

**Associated Spring**  
RAYMOND

 A business of BARNES GROUP INC

**ENGINEERED  
SOLUTIONS** DELIVERED  
ON TIME

**SPEC®**

Stock Precision Engineered Components

# Catalogue Solutions

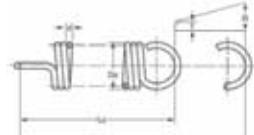
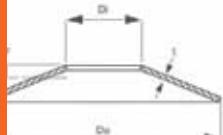
**Barnes**  
GROUP INC  
ENGINEERED COMPONENTS

**Associated  
Spring**  
  
A business of BARNES GROUP INC

**Associated Spring**  
RAYMOND  
  
A business of BARNES GROUP INC

**Hänggi**  
  
A business of BARNES GROUP INC

**SEEGEB**  
  
A business of BARNES GROUP INC



**ENGINEERED COMPONENTS**
**Innovative Precision Engineered Solutions**

**AEROSPACE & DEFENCE**

With a deep understanding of Aerospace & Defence precision requirements, we expertly engineer & manufacture components for critical applications. These include commercial & military aviation, satellite systems, space vehicles & missiles. We can meet AS9100 Certification and DFARS as needed.


**COMPRESSOR COMPONENTS**

As a global leader in the design & manufacture of precision engineered flapper & reed valves for both automotive & industrial HVAC & refrigeration, our experience in patented product & process innovations provides a competitive advantage to our customers.


**CUSTOM RETAINING/SNAP RINGS/WASHERS**

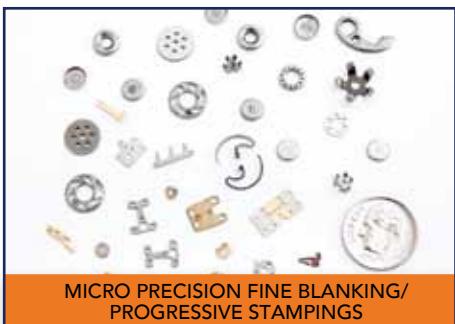
We design & manufacture retaining & snap rings and shims & washers that function as an "artificial shoulder" to locate & retain mating parts on shafts or in housings. This enables an economy of manufacture, ease of assembly, accuracy of positioning & end-play take-up versus alternate solutions.


**FUEL SYSTEM SOLUTIONS**

In addition to fuel system springs, we are a global leader in Gasoline Direct Injector (GDI) component technologies. Our superior Fuel delivery performance is achieved using our advanced innovative processes for optimised flow hole characteristics meeting critical tolerances with cost/throughput advantages vs: Laser drilling/EDM etc.


**MEDICAL PRECISION SOLUTIONS**

Our medical custom engineered solutions include surgical, X-ray, optical and other custom applications. We also make innovative components such as implantable bone plates, sampling needles and micro-stampings for medical and surgical suturing devices.


**MICRO PRECISION FINE BLANKING/PROGRESSIVE STAMPINGS**

Our Hänggi brand specialises in fine-blanked and progressive stamping solutions. We provide competitive advantage over machined components with superior quality and finish. Our solutions span a multitude of industries in a variety of materials and thicknesses.


**MICRO SPRINGS & WIREFORMS**

Our precision micro/small springs, wire forms & inductors are used in a variety of industries including hightech, telecom, and others. Additional capabilities include: precious metal plating, assembly & other custom solutions.


**SYSTEM SOLUTIONS/SUB ASSEMBLIES/SPRING PACKS**

Our world-class capabilities encompass designing, engineering & assembling parts into sub-assemblies, spring packs & system solutions. We provide unrivaled service & turnkey convenience: design to assembly/ testing/packaging/JIT.


**TRANSMISSION SPRING AND BELLEVILLE SOLUTIONS**

Our innovative automotive transmission springs are engineered & produced using the latest materials & state-of-the-art manufacturing processes. This technology supports modern, high efficiency, fuel saving transmission designs, optimising performance & lifecycle costs.



**ENGINEERED COMPONENTS**
**Innovative Precision Engineered Solutions**

**CATALOGUE ITEMS**

Catalogue parts are manufactured to the highest quality and are stocked and ready to ship. For ease and convenience, we have over 100,000 standard parts designed and optimised within proper stress levels and manufacturing limits.


**CUSTOM ENGINEERED SPRINGS/WIREFORMS**

Our custom springs & wire forms (e.g. accordion, torsion, clips, clamps & other static/dynamic components) encompass both standard catalogue stocked and engineered parts. With over 158 years of expertise, we offer multiple unique & innovative solutions.


**CUSTOM ENGINEERED STAMPINGS**

Our capabilities & expertise enable us to engineer & manufacture a multitude of custom metal stampings & flat spring requirements in a variety of shapes, sizes or materials.


**FLAT SPRING SOLUTIONS**

DIN 2093, Belleville, Clover® dome, curved, finger, wave, and multi-wave types are offered in a variety of materials and finishes. SPEC® offers a comprehensive range of flat spring products and custom solutions for limited space/high force applications.


**MECHANICAL STRUTS (M-STRUTS®)**

Mechanical struts (m-Struts®) offer a seal-less, gas-less, and oil-less solution for strut applications. Struts are offered in a variety of configurations & materials to suit standard needs, however our Special Order Department has engineered solutions far beyond the catalogue.


**MULTI-SLIDE**

We manufacture a wide variety of complex multi-slide components using various material grades, sections (both wire & flat) & sizes to our customers' specification which optimizes both performance & life-cycle costs.


**NITROGEN GAS STRUTS (N-STRUTS®)**

SPD n-Struts® are gas struts engineered to deliver optimal performance in various applications & environments. Our standard parts are offered in coated steel, stainless steel and various locking types. Our engineers can help design, manufacture & stock a custom solution.


**RAYMOND® TOOL COMPONENTS/ DIE SPRINGS**

Our Raymond® die springs & gas springs provide the tool & die and OEM industries with quality parts without compromise. Our springs are built to the highest standards enabling competitive advantage for our customers.


**STANDARD RINGS/SHIMS /WASHERS**

Our Seeger-Orbis brand manufactures a portfolio of precision, standard retaining rings, shims and washers that are used in a host of applications and markets. These quality components enable our customers quick access for their prototyping and other design needs.



## **United Kingdom**

Associated Spring Raymond  
European Headquarters  
Unit 4, Grosvenor Business Centre  
Vale Park, Evesham  
Worcestershire WR11 1GS  
**Tel:** (44) 1386 443366  
**Fax:** (44) 1386 446669  
**E-mail:** sales@assocspring.co.uk  
[www.asrayment.co.uk](http://www.asrayment.co.uk)

## **Canada**

Associated Spring Raymond  
3100 Mainway  
Burlington, Ont. L7M 1A3  
**Tel:** 800 263 4256  
**Fax:** 814 664 0312  
[www.asbg.com](http://www.asbg.com)

## **Czech Republic**

Cecho – Bohumil Cempírek S.R.O.  
Polnicka 151  
591 01 Zdár nad Sázavou  
**Tel:** 00 420 566 620705  
**Fax:** 00 420 566 620706  
**E-mail:** pruziny@cecho.cz  
[www.cecho.cz](http://www.cecho.cz)

## **Denmark**

Sodemann Industrifjedre A/S  
Industrivej 21  
DK 8260 Viby-J  
Denmark  
**Tel:** (45) 86 72 00 99  
**Fax:** (45) 86 29 97 86  
**E-mail:** sif@fjedre.dk  
[www.fjedre.dk](http://www.fjedre.dk)

## **Finland and Russia**

Meconet Oy  
Honkanummentie 8  
FI-01260 Vantaa  
**Tel:** +358 (0) 207 699 300  
**Fax:** +358 (0) 207 699 335  
**E-mail:** reino.heikkinen@meconet.net  
[www.meconet.net](http://www.meconet.net)

## **France**

Ressorts SPEC  
Bâtiment HERMES 2  
ZA de Pissaloup  
4 rue Edouard Branly  
78190 TRAPPES  
**Tel:** (33) 01 30 68 6363  
**Fax:** (33) 01 30 68 4050  
**E-mail:** info@ressortsspec.com  
[www.ressortsspec.com](http://www.ressortsspec.com)

## **Germany**

Associated Spring Raymond GmbH  
Heimrodstr. 10  
64625 Bensheim,  
Deutschland  
**Tel:** (49) 6251 93-3252-04  
**Fax:** (49) 6021 44 566 46  
**E-mail:** info@asrayment.de  
[www.asrayment.de](http://www.asrayment.de)

Febrotec GmbH  
Frankfurter Strasse 76  
D-58553 Halver  
**Tel:** (49) 2353 4866  
**Fax:** (49) 2353 4301  
**E-mail:** federn@febrotec.de  
[www.febrotec.de](http://www.febrotec.de)

## **Hungary**

Biotek KFT  
1165 Budapest  
Bokonyfoldi UT 104 Hungary  
**Tel:** (36) 1 434 2900  
**Fax:** (36) 1 260 8635  
**E-mail:** biotek@biotek.hu

## **India**

Star Circlips & Engineering Ltd  
Hingna Industrial Estate  
Nagpur-440 016  
**Tel:** (91) 7104 234742  
**Fax:** (91) 7104 237628  
**E-mail:** sales@starcirclips.net  
[www.starcirclips.com](http://www.starcirclips.com)

## **Israel**

Delta Elkon Mechanical Products Ltd. P.O.  
Box 8262  
New Industrial Zone  
South Netanya 42504  
**Tel:** (972) 1 599 500 557  
**Fax:** (972) 9 865 8492  
**E-mail:** natasha@delta-elkon.co.il  
[www.delta-elkon.co.il](http://www.delta-elkon.co.il)

## **Italy**

Metersprings Srl  
Via Molino 64  
13891 Camburzano (BI)  
P.IVA C.F. 02132550027  
**Tel:** (39) 015 23581  
**Fax:** (39) 015 23646  
**E-mail:** meter@meterspec.it  
[www.meterspec.it](http://www.meterspec.it)

## **Mexico**

Raymond Distribution - Mexico SA de CV  
Av. Concordia No 4601-A  
Col. Apodaca Centro  
Apodaca,  
N.L. Mexico  
C.P.66600  
**Tel:** 52 (81) 81 45 0680  
**Fax:** 52 (81) 81 45 0679  
**E-mail:** ventas@asrayment.com  
[www.asrayment.com](http://www.asrayment.com)

## **The Netherlands**

Amatec  
Jac P Thijsseweg 14  
NL-2408 ER Alphen Aan Den Rijn  
The Netherlands  
**Tel:** (31) 172 439359  
**Fax:** (31) 172 440313  
**E-mail:** info@amatec.nl  
[www.amatec.nl](http://www.amatec.nl)

## **Poland**

FCPK-BYTÓW Sp. z.o.o.  
ul.Le borska 26  
77-100 Bytów  
**Tel:** (48) 59 822 2026  
**Fax:** (48) 59 822 9703  
**E-mail:** fcpk@fcpk.com.pl  
[www.fcpk.com.pl](http://www.fcpk.com.pl)

## **Singapore**

Associated Spring Raymond Asia Pte Ltd.  
15A Tuas Road  
Jurong  
Singapore 638517  
**Tel:** (65) 6863 5636  
**Fax:** (65) 6863 6325  
**E-mail:** sales@raymondasia.com  
[www.raymondasia.com](http://www.raymondasia.com)

## **Spain**

Barnes Group Spain, S.R.L.  
La Peña 6 - Pab. 5  
01013 Vitoria-Gasteiz  
**Tel:** (34) 945 147542  
**Fax:** (34) 945 137655  
**E-mail:** ventas@bgespana.com  
[www.bgespana.com](http://www.bgespana.com)

## **Sweden**

EWES STÅLFJÄDER AB  
Lundavagen 45  
S-330 10 Bredaryd  
**Tel:** (46) 370 86700  
**Fax:** (46) 370 86249  
**E-mail:** info@ewes.se [www.ewes.se](http://www.ewes.se)

## **Switzerland**

Ressorts du Léman  
Chemin de la Gravière 16  
1225 Chêne-Bourg  
**Tel:** +41 (0) 22 860 13 10  
**Fax:** +41 (0) 22 860 13 12  
**E-mail:** info@ressortsduleman.ch  
[www.ressortsduleman.ch](http://www.ressortsduleman.ch)

## **USA**

Associated Spring Raymond  
370 W. Dussel Drive  
Suite A  
Maumee, OH 43537-1604  
**Tel:** (1) 419 891 9292  
**Fax:** (1) 419 891 9192  
[www.asrayment.com](http://www.asrayment.com)

Whilst all reasonable efforts are made to ensure the correctness of the information provided, we cannot be held responsible for any inaccuracies in, or omissions from, this brochure.



# Introduction

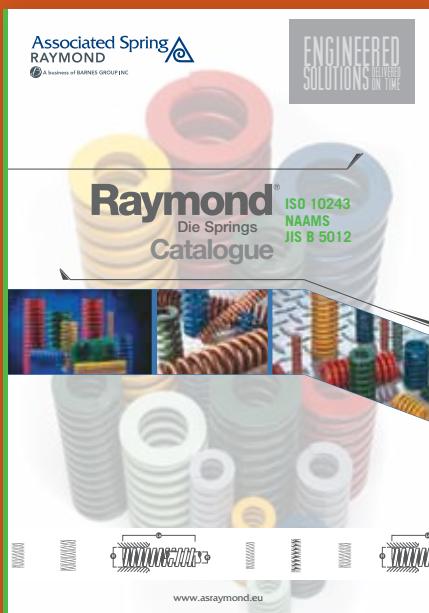
For more than a century, Associated Spring Raymond, a business of Barnes Group Inc., has been a world leader in the design, manufacture, and sale of highly engineered products including springs, precision metal components, assemblies, and custom hardware solutions.

From the 1882 Raymond "baby jumper spring" to the 1910 Wright Brothers' engine valve springs, today Associated Spring Raymond supplies billions of precision parts to industries on a global scale.

With worldwide stock of over 100,000 SKUs, and leading brands like RAYMOND®, m-Struts®, SPEC®, SPD®, and Clover® Dome, we provide quality products with competitive pricing, global service, and on-time delivery to our customers around the world.



## Our other catalogues...



Interested in Custom Engineered Solutions? Call us on

United Kingdom  
Tel: (44) 1386 443366

France  
Tel: (33) 01 30 68 6363

Spain  
Tel: (34) 945 147542

Germany  
Tel: (49) 6251 93-3252-04



UK	F	E
4 - 45	RESSORTS DE COMPRESSION	MUELLES/RESORTES DE COMPRESIÓN
46 - 55	RESSORTS DE COMPRESSION HAUTE PERFORMANCE	MUELLES/RESORTES DE COMPRESIÓN DE ALTO RENDIMIENTO
56 - 63	RESSORTS DE COMPRESSION DE FORTE PUISSANCE	MUELLES/RESORTES DE COMPRESIÓN EXTRAFUERTES CV
64 - 87	RESSORTS DE TRACTION	MUELLES/RESORTES DE TRACCIÓN
88 - 90	COMPRESSION/TRACTION AU MÈTRE	MUELLES DE TIRA DE METRO
92 - 95	RESSORTS CONIQUES	MUELLES/RESORTES DE COMPRESIÓN CÓNICOS
96 - 107	RESSORTS DE TORSION	MUELLES/RESORTES DE TORSIÓN
108 - 110	GAINES À VISSEZ	MUELLES/RESORTES VAINA ENTRELAZABLES
112 - 117	RESSORTS DISQUE - DIN 2093	MUELLES DE PLATILLO - DIN 2093
118 - 122	RESSORTS DISQUE - ACIER INOXYDABLE	MUELLES DE PLATILLO - ACERO INOXIDABLE
124 - 126	RONDELLES RESSORTS CONIQUES - DIN 6796	ARANDELAS ELÁSTICAS DE COMPRESIÓN CÓNICA - DIN 6796
128 - 130	RESSORTS DISQUE À CHARGE ÉLEVÉE	ARANDELAS DE DISCO DE ALTA FUERZA
132 - 134	RESSORTS DISQUE POUR BRIDES	ARANDELAS ELÁSTICAS DE DISCO PARA APPLICACIONES DE BRIDA
136 - 139	RONDELLES BELLEVILLE	ARANDELAS ELÁSTICAS BELLEVILLE
140 - 143	RONDELLES RESSORT CLOVER DOME	ARANDELAS ELÁSTICAS CLOVER DOME
144 - 147	RONDELLES SINUS	ARANDELAS ELÁSTICAS CURVADAS
148 - 150	RONDELLES ONDULÉES	ARANDELAS ELÁSTICAS ONDULADAS
152 - 155	RONDELLES ONDULÉES - TYPE COMPRESSION	ARANDELAS ELÁSTICAS ONDULADAS - TIPO DE COMPRESIÓN
156 - 159	RONDELLES ONDULÉES FENDUES	ARANDELAS ELÁSTICAS ONDULADAS PARTIDAS
160 - 162	RONDELLES ONDULÉES DE CHEVAUCHEMENT	ARANDELAS ELÁSTICAS ONDULADAS SUPERPUESTAS
164 - 166	RESSORTS ONDULÉS (FIL ROND)	MUELLES/RESORTES ONDULADOS (ALAMBRE DE PIANO)
168 - 171	RESSORTS DE COMPRESSION MULTIWAVE	MUELLES/RESORTES DE COMPRESIÓN ONDULADOS
172 - 174	RONDELLES RESSORT	ARANDELAS ELÁSTICAS DE OREJETAS
176 - 178	RESSORTS À FORCE CONSTANTE	MUELLES/RESORTES DE FUERZA CONSTANTE
180 - 184	CIRCLIPS SELON LA DIN 471/472	ANILLOS DE RETENCIÓN A DIN 471/472
186 - 188	ANNEAUX D'ARRÊT TYPE "E" - DIN 6799	RETENEDOR DE TIPO E A DIN 6799
190 - 196	RESSORTS DE COMPRESSION URÉTHANE	MUELLES/RESORTES DE COMPRESIÓN DE URETANO
197 - 199	RESSORTS DE COMPRESSION URÉTHANE STOCK	MUELLES/RESORTES DE COMPRESIÓN DE URETANO EN STOCK
200 - 201	EPROUVETTES ALMEN	TIRAS ALMEN
202 - 204	GOUPILLES ÉLASTIQUES, GOUPILLES ET ANNEAUX	PASADOR DE MUELLE/RESORTE, PASADORES Y ANILLOS

D

DRUCKFEDERN
HOCHLEISTUNGSDRUCKFEDERN
CV DRUCKFEDERN IN SCHWERER AUSFÜHRUNG
ZUGFEDERN
METERLANGE FEDERN
KEGELFEDERN
TORSIONSFEDERN
WURMFEDERN
TELLERFEDERN NACH DIN 2093
TELLERFEDERN AUS EDELSTAHL
SPANNSCHEIBEN NACH DIN 6796
HOCHLAST-UNTERLEGSCHEIBEN
TELLERFEDERN FÜR HOHE BELASTUNGEN
BELLEVILLE-FEDERSCHEIBEN
CLOVER DOME-FEDERSCHEIBEN
GEWÖLBTE FEDERSCHEIBEN
WELLENFEDERSCHEIBEN
WELLENFEDERSCHEIBEN - DRUCKAUSFÜHRUNG
GESCHLITZTE WELLFEDERSCHEIBEN
SPIRAL WELLFEDERSCHEIBE
WELLFEDERN (RUNDER DRAHT)
MEHRWELldruckfedern
FINGERFEDERSCHEIBEN
KONSTANTKRAFTFEDERN
SICHERUNGSRINGE NACH DIN 471/472
SICHERUNGSSCHEIBEN NACH DIN 6799
URETHAN-DRUCKFEDERN
STANDARD-URETHAN-DRUCKFEDERN
ALMENSTREIFEN
FEDERSTIFTE, STIFTE UND RINGE

I

MOLLE DI COMPRESSIONE
MOLLE DI COMPRESSIONE AD ALTE PRESTAZIONI
MOLLE DI COMPRESSIONE PER IMPIEGHI PESANTI CV
MOLLE DI ESTENSIONE
MOLLE A LUNGHEZZA CONTINUA
MOLLE CONICHE
MOLLE DI TORSIONE
MOLLA GARTER DI INTERBLOCCO
RONDELLE PER MOLLE A DISCO - DIN 2093
RONDELLE PER MOLLE A DISCO - ACCIAIO INOSSIDABILE
RONDELLE PER MOLLE CONICHE - DIN 6796
RONDELLE PER MOLLE A DISCO A CARICO ELEVATO
RONDELLE PER MOLLE A DISCO PER APPLICAZIONI A FLANGIA
RONDELLE PER MOLLE BELLEVILLE
RONDELLE PER MOLLE CLOVER DOME
RONDELLE PER MOLLE CURVE
RONDELLE PER MOLLE ONDULATE
RONDELLE PER MOLLE ONDULATE - TIPO A COMPRESSIONE
RONDELLE PER MOLLE ONDULATE DIVISE
RONDELLE PER MOLLE ONDULATE SOVRAPPOSTE
MOLLE ONDULATE (FILO TONDO)
MOLLE DI COMPRESSIONE MULTIONDULATE
RONDELLE PER MOLLE A LAMELLA
MOLLE A FORZA COSTANTE
ANELLI ELASTICI SECONDO DIN 471/472
FERMO DI TIPO E SECONDO DIN 6799
MOLLE DI COMPRESSIONE IN URETANO
MOLLE DI COMPRESSIONE IN URETANO DI STOCK
PROVINI ALMEN
PERNI A MOLLA, PERNI E ANELLI

P

MOLAS DE COMPRESSÃO		4 - 45
MOLAS DE COMPRESSÃO DE ALTA RENTABILIDADE		46 - 55
MOLAS DE COMPRESSÃO DE CARGA INTENSIVA CV		56 - 63
MOLAS DE TRAÇÃO		64 - 87
MOLAS DE COMPRIMENTO AJUSTÁVEL		88 - 90
MOLAS CÓNICAS		92 - 95
MOLAS DE TORÇÃO		96 - 107
MOLAS GARTER AUTOTRAVANTES		108 - 110
ANILHAS DE MOLA DE DISCO - DIN 2093		112 - 117
ANILHAS DE MOLA DE DISCO - AÇO INOXIDÁVEL		118 - 122
ANILHAS DE MOLA CÓNICAS - DIN 6796		124 - 126
ANILHAS DE DISCO DE CARGA PESADA		128 - 130
ANILHAS DE MOLA DE DISCO PARA APLICAÇÕES EM FLANGES		132 - 134
ANILHAS DE MOLA BELLEVILLE		136 - 139
ANILHAS DE MOLA CLOVER DOME		140 - 143
ANILHAS DE MOLA CURVAS		144 - 147
ANILHAS DE MOLA ONDULADAS		148 - 150
ANILHAS DE MOLA ONDULADAS - DO TIPO COMPRESSÃO		152 - 155
ARRUELAS ONDULADAS		156 - 159
ANILHAS DE MOLA ONDULADAS DE SOBREPOSIÇÃO		160 - 162
MOLAS ONDULADAS (ARAME REDONDO)		164 - 166
MOLAS DE COMPRESSÃO MULTIONDULADAS		168 - 171
ANILHAS DE MOLA DE PALHETAS		172 - 174
MOLAS DE FORÇA CONSTANTE		176 - 178
GRAMPOS DE RETENÇÃO AO RUIDO DIN 471/472		180 - 184
RETENTOR DE TIPO E DIN 6799		186 - 188
MOLAS DE COMPRESSÃO DE URETANO		190 - 196
STOCK DE MOLAS DE COMPRESSÃO URETANO		197 - 199
FITAS NIVELADORAS		200 - 201
PINOS DE MOLA, PINOS E ANÉIS		202 - 204



## COMPRESSION SPRINGS

SPEC compression springs provide design engineers, draughtsmen, production and maintenance departments with precision engineered springs in an economical and time-saving way. The Spec service saves time and therefore money, as design work and calculations are no longer required.

### MATERIALS

#### 'C' part numbers

Music wire: ASTM A228 or AMS 5112

STAINLESS STEEL / INOX: Type 302 as per ASTM A313 or AMS 5688 spring temper; Type 316 as per ASTM A313.

#### 'D' part numbers

Music wire: DIN 17223 or JIS G4314 SWP-A/B or AMS 5112

STAINLESS STEEL / INOX: Type 301, 302 or 304 as per DIN 17224 or JIS G4314 SUS 302/304 or AMS 5688 spring temper

### TOLERANCES

#### 'C' part numbers

Outside Diameter	
1.45 to 3.02mm	+/- 0.08mm
3.05 to 6.10mm	+/- 0.13mm
6.12 to 12.70mm	+/- 0.20mm
12.73 to 25.40mm	+/- 0.38mm
25.43 to 31.12mm	+/- 0.51mm
31.14 to 37.08mm	+/- 0.76mm
37.11 to 50.08mm	+/- 1.02mm
Load P	+/- 10%
Spring Rate R	+/- 10%

#### 'D' part numbers

All dimensions and forces to DIN 2095 (Grade 2)

### KEY TO MEASUREMENTS

Do = Outside Diameter  
d = Wire diameter  
Sh = Approx. Solid Height  
Lo = Free Length  
L<sub>1</sub> = Loaded Length  
P<sub>1</sub> = Load at L<sub>1</sub>  
R = Spring Rate

## RESSORTS DE COMPRESSION

Les ressorts de compression SPEC offrent aux Ingénieurs des Bureaux d'Etudes, aux Dessinateurs, et aux Services de Production et de Maintenance, des ressorts de précision économiques et efficaces. Le service SPEC permet de réaliser des économies de temps et donc d'argent, les calculs et dessins n'étant plus nécessaires.

### MATÉRIAUX

#### Références commençant par 'C'

Corde à piano suivant DIN 17223, Classe C. No. 1,1200. - BS5216 ND3 ou HD3 - AMS 5112.

Fil en acier inoxydable suivant DIN 17224, No. 1,4310, BS2056 EN58A. Commercial 302 AMS 5688 acier trempé pour ressorts; Acier Inoxydable type 316 L suivant ASTM A313.

#### Références commençant par 'D'

Corde à Piano suivant DIN 17223 ou JIS G4314 SWP-A/B ou AMS 5112.

Fil en acier inoxydable type 301, 302 ou 304 suivant DIN 17224 ou JIS G4314 SUS 302/304 ou AMS 5688 acier trempé pour ressorts.

### TOLÉRANCES

#### Références commençant par 'C'

Do=Diamètre extérieur	
1.45 à 3.02 mm	$\pm 0.08\text{mm}$
3.05 à 6.10 mm	$\pm 0.13\text{mm}$
6.12 à 12.70 mm	$\pm 0.20\text{mm}$
12.73 à 25.40 mm	$\pm 0.38\text{mm}$
25.43 à 31.12 mm	$\pm 0.51\text{mm}$
31.14 à 37.08 mm	$\pm 0.76\text{mm}$
37.11 à 50.08 mm	$\pm 1.02\text{mm}$
Charge P	$\pm 10\%$
Raideur H/mm, R	$\pm 10\%$

## MUELLES/RESORTES DE COMPRESIÓN

Nuestro catálogo de muelles/resortes de compresión de SPEC ofrece a ingenieros proyectistas, delineantes y los departamentos de producción y mantenimiento muelles/resortes de precisión de una forma económica y ágil. Gracias al servicio de SPEC, se ahorra tiempo y, por consiguiente, dinero, puesto que no se requieren trabajos de diseño ni cálculos.

### MATERIALES

#### Referencias 'C'

Alambre de piano: ASTM A228 ó AMS 5112

Acero inoxidable : Tipo 302 según ASTM A313 ó templado de resorte AMS 5688; En AISI 316 según ASTM A313.

#### Referencias 'D'

Alambre de piano: DIN 17223 ó JIS G4314 SWP-A/B ó AMS 5112

Acero inoxidable: Tipo 301, 302 ó 304 según DIN 17224 ó JIS G4314 SUS 302/304 ó templado de resorte AMS 5688.

### TOLERANCIAS

#### Referencias 'C'

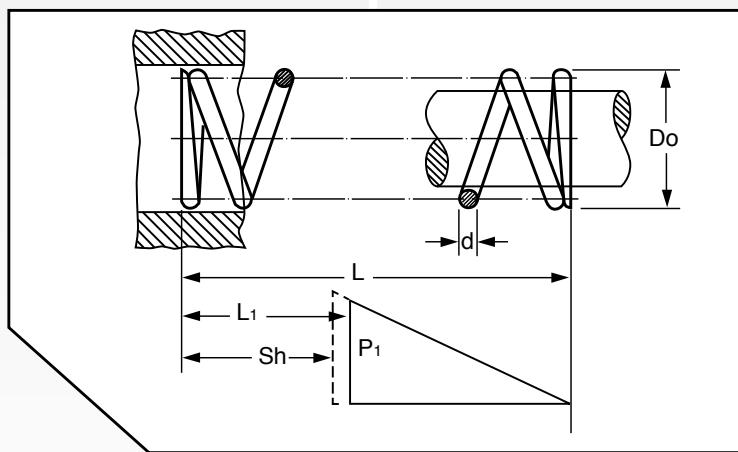
Diámetro exterior	
1.45 a 3.02 mm	$\pm 0.08\text{mm}$
3.05 a 6.10 mm	$\pm 0.13\text{mm}$
6.12 a 12.70 mm	$\pm 0.20\text{mm}$
12.73 a 25.40 mm	$\pm 0.38\text{mm}$
25.43 a 31.12 mm	$\pm 0.51\text{mm}$
31.14 a 37.08 mm	$\pm 0.76\text{mm}$
37.11 a 50.08 mm	$\pm 1.02\text{mm}$
Carga, P	$\pm 10\%$
Coeficiente compresión de muelle, R	$\pm 10\%$

#### Referencias 'D'

Dimensiones y fuerzas según DIN2095 (grado 2)

### CLAVES DE CARACTERÍSTICAS

Do = Diámetro exterior  
d = Diámetro del alambre  
Sh = Altura maciza aprox.  
Lo = Longitud libre  
L<sub>1</sub> = Longitud en carga  
P<sub>1</sub> = Carga a L<sub>1</sub>, Newton  
R = Coeficiente compresión



## DRUCKFEDERN

SPEC Druckfedern versetzen Konstrukteure, Zeichner, Produktion und Wartung Abteilungen mit Präzision ausgeführten Federn in einer ökonomischen und zeitsparenden Weise. Der SPEC Service spart Zeit und folglich Geld, da Designarbeit und -berechnungen nicht mehr angefordert werden.

### WERKSTOFFE

#### 'C' Teile

Gezogener Federstahldraht: ASTM A228 oder AMS 5112

Rostfreier Federstahldraht: 302 nach ASTM A313 oder AMS 5688 gehärtete Feder; Typ 316 gemäß ASTM A313.

#### 'D' Teile

Gezogener Federstahldraht: DIN 17223 oder JIS G4314 A313 SWP-A/B oder AMS 5112

Rostfreier Federstahldraht: 301, 302 oder 304 nach DIN 17224 oder JIS G4314 SUS 302/304 oder AMS 5688 gehärtete feder.

### TOLERANZEN

#### 'C' Teile

Außerer Durchmesser	
1.45 bis 3.02 mm	$\pm 0.08\text{mm}$
3.05 bis 6. 10 mm	$\pm 0.13\text{mm}$
6.12 bis 12.70 mm	$\pm 0.20\text{mm}$
12.73 bis 25.40 mm	$\pm 0.38\text{mm}$
25.43 bis 31.12 mm	$\pm 0.51\text{mm}$
31.14 bis 37.08 mm	$\pm 0.76\text{mm}$
37.11 bis 50.08 mm	$\pm 1.02\text{mm}$
Federkraft, P	$\pm 10\%$
Federrate, R	$\pm 10\%$

#### 'D' Teile

Massangaben und Kräften nach DIN 2095 (Klasse 2).

### KENNZEICHNEN DER ABMESSUNGEN

Do = Äußerer Windungsdurchmesser  
d = Drahdurchmesser  
Sh = Blocklänge der Feder  
Lo = Länge der unbelasteten Feder  
L<sub>1</sub> = Länge der belasteten Feder  
P<sub>1</sub> = Federkraft bei Federlänge L<sub>1</sub>  
R = Federrate

## MOLLE A COMPRESSIONE

Le molle a compressione SPEC forniscano a progettisti, disegnatori, ai reparti di produzione e manutenzione, molle di precisione nel modo più rapido ed economico.

Il servizio SPEC vi fa risparmiare tempo ed i costi di progettazione e di calcolo non sono più necessari.

### MATERIALE

#### Codici 'C' iniziale

Filo Armonico: ASTM A228 o AMS 5112

Acciaio inox: Type 302 secondo ASTM A313 o AMS 5688 molla temprata; Type 316 secondo ASTM A313.

#### Codici 'D' iniziale

Filo Armonico: DIN 17223 o JIS G4314 SWP-A/B or AMS 5112

Acciaio inossidabile: Type 301, 302 o 304 secondo DIN 17224 o JIS G4314 SUS 302/304 o AMS 5688  
Molla temprata

### TOLLERANZE

#### Codici 'C' iniziale

Do = Diametro esterno	
da 1.45 a 3.02 mm	$\pm 0.08\text{mm}$
da 3.05 a 6.10 mm	$\pm 0.13\text{mm}$
da 6.12 a 12.70 mm	$\pm 0.20\text{mm}$
da 12.73 a 25.40 mm	$\pm 0.38\text{mm}$
da 25.43 a 31.12 mm	$\pm 0.51\text{mm}$
da 31.14 a 37.08 mm	$\pm 0.76\text{mm}$
da 37.11 a 50.08 mm	$\pm 1.02\text{mm}$
Carico P	$\pm 10\%$
Compressione R	$\pm 10\%$

#### Codici 'D' iniziale

Tutte le dimensioni e forze secondo DIN 2095 (Grado 2)

### LEGENDA

Do = Diametro esterno  
d = Diametro filo  
Sh = Lunghezza a blocco  
(misura di riferimento approssimativa)  
Lo = Lunghezza libera  
L<sub>1</sub> = Lunghezza minima di lavoro  
P<sub>1</sub> = Carico a L<sub>1</sub>  
R = Carico di flessione unitaria

## MOLAS DE COMPRESSÃO

Por intermédio do catálogo de molas de compressão SPEC, os engenheiros projectistas, os desenhistas e os departamentos de produção e de manutenção, podem dispor de molas de precisão de forma económica e rápida. O serviço SPEC, permite poupar tempo e portanto dinheiro, uma vez que não são necessárias tarefas de desenho, nem cálculos.



### MATERIAIS

#### PEÇAS "C"

Arame de aço conforme à especificação DIN 17223 Classe C. No. 1,1200, BS5216 ou HD3 – MAS 5112.

Arame de aço inoxidável conforme à especificação DIN 17224 No. 1,4310 BS 2056 EN58A. Têmpera de molas comercial 302 AMS 5688; AISI 316 conforme à norma ASTM A313.

#### PEÇAS 'D'

Fio Armonico: DIN 17223 o JIS G4314 SWP-A/B or AMS 5112

Aço inoxidável Type 301, 302 o 304 segundo DIN 17224 o JIS G4314 SUS 302/304 o AMS 5688

### TOLERÂNCIAS

#### PEÇAS "C"

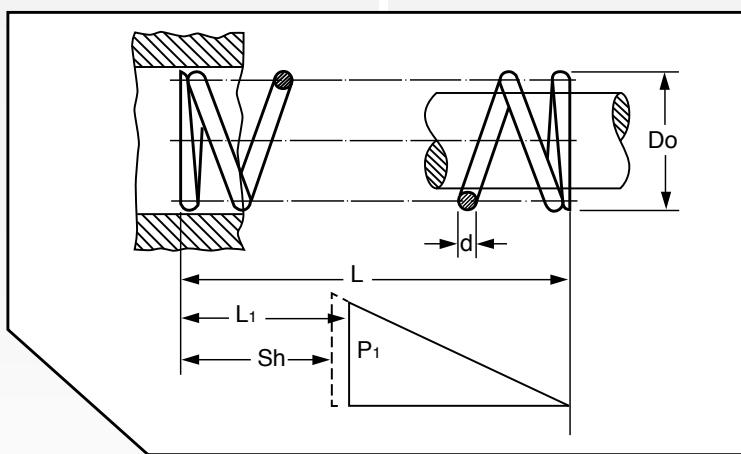
Do = Diâmetro exterior	
1.45 a 3.02 mm	$\pm 0.08\text{mm}$
3.05 a 6,10 mm	$\pm 0.13\text{mm}$
6,12 a 12,70 mm	$\pm 0.20\text{mm}$
12,73 a 25,40 mm	$\pm 0.38\text{mm}$
25,43 a 31,12 mm	$\pm 0,51\text{mm}$
31,14 a 37,08 mm	$\pm 0,76\text{mm}$
37,11 a 50,08 mm	$\pm 1,02\text{mm}$
Carga, P	$\pm 10\%$
Coeficiente de compressão de mola, R	$\pm 10\%$

#### PEÇAS 'D'

Todas as dimensões e forças em DIN 2095 (Grau 2)

### LEGENDA

Do = Diâmetro exterior  
d = Diâmetro do arame  
Sh = Altura maciça aproximada  
Lo = Comprimento livre (só para efeitos de referência)  
L<sub>1</sub> = Comprimento em carga (comprimento mínimo de trabalho)  
P<sub>1</sub> = Carga a L<sub>1</sub>  
R = Coeficiente de compressão



### United Kingdom

Tel: (44) 1386 443366

E-mail: sales@assocspring.co.uk

### France

Tel: (33) 01 30 68 6363

E-mail: info@ressortsspec.com

### Spain

Tel: (34) 945 147542

E-mail: ventas@bgespana.com

### Germany

Tel: (49) 6251 93-3252-04

E-mail: info@asraymond.de





## ADDITIONAL TECHNICAL DATA

### COMPRESSION SPRINGS

Music wire is not recommended for applications where temperature exceeds 121°C (250°F). STAINLESS STEEL / INOX is not recommended for applications where temperature exceeds 260°C (500°F). STAINLESS STEEL / INOX is slightly magnetic due to cold working during manufacturing. STAINLESS STEEL / INOX springs may have a slight residue of nickel on the surface of the wire; this is normal and will not affect the function.

#### ENDS

##### 'C' part numbers

Wire  $\leq$  0.5mm - squared and unground.  
Wire > 0.5mm – squared and ground.

##### 'D' part numbers

Wire  $\leq$  0.8mm - squared and unground  
Wire > 1.0mm, squared and ground

#### SURFACE FINISH

Music wire – oiled.

STAINLESS STEEL / INOX – plain wire.

Shot-peened and plated finishes supplied on request.

#### LOADS

Load values shown are based on a service life of 50,000 cycles at 0.50 stress range.

For normal service, springs should not be compressed below  $L_1$ . To determine the load at any working length use rate proposed deflection.  $P = (L-L_x) \times R$  where  $L_x$  is the new load height. Reference only.

1 lb = 4.448 Newtons

1 Newton = 0.225 lb

1 kg. = 9.80665 Newtons

1 Newton = 0.10197 kg

## DONNEES TECHNIQUES ADDITIONNELLES

### RESSORTS DE COMPRESSION

La corde à piano n'est pas recommandée pour des applications où la température excède 121°C (250°F). L'acier inoxydable n'est pas recommandé pour des applications où la température excède 260°C (500°F). L'acier inoxydable est légèrement magnétique, ceci étant du au travail à froid pendant la fabrication. Les ressorts en acier inoxydable peuvent avoir un léger résidu de nickel sur la surface du fil ; c'est normal et cela n'en affectera pas leur fonction.

#### EXTRÉMITÉS

##### Références commençant par 'C'

Fil  $\leq$  0,5 mm - équarri et non meulé.  
Fil > 0,5 mm - équarri et meulé.

##### Références commençant par 'D'

Fil  $\leq$  0,8 mm - équarri et non meulé.  
Fil > 1,0 mm - équarri et meulé.

#### ETAT DE SURFACE

Corde à piano : huilé.

Acier inoxydable : brut.

Finition par grenaillage et traitements de surface fournis à la demande.

#### CHARGES

Les valeurs de charge indiquées sont basées sur une longévité de 50 000 cycles à 50% de la tension admissible. En service normal, les ressorts ne doivent pas être compressés en dessous de  $L_1$ . Pour déterminer la charge à toute longueur de fonctionnement, multipliez la raideur par la défexion proposée (pour référence seulement).

1 kg. = 9,80665 Newtons

1 Newton = 0,10197 kg

## INFORMACIÓN TÉCNICA ADICIONAL

### MUELLES/RESORTES DE COMPRESIÓN

El alambre de piano no se recomienda para usos donde la temperatura excede de 121°C (250°F). El acero inoxidable no se recomienda para usos donde la temperatura excede de 260°C (500°F). El acero inoxidable es levemente magnético debido a la conformación en frío durante la fabricación. Los muelles/resortes del acero inoxidable pueden tener un residuo leve del níquel en la superficie del alambre; esto es normal y no afectará a su rendimiento.

#### EXTREMOS

##### Referencias 'C'

Alambre  $\leq$  0,5 mm - refrentado sin rectificar.  
Alambre > 0,5 mm – refrentado sin rectificar.

##### Referencias 'D'

Alambre  $\leq$  0,8 mm - refrentado sin rectificar.  
Alambre > 1,0 mm – refrentado sin rectificar.

#### ACABADO SUPERFICIAL

Alambre de piano lubricado.

Acer inoxidable – alambre normal.

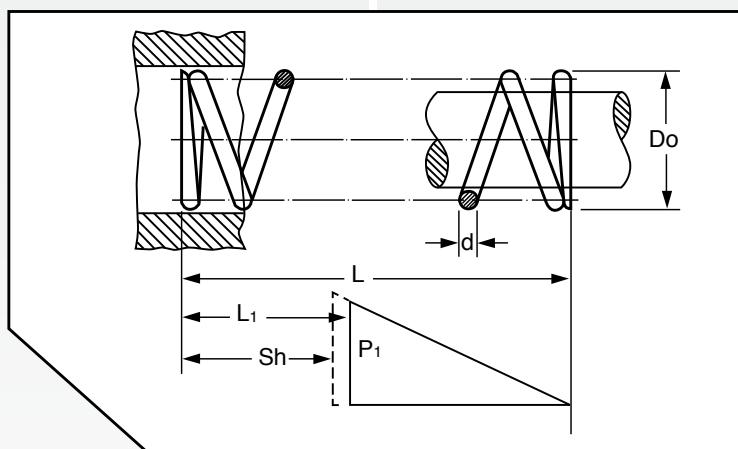
Bajo pedido granallado y con acabados especiales.

#### CARGAS

Los valores de carga se basan en una vida útil de 50.000 ciclos bajo una margen de tensión de 0.50. Para optimizar la vida de los muelles/resortes, éstos no deberían comprimirse por debajo de  $L_1$ . Para determinar la carga en cualquier longitud de trabajo, utilice el coeficiente de compresión x deflexión propuesta.

1 kg. = 9,80665 Newtons

1 Newton = 0,10197 kg



## ZUSÄTZLICHE TECHNISCHEN ANGABEN

### DRUCKFEDERN

Federstahldraht wird nicht für Anwendungen empfohlen, in denen Temperatur 121°C übersteigt (250°F). Das rostfreier Stahl nicht für Anwendungen empfohlen wird, in denen Temperatur rostfreien Stahl 260°C (500°F). Das rostfreier Stahl liegt etwas magnetisches wegen der Herstellung. Rostfreien Stahlfedern können einen geringfügigen Überrest des Nickels auf der Oberfläche der Leitung haben; dieses ist normal und wird nicht die Funktion beeinflussen.

### ENDWINDUNGEN

#### 'C' Teile

Draht  $\leq 0,5\text{mm}$  – viereckig und ungeschliffen.  
Draht  $> 0,5\text{mm}$  – viereckig und ungeschliffen.

#### 'D' Teile

Draht  $\leq 0,8\text{mm}$  – viereckig und ungeschliffen.  
Draht  $> 1,0\text{mm}$  – viereckig und ungeschliffen.  
geschliffen.

### OBERFLÄCHE

Gezogener Federstahldraht: Leicht eingeoilt.  
Rostfreier Federstahldraht: Nicht weiterbehandelt.  
Kügelgestrahlt und andere sondern Behandlungen verfügbar.

### KRAFTWERTE

Die Kraftwerte sind, für gezogenen Stahldraht, basierend auf einer Lebensdauer von 50.000 Zyklen bei einem Stressfaktor von 0,5. Für den Optimalbetrieb sollten Federn nicht über  $L_1$  hinaus belastet werden.  
Um die Kraft bei einer bestimmten Federlänge auszurechnen,  $P = (L_0 - L_x) \times P/f$ , wo  $L_x$  die neue Belastetenlänge ist.

1 kg. = 9,80665 Newtons  
1 Newton = 0,10197 kg

## ULTERIORI INFORMAZIONI TECNICHE

### MOLLE A COMPRESSIONE

L'utilizzo del filo armonico non è consigliato per le applicazioni che superano i 121°C (250°F). L'utilizzo dell'acciaio inox non è consigliato per le applicazioni dove la temperatura supera i 260°C (500°F). L'acciaio inox è leggermente magnetico dovuto alla lavorazione a freddo durante la produzione. Le molle in acciaio inox possono avere residui di nichel sulla superficie del filo, questo è normale e non ne altera la funzione.

### ESTREMITÀ

#### Codici 'C' iniziale

Filo  $\leq 0,5\text{mm}$  - quadrato e non molato.  
Filo  $> 0,5\text{mm}$  - quadrato e molato.

#### Codici 'D' iniziale

Filo  $\leq 0,8\text{mm}$  - quadrato e non molato.  
Filo  $> 1,0\text{mm}$  - quadrato e molato.

### FINITURA SUPERFICI

Acciaio Armonico : Filo normale oliato.  
Acciaio inossidabile : Filo liscio  
Su richiesta si forniscono finitura pallinata e placcata.

### CARICHI

I carichi indicati in tabella fanno riferimento ad un ciclo di vita media di 50000 cicli a 0,5 di flessione. La molla non dovrebbe essere compressa sotto  $L_1$ .  
Per finiture speciali la consegna è da concordare. Per determinare il carico per ogni lunghezza utilizzata moltiplicare il carico di flessione unitaria x la deflessione necessaria.

1 kg. = 9,80665 Newtons  
1 Newton = 0,10197 kg

## INFORMAÇÕES TÉCNICAS ADICIONAIS

### MOLAS DE COMPRESSÃO

Fio corda de piano é recomendada para temperaturas acima de 121 graus celcius( 250 graus F),  
Aço inoxidável não é recomendado para aplicações acima de 260 graus celcius(500 graus F). Aço inox é um pouco magnético em razão da sua fabricação a frio.  
As peças em inox podem apresentar um pouco de resíduo de níquel na superfície, isso é portanto, normal e não afeta a função da peça.

### EXTREMIDADES

#### PEÇAS " C "

Arame  $\leq 0,5\text{ mm}$  - quadrado e sem retificação.  
Arame  $> 0,5\text{ mm}$  - quadrado e retificado.

#### PEÇAS " D "

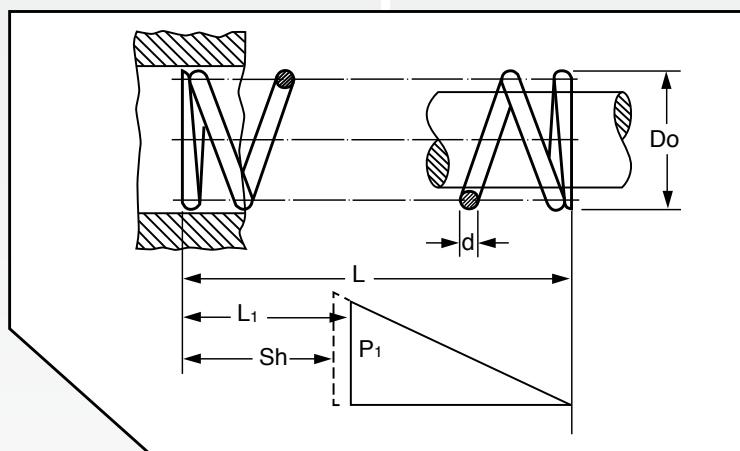
Arame  $\leq 0,8\text{ mm}$  - quadrado e sem retificação.  
Arame  $> 1,0\text{ mm}$  - quadrado e retificado.

### ACABAMENTO DE SUPERFÍCIE

Arame normal lubrificado. A pedido, podem ser fornecidas com acabamento granulado, e com acabamentos galvanizados. Deve ser tido em conta um período adicional para entrega de produtos com acabamento especial.

### CARGAS

Os valores de carga têm por base uma vida útil de 50.000 ciclos com uma variação de esforço de 0,50.  
Em caso de molas para trabalhos normais, a compressão não deve ser inferior a  $L_1$ .  
Para determinar a carga em qualquer comprimento de trabalho, multiplique o coeficiente de compressão pela deflexão proposta.  
1 kg. = 9,80665 Newtons  
1 Newton = 0,10197 kg



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0057-006-0120M			3.05	1.5	1.12		0.67	C0057-006-0120S	0.55		C0057-006-0120X	2.07		0.56
C0057-006-0190M			4.83	2.16	1.52		0.39	C0057-006-0190S	0.32		C0057-006-0190X	3.14		0.32
C0057-006-0250M			6.35	2.69	1.91		0.28	C0057-006-0250S	0.23		C0057-006-0250X	4.03		0.23
C0057-006-0310M			7.87	3.38	2.24		0.23	C0057-006-0310S	0.19		C0057-006-0310X	5.02		0.19
C0057-006-0380M	0.15		9.65	4.34	2.54	1.023	0.19	C0057-006-0380S	0.85	0.16	C0057-006-0380X	6.27	0.53	0.16
C0057-006-0440M			11.18	4.67	3		0.16	C0057-006-0440S	0.13		C0057-006-0440X	7.05		0.13
C0057-006-0500M			12.7	5.41	3.3		0.14	C0057-006-0500S	0.12		C0057-006-0500X	8.06		0.12
C0057-006-0560M			14.22	6.93	3.28		0.14	C0057-006-0560S	0.12		C0057-006-0560X	9.58		0.12
C0057-006-0620M			15.75	7.39	3.61		0.12	C0057-006-0620S	0.1		C0057-006-0620X	10.44		0.1
C0057-007-0120M			3.05	1.68	1.35		1.23	C0057-007-0120S	1.02		C0057-007-0120X	2.21		1.02
C0057-007-0190M			4.83	2.41	1.88		0.7	C0057-007-0190S	0.58		C0057-007-0190X	3.37		0.58
C0057-007-0250M			6.35	3.23	2.26		0.54	C0057-007-0250S	0.45		C0057-007-0250X	4.47		0.45
C0057-007-0310M			7.87	3.86	2.74		0.42	C0057-007-0310S	0.35		C0057-007-0310X	5.44		0.35
C0057-007-0380M	1.45	0.18	9.65	4.57	3.3	1.69	0.33	C0057-007-0380S	1.41	0.28	C0057-007-0380X	6.58	0.85	0.28
C0057-007-0440M			11.18	5.49	3.63		0.3	C0057-007-0440S	0.25		C0057-007-0440X	7.74		0.25
C0057-007-0500M			12.7	6.27	4.01		0.26	C0057-007-0500S	0.22		C0057-007-0500X	8.81		0.22
C0057-007-0560M			14.22	6.76	4.55		0.23	C0057-007-0560S	0.19		C0057-007-0560X	9.73		0.19
C0057-007-0620M			15.75	7.7	4.78		0.21	C0057-007-0620S	0.17		C0057-007-0620X	10.88		0.18
C0057-008-0120M			3.05	1.83	1.55		2.19	C0057-008-0120S	1.82		C0057-008-0120X	2.36		1.82
C0057-008-0190M			4.83	2.72	2.18		1.26	C0057-008-0190S	1.05		C0057-008-0190X	3.63		1.05
C0057-008-0250M			6.35	3.48	2.69		0.93	C0057-008-0250S	0.77		C0057-008-0250X	4.72		0.77
C0057-008-0310M			7.87	4.24	3.23		0.74	C0057-008-0310S	0.61		C0057-008-0310X	5.82		0.61
C0057-008-0380M			9.65	5.16	3.81	2.67	0.6	C0057-008-0380S	2.22	0.5	C0057-008-0380X	7.12	1.25	0.5
C0057-008-0440M			11.18	5.92	4.37		0.51	C0057-008-0440S	0.42		C0057-008-0440X	8.20		0.42
C0057-008-0500M			12.7	6.6	4.95		0.44	C0057-008-0500S	0.36		C0057-008-0500X	9.25		0.36
C0057-008-0560M			14.22	7.29	5.51		0.39	C0057-008-0560S	0.32		C0057-008-0560X	10.31		0.32
C0057-008-0620M			15.75	8.13	5.69		0.35	C0057-008-0620S	0.29		C0057-008-0620X	11.44		0.29
C0088-008-0120M	0.2		3.05	1.52	1.09		1.1	C0088-008-0120S		0.92	C0088-008-0120X	2.14		0.92
C0088-008-0190M			4.83	2.06	1.4		0.61	C0088-008-0190S		0.51	C0088-008-0190X	3.18		0.51
C0088-008-0250M			6.35	2.64	1.63		0.46	C0088-008-0250S		0.38	C0088-008-0250X	4.14		0.38
C0088-008-0310M			7.87	3.28	1.85		0.37	C0088-008-0310S		0.31	C0088-008-0310X	5.14		0.31
C0088-008-0380M			9.65	3.96	2.13	1.69	0.3	C0088-008-0380S	1.41	0.25	C0088-008-0380X	6.27	0.85	0.25
C0088-008-0440M			11.18	4.75	2.34		0.26	C0088-008-0440S		0.22	C0088-008-0440X	7.34		0.22
C0088-008-0500M			12.7	5.28	2.57		0.23	C0088-008-0500S		0.19	C0088-008-0500X	8.28		0.19
C0088-008-0560M			14.22	5.46	2.92		0.19	C0088-008-0560S		0.16	C0088-008-0560X	9.00		0.16
C0088-008-0620M			15.75	6.1	3.02		0.18	C0088-008-0620S		0.15	C0088-008-0620X	10.00		0.15
C0088-010-0120M			3.05	1.8	1.52		2.15	C0088-010-0120S		1.79	C0088-010-0120X	2.16		1.79
C0088-010-0190M			4.83	2.59	2.06		1.19	C0088-010-0190S		0.99	C0088-010-0190X	3.23		0.99
C0088-010-0250M			6.35	3.3	2.49		0.88	C0088-010-0250S		0.73	C0088-010-0250X	4.18		0.73
C0088-010-0310M			7.87	3.86	3		0.67	C0088-010-0310S		0.55	C0088-010-0310X	5.02		0.56
C0088-010-0380M			9.65	5.03	3.3		0.58	C0088-010-0380S	2.22	0.48	C0088-010-0380X	6.36		0.48
C0088-010-0440M	0.25		11.18	5.74	3.73	2.67	0.49	C0088-010-0440S		0.41	C0088-010-0440X	7.30	1.6	0.41
C0088-010-0500M	2.24		12.7	6.07	4.37		0.4	C0088-010-0500S		0.34	C0088-010-0500X	7.98		0.34
C0088-010-0560M			14.22	6.96	4.7		0.37	C0088-010-0560S		0.31	C0088-010-0560X	9.05		0.31
C0088-010-0620M			15.75	7.72	5.11		0.33	C0088-010-0620S		0.28	C0088-010-0620X	10.03		0.28
C0088-010-0690M			17.53	8.56	5.41		0.3	C0088-010-0690S		0.25	C0088-010-0690X	11.14		0.25
C0088-010-0750M			19.05	9.53	5.79		0.28	C0088-010-0750S		0.23	C0088-010-0750X	12.26		0.23
C0088-012-0120M			3.05	1.96	1.91		4.31	C0088-012-0120S		3.59	C0088-012-0120X	2.30		3.59
C0088-012-0190M			4.83	2.95	2.54		2.54	C0088-012-0190S		2.12	C0088-012-0190X	3.55		2.12
C0088-012-0250M			6.35	3.76	3.12		1.84	C0088-012-0250S		1.53	C0088-012-0250X	4.59		1.53
C0088-012-0310M			7.87	4.47	3.76		1.4	C0088-012-0310S		1.17	C0088-012-0310X	5.56		1.17
C0088-012-0380M			9.65	5.49	4.37		1.14	C0088-012-0380S		0.95	C0088-012-0380X	6.80		0.95
C0088-012-0440M	0.3		11.18	6.4	4.85	4.76	1	C0088-012-0440S	3.97	0.83	C0088-012-0440X	7.93	2.71	0.83
C0088-012-0500M			12.7	7.16	5.46		0.86	C0088-012-0500S		0.71	C0088-012-0500X	8.92		0.71
C0088-012-0560M			14.22	8.05	5.97		0.77	C0088-012-0560S		0.64	C0088-012-0560X	10.02		0.64
C0088-012-0620M			15.75	8.59	6.73		0.67	C0088-012-0620S		0.55	C0088-012-0620X	10.88		0.56
C0088-012-0690M			17.53	9.75	6.76		0.61	C0088-012-0690S		0.51	C0088-012-0690X	12.24		0.51
C0088-012-0750M			19.05	10.57	7.44		0.56	C0088-012-0750S		0.47	C0088-012-0750X	13.27		0.47
C0120-010-0250M			6.35	2.57	1.63		0.56	C0120-010-0250S		0.47	C0120-010-0250X	3.82		0.47
C0120-010-0310M			7.87	3	1.85		0.44	C0120-010-0310S		0.36	C0120-010-0310X	4.63		0.36
C0120-010-0380M			9.65	3.56	2.11		0.35	C0120-010-0380S		0.29	C0120-010-0380X	5.60		0.29
C0120-010-0440M			11.18	4.01	2.34		0.3	C0120-010-0440S		0.25	C0120-010-0440X	6.41		0.25
C0120-010-0500M			12.7	4.57	2.57		0.26	C0120-010-0500S		0.22	C0120-010-0500X	7.30		0.22
C0120-010-0560M			14.22	5.51	2.77		0.25	C0120-010-0560S		0.2	C0120-010-0560X	8.44		0.2
C0120-010-0620M	3.05	0.25	15.75	5.59	3	2.14	0.21	C0120-010-0620S	1.78	0.17	C0120-010-0620X	9.00	1.2	0.18
C0120-010-0690M			17.53	6.5	3.28		0.19	C0120-010-0690S		0.16	C0120-010-0690X	10.16		0.16
C0120-010-0750M			19.05	6.86	3.48		0.18	C0120-010-0750S		0.15	C0120-010-0750X	10.95		0.15
C0120-010-0810M			20.57	7.04	3.71		0.16	C0120-010-0810S		0.13	C0120-010-0810X	11.58		0.13
C0120-010-0880M			22.35	8.81	3.96		0.16	C0120-010-0880S		0.13	C0120-010-0880X	13.35		0.13
C0120-010-0940M			23.88	8.71	4.19		0.14	C0120-010-0940S		0.12	C0120-010-0940X	13.75		0.12
C0120-010-1000M			25.4	7.98	4.42		0.12	C0120-010-1000S		0.1	C0120-010-1000X	13.83		0.1

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0120-010-1120M			28.45	11.02	4.88		0.12	C0120-010-1120S	0.1		C0120-010-1120X	16.88		0.1
C0120-010-1250M		0.25	31.75	11.48	5.36	2.14	0.11	C0120-010-1250S	1.78	0.09	C0120-010-1250X	18.25	1.2	0.09
C0120-010-1500M			38.1	13.72	6.3		0.09	C0120-010-1500S		0.07	C0120-010-1500X	21.90		0.07
C0120-012-0250M			6.35	3.15	2.06		1.1	C0120-012-0250S		0.92	C0120-012-0250X	4.15		0.92
C0120-012-0310M			7.87	3.86	2.36		0.88	C0120-012-0310S		0.73	C0120-012-0310X	5.10		0.73
C0120-012-0380M			9.65	4.6	2.72		0.7	C0120-012-0380S		0.58	C0120-012-0380X	6.18		0.58
C0120-012-0440M			11.18	5.26	3.02		0.6	C0120-012-0440S		0.5	C0120-012-0440X	7.10		0.5
C0120-012-0500M			12.7	6.02	3.33		0.53	C0120-012-0500S		0.44	C0120-012-0500X	8.08		0.44
C0120-012-0560M			14.22	6.5	3.63		0.46	C0120-012-0560S		0.38	C0120-012-0560X	8.89		0.38
C0120-012-0620M			15.75	7.39	3.94		0.42	C0120-012-0620S		0.35	C0120-012-0620X	9.97		0.35
C0120-012-0690M		0.3	17.53	8.05	4.29	3.51	0.37	C0120-012-0690S	2.92	0.31	C0120-012-0690X	10.92	2	0.31
C0120-012-0750M			19.05	9.02	4.6		0.35	C0120-012-0750S		0.29	C0120-012-0750X	12.11		0.29
C0120-012-0810M			20.57	9.4	4.9		0.32	C0120-012-0810S		0.26	C0120-012-0810X	12.87		0.26
C0120-012-0880M			22.35	10.54	5.26		0.3	C0120-012-0880S		0.25	C0120-012-0880X	14.19		0.25
C0120-012-0940M			23.88	10.49	5.56		0.26	C0120-012-0940S		0.22	C0120-012-0940X	14.63		0.22
C0120-012-1000M			25.4	12.01	5.87		0.26	C0120-012-1000S		0.22	C0120-012-1000X	16.15		0.22
C0120-012-1120M			28.45	12.88	6.48		0.23	C0120-012-1120S		0.19	C0120-012-1120X	17.78		0.19
C0120-012-1250M			31.75	15.04	7.14		0.21	C0120-012-1250S		0.17	C0120-012-1250X	20.19		0.18
C0120-012-1500M			38.1	18.03	8.41		0.18	C0120-012-1500S		0.15	C0120-012-1500X	24.23		0.15
C0120-014-0250M			6.35	3.51	2.57		1.93	C0120-014-0250S		1.6	C0120-014-0250X	4.37		1.6
C0120-014-0310M			7.87	4.24	2.97		1.51	C0120-014-0310S		1.25	C0120-014-0310X	5.34		1.25
C0120-014-0380M			9.65	5.13	3.45		1.21	C0120-014-0380S		1.01	C0120-014-0380X	6.49		1.01
C0120-014-0440M			11.18	5.89	3.86		1.03	C0120-014-0440S		0.86	C0120-014-0440X	7.48		0.86
C0120-014-0500M			12.7	6.68	4.27		0.91	C0120-014-0500S		0.76	C0120-014-0500X	8.50		0.76
C0120-014-0560M			14.22	7.39	4.67		0.81	C0120-014-0560S		0.67	C0120-014-0560X	9.48		0.67
C0120-014-0620M			15.75	8.13	5.08		0.72	C0120-014-0620S		0.6	C0120-014-0620X	10.43		0.6
C0120-014-0690M		0.36	17.53	9.02	5.56	5.47	0.65	C0120-014-0690S	4.56	0.54	C0120-014-0690X	11.63	3.2	0.54
C0120-014-0750M			19.05	9.78	5.97		0.6	C0120-014-0750S		0.5	C0120-014-0750X	12.63		0.5
C0120-014-0810M			20.57	10.52	6.38		0.54	C0120-014-0810S		0.45	C0120-014-0810X	13.54		0.45
C0120-014-0880M			22.35	11.58	6.83		0.51	C0120-014-0880S		0.42	C0120-014-0880X	14.83		0.42
C0120-014-0940M			23.88	12.29	7.24		0.47	C0120-014-0940S		0.39	C0120-014-0940X	15.80		0.39
C0120-014-1000M			25.4	12.9	7.65		0.44	C0120-014-1000S		0.36	C0120-014-1000X	16.67		0.36
C0120-014-1120M			28.45	14.25	8.46		0.39	C0120-014-1120S		0.32	C0120-014-1120X	18.53		0.32
C0120-014-1250M			31.75	16.05	9.35		0.35	C0120-014-1250S		0.29	C0120-014-1250X	20.84		0.29
C0120-014-1500M			38.1	19.71	11.02		0.3	C0120-014-1500S		0.25	C0120-014-1500X	25.27		0.25
C0120-016-0190M	3.05		4.83	3	2.57		4.48	C0120-016-0190S		3.73	C0120-016-0190X	3.59		3.73
C0120-016-0250M			6.35	3.68	3.02		3.06	C0120-016-0250S		2.55	C0120-016-0250X	4.55		2.55
C0120-016-0310M			7.87	4.55	3.53		2.45	C0120-016-0310S		2.04	C0120-016-0310X	5.62		2.04
C0120-016-0380M			9.65	5.51	4.14		1.98	C0120-016-0380S		1.65	C0120-016-0380X	6.86		1.65
C0120-016-0440M			11.18	6.25	4.75		1.66	C0120-016-0440S		1.39	C0120-016-0440X	7.85		1.39
C0120-016-0500M			12.7	7.11	5.28		1.45	C0120-016-0500S		1.21	C0120-016-0500X	8.90		1.21
C0120-016-0560M		0.41	14.22	7.82	5.87	8.18	1.28	C0120-016-0560S	6.81	1.06	C0120-016-0560X	9.90	4.63	1.06
C0120-016-0620M			15.75	8.69	6.38		1.16	C0120-016-0620S		0.96	C0120-016-0620X	10.97		0.96
C0120-016-0690M			17.53	9.53	7.14		1.02	C0120-016-0690S		0.85	C0120-016-0690X	12.08		0.85
C0120-016-0750M			19.05	10.26	7.7		0.93	C0120-016-0750S		0.77	C0120-016-0750X	13.10		0.77
C0120-016-1000M			25.4	14	9.6		0.72	C0120-016-1000S		0.6	C0120-016-1000X	17.70		0.6
C0120-016-1120M			28.45	15.47	10.64		0.63	C0120-016-1120S		0.52	C0120-016-1120X	19.68		0.53
C0120-016-1250M			31.75	17.15	11.76		0.56	C0120-016-1250S		0.47	C0120-016-1250X	21.89		0.47
C0120-016-1500M			38.1	21.41	13.82		0.49	C0120-016-1500S		0.41	C0120-016-1500X	26.83		0.41
C0120-018-0190M			4.83	3.25	2.97		7.23	C0120-018-0190S		6.02	C0120-018-0190X	3.75		6.02
C0120-018-0250M			6.35	4.04	3.53		4.94	C0120-018-0250S		4.12	C0120-018-0250X	4.77		4.11
C0120-018-0310M			7.87	4.9	4.22		3.84	C0120-018-0310S		3.2	C0120-018-0310X	5.84		3.19
C0120-018-0380M			9.65	6.02	4.93		3.13	C0120-018-0380S		2.61	C0120-018-0380X	7.17		2.61
C0120-018-0440M			11.18	6.88	5.59		2.66	C0120-018-0440S		2.22	C0120-018-0440X	8.25		2.22
C0120-018-0500M			12.7	7.75	6.3		2.29	C0120-018-0500S		1.91	C0120-018-0500X	9.31		1.91
C0120-018-0560M		0.46	14.22	8.53	7.09	11.39	2	C0120-018-0560S	9.49	1.66	C0120-018-0560X	10.33	6.49	1.66
C0120-018-0620M			15.75	9.6	7.54		1.86	C0120-018-0620S		1.55	C0120-018-0620X	11.56		1.55
C0120-018-0690M			17.53	10.52	8.43		1.63	C0120-018-0690S		1.36	C0120-018-0690X	12.75		1.36
C0120-018-0750M			19.05	11.38	9.12		1.49	C0120-018-0750S		1.24	C0120-018-0750X	13.82		1.24
C0120-018-1000M			25.4	15.24	11.56		1.12	C0120-018-1000S		0.93	C0120-018-1000X	18.46		0.93
C0120-018-1120M			28.45	17.04	12.83		1	C0120-018-1120S		0.83	C0120-018-1120X	20.65		0.83
C0120-018-1250M			31.75	19	14.2		0.89	C0120-018-1250S		0.74	C0120-018-1250X	23.04		0.74
C0120-018-1500M			38.1	22.61	16.84		0.74	C0120-018-1500S		0.61	C0120-018-1500X	27.52		0.61
C0120-020-0250M			6.35	4.47	4.14		7.84	C0120-020-0250S		6.53	C0120-020-0250X	5.01		6.54
C0120-020-0310M			7.87	5.46	4.88		6.09	C0120-020-0310S		5.07	C0120-020-0310X	6.14		5.08
C0120-020-0380M			9.65	6.6	5.74		4.85	C0120-020-0380S		4.04	C0120-020-0380X	7.48		4.04
C0120-020-0440M		0.51	11.18	7.59	6.5	14.72	4.12	C0120-020-0440S	12.26	3.43	C0120-020-0440X	8.61	8.76	3.43
C0120-020-0500M			12.7	8.59	7.24		3.57	C0120-020-0500S		2.97	C0120-020-0500X	9.75		2.98
C0120-020-0560M			14.22	9.58	7.98		3.17	C0120-020-0560S		2.64	C0120-020-0560X	10.90		2.64
C0120-020-0620M			15.75	10.57	8.74		2.84	C0120-020-0620S		2.37	C0120-020-0620X	12.03		2.36
C0120-020-0690M			17.53	11.71	9.6		2.54	C0120-020-0690S		2.12	C0120-020-0690X	13.37		2.12

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0120-020-0750M	0.51		19.05	12.7	10.34	14.72	2.31	C0120-020-0750S	1.92	C0120-020-0750X	14.49	8.76	1.93	
C0120-020-0810M			20.57	13.69	11.1		2.14	C0120-020-0810S	1.78	C0120-020-0810X	15.64		1.78	
C0120-020-0880M			22.35	14.83	11.96		1.96	C0120-020-0880S	1.63	C0120-020-0880X	16.98		1.63	
C0120-020-0940M			23.88	15.82	12.7		1.82	C0120-020-0940S	12.26	C0120-020-0940X	18.09		1.52	
C0120-020-1000M			25.4	16.81	13.46		1.72	C0120-020-1000S		C0120-020-1000X	19.26		1.43	
C0120-020-1120M			28.45	18.77	14.94		1.52	C0120-020-1120S		C0120-020-1120X	21.53		1.27	
C0120-020-1250M			31.75	20.93	16.56		1.37	C0120-020-1250S		C0120-020-1250X	24.03		1.14	
C0120-020-1500M			38.1	25.02	19.66		1.12	C0120-020-1500S		C0120-020-1500X	28.69		0.93	
C0120-022-0250M			6.35	4.75	4.34		12.36	C0120-022-0250S		C0120-022-0250X	5.23		10.3	
C0120-022-0310M			7.87	5.74	5.31		9.33	C0120-022-0310S		C0120-022-0310X	6.39		7.78	
C0120-022-0380M	0.56		9.65	6.91	6.4	19.93	7.27	C0120-022-0380S		C0120-022-0380X	7.75	11.52	6.05	
C0120-022-0440M			11.18	8.05	7.11		6.37	C0120-022-0440S		C0120-022-0440X	9.00		5.31	
C0120-022-0500M			12.7	9.04	8.1		5.45	C0120-022-0500S		C0120-022-0500X	10.16		4.54	
C0120-022-0560M			14.22	10.19	8.79		4.94	C0120-022-0560S		C0120-022-0560X	11.42		4.11	
C0120-022-0620M			15.75	11.18	9.75		4.36	C0120-022-0620S	16.6	C0120-022-0620X	12.57		3.63	
C0120-022-0690M			17.53	12.17	11.23		3.71	C0120-022-0690S		C0120-022-0690X	13.80		3.09	
C0120-022-0750M		3.05	19.05	13.41	11.71		3.54	C0120-022-0750S		C0120-022-0750X	15.13		2.95	
C0120-022-0810M			20.57	14.48	12.55		3.27	C0120-022-0810S		C0120-022-0810X	16.34		2.73	
C0120-022-0940M			23.88	16.64	14.38		2.75	C0120-022-0940S		C0120-022-0940X	18.84		2.29	
C0120-022-1000M			25.4	17.65	15.24		2.57	C0120-022-1000S		C0120-022-1000X	20.02		2.15	
C0120-022-1120M	0.61		28.45	20.12	16.94	25.04	2.4	C0120-022-1120S		C0120-022-1120X	22.68	14.77	2	
C0120-022-1250M			31.75	22.02	18.77		2.05	C0120-022-1250S		C0120-022-1250X	24.99		1.71	
C0120-022-1500M			38.1	26.37	22.33		1.7	C0120-022-1500S		C0120-022-1500X	29.95		1.41	
C0120-024-0310M			7.87	6.15	5.82		14.41	C0120-024-0310S		C0120-024-0310X	6.64		12.01	
C0120-024-0380M			9.65	7.44	6.88		11.36	C0120-024-0380S		C0120-024-0380X	8.09		9.47	
C0120-024-0440M			11.18	8.59	7.8		9.63	C0120-024-0440S		C0120-024-0440X	9.34		8.02	
C0120-024-0500M			12.7	9.7	8.71		8.35	C0120-024-0500S		C0120-024-0500X	10.58		6.96	
C0120-024-0560M			14.22	10.82	9.63		7.37	C0120-024-0560S		C0120-024-0560X	11.82		6.14	
C0120-024-0620M			15.75	11.96	10.54		6.6	C0120-024-0620S		C0120-024-0620X	13.06		5.5	
C0120-024-0690M			17.53	13.26	11.61		5.88	C0120-024-0690S	20.86	C0120-024-0690X	14.51		4.9	
C0120-024-0750M	0.53		19.05	14.4	12.52	14.01	5.38	C0120-024-0750S		C0120-024-0750X	15.75	14.77	4.48	
C0120-024-0810M			20.57	15.52	13.44		4.96	C0120-024-0810S		C0120-024-0810X	17.00		4.13	
C0120-024-0880M			22.35	16.84	14.5		4.54	C0120-024-0880S		C0120-024-0880X	18.45		3.78	
C0120-024-0940M			23.88	17.96	15.42		4.24	C0120-024-0940S		C0120-024-0940X	19.69		3.53	
C0120-024-1000M			25.4	19.08	16.33		3.96	C0120-024-1000S		C0120-024-1000X	20.92		3.3	
C0120-024-1120M			28.45	21.34	18.16		3.52	C0120-024-1120S		C0120-024-1120X	23.41		2.93	
C0120-024-1250M			31.75	23.77	20.14		3.13	C0120-024-1250S		C0120-024-1250X	26.10		2.61	
C0120-024-1500M			38.1	28.47	23.95		2.61	C0120-024-1500S		C0120-024-1500X	31.31		2.17	
C0148-021-0250M	0.58		6.35	4.11	3.63	17.97	6.25	C0148-021-0250S		C0148-021-0250X	4.74	10.94	5.21	
C0148-021-0310M			7.87	4.98	4.22		4.85	C0148-021-0310S		C0148-021-0310X	5.80		4.04	
C0148-021-0380M			9.65	6.02	4.9		3.85	C0148-021-0380S		C0148-021-0380X	7.04		3.21	
C0148-021-0440M			11.18	6.88	5.51		3.27	C0148-021-0440S		C0148-021-0440X	8.10		2.73	
C0148-021-0500M			12.7	7.77	6.1		2.84	C0148-021-0500S		C0148-021-0500X	9.15		2.36	
C0148-021-0560M			14.22	8.66	6.68		2.5	C0148-021-0560S		C0148-021-0560X	10.20		2.09	
C0148-021-0620M			15.75	9.53	7.26		2.24	C0148-021-0620S		C0148-021-0620X	11.25		1.87	
C0148-021-0690M			17.53	10.54	7.95		2.01	C0148-021-0690S	11.67	C0148-021-0690X	12.52		1.68	
C0148-021-0750M			19.05	11.43	8.53		1.84	C0148-021-0750S		C0148-021-0750X	13.57		1.53	
C0148-021-0810M			20.57	12.32	9.12		1.7	C0148-021-0810S		C0148-021-0810X	14.64		1.41	
C0148-021-0880M	3.76		22.35	13.34	9.8	25.04	1.56	C0148-021-0880S		C0148-021-0880X	15.89	14.77	1.3	
C0148-021-0940M			23.88	14.22	10.41		1.45	C0148-021-0940S		C0148-021-0940X	16.94		1.21	
C0148-021-1000M			25.4	15.09	11		1.37	C0148-021-1000S		C0148-021-1000X	18.02		1.14	
C0148-021-1250M			31.75	18.75	13.44		1.07	C0148-021-1250S		C0148-021-1250X	22.32		0.89	
C0148-021-1500M			38.1	22.4	15.9		0.89	C0148-021-1500S		C0148-021-1500X	26.82		0.74	
C0148-023-0250M			6.35	4.37	4.06	14.01	9.11	C0148-023-0250S		C0148-023-0250X	4.91		7.59	
C0148-023-0310M			7.87	5.31	4.75		7.02	C0148-023-0310S		C0148-023-0310X	6.01		5.85	
C0148-023-0380M			9.65	6.43	5.54		5.55	C0148-023-0380S		C0148-023-0380X	7.29		4.62	
C0148-023-0440M			11.18	7.37	6.22		4.71	C0148-023-0440S		C0148-023-0440X	8.39		3.92	
C0148-023-0500M			12.7	8.31	6.91		4.08	C0148-023-0500S		C0148-023-0500X	9.49		3.4	
C0148-023-0560M			14.22	9.25	7.59		3.61	C0148-023-0560S		C0148-023-0560X	10.59		3.01	
C0148-023-0620M			15.75	10.19	8.28		3.24	C0148-023-0620S		C0148-023-0620X	11.70		2.7	
C0148-023-0690M			17.53	11.28	9.07		2.89	C0148-023-0690S	14.97	C0148-023-0690X	12.99		2.41	
C0148-023-0750M			19.05	12.22	9.75		2.64	C0148-023-0750S		C0148-023-0750X	14.09		2.2	
C0148-023-0810M			20.57	13.16	10.41		2.43	C0148-023-0810S		C0148-023-0810X	15.19		2.03	
C0148-023-0880M	4.57		22.35	14.27	11.23	25.04	2.22	C0148-023-0880S		C0148-023-0880X	16.46	14.77	1.85	
C0148-023-0940M			23.88	15.21	11.91		2.08	C0148-023-0940S		C0148-023-0940X	17.58		1.74	
C0148-023-1000M			25.4	16.15	12.57		1.94	C0148-023-1000S		C0148-023-1000X	18.65		1.62	
C0148-023-1250M			31.75	20.09	15.42		1.54	C0148-023-1250S		C0148-023-1250X	23.24		1.28	
C0148-023-1500M			38.1	24	18.26		1.28	C0148-023-1500S		C0148-023-1500X</				

## COMPRESSION SPRINGS MUSIC WIRE

## 302 STAINLESS STEEL / INOX

## 316 STAINLESS STEEL / INOX

Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0180-012-0440M			11.18	4.32	1.88		0.35	C0180-012-0440S		0.29	C0180-012-0440X	6.47		0.29
C0180-012-0500M			12.7	4.62	2.03		0.3	C0180-012-0500S		0.25	C0180-012-0500X	7.17		0.25
C0180-012-0560M			14.22	5.08	2.16		0.26	C0180-012-0560S		0.22	C0180-012-0560X	7.95		0.22
C0180-012-0620M			15.75	5.94	2.31		0.25	C0180-012-0620S		0.2	C0180-012-0620X	9.03		0.2
C0180-012-0690M	0.3	17.53	6.1	2.46	2.4	0.21	C0180-012-0690S	2	0.17	C0180-012-0690X	9.69	1.38	0.18	
C0180-012-0750M			19.05	6.58	2.62		0.19	C0180-012-0750S		0.16	C0180-012-0750X	10.50		0.16
C0180-012-0810M			20.57	6.86	2.77		0.18	C0180-012-0810S		0.15	C0180-012-0810X	11.17		0.15
C0180-012-0880M			22.35	8.64	2.92		0.18	C0180-012-0880S		0.15	C0180-012-0880X	12.95		0.15
C0180-012-0940M			23.88	8.53	3.07		0.16	C0180-012-0940S		0.13	C0180-012-0940X	13.42		0.13
C0180-012-1000M			25.4	8.26	3.2		0.14	C0180-012-1000S		0.12	C0180-012-1000X	13.64		0.12
C0180-012-1250M			31.75	12.17	3.78		0.12	C0180-012-1250S		0.1	C0180-012-1250X	18.31		0.1
C0180-012-1500M			38.1	15.24	4.37		0.11	C0180-012-1500S		0.09	C0180-012-1500X	22.42		0.09
C0180-014-0250M			6.35	2.92	1.75		1.09	C0180-014-0250S		0.9	C0180-014-0250X	3.95		0.9
C0180-014-0310M			7.87	3.53	1.93		0.86	C0180-014-0310S		0.71	C0180-014-0310X	4.84		0.71
C0180-014-0380M			9.65	4.19	2.16		0.68	C0180-014-0380S		0.57	C0180-014-0380X	5.84		0.57
C0180-014-0440M			11.18	4.9	2.34		0.6	C0180-014-0440S		0.5	C0180-014-0440X	6.81		0.5
C0180-014-0500M			12.7	5.33	2.54		0.51	C0180-014-0500S		0.42	C0180-014-0500X	7.58		0.42
C0180-014-0560M			14.22	6.05	2.72		0.46	C0180-014-0560S		0.38	C0180-014-0560X	8.51		0.38
C0180-014-0620M	0.36	15.75	6.48	2.9	3.74	0.4	C0180-014-0620S	3.12	0.34	C0180-014-0620X	9.29	2.2	0.34	
C0180-014-0690M			17.53	7.34	3.12		0.37	C0180-014-0690S		0.31	C0180-014-0690X	10.45		0.31
C0180-014-0750M			19.05	7.82	3.3		0.33	C0180-014-0750S		0.28	C0180-014-0750X	11.23		0.28
C0180-014-0880M			22.35	9.02	3.71		0.28	C0180-014-0880S		0.23	C0180-014-0880X	13.07		0.23
C0180-014-1000M			25.4	10.16	4.09		0.25	C0180-014-1000S		0.2	C0180-014-1000X	14.79		0.2
C0180-014-1250M			31.75	12.34	4.85		0.19	C0180-014-1250S		0.16	C0180-014-1250X	18.24		0.16
C0180-014-1380M			35.05	13.72	5.26		0.18	C0180-014-1380S		0.15	C0180-014-1380X	20.20		0.15
C0180-014-1500M			38.1	14.4	5.64		0.16	C0180-014-1500S		0.13	C0180-014-1500X	21.59		0.13
C0180-016-0250M			6.35	2.77	2.03		1.56	C0180-016-0250S		1.3	C0180-016-0250X	3.92		1.3
C0180-016-0310M			7.87	3.63	2.21		1.31	C0180-016-0310S		1.09	C0180-016-0310X	5.00		1.09
C0180-016-0380M			9.65	4.29	2.54		1.03	C0180-016-0380S		0.86	C0180-016-0380X	5.99		0.86
C0180-016-0440M			11.18	4.75	2.84		0.86	C0180-016-0440S		0.71	C0180-016-0440X	6.77		0.71
C0180-016-0500M			12.7	5.21	3.15		0.74	C0180-016-0500S		0.61	C0180-016-0500X	7.56		0.61
C0180-016-0560M			14.22	5.66	3.45		0.65	C0180-016-0560S		0.54	C0180-016-0560X	8.39		0.54
C0180-016-0620M	0.41	15.75	6.45	3.66	5.56	0.6	C0180-016-0620S	4.63	0.5	C0180-016-0620X	9.40	3.16	0.5	
C0180-016-0690M	4.57	17.53	7.19	3.94		0.54	C0180-016-0690S		0.45	C0180-016-0690X	10.56		0.45	
C0180-016-0750M		19.05	7.62	4.24		0.49	C0180-016-0750S		0.41	C0180-016-0750X	11.34		0.41	
C0180-016-0880M			22.35	9.65	4.7		0.44	C0180-016-0880S		0.36	C0180-016-0880X	13.72		0.36
C0180-016-1000M			25.4	10.97	5.18		0.39	C0180-016-1000S		0.32	C0180-016-1000X	15.59		0.32
C0180-016-1250M			31.75	13.08	6.22		0.3	C0180-016-1250S		0.25	C0180-016-1250X	19.05		0.25
C0180-016-1380M			35.05	15.24	6.76		0.28	C0180-016-1380S		0.23	C0180-016-1380X	21.56		0.23
C0180-016-1500M			38.1	15.42	7.24		0.25	C0180-016-1500S		0.2	C0180-016-1500X	22.68		0.2
C0180-016-1750M			44.45	17.98	8.28		0.21	C0180-016-1750S		0.17	C0180-016-1750X	26.46		0.18
C0180-018-0250M			6.35	3.05	2.39		2.36	C0180-018-0250S		1.97	C0180-018-0250X	4.09		1.97
C0180-018-0310M			7.87	3.96	2.62		2	C0180-018-0310S		1.66	C0180-018-0310X	5.19		1.66
C0180-018-0380M			9.65	4.83	2.95		1.63	C0180-018-0380S		1.36	C0180-018-0380X	6.37		1.36
C0180-018-0440M			11.18	5.46	3.3		1.37	C0180-018-0440S		1.14	C0180-018-0440X	7.26		1.14
C0180-018-0500M			12.7	6.07	3.66		1.17	C0180-018-0500S		0.98	C0180-018-0500X	8.14		0.98
C0180-018-0560M			14.22	6.4	4.11		1	C0180-018-0560S		0.83	C0180-018-0560X	8.86		0.83
C0180-018-0620M			15.75	7.01	4.45		0.89	C0180-018-0620S		0.74	C0180-018-0620X	9.76		0.74
C0180-018-0690M	0.46	17.53	7.87	4.8	7.83	0.81	C0180-018-0690S	6.52	0.67	C0180-018-0690X	10.88	4.45	0.67	
C0180-018-0750M			19.05	8.2	5.26		0.72	C0180-018-0750S		0.6	C0180-018-0750X	11.60		0.6
C0180-018-0880M			22.35	10.26	5.77		0.65	C0180-018-0880S		0.54	C0180-018-0880X	14.09		0.54
C0180-018-1000M			25.4	11.43	6.4		0.56	C0180-018-1000S		0.47	C0180-018-1000X	15.85		0.47
C0180-018-1250M			31.75	14.55	7.7		0.46	C0180-018-1250S		0.38	C0180-018-1250X	20.00		0.38
C0180-018-1380M			35.05	15.62	8.38		0.4	C0180-018-1380S		0.34	C0180-018-1380X	21.77		0.34
C0180-018-1500M			38.1	16.81	9.02		0.37	C0180-018-1500S		0.31	C0180-018-1500X	23.55		0.31
C0180-018-1750M			44.45	19.61	10.31		0.32	C0180-018-1750S		0.26	C0180-018-1750X	27.47		0.26
C0180-020-0250M			6.35	3.61	2.87		3.71	C0180-020-0250S		3.09	C0180-020-0250X	4.39		3.09
C0180-020-0310M			7.87	4.34	3.25		2.89	C0180-020-0310S		2.41	C0180-020-0310X	5.35		2.41
C0180-020-0380M			9.65	5.21	3.71		2.29	C0180-020-0380S		1.91	C0180-020-0380X	6.47		1.91
C0180-020-0440M			11.18	5.94	4.09		1.94	C0180-020-0440S		1.62	C0180-020-0440X	7.42		1.62
C0180-020-0500M			12.7	6.68	4.47		1.7	C0180-020-0500S		1.41	C0180-020-0500X	8.41		1.41
C0180-020-0560M			14.22	7.42	4.85		1.51	C0180-020-0560S		1.25	C0180-020-0560X	9.38		1.25
C0180-020-0620M			15.75	8.15	5.26		1.35	C0180-020-0620S		1.12	C0180-020-0620X	10.34		1.12
C0180-020-0690M	0.51	17.53	9.02	5.69	10.19	1.19	C0180-020-0690S	8.49	0.99	C0180-020-0690X	11.40	6.09	0.99	
C0180-020-0750M			19.05	9.75	6.07		1.1	C0180-020-0750S		0.92	C0180-020-0750X	12.44		0.92
C0180-020-0880M			22.35	11.35	6.91		0.93	C0180-020-0880S		0.77	C0180-020-0880X	14.49		0.77
C0180-020-1000M			25.4	12.83	7.67		0.81	C0180-020-1000S		0.67	C0180-020-1000X	16.34		0.67
C0180-020-1250M			31.75	15.9	9.3		0.65	C0180-020-1250S		0.54	C0180-020-1250X	20.49		0.54
C0180-020-1380M			35.05	17.5	10.11		0.58	C0180-020-1380S		0.48	C0180-020-1380X	22.43		0.48
C0180-020-1500M			38.1	18.72	10.9		0.53	C0180-020-1500S		0.44	C0180-020-1500X	24.21		0.44
C0180-020-1750M			44.45	22.05	12.5		0.46	C0180-020-1750S		0.38	C0180-020-1750X	28.43		0.38



COMPRESSION SPRINGS MUSIC WIRE								302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX			
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0180-022-0250M			6.35	3.66	3.07		5.18	C0180-022-0250S	4.31		C0180-022-0250X	4.49		4.32
C0180-022-0310M			7.87	4.52	3.48		4.15	C0180-022-0310S	3.46		C0180-022-0310X	5.55		3.46
C0180-022-0380M			9.65	5.64	3.91		3.47	C0180-022-0380S	2.89		C0180-022-0380X	6.87		2.89
C0180-022-0440M			11.18	6.48	4.32		2.96	C0180-022-0440S	2.47		C0180-022-0440X	7.92		2.47
C0180-022-0500M			12.7	7.11	4.88		2.49	C0180-022-0500S	2.07		C0180-022-0500X	8.82		2.07
C0180-022-0560M			14.22	7.52	5.56		2.08	C0180-022-0560S	1.73		C0180-022-0560X	9.60		1.74
C0180-022-0620M			15.75	8.18	6.12		1.84	C0180-022-0620S	1.53		C0180-022-0620X	10.50		1.53
C0180-022-0690M	0.56		17.53	9.27	6.58	13.92	1.68	C0180-022-0690S	11.6	1.4	C0180-022-0690X	11.79	8.05	1.4
C0180-022-0750M			19.05	9.88	7.11		1.52	C0180-022-0750S		1.27	C0180-022-0750X	12.72		1.27
C0180-022-0810M			20.57	10.29	7.85		1.35	C0180-022-0810S		1.12	C0180-022-0810X	13.42		1.12
C0180-022-0940M			23.88	12.34	8.56		1.21	C0180-022-0940S		1.01	C0180-022-0940X	15.89		1.01
C0180-022-1000M			25.4	13.16	9.02		1.14	C0180-022-1000S		0.95	C0180-022-1000X	16.93		0.95
C0180-022-1120M			28.45	14.73	9.93		1.02	C0180-022-1120S		0.85	C0180-022-1120X	18.95		0.85
C0180-022-1250M			31.75	16.46	10.92		0.91	C0180-022-1250S		0.76	C0180-022-1250X	21.16		0.76
C0180-022-1500M			38.1	19.61	12.85		0.75	C0180-022-1500S		0.63	C0180-022-1500X	25.29		0.63
C0180-022-1750M			44.45	23.6	13.97		0.67	C0180-022-1750S		0.55	C0180-022-1750X	29.96		0.56
C0180-024-0250M			6.35	4.06	3.63		7.41	C0180-024-0250S		6.17	C0180-024-0250X	4.67		6.17
C0180-024-0310M			7.87	4.9	4.17		5.71	C0180-024-0310S		4.76	C0180-024-0310X	5.70		4.76
C0180-024-0380M			9.65	5.89	4.8		4.5	C0180-024-0380S		3.75	C0180-024-0380X	6.89		3.75
C0180-024-0440M			11.18	6.73	5.33		3.82	C0180-024-0440S		3.18	C0180-024-0440X	7.92		3.18
C0180-024-0500M			12.7	7.57	5.89		3.31	C0180-024-0500S		2.76	C0180-024-0500X	8.94		2.76
C0180-024-0560M			14.22	8.41	6.43		2.92	C0180-024-0560S		2.43	C0180-024-0560X	9.97		2.44
C0180-024-0620M	0.61		15.75	9.27	6.96	16.95	2.61	C0180-024-0620S	14.12	2.17	C0180-024-0620X	10.98	10.36	2.17
C0180-024-0750M			19.05	11.1	8.13		2.14	C0180-024-0750S		1.78	C0180-024-0750X	13.23		1.78
C0180-024-0880M			22.35	12.93	9.3		1.8	C0180-024-0880S		1.5	C0180-024-0880X	15.46		1.5
C0180-024-1000M			25.4	14.61	10.36		1.58	C0180-024-1000S		1.31	C0180-024-1000X	17.51		1.31
C0180-024-1120M			28.45	16.28	11.43		1.4	C0180-024-1120S		1.17	C0180-024-1120X	19.57		1.17
C0180-024-1250M			31.75	18.11	12.6		1.24	C0180-024-1250S		1.04	C0180-024-1250X	21.75		1.03
C0180-024-1500M			38.1	21.64	14.86		1.03	C0180-024-1500S		0.86	C0180-024-1500X	26.06		0.86
C0180-024-1750M			44.45	25.15	17.09		0.88	C0180-024-1750S		0.73	C0180-024-1750X	30.25		0.73
C0180-024-2000M			50.8	28.68	19.33		0.77	C0180-024-2000S		0.64	C0180-024-2000X	34.66		0.64
C0180-026-0250M			6.35	4.14	3.78		10.12	C0180-026-0250S		8.43	C0180-026-0250X	4.80		8.43
C0180-026-0310M			7.87	5.16	4.27		8.23	C0180-026-0310S		6.86	C0180-026-0310X	5.97		6.86
C0180-026-0380M			9.65	6.25	4.95		6.57	C0180-026-0380S		5.47	C0180-026-0380X	7.26		5.47
C0180-026-0440M			11.18	7.09	5.61		5.46	C0180-026-0440S		4.55	C0180-026-0440X	8.30		4.55
C0180-026-0500M			12.7	7.92	6.27		4.69	C0180-026-0500S		3.91	C0180-026-0500X	9.36		3.91
C0180-026-0560M			14.22	8.79	6.91		4.12	C0180-026-0560S		3.43	C0180-026-0560X	10.41		3.43
C0180-026-0620M			15.75	9.63	7.57		3.66	C0180-026-0620S		3.05	C0180-026-0620X	11.46		3.05
C0180-026-0690M			17.53	10.72	8.23		3.29	C0180-026-0690S		2.74	C0180-026-0690X	12.76		2.74
C0180-026-0750M	0.66		19.05	11.56	8.94	22.38	2.98	C0180-026-0750S	18.64	2.48	C0180-026-0750X	13.78	13.08	2.48
C0180-026-0810M			20.57	12.4	9.58		2.73	C0180-026-0810S		2.27	C0180-026-0810X	14.83		2.27
C0180-026-0880M			22.35	13.51	10.24		2.52	C0180-026-0880S		2.1	C0180-026-0880X	16.13		2.1
C0180-026-1000M			25.4	14.94	11.71		2.14	C0180-026-1000S		1.78	C0180-026-1000X	18.05		1.78
C0180-026-1120M			28.45	16.61	12.93		1.89	C0180-026-1120S		1.58	C0180-026-1120X	20.15		1.58
C0180-026-1250M			31.75	18.57	14.27		1.7	C0180-026-1250S		1.41	C0180-026-1250X	22.51		1.41
C0180-026-1500M			38.1	22.12	16.84		1.4	C0180-026-1500S		1.17	C0180-026-1500X	26.90		1.17
C0180-026-1750M			44.45	25.65	19.41		1.19	C0180-026-1750S		0.99	C0180-026-1750X	31.27		0.99
C0180-026-2000M			50.8	29.13	21.97		1.03	C0180-026-2000S		0.86	C0180-026-2000X	35.61		0.86
C0180-029-0250M			6.35	4.6	4.37		16.3	C0180-029-0250S		13.58	C0180-029-0250X	5.03		13.58
C0180-029-0310M			7.87	5.56	5.28		12.43	C0180-029-0310S		10.35	C0180-029-0310X	6.14		10.36
C0180-029-0380M			9.65	6.71	6.12		9.72	C0180-029-0380S		8.1	C0180-029-0380X	7.44		8.1
C0180-029-0440M			11.18	7.7	6.86		8.2	C0180-029-0440S		6.83	C0180-029-0440X	8.55		6.83
C0180-029-0500M			12.7	8.66	7.59		7.09	C0180-029-0500S		5.91	C0180-029-0500X	9.67		5.91
C0180-029-0560M			14.22	9.65	8.31		6.23	C0180-029-0560S		5.19	C0180-029-0560X	10.77		5.19
C0180-029-0620M			15.75	10.62	9.04		5.57	C0180-029-0620S		4.64	C0180-029-0620X	11.88		4.64
C0180-029-0690M			17.53	11.76	9.91		4.96	C0180-029-0690S		4.13	C0180-029-0690X	13.18		4.13
C0180-029-0750M			19.05	12.73	10.62		4.52	C0180-029-0750S		3.77	C0180-029-0750X	14.29		3.76
C0180-029-0810M	0.74		20.57	13.72	11.35	28.6	4.17	C0180-029-0810S	23.82	3.47	C0180-029-0810X	15.41	17.93	3.47
C0180-029-0880M			22.35	14.83	12.22		3.82	C0180-029-0880S		3.18	C0180-029-0880X	16.71		3.18
C0180-029-0940M			23.88	15.82	12.93		3.56	C0180-029-0940S		2.97	C0180-029-0940X	17.82		2.96
C0180-029-1000M			25.4	16.79	13.67		3.33	C0180-029-1000S		2.77	C0180-029-1000X	18.93		2.77
C0180-029-1120M			28.45	18.75	15.14		2.94	C0180-029-1120S		2.45	C0180-029-1120X	21.13		2.45
C0180-029-1250M			31.75	20.85	16.71		2.63	C0180-029-1250S		2.19	C0180-029-1250X	23.56		2.19
C0180-029-1380M			35.05	22.99	18.29		2.36	C0180-029-1380S		1.97	C0180-029-1380X	25.95		1.97
C0180-029-1500M			38.1	24.94	19.76		2.17	C0180-029-1500S		1.81	C0180-029-1500X	28.19		1.81
C0180-029-1750M	4.57		44.45	29.01	22.78		1.86	C0180-029-1750S		1.55	C0180-029-1750X	32.86		1.55
C0180-029-2000M			50.8	33.07	25.83		1.61	C0180-029-2000S		1.34	C0180-029-2000X	37.44		1.34
C0180-032-0310M			7.87	6.05	5.23		21.49	C0180-032-0310S		17.9	C0180-032-0310X	6.55		17.9
C0180-032-0380M	0.81		9.65	7.34	6.1	39.28	16.99	C0180-032-0380S	32.72	14.15	C0180-032-0380X	7.97	23.8	14.15
C0180-032-0440M			11.18	8.28	7.11		13.57	C0180-032-0440S		11.3	C0180-032-0440X	9.07		11.31
C0180-032-0500M			12.7	9.25	8.1		11.36	C0180-032-0500S		9				

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0180-032-0560M	0.81	0.81	0.81	14.22	10.41	8.71	10.31	C0180-032-0560S	8.59	C0180-032-0560X	11.46	11.46	8.59	
C0180-032-0620M				15.75	11.38	9.7	8.98	C0180-032-0620S	7.48	C0180-032-0620X	12.57		7.48	
C0180-032-0690M				17.53	12.8	10.31	8.32	C0180-032-0690S	6.93	C0180-032-0690X	14.09		6.93	
C0180-032-0750M				19.05	13.61	11.58	7.23	C0180-032-0750S	6.02	C0180-032-0750X	15.10		6.02	
C0180-032-0810M				20.57	14.55	12.6	6.53	C0180-032-0810S	5.44	C0180-032-0810X	16.20		5.44	
C0180-032-0880M				22.35	15.65	13.79	5.87	C0180-032-0880S	4.89	C0180-032-0880X	17.49		4.89	
C0180-032-0940M				23.88	16.71	14.63	39.28	C0180-032-0940S	32.72	C0180-032-0940X	18.67	23.8	4.57	
C0180-032-1000M				25.4	17.78	15.44	5.15	C0180-032-1000S	4.29	C0180-032-1000X	19.86		4.29	
C0180-032-1120M				28.45	19.69	17.2	4.48	C0180-032-1120S	3.73	C0180-032-1120X	22.08		3.73	
C0180-032-1250M				31.75	21.92	19	3.99	C0180-032-1250S	3.32	C0180-032-1250X	24.60		3.33	
C0180-032-1380M				35.05	24.16	20.8	3.61	C0180-032-1380S	3.01	C0180-032-1380X	27.14		3.01	
C0180-032-1500M				38.1	26.16	22.48	3.29	C0180-032-1500S	2.74	C0180-032-1500X	29.43		2.74	
C0180-032-1750M				44.45	30.53	25.98	2.82	C0180-032-1750S	2.35	C0180-032-1750X	34.33		2.35	
C0180-032-2000M		4.57	4.57	50.8	34.77	29.46	2.45	C0180-032-2000S	2.04	C0180-032-2000X	39.16		2.04	
C0180-035-0380M				9.65	7.67	7.26	23.99	C0180-035-0380S	19.98	C0180-035-0380X	8.12		19.98	
C0180-035-0440M				11.18	8.79	8.15	20.08	C0180-035-0440S	16.73	C0180-035-0440X	9.34		16.73	
C0180-035-0500M				12.7	9.93	9.04	17.28	C0180-035-0500S	14.39	C0180-035-0500X	10.57		14.4	
C0180-035-0560M				14.22	11.07	9.93	15.16	C0180-035-0560S	12.63	C0180-035-0560X	11.80		12.63	
C0180-035-0620M				15.75	12.22	10.82	13.52	C0180-035-0620S	11.26	C0180-035-0620X	13.02		11.26	
C0180-035-0690M				17.53	13.54	11.86	11.99	C0180-035-0690S	9.99	C0180-035-0690X	14.46		9.99	
C0180-035-0750M				19.05	14.68	12.75	10.93	C0180-035-0750S	9.1	C0180-035-0750X	15.68		9.1	
C0180-035-0810M		0.89	0.89	20.57	15.82	13.64	47.77	C0180-035-0810S	39.79	C0180-035-0810X	16.91	30.69	8.37	
C0180-035-0880M				22.35	17.15	14.68	9.18	C0180-035-0880S	7.65	C0180-035-0880X	18.34		7.64	
C0180-035-0940M				23.88	18.29	15.57	8.55	C0180-035-0940S	7.12	C0180-035-0940X	19.57		7.12	
C0180-035-1000M				25.4	19.43	16.46	8	C0180-035-1000S	6.66	C0180-035-1000X	20.80		6.67	
C0180-035-1120M				28.45	21.69	18.24	7.07	C0180-035-1120S	5.89	C0180-035-1120X	23.24		5.89	
C0180-035-1250M				31.75	24.16	20.14	6.3	C0180-035-1250S	5.25	C0180-035-1250X	25.91		5.25	
C0180-035-1500M				38.1	28.91	23.85	5.2	C0180-035-1500S	4.33	C0180-035-1500X	31.02		4.33	
C0180-035-1750M				44.45	33.66	27.56	4.43	C0180-035-1750S	3.69	C0180-035-1750X	36.14		3.69	
C0180-035-2000M				50.8	38.4	31.27	3.85	C0180-035-2000S	3.21	C0180-035-2000X	41.24		3.21	
C0210-018-0250M	0.46	0.46	0.46	6.35	2.9	2.26	1.93	C0210-018-0250S	1.6	C0210-018-0250X	3.95	3.87	1.6	
C0210-018-0310M				7.87	3.43	2.51	1.51	C0210-018-0310S	1.25	C0210-018-0310X	4.81		1.25	
C0210-018-0380M				9.65	4.09	2.79	1.19	C0210-018-0380S	0.99	C0210-018-0380X	5.77		0.99	
C0210-018-0440M				11.18	4.62	3.05	1.02	C0210-018-0440S	0.85	C0210-018-0440X	6.63		0.85	
C0210-018-0500M				12.7	5.18	3.3	0.89	C0210-018-0500S	0.74	C0210-018-0500X	7.52		0.74	
C0210-018-0560M				14.22	5.74	3.56	0.79	C0210-018-0560S	0.66	C0210-018-0560X	8.36		0.66	
C0210-018-0620M				15.75	6.3	3.81	0.7	C0210-018-0620S	0.58	C0210-018-0620X	9.15		0.58	
C0210-018-0690M				17.53	6.93	4.09	0.63	C0210-018-0690S	0.52	C0210-018-0690X	10.19		0.53	
C0210-018-0750M				19.05	7.49	4.34	6.67	C0210-018-0750S	5.56	C0210-018-0750X	11.05	3.87	0.48	
C0210-018-0810M				20.57	7.87	4.6	0.53	C0210-018-0810S	0.44	C0210-018-0810X	11.78		0.44	
C0210-018-0880M				22.35	8.69	4.88	0.49	C0210-018-0880S	0.41	C0210-018-0880X	12.93		0.41	
C0210-018-1000M				25.4	9.53	5.38	0.42	C0210-018-1000S	0.35	C0210-018-1000X	14.40		0.35	
C0210-018-1250M				31.75	11.71	6.43	0.33	C0210-018-1250S	0.28	C0210-018-1250X	17.86		0.28	
C0210-018-1500M				38.1	14.38	7.47	0.28	C0210-018-1500S	0.23	C0210-018-1500X	21.60		0.23	
C0210-018-1750M				44.45	17.25	8.48	0.25	C0210-018-1750S	0.2	C0210-018-1750X	25.60		0.2	
C0210-018-2000M				50.8	19	9.53	0.21	C0210-018-2000S	0.17	C0210-018-2000X	28.81		0.18	
C0210-022-0250M	0.56	0.56	0.56	6.35	3.56	2.87	4.13	C0210-022-0250S	3.44	C0210-022-0250X	4.33	3.87	3.44	
C0210-022-0310M				7.87	4.27	3.23	3.2	C0210-022-0310S	2.67	C0210-022-0310X	5.27		2.67	
C0210-022-0380M				9.65	5.11	3.63	2.54	C0210-022-0380S	2.12	C0210-022-0380X	6.36		2.12	
C0210-022-0440M				11.18	5.82	3.99	2.15	C0210-022-0440S	1.79	C0210-022-0440X	7.30		1.79	
C0210-022-0500M				12.7	6.53	4.32	1.87	C0210-022-0500S	1.56	C0210-022-0500X	8.24		1.56	
C0210-022-0560M				14.22	7.24	4.67	1.65	C0210-022-0560S	1.37	C0210-022-0560X	9.15		1.37	
C0210-022-0620M				15.75	7.98	5.03	1.49	C0210-022-0620S	1.24	C0210-022-0620X	10.14		1.24	
C0210-022-0690M		5.33	5.33	17.53	8.79	5.44	11.52	C0210-022-0690S	9.6	C0210-022-0690X	11.17	6.94	1.09	
C0210-022-0750M				19.05	9.5	5.79	1.21	C0210-022-0750S	1.01	C0210-022-0750X	12.14		1.01	
C0210-022-0810M				20.57	10.21	6.12	1.12	C0210-022-0810S	0.93	C0210-022-0810X	13.12		0.93	
C0210-022-0880M				22.35	11.05	6.53	1.02	C0210-022-0880S	0.85	C0210-022-0880X	14.13		0.85	
C0210-022-1000M				25.4	12.47	7.24	0.89	C0210-022-1000S	0.74	C0210-022-1000X	16.05		0.74	
C0210-022-1250M				31.75	15.44	8.69	0.7	C0210-022-1250S	0.58	C0210-022-1250X	19.83		0.58	
C0210-022-1500M				38.1	18.16	10.13	0.58	C0210-022-1500S	0.48	C0210-022-1500X	23.65		0.48	
C0210-022-1750M				44.45	21.77	11.58	0.51	C0210-022-1750S	0.42	C0210-022-1750X	28.00		0.42	
C0210-022-2000M				50.8	24.36	13.06	0.44	C0210-022-2000S	0.36	C0210-022-2000X	31.72		0.36	
C0210-026-0250M	0.66	0.66	0.66	6.35	3.96	3.56	7.72	C0210-026-0250S	6.43	C0210-026-0250X	4.58	11.34	6.43	
C0210-026-0310M				7.87	4.78	4.04	5.94	C0210-026-0310S	4.95	C0210-026-0310X	5.58		4.95	
C0210-														



COMPRESSION SPRINGS MUSIC WIRE								302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX			
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0210-026-0810M	5.33	0.66	20.57	11.46	8.03	18.42	2.01	C0210-026-0810S	1.67	1.67	C0210-026-0810X	13.80	1.68	
C0210-026-0880M			22.35	12.4	8.59		1.84	C0210-026-0880S	1.53	1.53	C0210-026-0880X	14.94	1.53	
C0210-026-1000M			25.4	14	9.55		1.61	C0210-026-1000S	1.34	1.34	C0210-026-1000X	16.94	1.34	
C0210-026-1250M			31.75	17.35	11.53		1.28	C0210-026-1250S	15.34	1.06	C0210-026-1250X	21.09	11.34	1.06
C0210-026-1500M			38.1	20.68	13.54		1.05	C0210-026-1500S	0.88	0.88	C0210-026-1500X	25.12	0.88	
C0210-026-1750M			44.45	24.03	15.52		0.89	C0210-026-1750S	0.74	0.74	C0210-026-1750X	29.19	0.74	
C0210-026-2000M			50.8	27.38	17.5		0.79	C0210-026-2000S	0.66	0.66	C0210-026-2000X	33.50	0.66	
C0240-016-0250M	0.41	0.41	6.35	2.59	1.78	4.09	1.09	C0240-016-0250S	0.9	0.9	C0240-016-0250X	3.71	0.9	
C0240-016-0310M			7.87	3.02	1.93		0.84	C0240-016-0310S	0.7	0.7	C0240-016-0310X	4.46	0.7	
C0240-016-0380M			9.65	3.66	2.11		0.68	C0240-016-0380S	0.57	0.57	C0240-016-0380X	5.45	0.57	
C0240-016-0440M			11.18	4.06	2.26		0.58	C0240-016-0440S	0.48	0.48	C0240-016-0440X	6.21	0.48	
C0240-016-0500M			12.7	4.65	2.41		0.51	C0240-016-0500S	0.42	0.42	C0240-016-0500X	7.05	0.42	
C0240-016-0560M			14.22	4.88	2.57		0.44	C0240-016-0560S	0.36	0.36	C0240-016-0560X	7.67	0.36	
C0240-016-0620M			15.75	5.51	2.72		0.4	C0240-016-0620S	0.34	0.34	C0240-016-0620X	8.63	0.34	
C0240-016-0690M			17.53	5.84	2.9		0.35	C0240-016-0690S	3.41	0.29	C0240-016-0690X	9.34	2.4	0.29
C0240-016-0750M			19.05	6.76	3.05		0.33	C0240-016-0750S		0.28	C0240-016-0750X	10.43	0.28	
C0240-016-0810M			20.57	6.83	3.2		0.3	C0240-016-0810S		0.25	C0240-016-0810X	10.94	0.25	
C0240-016-0880M	6.1	6.1	22.35	7.75	3.38	5.69	0.28	C0240-016-0880S		0.23	C0240-016-0880X	12.12	0.23	
C0240-016-1000M			25.4	8.71	3.68		0.25	C0240-016-1000S		0.2	C0240-016-1000X	13.70	0.2	
C0240-016-1250M			31.75	10.54	4.32		0.19	C0240-016-1250S		0.16	C0240-016-1250X	16.86	0.16	
C0240-016-1500M			38.1	12.14	4.95		0.16	C0240-016-1500S		0.13	C0240-016-1500X	19.91	0.13	
C0240-016-1750M			44.45	15.24	5.59		0.14	C0240-016-1750S		0.12	C0240-016-1750X	23.98	0.12	
C0240-016-2000M			50.8	17.42	6.22		0.12	C0240-016-2000S		0.1	C0240-016-2000X	27.41	0.1	
C0240-018-0250M	0.46	0.46	6.35	2.92	2.03	4.74	1.66	C0240-018-0250S		1.39	C0240-018-0250X	3.91	1.39	
C0240-018-0310M			7.87	3.48	2.24		1.3	C0240-018-0310S		1.08	C0240-018-0310X	4.74	1.08	
C0240-018-0380M			9.65	4.11	2.44		1.03	C0240-018-0380S		0.86	C0240-018-0380X	5.72	0.86	
C0240-018-0440M			11.18	4.67	2.62		0.88	C0240-018-0440S		0.73	C0240-018-0440X	6.53	0.73	
C0240-018-0500M			12.7	5.31	2.82		0.77	C0240-018-0500S		0.64	C0240-018-0500X	7.42	0.64	
C0240-018-0560M			14.22	5.89	3		0.68	C0240-018-0560S		0.57	C0240-018-0560X	8.27	0.57	
C0240-018-0620M			15.75	6.38	3.2		0.61	C0240-018-0620S		0.51	C0240-018-0620X	9.11	0.51	
C0240-018-0690M			17.53	7.01	3.4		0.54	C0240-018-0690S		0.45	C0240-018-0690X	10.04	0.45	
C0240-018-0750M			19.05	7.44	3.58		0.49	C0240-018-0750S		0.41	C0240-018-0750X	10.76	3.38	0.41
C0240-018-0810M			20.57	8.13	3.78		0.46	C0240-018-0810S		0.38	C0240-018-0810X	11.64	0.38	
C0240-018-0880M	0.51	0.51	22.35	8.79	3.99	7.78	0.42	C0240-018-0880S		0.35	C0240-018-0880X	12.68	0.35	
C0240-018-1000M			25.4	9.91	4.37		0.37	C0240-018-1000S		0.31	C0240-018-1000X	14.34	0.31	
C0240-018-1250M			31.75	12.62	5.16		0.3	C0240-018-1250S		0.25	C0240-018-1250X	18.09	0.25	
C0240-018-1500M			38.1	14.88	5.92		0.25	C0240-018-1500S		0.2	C0240-018-1500X	21.51	0.2	
C0240-018-1750M			44.45	17.35	6.71		0.21	C0240-018-1750S		0.17	C0240-018-1750X	25.10	0.18	
C0240-018-2000M			50.8	18.29	7.47		0.18	C0240-018-2000S		0.15	C0240-018-2000X	27.58	0.15	
C0240-020-0250M	6.1	6.1	6.35	3.2	2.31	4.68	2.47	C0240-020-0250S		2.06	C0240-020-0250X	4.10	2.06	
C0240-020-0310M			7.87	3.84	2.51		1.93	C0240-020-0310S		1.6	C0240-020-0310X	4.99	1.6	
C0240-020-0380M			9.65	4.57	2.79		1.52	C0240-020-0380S		1.27	C0240-020-0380X	6.01	1.27	
C0240-020-0440M			11.18	5.18	3		1.3	C0240-020-0440S		1.08	C0240-020-0440X	6.89	1.08	
C0240-020-0500M			12.7	5.82	3.23		1.12	C0240-020-0500S		0.93	C0240-020-0500X	7.74	0.93	
C0240-020-0560M			14.22	6.45	3.45		1	C0240-020-0560S		0.83	C0240-020-0560X	8.66	0.83	
C0240-020-0620M			15.75	7.06	3.68		0.89	C0240-020-0620S		0.74	C0240-020-0620X	9.53	0.74	
C0240-020-0690M			17.53	7.8	3.94		0.81	C0240-020-0690S		0.67	C0240-020-0690X	10.63	4.63	0.67
C0240-020-0750M			19.05	8.43	4.17		0.74	C0240-020-0750S		0.61	C0240-020-0750X	11.50	0.61	
C0240-020-0810M			20.57	8.86	4.37		0.67	C0240-020-0810S		0.55	C0240-020-0810X	12.23	0.56	
C0240-020-0880M	0.56	0.56	22.35	9.65	4.62	10.63	0.61	C0240-020-0880S		0.51	C0240-020-0880X	13.29	0.51	
C0240-020-1000M			25.4	11.02	5.08		0.54	C0240-020-1000S		0.45	C0240-020-1000X	15.17	0.45	
C0240-020-1250M			31.75	13.23	5.99		0.42	C0240-020-1250S		0.35	C0240-020-1250X	18.53	0.35	
C0240-020-1500M			38.1	15.88	6.93		0.35	C0240-020-1500S		0.29	C0240-020-1500X	22.24	0.29	
C0240-020-1750M			44.45	18.31	7.85		0.3	C0240-020-1750S		0.25	C0240-020-1750X	25.79	0.25	
C0240-020-2000M			50.8	21.16	8.79		0.26	C0240-020-2000S		0.22	C0240-020-2000X	29.65	0.22	
C0240-022-0250M	0.66	0.66	6.35	3.23	2.62	8.85	3.41	C0240-022-0250S		2.84	C0240-022-0250X	4.19	2.84	
C0240-022-0310M			7.87	3.86	2.87		2.64	C0240-022-0310S		2.2	C0240-022-0310X	5.09	2.2	
C0240-022-0380M			9.65	4.72	2.92		2.15	C0240-022-0380S		1.79	C0240-022-0380X	6.23	1.79	
C0240-022-0440M			11.18	4.9	3.33		1.7	C0240-022-0440S		1.41	C0240-022-0440X	6.84	1.41	
C0240-022-0500M			12.7	5.54	3.61		1.49	C0240-022-0500S		1.24	C0240-022-0500X	7.75	1.24	
C0240-022-0560M			14.22	6.15	3.91		1.31	C0240-022-0560S		1.09	C0240-022-0560X	8.62	1.09	
C0240-022-0620M			15.75	6.78	4.17		1.19	C0240-022-0620S		0.99	C0240-022-0620X	9.57	0.99	
C0240-022-0690M			17.53	7.67	4.45		1.09	C0240-022-0690S		0.9	C0240-022-0690X	10.75	6.14	0.9
C0240-022-0750M			19.05	8.31	4.78		0.98	C0240-022-0750S		0.82	C0240-022-0750X	1		

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0240-024-0440M	0.61	0.61	19.05	11.18	5.77	3.94	2.4	C0240-024-0440S	10.82	2	C0240-024-0440X	7.21	7.92	2
C0240-024-0500M				12.7	6.45	4.27	2.08	C0240-024-0500S		1.73	C0240-024-0500X	8.13		1.74
C0240-024-0560M				14.22	7.16	4.57	1.84	C0240-024-0560S		1.53	C0240-024-0560X	9.05		1.53
C0240-024-0620M				15.75	7.85	4.9	1.65	C0240-024-0620S		1.37	C0240-024-0620X	9.97		1.37
C0240-024-0690M				17.53	8.66	5.28	1.47	C0240-024-0690S		1.23	C0240-024-0690X	11.06		1.23
C0240-024-0750M				19.05	9.35	5.61	12.99	C0240-024-0750S		1.11	C0240-024-0750X	11.90		1.11
C0240-024-0810M				20.57	10.06	5.92	1.23	C0240-024-0810S		1.02	C0240-024-0810X	12.81		1.02
C0240-024-0880M				22.35	10.85	6.3	1.12	C0240-024-0880S		0.93	C0240-024-0880X	13.86		0.93
C0240-024-1000M				25.4	12.24	6.96	0.98	C0240-024-1000S		0.82	C0240-024-1000X	15.70		0.82
C0240-024-1250M				31.75	15.14	8.31	0.79	C0240-024-1250S		0.66	C0240-024-1250X	19.68		0.66
C0240-024-1500M	0.66	0.66	19.05	38.1	18.03	9.63	0.65	C0240-024-1500S	14.27	0.54	C0240-024-1500X	23.42	10.01	0.54
C0240-024-1750M				44.45	21.29	10.97	0.56	C0240-024-1750S		0.47	C0240-024-1750X	27.47		0.47
C0240-024-2000M				50.8	23.34	12.32	0.47	C0240-024-2000S		0.39	C0240-024-2000X	30.68		0.39
C0240-026-0310M				7.87	4.47	3.51	5.03	C0240-026-0310S		4.19	C0240-026-0310X	5.48		4.19
C0240-026-0380M				9.65	5.46	3.63	4.08	C0240-026-0380S		3.4	C0240-026-0380X	6.70		3.4
C0240-026-0440M				11.18	6.27	3.96	3.48	C0240-026-0440S		2.9	C0240-026-0440X	7.72		2.9
C0240-026-0500M				12.7	7.09	4.29	3.05	C0240-026-0500S		2.54	C0240-026-0500X	8.75		2.54
C0240-026-0560M				14.22	7.57	4.78	2.57	C0240-026-0560S		2.14	C0240-026-0560X	9.55		2.15
C0240-026-0620M				15.75	8.05	5.28	2.22	C0240-026-0620S		1.85	C0240-026-0620X	10.33		1.85
C0240-026-0690M				17.53	8.76	5.79	1.94	C0240-026-0690S		1.62	C0240-026-0690X	11.33		1.62
C0240-026-0750M				19.05	9.25	6.25	17.13	C0240-026-0750S		1.46	C0240-026-0750X	12.18		1.46
C0240-026-0810M				20.57	10.06	6.6	1.63	C0240-026-0810S		1.36	C0240-026-0810X	13.18		1.36
C0240-026-0880M				22.35	10.8	7.14	1.47	C0240-026-0880S		1.23	C0240-026-0880X	14.17		1.23
C0240-026-1000M	6.1	0.74	19.05	25.4	12.19	7.95	1.3	C0240-026-1000S	18.34	1.08	C0240-026-1000X	16.11	13.83	1.08
C0240-026-1250M				31.75	15.16	9.53	1.03	C0240-026-1250S		0.86	C0240-026-1250X	20.10		0.86
C0240-026-1500M				38.1	18.14	11.1	0.86	C0240-026-1500S		0.71	C0240-026-1500X	24.07		0.71
C0240-026-1750M				44.45	20.6	12.67	0.72	C0240-026-1750S		0.6	C0240-026-1750X	27.68		0.6
C0240-026-2000M				50.8	23.65	14.25	0.63	C0240-026-2000S		0.52	C0240-026-2000X	31.70		0.53
C0240-029-0380M				9.65	5.72	4.7	5.6	C0240-029-0380S		4.66	C0240-029-0380X	6.69		4.67
C0240-029-0440M				11.18	6.53	5.16	4.73	C0240-029-0440S		3.94	C0240-029-0440X	7.67		3.94
C0240-029-0500M				12.7	7.32	5.61	4.08	C0240-029-0500S		3.4	C0240-029-0500X	8.64		3.4
C0240-029-0560M				14.22	8.1	6.1	3.61	C0240-029-0560S		3.01	C0240-029-0560X	9.63		3.01
C0240-029-0620M				15.75	8.89	6.55	3.22	C0240-029-0620S		2.68	C0240-029-0620X	10.60		2.68
C0240-029-0690M				17.53	9.83	7.09	2.85	C0240-029-0690S		2.37	C0240-029-0690X	11.72		2.38
C0240-029-0750M				19.05	10.62	7.57	2.61	C0240-029-0750S		2.17	C0240-029-0750X	12.69		2.17
C0240-029-0810M				20.57	11.4	8.03	2.4	C0240-029-0810S		2	C0240-029-0810X	13.66		2
C0240-029-0880M				22.35	12.32	8.56	22.02	C0240-029-0880S		1.84	C0240-029-0880X	14.84		13.83
C0240-029-0940M				23.88	13.13	9.02	2.05	C0240-029-0940S		1.71	C0240-029-0940X	15.78		1.71
C0240-029-1000M				25.4	13.92	9.5	1.93	C0240-029-1000S		1.6	C0240-029-1000X	16.79		1.6
C0240-029-1120M				28.45	15.49	10.41	1.7	C0240-029-1120S		1.41	C0240-029-1120X	18.69		1.41
C0240-029-1250M				31.75	17.22	11.43	1.52	C0240-029-1250S		1.27	C0240-029-1250X	20.87		1.27
C0240-029-1380M				35.05	18.92	12.42	1.37	C0240-029-1380S		1.14	C0240-029-1380X	22.91		1.14
C0240-029-1500M				38.1	20.52	13.36	1.26	C0240-029-1500S		1.05	C0240-029-1500X	24.95		1.05
C0240-029-1750M				44.45	23.83	15.29	1.07	C0240-029-1750S		0.89	C0240-029-1750X	28.93		0.89
C0240-029-2000M				50.8	27.13	17.22	0.93	C0240-029-2000S		0.77	C0240-029-2000X	32.93		0.77
C0240-032-0310M	0.81	0.81	19.05	7.87	5.13	4.24	11.17	C0240-032-0310S	25.53	9.3	C0240-032-0310X	5.90	18.41	9.31
C0240-032-0380M				9.65	6.4	4.67	9.42	C0240-032-0380S		7.85	C0240-032-0380X	7.31		7.85
C0240-032-0440M				11.18	7.16	5.31	7.56	C0240-032-0440S		6.3	C0240-032-0440X	8.25		6.3
C0240-032-0500M				12.7	7.95	5.89	6.44	C0240-032-0500S		5.36	C0240-032-0500X	9.27		5.37
C0240-032-0560M				14.22	8.74	6.48	5.59	C0240-032-0560S		4.66	C0240-032-0560X	10.27		4.65
C0240-032-0620M				15.75	9.5	7.09	4.9	C0240-032-0620S		4.08	C0240-032-0620X	11.24		4.08
C0240-032-0690M				17.53	10.52	7.7	4.38	C0240-032-0690S		3.65	C0240-032-0690X	12.48		3.65
C0240-032-0750M				19.05	11.05	8.51	3.84	C0240-032-0750S		3.2	C0240-032-0750X	13.29		3.19
C0240-032-0810M				20.57	11.84	9.12	30.65	C0240-032-0810S		2.92	C0240-032-0810X	14.26		2.92
C0240-032-0880M				22.35	12.85	9.75	3.22	C0240-032-0880S		2.68	C0240-032-0880X	15.49		2.68
C0240-032-0940M	0.89	0.89	19.05	23.88	13.64	10.34	2.99	C0240-032-0940S	30.9	2.49	C0240-032-0940X	16.49	23.89	2.49
C0240-032-1000M				25.4	14.4	10.95	2.78	C0240-032-1000S		2.32	C0240-032-1000X	17.46		2.32
C0240-032-1250M				31.75	17.75	13.36	2.19	C0240-032-1250S		1.82	C0240-032-1250X	21.65		1.82
C0240-032-1380M				35.05	19.43	14.55	1.96	C0240-032-1380S		1.63	C0240-032-1380X	23.78		1.63
C0240-032-1500M				38.1	21.11	15.65	1.8	C0240-032-1500S		1.5	C0240-032-1500X	25.84		1.5
C0240-032-1750M				44.45	24.56	17.96	1.54	C0240-032-1750S		1.28	C0240-032-1750X	30.10		1.28
C0240-032-2000M														

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0240-035-0880M			22.35	14.12	11.3		4.5	C0240-035-0880S	3.75		C0240-035-0880X	15.98		3.75
C0240-035-0940M			23.88	15.04	11.96		4.2	C0240-035-0940S	3.5		C0240-035-0940X	17.05		3.5
C0240-035-1000M			25.4	15.95	12.6		3.92	C0240-035-1000S	3.27		C0240-035-1000X	18.09		3.27
C0240-035-1250M			31.75	19.76	15.27		3.1	C0240-035-1250S	2.58		C0240-035-1250X	22.50		2.58
C0240-035-1380M	0.89		35.05	21.74	16.66	37.1	2.78	C0240-035-1380S	30.9	2.32	C0240-035-1380X	24.75	23.89	2.32
C0240-035-1500M			38.1	23.57	17.93		2.56	C0240-035-1500S	2.13		C0240-035-1500X	26.88		2.13
C0240-035-1750M			44.45	27.38	20.6		2.17	C0240-035-1750S	1.81		C0240-035-1750X	31.24		1.81
C0240-035-2000M			50.8	31.19	23.27		1.89	C0240-035-2000S	1.58		C0240-035-2000X	35.63		1.58
C0240-035-2250M			57.15	35	25.93		1.68	C0240-035-2250S	1.4		C0240-035-2250X	40.09		1.4
C0240-035-2500M			63.5	38.81	28.6		1.51	C0240-035-2500S	1.25		C0240-035-2500X	44.45		1.25
C0240-038-0310M			7.87	5.66	5.28		22.26	C0240-038-0310S	18.54		C0240-038-0310X	6.24		18.54
C0240-038-0380M			9.65	6.88	6.02		17.77	C0240-038-0380S	14.8		C0240-038-0380X	7.60		14.81
C0240-038-0440M			11.18	7.85	6.73		14.78	C0240-038-0440S	12.31		C0240-038-0440X	8.71		12.31
C0240-038-0500M			12.7	8.81	7.47		12.66	C0240-038-0500S	10.55		C0240-038-0500X	9.83		10.55
C0240-038-0560M			14.22	9.78	8.2		11.07	C0240-038-0560S	9.22		C0240-038-0560X	10.94		9.22
C0240-038-0620M			15.75	10.77	8.89		9.88	C0240-038-0620S	8.23		C0240-038-0620X	12.06		8.23
C0240-038-0690M			17.53	11.99	9.63		8.88	C0240-038-0690S	7.4		C0240-038-0690X	13.43		7.4
C0240-038-0750M			19.05	12.95	10.34		8.07	C0240-038-0750S	6.72		C0240-038-0750X	14.54		6.72
C0240-038-0810M			20.57	13.92	11.07		7.39	C0240-038-0810S	6.16		C0240-038-0810X	15.65		6.16
C0240-038-0880M			22.35	14.96	12.04		6.65	C0240-038-0880S	5.54		C0240-038-0880X	16.88		5.54
C0240-038-0940M	0.97		23.88	15.75	12.98	49.2	6.06	C0240-038-0940S	40.98	5.05	C0240-038-0940X	17.87	30.29	5.05
C0240-038-1000M			25.4	16.71	13.74		5.66	C0240-038-1000S	4.71		C0240-038-1000X	18.97		4.71
C0240-038-1120M			28.45	18.67	15.16		5.03	C0240-038-1120S	4.19		C0240-038-1120X	21.21		4.19
C0240-038-1250M			31.75	20.85	16.59		4.52	C0240-038-1250S	3.77		C0240-038-1250X	23.70		3.76
C0240-038-1380M			35.05	23.04	18.06		4.1	C0240-038-1380S	3.42		C0240-038-1380X	26.17		3.41
C0240-038-1500M			38.1	24.99	19.51		3.75	C0240-038-1500S	3.12		C0240-038-1500X	28.39		3.12
C0240-038-1750M			44.45	28.22	23.16		3.03	C0240-038-1750S	2.52		C0240-038-1750X	32.44		2.52
C0240-038-2000M			50.8	32.21	26.21		2.64	C0240-038-2000S	2.2		C0240-038-2000X	37.04		2.2
C0240-038-2250M			57.15	36.02	29.24		2.33	C0240-038-2250S	1.94		C0240-038-2250X	41.53		1.94
C0240-038-2500M			63.5	40.08	32.26		2.1	C0240-038-2500S	1.75		C0240-038-2500X	46.18		1.75
C0240-040-0310M			7.87	5.92	5.59		27.28	C0240-040-0310S	22.72		C0240-040-0310X	6.33		22.73
C0240-040-0380M			9.65	7.09	6.96		20.91	C0240-040-0380S	17.42		C0240-040-0380X	7.63		17.42
C0240-040-0440M			11.18	8.1	7.75		17.42	C0240-040-0440S	14.51		C0240-040-0440X	8.76		14.51
C0240-040-0500M			12.7	9.12	8.53		14.94	C0240-040-0500S	12.45		C0240-040-0500X	9.88		12.44
C0240-040-0560M			14.22	10.13	9.3		13.08	C0240-040-0560S	10.9		C0240-040-0560X	11.00		10.9
C0240-040-0620M	6.1		15.75	11.15	10.08		11.63	C0240-040-0620S	9.69		C0240-040-0620X	12.12		9.69
C0240-040-0690M			17.53	12.32	11		10.28	C0240-040-0690S	8.56		C0240-040-0690X	13.42		8.56
C0240-040-0750M			19.05	13.34	11.79		9.37	C0240-040-0750S	7.81		C0240-040-0750X	14.55		7.81
C0240-040-0810M			20.57	14.35	12.57		8.6	C0240-040-0810S	7.16		C0240-040-0810X	15.67		7.16
C0240-040-0880M			22.35	15.52	13.49		7.84	C0240-040-0880S	6.53		C0240-040-0880X	16.98		6.54
C0240-040-0940M	1.02		23.88	16.54	14.27	53.51	7.3	C0240-040-0940S	44.57	6.08	C0240-040-0940X	18.10	35.14	6.08
C0240-040-1000M			25.4	17.55	15.04		6.83	C0240-040-1000S	5.69		C0240-040-1000X	19.22		5.69
C0240-040-1120M			28.45	19.58	16.61		6.04	C0240-040-1120S	5.03		C0240-040-1120X	21.47		5.03
C0240-040-1250M			31.75	21.77	18.31		5.36	C0240-040-1250S	4.46		C0240-040-1250X	23.88		4.46
C0240-040-1380M			35.05	23.98	20.02		4.83	C0240-040-1380S	4.02		C0240-040-1380X	26.32		4.03
C0240-040-1500M			38.1	25.98	21.56		4.41	C0240-040-1500S	3.67		C0240-040-1500X	28.54		3.68
C0240-040-1750M			44.45	30.2	24.82		3.77	C0240-040-1750S	3.14		C0240-040-1750X	33.25		3.14
C0240-040-2000M			50.8	34.42	28.09		3.27	C0240-040-2000S	2.72		C0240-040-2000X	37.92		2.73
C0240-040-2250M			57.15	38.66	35.99		2.89	C0240-040-2250S	2.41		C0240-040-2250X	42.55		2.41
C0240-040-2500M			63.5	42.88	34.62		2.59	C0240-040-2500S	2.16		C0240-040-2500X	47.23		2.16
C0240-042-0380M			9.65	7.24	6.91		26.44	C0240-042-0380S	22.02		C0240-042-0380X	7.86		22.03
C0240-042-0440M			11.18	8.2	7.87		21.54	C0240-042-0440S	17.94		C0240-042-0440X	8.97		17.94
C0240-042-0500M			12.7	9.27	8.71		18.56	C0240-042-0500S	15.46		C0240-042-0500X	10.14		15.46
C0240-042-0560M			14.22	10.34	9.47		16.46	C0240-042-0560S	13.71		C0240-042-0560X	11.34		13.71
C0240-042-0620M			15.75	11.46	10.19		14.88	C0240-042-0620S	12.4		C0240-042-0620X	12.56		12.4
C0240-042-0690M			17.53	12.65	11.2		13.13	C0240-042-0690S	10.94		C0240-042-0690X	13.91		10.94
C0240-042-0750M			19.05	13.39	12.67		11.21	C0240-042-0750S	9.34		C0240-042-0750X	14.81		9.34
C0240-042-0810M			20.57	14.45	13.34		10.51	C0240-042-0810S	8.75		C0240-042-0810X	16.06		8.75
C0240-042-0880M			22.35	15.77	14.12		9.81	C0240-042-0880S	8.17		C0240-042-0880X	17.51		8.17
C0240-042-0940M	1.07		23.88	16.69	15.24	64.01	8.93	C0240-042-0940S	53.32	7.44	C0240-042-0940X	18.56	39.54	7.44
C0240-042-1000M			25.4	17.75	16.03		8.41	C0240-042-1000S	7.01		C0240-042-1000X	19.75		7
C0240-042-1120M			28.45	19.89	17.75		7.44	C0240-042-1120S	6.2		C0240-042-1120X	22.07		6.2
C0240-042-1250M			31.75	22.05	19.76		6.57	C0240-042-1250S	5.47		C0240-042-1250X	24.52		5.47
C0240-042-1380M			35.05	24.33	21.51		5.95	C0240-042-1380S	4.96		C0240-042-1380X	27.08		4.96
C0240-042-1500M			38.1	26.11	23.7		5.34	C0240-042-1500S	4.45		C0240-042-1500X	29.21		4.45
C0240-042-1750M			44.45	30.66	26.42		4.64	C0240-042-1750S	3.87		C0240-042-1750X	34.22		3.86
C0240-042-2000M			50.8	34.9	29.9		4.03	C0240-042-2000S	3.36		C0240-042-2000X	39.01		3.36
C0240-042-2250M			57.15	39.24	33.38		3.57	C0240-042-2250S	2.97		C0240-042-2250X	43.86		2.98
C0240-042-2500M			63.5	43.54	36.88		3.2	C0240-042-2500S	2.67		C0240-042-2500X	48.68		2.67
C0240-045-0440M	1.14		11.18	8.84	8.28	71.92	30.63	C0240-045-0440S	59.91	25.51	C0240-045-0440X	9.29	48.13	25.51
C0240-045-0500M</														

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0240-045-0560M	6.1	1.14	14.22	11.07	10.06		22.8	C0240-045-0560S	18.99	C0240-045-0560X	11.69		18.99	
C0240-045-0620M			15.75	12.19	11.07		20.22	C0240-045-0620S	16.84	C0240-045-0620X	12.89		16.85	
C0240-045-0690M			17.53	13.51	12.12		17.86	C0240-045-0690S	14.88	C0240-045-0690X	14.29		14.88	
C0240-045-0750M			19.05	14.63	13.11		16.23	C0240-045-0750S	13.52	C0240-045-0750X	15.49		13.52	
C0240-045-0810M			20.57	15.75	14		14.88	C0240-045-0810S	12.4	C0240-045-0810X	16.69		12.4	
C0240-045-0880M			22.35	17.04	15.09	71.92	13.57	C0240-045-0880S	59.91	11.3	C0240-045-0880X	18.09	48.13	11.31
C0240-045-1000M			25.4	19.3	16.94		11.78	C0240-045-1000S	9.81	C0240-045-1000X	20.50		9.82	
C0240-045-1250M			31.75	23.98	20.65		9.25	C0240-045-1250S	7.71	C0240-045-1250X	25.50		7.7	
C0240-045-1500M			38.1	28.65	24.36		7.6	C0240-045-1500S	6.33	C0240-045-1500X	30.50		6.33	
C0240-045-1750M			44.45	33.3	28.07		6.46	C0240-045-1750S	5.38	C0240-045-1750X	35.51		5.38	
C0240-045-2000M	0.56	0.56	50.8	37.97	31.78		5.6	C0240-045-2000S	4.66	C0240-045-2000X	40.49		4.67	
C0240-045-2250M			57.15	42.65	35.48		4.96	C0240-045-2250S	4.13	C0240-045-2250X	45.49		4.13	
C0240-045-2500M			63.5	47.32	39.19		4.45	C0240-045-2500S	3.71	C0240-045-2500X	50.51		3.71	
C0300-022-0380M			9.65	4.19	2.54		1.58	C0300-022-0380S	1.31	C0300-022-0380X	5.88		1.31	
C0300-022-0440M			11.18	4.72	2.69		1.33	C0300-022-0440S	1.11	C0300-022-0440X	6.71		1.11	
C0300-022-0500M			12.7	5.21	2.77		1.16	C0300-022-0500S	0.96	C0300-022-0500X	7.56		0.96	
C0300-022-0560M			14.22	5.97	2.92		1.03	C0300-022-0560S	0.86	C0300-022-0560X	8.47		0.86	
C0300-022-0620M			15.75	6.02	3.2		0.88	C0300-022-0620S	0.73	C0300-022-0620X	8.96		0.73	
C0300-022-0690M			17.53	7.04	3.33		0.82	C0300-022-0690S	0.69	C0300-022-0690X	10.30		0.69	
C0300-022-0750M			19.05	7.06	3.61		0.72	C0300-022-0750S	0.6	C0300-022-0750X	10.77		0.6	
C0300-022-0810M			20.57	7.67	3.78		0.67	C0300-022-0810S	0.55	C0300-022-0810X	11.64		0.56	
C0300-022-0880M			22.35	8.86	3.91	8.59	0.63	C0300-022-0880S	7.16	0.52	C0300-022-0880X	12.92	4.94	0.53
C0300-022-1000M			25.4	10.08	4.45		0.56	C0300-022-1000S	0.47	C0300-022-1000X	14.79		0.47	
C0300-022-1250M	7.62	0.66	31.75	12.14	5.18		0.44	C0300-022-1250S	0.36	C0300-022-1250X	18.17		0.36	
C0300-022-1500M			38.1	14.76	5.89		0.37	C0300-022-1500S	0.31	C0300-022-1500X	21.94		0.31	
C0300-022-1750M			44.45	17.22	6.63		0.32	C0300-022-1750S	0.26	C0300-022-1750X	25.59		0.26	
C0300-022-2000M			50.8	18.11	7.34		0.26	C0300-022-2000S	0.22	C0300-022-2000X	28.17		0.22	
C0300-022-2250M			57.15	22.12	7.82		0.25	C0300-022-2250S	0.2	C0300-022-2250X	32.91		0.2	
C0300-022-2500M			63.5	25.78	8.48		0.23	C0300-022-2500S	0.19	C0300-022-2500X	37.39		0.19	
C0300-026-0440M			11.18	5.23	3.3		2.33	C0300-026-0440S		1.94	C0300-026-0440X	6.99		1.94
C0300-026-0500M			12.7	5.56	3.63		1.94	C0300-026-0500S		1.62	C0300-026-0500X	7.69		1.62
C0300-026-0560M			14.22	6.5	3.76		1.8	C0300-026-0560S		1.5	C0300-026-0560X	8.82		1.5
C0300-026-0620M			15.75	6.83	4.11		1.56	C0300-026-0620S		1.3	C0300-026-0620X	9.50		1.3
C0300-026-0690M			17.53	7.42	4.47		1.37	C0300-026-0690S		1.14	C0300-026-0690X	10.39		1.14
C0300-026-0750M			19.05	8.33	4.62		1.3	C0300-026-0750S		1.08	C0300-026-0750X	11.53		1.08
C0300-026-0810M			20.57	8.69	4.93		1.17	C0300-026-0810S		0.98	C0300-026-0810X	12.27		0.98
C0300-026-0880M			22.35	9.27	5.23		1.07	C0300-026-0880S		0.89	C0300-026-0880X	13.23		0.89
C0300-026-0940M			23.88	9.6	5.64	13.88	0.96	C0300-026-0940S	11.56	0.8	C0300-026-0940X	13.76	8.14	0.8
C0300-026-1000M			25.4	9.93	5.94		0.89	C0300-026-1000S		0.74	C0300-026-1000X	14.49		0.74
C0300-026-1250M			31.75	13.31	6.91		0.75	C0300-026-1250S		0.63	C0300-026-1250X	18.81		0.63
C0300-026-1500M			38.1	15.47	7.95		0.61	C0300-026-1500S		0.51	C0300-026-1500X	22.20		0.51
C0300-026-1750M			44.45	18.03	8.99		0.53	C0300-026-1750S		0.44	C0300-026-1750X	25.90		0.44
C0300-026-2000M			50.8	20.32	10.01		0.46	C0300-026-2000S		0.38	C0300-026-2000X	29.40		0.38
C0300-026-2250M			57.15	25.45	10.57		0.44	C0300-026-2250S		0.36	C0300-026-2250X	34.89		0.36
C0300-026-2500M			63.5	27.56	11.56		0.39	C0300-026-2500S		0.32	C0300-026-2500X	38.20		0.32
C0300-030-0440M	0.76	0.76	11.18	5.97	4.37		3.77	C0300-030-0440S		3.14	C0300-030-0440X	7.23		3.14
C0300-030-0500M			12.7	6.65	4.7		3.26	C0300-030-0500S		2.72	C0300-030-0500X	8.14		2.71
C0300-030-0560M			14.22	7.37	5.03		2.87	C0300-030-0560S		2.39	C0300-030-0560X	9.05		2.39
C0300-030-0620M			15.75	8.05	5.38		2.56	C0300-030-0620S		2.13	C0300-030-0620X	9.93		2.13
C0300-030-0690M			17.53	8.89	5.77		2.28	C0300-030-0690S		1.9	C0300-030-0690X	11.00		1.9
C0300-030-0750M			19.05	9.58	6.1		2.08	C0300-030-0750S		1.73	C0300-030-0750X	11.92		1.74
C0300-030-0810M			20.57	10.29	6.43		1.91	C0300-030-0810S		1.59	C0300-030-0810X	12.79		1.59
C0300-030-0880M			22.35	11.1	6.81	19.66	1.75	C0300-030-0880S	16.38	1.46	C0300-030-0880X	13.86	12.37	1.46
C0300-030-0940M			23.88	11.81	7.14		1.63	C0300-030-0940S		1.36	C0300-030-0940X	14.75		1.36
C0300-030-1000M			25.4	12.5	7.47		1.52	C0300-030-1000S		1.27	C0300-030-1000X	15.64		1.27
C0300-030-1250M	0.81	0.81	31.75	15.42	8.84		1.21	C0300-030-1250S		1.01	C0300-030-1250X	19.45		1.01
C0300-030-1500M			38.1	18.34	10.21		1	C0300-030-1500S		0.83	C0300-030-1500X	23.21		0.83
C0300-030-1750M			44.45	21.26	11.61		0.84	C0300-030-1750S		0.7	C0300-030-1750X	26.77		0.7
C0300-030-2000M			50.8	24.18	12.98		0.74	C0300-030-2000S		0.61	C0300-030-2000X	30.59		0.61
C0300-030-2250M			57.15	27.1	14.35		0.65	C0300-030-2250S		0.54	C0300-030-2250X	34.21		0.54
C0300-030-2500M			63.5	30.48	15.72		0.6	C0300-030-2500S		0.5	C0300-030-2500X	38.53		0.5
C0300-032-0440M			11.18	5.97	4.45		4.78	C0300-032-0440S		3.98	C0300-032-0440X	7.42		3.98
C0300-032-0500M			12.7	6.68	4.83		4.13	C0300-032-0500S		3.44	C0300-032-0500X	8.35		3.44
C0300-032-0560M			14.22	7.26	5.28		3.57	C0300-032-0560S		2.97	C0300-032-0560X	9.19		2.98
C0300-032-0620M			15.75	7.92	5.66		3.19	C0300-032-0620S		2.66	C0300-032-0620X	10.11		2.65
C0300-032-0690M			17.53	8.84	6.1		2.85	C0300-032-0690S		2.37	C0300-032-0690X	11.23		2.38
C0300-032-0750M			19.05	9.5	6.48	24.87	2.61	C0300-032-0750S	20.72	2.17	C0300-032-0750X	12.16	14.99	2.17
C0300-032-0810M														

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0300-032-1250M			31.75	15.24	9.86		1.51	C0300-032-1250S	1.25		C0300-032-1250X	19.82		1.25
C0300-032-1500M			38.1	18.11	11.43		1.24	C0300-032-1500S	1.04		C0300-032-1500X	23.64		1.03
C0300-032-1750M	0.81	44.45	20.78	12.98	24.87	1.05	20.72	C0300-032-1750S	0.88		C0300-032-1750X	27.34	14.99	0.88
C0300-032-2000M			50.8	24	14.55		0.93	C0300-032-2000S	0.77		C0300-032-2000X	31.44		0.77
C0300-032-2250M			57.15	28.27	15.44		0.86	C0300-032-2250S	0.71		C0300-032-2250X	36.20		0.71
C0300-032-2500M			63.5	31.32	16.66		0.77	C0300-032-2500S	0.64		C0300-032-2500X	40.17		0.64
C0300-035-0380M			9.65	5.69	4.9		8.06	C0300-035-0380S	6.71		C0300-035-0380X	6.75		6.71
C0300-035-0440M			11.18	6.45	5.33		6.74	C0300-035-0440S	5.61		C0300-035-0440X	7.71		5.62
C0300-035-0500M			12.7	7.21	5.77		5.81	C0300-035-0500S	4.84		C0300-035-0500X	8.68		4.84
C0300-035-0560M			14.22	7.98	6.2		5.1	C0300-035-0560S	4.25		C0300-035-0560X	9.64		4.24
C0300-035-0620M			15.75	8.74	6.65		4.54	C0300-035-0620S	3.78		C0300-035-0620X	10.59		3.78
C0300-035-0690M			17.53	9.63	7.14		4.03	C0300-035-0690S	3.36		C0300-035-0690X	11.72		3.36
C0300-035-0750M	0.89		19.05	10.36	7.57		3.68	C0300-035-0750S	3.07		C0300-035-0750X	12.69		3.06
C0300-035-0810M			20.57	11.13	8.03		3.38	C0300-035-0810S	2.82		C0300-035-0810X	13.66		2.82
C0300-035-0880M			22.35	12.01	8.51		3.08	C0300-035-0880S	2.57		C0300-035-0880X	14.77		2.57
C0300-035-0940M			23.88	12.78	8.97	31.85	2.87	C0300-035-0940S	26.53	2.39	C0300-035-0940X	15.73	19.48	2.39
C0300-035-1000M			25.4	13.54	9.4		2.68	C0300-035-1000S		2.23	C0300-035-1000X	16.67		2.23
C0300-035-1120M			28.45	15.06	10.26		2.38	C0300-035-1120S		1.98	C0300-035-1120X	18.63		1.98
C0300-035-1250M			31.75	16.69	11.2		2.12	C0300-035-1250S		1.77	C0300-035-1250X	20.72		1.77
C0300-035-1380M			35.05	18.34	12.14		1.91	C0300-035-1380S		1.59	C0300-035-1380X	22.80		1.59
C0300-035-1500M			38.1	19.86	13		1.75	C0300-035-1500S		1.46	C0300-035-1500X	24.75		1.46
C0300-035-1750M			44.45	23.01	14.81		1.49	C0300-035-1750S		1.24	C0300-035-1750X	28.74		1.24
C0300-035-2000M	7.62		50.8	26.16	16.61		1.3	C0300-035-2000S		1.08	C0300-035-2000X	32.76		1.08
C0300-035-2250M			57.15	29.34	18.42		1.14	C0300-035-2250S		0.95	C0300-035-2250X	36.61		0.95
C0300-035-2500M			63.5	32.49	20.22		1.03	C0300-035-2500S		0.86	C0300-035-2500X	40.87		0.86
C0300-038-0380M			9.65	6.1	5		11.29	C0300-038-0380S		9.4	C0300-038-0380X	7.02		9.41
C0300-038-0440M			11.18	6.88	5.54		9.37	C0300-038-0440S		7.81	C0300-038-0440X	8.00		7.81
C0300-038-0500M			12.7	7.75	6.02		8.13	C0300-038-0500S		6.77	C0300-038-0500X	9.04		6.77
C0300-038-0560M			14.22	8.31	6.73		6.79	C0300-038-0560S		5.66	C0300-038-0560X	9.85		5.66
C0300-038-0620M			15.75	9.17	7.21		6.11	C0300-038-0620S		5.09	C0300-038-0620X	10.88		5.09
C0300-038-0690M			17.53	9.96	7.95		5.31	C0300-038-0690S		4.42	C0300-038-0690X	11.92		4.42
C0300-038-0750M			19.05	10.82	8.41		4.89	C0300-038-0750S		4.07	C0300-038-0750X	12.96		4.07
C0300-038-0810M			20.57	11.68	8.92		4.52	C0300-038-0810S		3.77	C0300-038-0810X	13.99		3.76
C0300-038-0880M			22.35	12.47	9.63		4.06	C0300-038-0880S		3.38	C0300-038-0880X	15.03		3.39
C0300-038-0940M		0.97	23.88	13.34	10.11	40.21	3.82	C0300-038-0940S	33.49	3.18	C0300-038-0940X	16.09	24.78	3.18
C0300-038-1000M	1.02	25.4	14.2	10.59			3.59	C0300-038-1000S		2.99	C0300-038-1000X	17.12		2.99
C0300-038-1120M			28.45	15.93	11.58		3.2	C0300-038-1120S		2.67	C0300-038-1120X	19.17		2.67
C0300-038-1250M			31.75	17.91	12.52		2.91	C0300-038-1250S		2.42	C0300-038-1250X	21.52		2.42
C0300-038-1380M			35.05	19.89	13.51		2.64	C0300-038-1380S		2.2	C0300-038-1380X	23.80		2.2
C0300-038-1500M			38.1	21.64	14.48		2.43	C0300-038-1500S		2.02	C0300-038-1500X	25.88		2.03
C0300-038-1750M			44.45	23.95	17.27		1.96	C0300-038-1750S		1.63	C0300-038-1750X	29.29		1.63
C0300-038-2000M			50.8	27.13	19.43		1.7	C0300-038-2000S		1.41	C0300-038-2000X	33.29		1.41
C0300-038-2250M			57.15	31.65	20.47		1.58	C0300-038-2250S		1.31	C0300-038-2250X	38.28		1.31
C0300-038-2500M			63.5	35.38	22.2		1.44	C0300-038-2500S		1.2	C0300-038-2500X	42.79		1.2
C0300-040-0380M	1.07	9.65	6.35	5.87			13.22	C0300-040-0380S		11.01	C0300-040-0380X	7.04		11.01
C0300-040-0440M			11.18	7.19	6.43		11.01	C0300-040-0440S		9.17	C0300-040-0440X	8.04		9.18
C0300-040-0500M			12.7	8.05	6.99		9.44	C0300-040-0500S		7.86	C0300-040-0500X	9.04		7.86
C0300-040-0560M			14.22	8.92	7.54		8.27	C0300-040-0560S		6.89	C0300-040-0560X	10.04		6.89
C0300-040-0620M			15.75	9.78	8.13		7.34	C0300-040-0620S		6.11	C0300-040-0620X	11.04		6.11
C0300-040-0690M			17.53	10.8	8.79		6.5	C0300-040-0690S		5.41	C0300-040-0690X	12.21		5.41
C0300-040-0750M			19.05	11.66	9.35		5.92	C0300-040-0750S		4.93	C0300-040-0750X	13.21		4.93
C0300-040-0810M			20.57	12.52	9.91		5.43	C0300-040-0810S		4.52	C0300-040-0810X	14.21		4.52
C0300-040-0880M			22.35	13.51	10.57		4.96	C0300-040-0880S		4.13	C0300-040-0880X	15.38		4.13
C0300-040-0940M			23.88	14.38	11.13	43.81	4.61	C0300-040-0940S	36.49	3.84	C0300-040-0940X	16.38	28.78	3.84
C0300-040-1000M	1.07	25.4	15.24	11.68			4.31	C0300-040-1000S		3.59	C0300-040-1000X	17.38		3.59
C0300-040-1120M			28.45	16.97	12.83		3.82	C0300-040-1120S		3.18	C0300-040-1120X	19.40		3.18
C0300-040-1250M			31.75	18.82	14.05		3.4	C0300-040-1250S		2.83	C0300-040-1250X	21.58		2.83
C0300-040-1380M			35.05	20.7	15.27		3.05	C0300-040-1380S		2.54	C0300-040-1380X	23.72		2.54
C0300-040-1500M			38.1	22.4	16.38		2.8	C0300-040-1500S		2.33	C0300-040-1500X	25.77		2.33
C0300-040-1750M			44.45	26.01	18.72		2.38	C0300-040-1750S		1.98	C0300-040-1750X	29.95		1.98
C0300-040-2000M			50.8	29.59	21.08		2.07	C0300-040-2000S		1.72	C0300-040-2000X	34.08		1.72
C0300-040-2250M			57.15	33.17	23.42		1.82	C0300-040-2250S		1.52	C0300-040-2250X	38.18		1.52
C0300-040-2500M			63.5	36.78	25.78		1.65	C0300-040-2500S		1.37	C0300-040-2500X	42.52		1.37
C0300-042-0380M	1.07	9.65	6.88	5.33			18.96	C0300-042-0380S		15.79	C0300-042-0380X	7.60		15.8
C0300-042-0440M			11.18	7.87	5.84		15.9	C0300-042-0440S		13.24	C0300-042-0440X	8.73		13.25
C0300-042-0500M			12.7	8.46	6.76		12.38	C0300-042-0500S		10.31	C0300-042-0500X	9.55		10.31
C0300-042-0560M			14.22	9.25	7.47		10.54	C0300-042-0560S		8.78	C0300-042-0560X	10.53		8.78
C0300-042-0620M			15.75	9.93	8.26	52.53	9.04	C0300-042-0620S	43.76	7.53	C0300-042-0620X	11.44	32.47	7.53
C0300-042-0690M			17.53</td											

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0300-042-0880M			22.35	13.49	11.23		5.92	C0300-042-0880S	4.93		C0300-042-0880X	15.77		4.93
C0300-042-0940M			23.88	14.48	11.73		5.59	C0300-042-0940S	4.66		C0300-042-0940X	16.90		4.65
C0300-042-1000M			25.4	15.44	12.29		5.27	C0300-042-1000S	4.39		C0300-042-1000X	18.01		4.39
C0300-042-1120M			28.45	17.37	13.36		4.75	C0300-042-1120S	3.96		C0300-042-1120X	20.24		3.95
C0300-042-1250M	1.07		31.75	19.3	14.68	52.53	4.22	C0300-042-1250S	43.76	3.52	C0300-042-1250X	22.52	32.47	3.52
C0300-042-1380M			35.05	21.21	16		3.8	C0300-042-1380S	3.17		C0300-042-1380X	24.80		3.17
C0300-042-1500M			38.1	22.89	17.37		3.45	C0300-042-1500S	2.87		C0300-042-1500X	26.81		2.87
C0300-042-1750M			44.45	26.16	20.17		2.87	C0300-042-1750S	2.39		C0300-042-1750X	30.88		2.39
C0300-042-2000M			50.8	29.67	22.71		2.49	C0300-042-2000S	2.07		C0300-042-2000X	35.13		2.07
C0300-042-2250M			57.15	33.35	25.27		2.21	C0300-042-2250S	1.84		C0300-042-2250X	39.49		1.84
C0300-042-2500M			63.5	38.15	26.67		2.07	C0300-042-2500S	1.72		C0300-042-2500X	44.64		1.72
C0300-045-0380M			9.65	6.71	6.27		21.63	C0300-045-0380S	18.02		C0300-045-0380X	7.45		18.02
C0300-045-0440M			11.18	7.75	6.83		18.58	C0300-045-0440S	15.48		C0300-045-0440X	8.61		15.48
C0300-045-0500M			12.7	8.79	7.42		16.21	C0300-045-0500S	13.5		C0300-045-0500X	9.76		13.51
C0300-045-0560M			14.22	9.6	8.26		13.71	C0300-045-0560S	11.42		C0300-045-0560X	10.75		11.42
C0300-045-0620M			15.75	10.39	9.12		11.84	C0300-045-0620S	9.86		C0300-045-0620X	11.73		9.86
C0300-045-0690M			17.53	11.68	9.68		10.86	C0300-045-0690S	9.05		C0300-045-0690X	13.14		9.04
C0300-045-0750M			19.05	12.47	10.54		9.63	C0300-045-0750S	8.02		C0300-045-0750X	14.11		8.02
C0300-045-0810M			20.57	13.51	11.1		8.98	C0300-045-0810S	7.48		C0300-045-0810X	15.28		7.48
C0300-045-0880M			22.35	14.55	11.99		8.13	C0300-045-0880S	6.77		C0300-045-0880X	16.49		6.77
C0300-045-0940M	1.14		23.88	15.34	12.85	63.43	7.42	C0300-045-0940S	52.84	6.18	C0300-045-0940X	17.47	39.63	6.19
C0300-045-1000M			25.4	16.38	13.39		7.04	C0300-045-1000S		5.86	C0300-045-1000X	18.64		5.86
C0300-045-1120M			28.45	18.44	14.55		6.34	C0300-045-1120S		5.28	C0300-045-1120X	20.94		5.28
C0300-045-1250M			31.75	20.55	15.98		5.66	C0300-045-1250S		4.71	C0300-045-1250X	23.33		4.71
C0300-045-1380M			35.05	22.61	17.42		5.1	C0300-045-1380S		4.25	C0300-045-1380X	25.71		4.24
C0300-045-1500M			38.1	24.43	18.85		4.64	C0300-045-1500S		3.87	C0300-045-1500X	27.84		3.86
C0300-045-1750M			44.45	27.61	22.3		3.77	C0300-045-1750S		3.14	C0300-045-1750X	31.81		3.14
C0300-045-2000M			50.8	31.42	25.15		3.27	C0300-045-2000S		2.72	C0300-045-2000X	36.26		2.73
C0300-045-2250M			57.15	35.33	27.99		2.91	C0300-045-2250S		2.42	C0300-045-2250X	40.78		2.42
C0300-045-2500M			63.5	40.16	29.72		2.73	C0300-045-2500S		2.27	C0300-045-2500X	46.08		2.27
C0300-047-0380M			9.65	7.09	6.35		27.84	C0300-047-0380S		23.19	C0300-047-0380X	7.71		23.19
C0300-047-0440M			11.18	8.05	7.09		23.01	C0300-047-0440S		19.17	C0300-047-0440X	8.83		19.17
C0300-047-0500M			12.7	9.04	7.9		19.61	C0300-047-0500S		16.34	C0300-047-0500X	9.95		16.34
C0300-047-0560M			14.22	10.03	8.71		17.09	C0300-047-0560S		14.24	C0300-047-0560X	11.07		14.24
C0300-047-0620M			15.75	11.02	9.5		15.15	C0300-047-0620S		12.62	C0300-047-0620X	12.18		12.62
C0300-047-0690M	7.62		17.53	12.17	10.36		13.36	C0300-047-0690S		11.13	C0300-047-0690X	13.49		11.13
C0300-047-0750M			19.05	13.16	11.05		12.13	C0300-047-0750S		10.1	C0300-047-0750X	14.60		10.11
C0300-047-0810M			20.57	14.12	11.71		11.12	C0300-047-0810S		9.26	C0300-047-0810X	15.72		9.26
C0300-047-0880M			22.35	15.29	12.52		10.14	C0300-047-0880S		8.45	C0300-047-0880X	17.03		8.45
C0300-047-0940M			23.88	16.26	13.21		9.42	C0300-047-0940S		7.85	C0300-047-0940X	18.15		7.85
C0300-047-1000M	1.19		25.4	17.25	13.89	71.61	8.79	C0300-047-1000S	59.65	7.32	C0300-047-1000X	19.26	44.97	7.32
C0300-047-1120M			28.45	19.23	15.24		7.76	C0300-047-1120S		6.46	C0300-047-1120X	21.49		6.46
C0300-047-1250M			31.75	21.36	16.71		6.88	C0300-047-1250S		5.73	C0300-047-1250X	23.91		5.73
C0300-047-1380M			35.05	23.5	18.21		6.2	C0300-047-1380S		5.16	C0300-047-1380X	26.35		5.16
C0300-047-1500M			38.1	25.45	19.56		5.66	C0300-047-1500S		4.71	C0300-047-1500X	28.56		4.71
C0300-047-1750M			44.45	29.57	22.4		4.82	C0300-047-1750S		4.02	C0300-047-1750X	33.24		4.01
C0300-047-2000M			50.8	33.66	25.25		4.19	C0300-047-2000S		3.49	C0300-047-2000X	37.90		3.49
C0300-047-2250M			57.15	37.77	28.09		3.7	C0300-047-2250S		3.08	C0300-047-2250X	42.54		3.08
C0300-047-2500M			63.5	41.86	30.94		3.31	C0300-047-2500S		2.76	C0300-047-2500X	47.19		2.76
C0300-047-2750M			69.85	45.97	33.78		2.99	C0300-047-2750S		2.49	C0300-047-2750X	51.83		2.49
C0300-047-3000M			76.2	50.06	36.63		2.75	C0300-047-3000S		2.29	C0300-047-3000X	56.57		2.29
C0300-049-0380M			9.65	7.24	6.68		33.18	C0300-049-0380S		27.64	C0300-049-0380X	7.86		27.64
C0300-049-0440M			11.18	8.26	7.47		27.37	C0300-049-0440S		22.8	C0300-049-0440X	9.00		22.8
C0300-049-0500M			12.7	9.27	8.33		23.29	C0300-049-0500S		19.4	C0300-049-0500X	10.14		19.4
C0300-049-0560M			14.22	10.29	9.19		20.26	C0300-049-0560S		16.88	C0300-049-0560X	11.29		16.88
C0300-049-0620M			15.75	11.28	10.03		17.93	C0300-049-0620S		14.94	C0300-049-0620X	12.43		14.94
C0300-049-0690M			17.53	12.47	10.95		15.81	C0300-049-0690S		13.17	C0300-049-0690X	13.76		13.17
C0300-049-0750M			19.05	13.49	11.68		14.36	C0300-049-0750S		11.96	C0300-049-0750X	14.90		11.96
C0300-049-0810M			20.57	14.48	12.42		13.15	C0300-049-0810S		10.95	C0300-049-0810X	16.05		10.96
C0300-049-0880M			22.35	15.67	13.28		11.98	C0300-049-0880S		9.98	C0300-049-0880X	17.38		9.98
C0300-049-0940M			23.88	16.69	14		11.12	C0300-049-0940S		9.26	C0300-049-0940X	18.52		9.26
C0300-049-1000M	1.24		25.4	17.7	14.73	79.98	10.38	C0300-049-1000S	66.62	8.65	C0300-049-1000X	19.67	49.6	8.65
C0300-049-1120M			28.45	19.71	16.21		9.16	C0300-049-1120S		7.63	C0300-049-1120X	21.95		7.63
C0300-049-1250M			31.75	21.89	17.78		8.13	C0300-049-1250S		6.77	C0300-049-1250X	24.42		6.77
C0300-049-1380M			35.05	24.1	19.38		7.3	C0300-049-1380S		6.08	C0300-049-1380X	26.90		6.08
C0300-049-1500M			38.1	26.11	20.85		6.67	C0300-049-1500S		5.56	C0300-049-1500X	29.18		5.56
C0300-049-1750M			44.45	30.33	23.9		5.67	C0300-049-1750S		4.72	C0300-049-1750X	33.96		4.73
C0300-049-2000M			50.8	34.54	26.95		4.92	C0300-049-2000S		4.1	C0300-049-2000X	38.70		4.1
C0300-049-2250M			57.15	38.76	30		4.34	C0300-049-2250S		3.62	C0300-049-2250X	43.44		3.62
C0300-049-2500M			63.5	42.98	33.05		3.91	C0300-049-2500S		3.26	C0300-049-2500X	48.25		3.25
C030														

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	L <sub>0</sub> (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>i</sub> (N)	R (N/mm)	Part Number	P <sub>i</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>i</sub> (N)	R (N/mm)
C0300-049-3000M		1.24	76.2	51.41	39.14	79.98	3.22	C0300-049-3000S	66.62	2.68	C0300-049-3000X	57.72	49.6	2.68
C0300-051-0380M			9.65	7.39	6.96		39.68	C0300-051-0380S		33.05	C0300-051-0380X	7.97		33.06
C0300-051-0440M			11.18	8.43	7.82		32.64	C0300-051-0440S		27.19	C0300-051-0440X	9.13		27.19
C0300-051-0500M			12.7	9.47	8.71		27.72	C0300-051-0500S		23.09	C0300-051-0500X	10.29		23.09
C0300-051-0560M			14.22	10.49	9.63		24.08	C0300-051-0560S		20.06	C0300-051-0560X	11.45		20.06
C0300-051-0620M			15.75	11.53	10.54		21.29	C0300-051-0620S		17.73	C0300-051-0620X	12.61		17.74
C0300-051-0690M			17.53	12.75	11.51		18.75	C0300-051-0690S		15.62	C0300-051-0690X	13.96		15.62
C0300-051-0750M			19.05	13.77	12.27		17.02	C0300-051-0750S		14.18	C0300-051-0750X	15.13		14.18
C0300-051-0810M			20.57	14.81	13.06		15.58	C0300-051-0810S		12.98	C0300-051-0810X	16.29		12.98
C0300-051-0880M			22.35	16.03	13.97		14.18	C0300-051-0880S		11.81	C0300-051-0880X	17.64		11.82
C0300-051-0940M			23.88	17.07	14.73		13.17	C0300-051-0940S		10.97	C0300-051-0940X	18.80		10.97
C0300-051-1000M		1.3	25.4	18.08	15.52	89.72	12.28	C0300-051-1000S	74.74	10.23	C0300-051-1000X	19.96	55.64	10.23
C0300-051-1120M			28.45	20.17	17.07		10.84	C0300-051-1120S		9.03	C0300-051-1120X	22.29		9.03
C0300-051-1250M			31.75	22.4	18.75		9.61	C0300-051-1250S		8.01	C0300-051-1250X	24.80		8.01
C0300-051-1380M			35.05	24.66	20.45		8.63	C0300-051-1380S		7.19	C0300-051-1380X	27.32		7.19
C0300-051-1500M			38.1	26.72	22		7.9	C0300-051-1500S		6.58	C0300-051-1500X	29.64		6.58
C0300-051-1750M			44.45	31.04	25.22		6.69	C0300-051-1750S		5.57	C0300-051-1750X	34.47		5.57
C0300-051-2000M			50.8	35.36	28.47		5.81	C0300-051-2000S		4.84	C0300-051-2000X	39.31		4.84
C0300-051-2250M			57.15	39.67	31.7		5.13	C0300-051-2250S		4.27	C0300-051-2250X	44.13		4.27
C0300-051-2500M			63.5	43.99	34.95		4.61	C0300-051-2500S		3.84	C0300-051-2500X	49.00		3.84
C0300-051-2750M			69.85	48.31	38.18		4.17	C0300-051-2750S		3.47	C0300-051-2750X	53.82		3.47
C0300-051-3000M			76.2	52.63	41.43		3.8	C0300-051-3000S		3.17	C0300-051-3000X	58.62		3.17
C0360-026-0500M			12.7	5.46	2.97		1.61	C0360-026-0500S		1.34	C0360-026-0500X	7.62		1.34
C0360-026-0560M			14.22	6.07	3.12		1.44	C0360-026-0560S		1.2	C0360-026-0560X	8.53		1.2
C0360-026-0620M			15.75	6.71	3.28		1.3	C0360-026-0620S		1.08	C0360-026-0620X	9.44		1.08
C0360-026-0690M			17.53	7.57	3.45		1.17	C0360-026-0690S		0.98	C0360-026-0690X	10.55		0.98
C0360-026-0750M			19.05	8.2	3.63		1.07	C0360-026-0750S		0.89	C0360-026-0750X	11.39		0.89
C0360-026-0810M			20.57	8.81	3.76		1	C0360-026-0810S		0.83	C0360-026-0810X	12.38		0.83
C0360-026-0880M	0.66		22.35	8.79	4.11	11.65	0.86	C0360-026-0880S	9.7	0.71	C0360-026-0880X	12.82	6.81	0.71
C0360-026-0940M			23.88	9.4	4.29		0.81	C0360-026-0940S		0.67	C0360-026-0940X	13.72		0.67
C0360-026-1000M			25.4	9.12	4.6		0.72	C0360-026-1000S		0.6	C0360-026-1000X	14.01		0.6
C0360-026-1120M			28.45	11.25	4.75		0.68	C0360-026-1120S		0.57	C0360-026-1120X	16.47		0.57
C0360-026-1250M			31.75	12.17	5.41		0.6	C0360-026-1250S		0.5	C0360-026-1250X	18.01		0.5
C0360-026-1500M			38.1	14.33	6.15		0.49	C0360-026-1500S		0.41	C0360-026-1500X	21.42		0.41
C0360-026-1750M			44.45	16.56	6.86		0.42	C0360-026-1750S		0.35	C0360-026-1750X	24.99		0.35
C0360-026-2000M			50.8	21.18	7.57		0.37	C0360-026-2000S		0.31	C0360-026-2000X	28.56		0.31
C0360-029-0500M			12.7	6.05	3.81		2.26	C0360-029-0500S		1.88	C0360-029-0500X	7.70		1.88
C0360-029-0560M			14.22	6.68	4.04		2	C0360-029-0560S		1.66	C0360-029-0560X	8.56		1.66
C0360-029-0620M			15.75	7.29	4.24		1.79	C0360-029-0620S		1.49	C0360-029-0620X	9.42		1.49
C0360-029-0690M			17.53	8.03	4.5		1.58	C0360-029-0690S		1.31	C0360-029-0690X	10.35		1.31
C0360-029-0750M			19.05	8.66	4.72		1.44	C0360-029-0750S		1.2	C0360-029-0750X	11.18		1.2
C0360-029-0810M			20.57	9.27	4.93		1.33	C0360-029-0810S		1.11	C0360-029-0810X	12.08		1.11
C0360-029-0880M	0.74		22.35	10.01	5.18		1.21	C0360-029-0880S		1.01	C0360-029-0880X	13.00		1.01
C0360-029-0940M	9.14		23.88	10.62	5.41	15.03	1.14	C0360-029-0940S	12.52	0.95	C0360-029-0940X	13.94	9.43	0.95
C0360-029-1000M			25.4	11.25	5.61		1.07	C0360-029-1000S		0.89	C0360-029-1000X	14.82		0.89
C0360-029-1120M			28.45	12.5	6.05		0.95	C0360-029-1120S		0.79	C0360-029-1120X	16.49		0.79
C0360-029-1250M			31.75	13.84	6.53		0.84	C0360-029-1250S		0.7	C0360-029-1250X	18.30		0.7
C0360-029-1380M			35.05	15.19	6.99		0.75	C0360-029-1380S		0.63	C0360-029-1380X	20.04		0.63
C0360-029-1500M			38.1	16.43	7.42		0.7	C0360-029-1500S		0.58	C0360-029-1500X	21.96		0.58
C0360-029-1750M			44.45	19.02	8.33		0.6	C0360-029-1750S		0.5	C0360-029-1750X	25.46		0.5
C0360-029-2000M			50.8	21.18	9.25		0.51	C0360-029-2000S		0.42	C0360-029-2000X	28.54		0.42
C0360-032-0380M			9.65	4.83	3.84		4.34	C0360-032-0380S		3.62	C0360-032-0380X	6.17		3.62
C0360-032-0440M			11.18	5.44	4.11		3.64	C0360-032-0440S		3.03	C0360-032-0440X	7.02		3.03
C0360-032-0500M			12.7	6.02	4.04		3.13	C0360-032-0500S		2.61	C0360-032-0500X	7.88		2.61
C0360-032-0560M			14.22	6.86	4.24		2.85	C0360-032-0560S		2.37	C0360-032-0560X	8.93		2.38
C0360-032-0620M			15.75	7.72	4.45		2.61	C0360-032-0620S		2.17	C0360-032-0620X	9.95		2.17
C0360-032-0690M			17.53	8.15	4.85		2.24	C0360-032-0690S		1.87	C0360-032-0690X	10.78		1.87
C0360-032-0750M			19.05	9.02	5.05		2.08	C0360-032-0750S		1.73	C0360-032-0750X	11.79		1.74
C0360-032-0810M			20.57	9.86	5.26		1.96	C0360-032-0810S		1.63	C0360-032-0810X	12.86		1.63
C0360-032-0880M			22.35	10.31	5.69		1.73	C0360-032-0880S		1.44	C0360-032-0880X	13.63		1.44
C0360-032-0940M	0.81		23.88	11.15	5.87	21	1.65	C0360-032-0940S	17.49	1.37	C0360-032-0940X	14.69	12.59	1.37
C0360-032-1000M			25.4	11.35	6.27		1.49	C0360-032-1000S		1.24	C0360-032-1000X	15.24		1.24
C0360-032-1120M			28.45	12.4	6.86		1.31	C0360-032-1120S		1.09	C0360-032-1120X	16.93		1.09
C0360-032-1250M			31.75	13.59	7.7		1.16	C0360-032-1250S		0.96	C0360-032-1250X	18.66		0.96
C0360-032-1380M			35.05	14.99	8.05		1.05	C0360-032-1380S		0.88	C0360-032-1380X	20.66		0.88
C0360-032-1500M			38.1	16.03	8.74		0.95	C0360-032-1500S		0.79	C0360-032-1500X	22.11		0.79
C0360-032-1750M			44.45	18.39	9.93		0.81	C0360-032-1750S		0.67	C0360-032-1750X	25.68		0.67
C0360-032-2000M			50.8	20.83	11.02		0.7	C0360-032-2000S		0.58	C0360-032-2000X	29.21		0.58
C0360-032-2250M			57.15	25.53	11.79		0.67	C0360-032-2250S		0.55	C0360-032-2250X	34.42		0.56
C0360-032-2500M			63.5	28.27	12.65		0.6	C0360-032-2500S		0.5	C0360-032-2500X	38.10		0.5
C0360-035-0440M		0.89	11.18	6.05	4.62	25.49	4.9							

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0360-035-0500M			12.7	6.73	4.95		4.27	C0360-035-0500S		3.56	C0360-035-0500X	8.09		3.56
C0360-035-0560M			14.22	7.44	5.28		3.75	C0360-035-0560S		3.12	C0360-035-0560X	8.97		3.12
C0360-035-0620M			15.75	8.13	5.59		3.34	C0360-035-0620S		2.78	C0360-035-0620X	9.86		2.79
C0360-035-0690M			17.53	8.94	5.97		2.96	C0360-035-0690S		2.47	C0360-035-0690X	10.87		2.47
C0360-035-0750M			19.05	9.63	6.27		2.7	C0360-035-0750S		2.25	C0360-035-0750X	11.74		2.25
C0360-035-0810M			20.57	10.31	6.6		2.49	C0360-035-0810S		2.07	C0360-035-0810X	12.65		2.07
C0360-035-0880M			22.35	11.13	6.99		2.28	C0360-035-0880S		1.9	C0360-035-0880X	13.70		1.9
C0360-035-0940M	0.89		23.88	11.81	7.29	25.49	2.12	C0360-035-0940S	21.23	1.77	C0360-035-0940X	14.58	16.41	1.77
C0360-035-1000M			25.4	12.52	7.62		1.98	C0360-035-1000S		1.65	C0360-035-1000X	15.44		1.65
C0360-035-1120M			28.45	13.89	8.26		1.75	C0360-035-1120S		1.46	C0360-035-1120X	17.20		1.46
C0360-035-1250M			31.75	15.39	8.94		1.56	C0360-035-1250S		1.3	C0360-035-1250X	19.11		1.3
C0360-035-1380M			35.05	16.89	9.63		1.4	C0360-035-1380S		1.17	C0360-035-1380X	20.99		1.17
C0360-035-1500M			38.1	18.29	10.26		1.28	C0360-035-1500S		1.06	C0360-035-1500X	22.69		1.06
C0360-035-1750M			44.45	21.18	11.61		1.1	C0360-035-1750S		0.92	C0360-035-1750X	26.59		0.92
C0360-035-2000M			50.8	24.05	12.93		0.95	C0360-035-2000S		0.79	C0360-035-2000X	29.97		0.79
C0360-035-2250M			57.15	26.95	14.27		0.84	C0360-035-2250S		0.7	C0360-035-2250X	33.71		0.7
C0360-035-2500M			63.5	29.82	15.6		0.75	C0360-035-2500S		0.63	C0360-035-2500X	37.34		0.63
C0360-038-0440M			11.18	5.99	4.83		6.55	C0360-038-0440S		5.46	C0360-038-0440X	7.34		5.45
C0360-038-0500M			12.7	7.01	5.05		5.97	C0360-038-0500S		4.97	C0360-038-0500X	8.50		4.98
C0360-038-0560M			14.22	7.49	5.54		5.04	C0360-038-0560S		4.2	C0360-038-0560X	9.25		4.2
C0360-038-0620M			15.75	7.98	6.02		4.36	C0360-038-0620S		3.63	C0360-038-0620X	9.99		3.63
C0360-038-0690M			17.53	8.74	6.5		3.87	C0360-038-0690S		3.22	C0360-038-0690X	11.04		3.22
C0360-038-0750M			19.05	9.73	6.76		3.64	C0360-038-0750S		3.03	C0360-038-0750X	12.16		3.03
C0360-038-0810M			20.57	10.24	7.24		3.27	C0360-038-0810S		2.72	C0360-038-0810X	12.91		2.73
C0360-038-0880M	0.97		22.35	10.97	7.72		2.98	C0360-038-0880S		2.48	C0360-038-0880X	13.92		2.48
C0360-038-0940M	0.97		23.88	11.46	8.2	33.94	2.73	C0360-038-0940S	28.27	2.27	C0360-038-0940X	14.69	20.91	2.27
C0360-038-1000M			25.4	12.47	8.43		2.63	C0360-038-1000S		2.19	C0360-038-1000X	15.85		2.19
C0360-038-1120M			28.45	13.44	9.4		2.26	C0360-038-1120S		1.88	C0360-038-1120X	17.34		1.88
C0360-038-1250M			31.75	15.19	10.13		2.05	C0360-038-1250S		1.71	C0360-038-1250X	19.50		1.71
C0360-038-1380M			35.05	16.43	11.1		1.82	C0360-038-1380S		1.52	C0360-038-1380X	21.27		1.52
C0360-038-1500M			38.1	17.91	11.81		1.68	C0360-038-1500S		1.4	C0360-038-1500X	23.17		1.4
C0360-038-1750M			44.45	21.11	13.36		1.45	C0360-038-1750S		1.21	C0360-038-1750X	27.18		1.21
C0360-038-2000M			50.8	23.88	14.91		1.26	C0360-038-2000S		1.05	C0360-038-2000X	30.90		1.05
C0360-038-2250M			57.15	26.87	16.48		1.12	C0360-038-2250S		0.93	C0360-038-2250X	34.76		0.93
C0360-038-2500M			63.5	29.49	18.06		1	C0360-038-2500S		0.83	C0360-038-2500X	38.36		0.83
C0360-040-0440M	9.14		11.18	6.58	5.54		8.06	C0360-040-0440S		6.71	C0360-040-0440X	7.55		6.71
C0360-040-0500M			12.7	7.34	5.94		6.9	C0360-040-0500S		5.75	C0360-040-0500X	8.47		5.75
C0360-040-0560M			14.22	8.1	6.35		6.04	C0360-040-0560S		5.03	C0360-040-0560X	9.39		5.03
C0360-040-0620M			15.75	8.86	6.78		5.38	C0360-040-0620S		4.48	C0360-040-0620X	10.32		4.48
C0360-040-0690M			17.53	9.73	7.26		4.75	C0360-040-0690S		3.96	C0360-040-0690X	11.38		3.95
C0360-040-0750M			19.05	10.49	7.67		4.33	C0360-040-0750S		3.61	C0360-040-0750X	12.30		3.6
C0360-040-0810M			20.57	11.25	8.08		3.98	C0360-040-0810S		3.32	C0360-040-0810X	13.23		3.31
C0360-040-0880M	1.02		22.35	12.14	8.56		3.63	C0360-040-0880S		3.02	C0360-040-0880X	14.30	24.29	3.02
C0360-040-0940M	1.02		23.88	12.9	8.97	37.01	3.36	C0360-040-0940S	30.83	2.8	C0360-040-0940X	15.20		2.8
C0360-040-1000M			25.4	13.64	9.4		3.15	C0360-040-1000S		2.62	C0360-040-1000X	16.14		2.63
C0360-040-1120M			28.45	15.16	10.21		2.78	C0360-040-1120S		2.32	C0360-040-1120X	17.97		2.32
C0360-040-1250M			31.75	16.81	11.13		2.47	C0360-040-1250S		2.06	C0360-040-1250X	19.93		2.06
C0360-040-1380M			35.05	18.44	12.01		2.22	C0360-040-1380S		1.85	C0360-040-1380X	21.93		1.85
C0360-040-1500M			38.1	19.96	12.83		2.05	C0360-040-1500S		1.71	C0360-040-1500X	23.86		1.71
C0360-040-1750M			44.45	23.11	14.55		1.73	C0360-040-1750S		1.44	C0360-040-1750X	27.62		1.44
C0360-040-2000M			50.8	26.29	16.28		1.51	C0360-040-2000S		1.25	C0360-040-2000X	31.43		1.25
C0360-040-2250M			57.15	29.44	18.01		1.33	C0360-040-2250S		1.11	C0360-040-2250X	35.23		1.11
C0360-040-2500M			63.5	32.59	19.74		1.19	C0360-040-2500S		0.99	C0360-040-2500X	39.00		0.99
C0360-042-0440M			11.18	6.81	5.31		10.17	C0360-042-0440S		8.47	C0360-042-0440X	7.94		8.48
C0360-042-0500M			12.7	7.44	5.87		8.46	C0360-042-0500S		7.05	C0360-042-0500X	8.80		7.05
C0360-042-0560M			14.22	8.08	6.4		7.23	C0360-042-0560S		6.02	C0360-042-0560X	9.67		6.02
C0360-042-0620M			15.75	9.17	6.65		6.76	C0360-042-0620S		5.63	C0360-042-0620X	10.87		5.63
C0360-042-0690M			17.53	10.06	7.21		5.95	C0360-042-0690S		4.96	C0360-042-0690X	11.99		4.96
C0360-042-0750M			19.05	10.82	7.65		5.41	C0360-042-0750S		4.51	C0360-042-0750X	12.96		4.51
C0360-042-0810M			20.57	11.35	8.28		4.82	C0360-042-0810S		4.02	C0360-042-0810X	13.73		4.01
C0360-042-0880M	1.07		22.35	12.27	8.79		4.42	C0360-042-0880S		3.68	C0360-042-0880X	14.89		3.68
C0360-042-0940M	1.07		23.88	12.9	9.35	44.48	4.04	C0360-042-0940S	37.05	3.37	C0360-042-0940X	15.73	27.44	3.37
C0360-042-1000M			25.4	13.56	9.86		3.77	C0360-042-1000S		3.14	C0360-042-1000X	16.65		3.14
C0360-042-1120M			28.45	14.86	10.92		3.27	C0360-042-1120S		2.72	C0360-042-1120X	18.39		2.73
C0360-042-1250M			31.75	16.84	11.76		2.98	C0360-042-1250S		2.48	C0360-042-1250X	20.68		2.48
C0360-042-1380M			35.05	18.82	12.57		2.73	C0360-042-1380S		2.27	C0360-042-1380X	22.99		2.27
C0360-042-1500M			38.1	20.55	13.34		2.54	C0360-042-1500S		2.12	C0360-042-1500X	25.12		2.12
C0360-042-1750M			44.45	22.94	15.77		2.07	C0360-042-1750S		1.72	C0360-042-1750X	28.50		1.72
C0360-042-2000M			50.8	26.14	17.65		1.8	C0360-042-2000S		1.5	C0360-042-2000X	32.53		1.5
C0360-042-2250M			57.15	29.24	19.56		1.59	C0360-042-2250S		1.33	C0360-042-2250X	36.47		1.33
C0360-042-2500M			63.5	32.13	21.44		1.42	C0360-042-2500S						

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0360-045-0440M			11.18	7.29	5.69		13.83	C0360-045-0440S	11.52	C0360-045-0440X	8.26		11.52	
C0360-045-0500M			12.7	8.03	6.27		11.5	C0360-045-0500S	9.58	C0360-045-0500X	9.20		9.58	
C0360-045-0560M			14.22	8.76	6.86		9.84	C0360-045-0560S	8.2	C0360-045-0560X	10.13		8.2	
C0360-045-0620M			15.75	9.5	7.42		8.6	C0360-045-0620S	7.16	C0360-045-0620X	11.06		7.16	
C0360-045-0690M			17.53	10.52	7.98		7.67	C0360-045-0690S	6.39	C0360-045-0690X	12.27		6.39	
C0360-045-0750M			19.05	11.25	8.56		6.9	C0360-045-0750S	5.75	C0360-045-0750X	13.21		5.75	
C0360-045-0810M			20.57	11.99	9.12		6.27	C0360-045-0810S	5.22	C0360-045-0810X	14.14		5.22	
C0360-045-0880M			22.35	13	9.7		5.74	C0360-045-0880S	4.78	C0360-045-0880X	15.33		4.78	
C0360-045-0940M			23.88	13.74	10.26		5.31	C0360-045-0940S	4.42	C0360-045-0940X	16.28		4.42	
C0360-045-1000M	1.14		25.4	14.48	10.85	53.78	4.92	C0360-045-1000S	4.1	C0360-045-1000X	17.21	33.58	4.1	
C0360-045-1120M			28.45	15.98	11.99		4.31	C0360-045-1120S	3.59	C0360-045-1120X	19.09		3.59	
C0360-045-1250M			31.75	17.73	13.11		3.84	C0360-045-1250S	3.2	C0360-045-1250X	21.24		3.19	
C0360-045-1380M			35.05	19.46	14.27		3.45	C0360-045-1380S	2.87	C0360-045-1380X	23.36		2.87	
C0360-045-1500M			38.1	20.96	15.42		3.13	C0360-045-1500S	2.61	C0360-045-1500X	25.24		2.61	
C0360-045-1750M			44.45	24.26	17.63		2.66	C0360-045-1750S	2.22	C0360-045-1750X	29.30		2.22	
C0360-045-2000M			50.8	27.53	19.76		2.31	C0360-045-2000S	1.92	C0360-045-2000X	33.36		1.93	
C0360-045-2250M			57.15	30.91	21.89		2.05	C0360-045-2250S	1.71	C0360-045-2250X	37.47		1.71	
C0360-045-2500M			63.5	34.26	24.03		1.84	C0360-045-2500S	1.53	C0360-045-2500X	41.57		1.53	
C0360-045-2750M			69.85	38.91	25.15		1.73	C0360-045-2750S	1.44	C0360-045-2750X	46.59		1.44	
C0360-047-0440M			11.18	7.59	6.53		16.21	C0360-047-0440S	13.5	C0360-047-0440X	8.35		13.51	
C0360-047-0500M			12.7	8.51	7.04		13.82	C0360-047-0500S	11.51	C0360-047-0500X	9.39		11.51	
C0360-047-0560M			14.22	9.42	7.54		12.03	C0360-047-0560S	10.02	C0360-047-0560X	10.42		10.02	
C0360-047-0620M			15.75	10.31	8.08		10.66	C0360-047-0620S	8.88	C0360-047-0620X	11.45		8.88	
C0360-047-0690M			17.53	11.38	8.66		9.4	C0360-047-0690S	7.83	C0360-047-0690X	12.66		7.83	
C0360-047-0750M			19.05	12.29	9.17		8.55	C0360-047-0750S	7.12	C0360-047-0750X	13.69		7.12	
C0360-047-0810M			20.57	13.18	9.68		7.83	C0360-047-0810S	6.52	C0360-047-0810X	14.73		6.52	
C0360-047-0880M			22.35	14.25	10.29		7.13	C0360-047-0880S	5.94	C0360-047-0880X	15.93		5.94	
C0360-047-0940M			23.88	15.14	10.8		6.64	C0360-047-0940S	5.53	C0360-047-0940X	16.98		5.53	
C0360-047-1000M	1.19		25.4	16.05	11.3		6.18	C0360-047-1000S	5.15	C0360-047-1000X	17.99		5.15	
C0360-047-1120M	1.19		28.45	17.86	12.32	57.87	5.46	C0360-047-1120S	4.55	C0360-047-1120X	20.07	38.12	4.55	
C0360-047-1250M			31.75	19.81	13.44		4.85	C0360-047-1250S	4.04	C0360-047-1250X	22.31		4.04	
C0360-047-1380M			35.05	21.79	14.55		4.36	C0360-047-1380S	3.63	C0360-047-1380X	24.55		3.63	
C0360-047-1500M			38.1	23.6	15.57		3.99	C0360-047-1500S	3.32	C0360-047-1500X	26.63		3.33	
C0360-047-1750M			44.45	27.36	17.7		3.38	C0360-047-1750S	2.82	C0360-047-1750X	30.90		2.82	
C0360-047-2000M			50.8	31.14	19.84		2.94	C0360-047-2000S	2.45	C0360-047-2000X	35.24		2.45	
C0360-047-2250M	9.14		57.15	34.9	21.97		2.61	C0360-047-2250S	2.17	C0360-047-2250X	39.60		2.17	
C0360-047-2500M			63.5	38.68	24.1		2.33	C0360-047-2500S	1.94	C0360-047-2500X	43.84		1.94	
C0360-047-2750M			69.85	42.44	26.24		2.12	C0360-047-2750S	1.77	C0360-047-2750X	48.24		1.77	
C0360-047-3000M			76.2	46.2	28.37		1.93	C0360-047-3000S	1.6	C0360-047-3000X	52.43		1.6	
C0360-047-3250M			82.55	49.99	30.51		1.77	C0360-047-3250S	1.47	C0360-047-3250X	56.66		1.47	
C0360-047-3500M			88.9	53.75	32.61		1.65	C0360-047-3500S	1.37	C0360-047-3500X	61.09		1.37	
C0360-049-0440M			11.18	7.77	6.88		19.03	C0360-049-0440S	15.85	C0360-049-0440X	8.52		15.86	
C0360-049-0500M			12.7	8.71	7.44		16.2	C0360-049-0500S	13.49	C0360-049-0500X	9.58		13.49	
C0360-049-0560M			14.22	9.63	8		14.1	C0360-049-0560S	11.75	C0360-049-0560X	10.64		11.74	
C0360-049-0620M			15.75	10.57	8.53		12.47	C0360-049-0620S	10.39	C0360-049-0620X	11.69		10.39	
C0360-049-0690M			17.53	11.63	9.19		11	C0360-049-0690S	9.16	C0360-049-0690X	12.93		9.16	
C0360-049-0750M			19.05	12.57	9.75		9.98	C0360-049-0750S	8.31	C0360-049-0750X	13.98		8.31	
C0360-049-0810M			20.57	13.51	10.29		9.14	C0360-049-0810S	7.61	C0360-049-0810X	15.04		7.61	
C0360-049-0880M			22.35	14.58	10.95		8.34	C0360-049-0880S	6.95	C0360-049-0880X	16.29		6.94	
C0360-049-0940M			23.88	15.52	11.51		7.74	C0360-049-0940S	6.45	C0360-049-0940X	17.34		6.45	
C0360-049-1000M	1.24		25.4	16.43	12.04		7.21	C0360-049-1000S	6.01	C0360-049-1000X	18.39		6.01	
C0360-049-1120M	1.24		28.45	18.29	13.16	64.72	6.37	C0360-049-1120S	5.31	C0360-049-1120X	20.51	42.12	5.31	
C0360-049-1250M			31.75	20.29	14.35		5.66	C0360-049-1250S	4.71	C0360-049-1250X	22.81		4.71	
C0360-049-1380M			35.05	22.33	15.54		5.08	C0360-049-1380S	4.23	C0360-049-1380X	25.09		4.23	
C0360-049-1500M			38.1	24.18	16.66		4.64	C0360-049-1500S	3.87	C0360-049-1500X	27.20		3.86	
C0360-049-1750M			44.45	28.04	18.97		3.94	C0360-049-1750S	3.28	C0360-049-1750X	31.62		3.28	
C0360-049-2000M			50.8	31.9	21.26		3.43	C0360-049-2000S	2.86	C0360-049-2000X	36.07		2.86	
C0360-049-2250M			57.15	35.76	23.57		3.03	C0360-049-2250S	2.52	C0360-049-2250X	40.46		2.52	
C0360-049-2500M			63.5	39.65	25.88		2.71	C0360-049-2500S	2.26	C0360-049-2500X	44.87		2.26	
C0360-049-2750M			69.85	43.51	28.19		2.45	C0360-049-2750S	2.04	C0360-049-2750X	49.22		2.04	
C0360-049-3000M			76.2	47.37	30.48		2.24	C0360-049-3000S	1.87	C0360-049-3000X	53.64		1.87	
C0360-049-3250M			82.55	51.23	32.79		2.07	C0360-049-3250S	1.72	C0360-049-3250X	58.08		1.72	
C0360-049-3500M			88.9	55.09	35.1		1.91	C0360-049-3500S	1.59	C0360-049-3500X	62.41		1.59	
C0360-051-0440M			11.18	7.9	7.26		22.2	C0360-051-0440S	18.49	C0360-051-0440X	8.62		18.5	
C0360-051-0500M			12.7	8.84	7.85		18.86	C0360-051-0500S	15.71	C0360-051-0500X	9.69		15.71	
C0360-051-0560M			14.22	9.78	8.46		16.39	C0360-051-0560S	13.65	C0360-051-0560X	10.76		13.65	
C0360-051-0620M	1.3		15.75	10.72	9.04	72.68	14.48	C0360-051-0620S	12.06	C0360-051-0620X	11.83	47.33	12.06	
C0360-051-0690M			17.53	11.84	9.75		12.77	C0360-051-0690S	10.64	C0360-051-0690X	13.08		10.63	
C0360-051-0750M			19.05	12.78	10.34		11.57	C0360-051-0750S	9.64	C0360-051-0750X	14.14		9.64	
C0360-051-0810M			20.57	13.72	10.95		10.59	C0360-051-0810S	8.82	C0360-051-0810X	15.21		8.83	
C0360-051-0880M			22.35	14.81	11.63		9.65	C0360-051-0880S	8.04	C0360-051-0880X	16.46		8.04	

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0360-051-0940M			23.88	15.75	12.24		8.95	C0360-051-0940S		7.46	C0360-051-0940X	17.53		7.45
C0360-051-1000M			25.4	16.71	12.83		8.35	C0360-051-1000S		6.96	C0360-051-1000X	18.60		6.96
C0360-051-1120M			28.45	18.59	14.02		7.37	C0360-051-1120S		6.14	C0360-051-1120X	20.74		6.14
C0360-051-1250M			31.75	20.62	15.32		6.53	C0360-051-1250S		5.44	C0360-051-1250X	23.05		5.44
C0360-051-1380M			35.05	22.68	16.61		5.87	C0360-051-1380S		4.89	C0360-051-1380X	25.37		4.89
C0360-051-1500M			38.1	24.56	17.81		5.38	C0360-051-1500S		4.48	C0360-051-1500X	27.53		4.48
C0360-051-1750M	1.3	44.45	28.5	20.32	72.68	4.55	C0360-051-1750S	60.54	3.79	C0360-051-1750X	31.97	47.33	3.79	
C0360-051-2000M			50.8	32.41	22.81		3.96	C0360-051-2000S		3.3	C0360-051-2000X	36.45		3.3
C0360-051-2250M			57.15	36.35	25.3		3.48	C0360-051-2250S		2.9	C0360-051-2250X	40.85		2.9
C0360-051-2500M			63.5	40.28	27.79		3.13	C0360-051-2500S		2.61	C0360-051-2500X	45.38		2.61
C0360-051-2750M			69.85	44.2	30.28		2.84	C0360-051-2750S		2.37	C0360-051-2750X	49.82		2.36
C0360-051-3000M			76.2	48.13	32.77		2.59	C0360-051-3000S		2.16	C0360-051-3000X	54.28		2.16
C0360-051-3250M			82.55	52.07	35.26		2.38	C0360-051-3250S		1.98	C0360-051-3250X	58.70		1.98
C0360-051-3500M			88.9	55.98	37.74		2.21	C0360-051-3500S		1.84	C0360-051-3500X	63.15		1.84
C0360-055-0440M			11.18	8.26	7.87		30.75	C0360-055-0440S		25.61	C0360-055-0440X	8.93		25.61
C0360-055-0500M			12.7	9.25	8.56		26.02	C0360-055-0500S		21.67	C0360-055-0500X	10.04		21.68
C0360-055-0560M			14.22	10.26	9.22		22.55	C0360-055-0560S		18.78	C0360-055-0560X	11.16		18.79
C0360-055-0620M			15.75	11.25	9.88		19.89	C0360-055-0620S		16.57	C0360-055-0620X	12.27		16.57
C0360-055-0690M			17.53	12.4	10.67		17.49	C0360-055-0690S		14.57	C0360-055-0690X	13.57		14.57
C0360-055-0750M			19.05	13.41	11.35		15.86	C0360-055-0750S		13.21	C0360-055-0750X	14.69		13.22
C0360-055-0810M			20.57	14.4	12.01		14.5	C0360-055-0810S		12.08	C0360-055-0810X	15.81		12.08
C0360-055-0880M			22.35	15.54	12.8		13.19	C0360-055-0880S		10.99	C0360-055-0880X	17.11		10.98
C0360-055-0940M			23.88	16.56	13.46		12.22	C0360-055-0940S		10.18	C0360-055-0940X	18.22		10.18
C0360-055-1000M	1.4	25.4	17.55	14.15	89.58	11.4	C0360-055-1000S	74.62	9.5	C0360-055-1000X	19.34	57.6	9.5	
C0360-055-1120M			28.45	19.53	15.47		10.05	C0360-055-1120S		8.37	C0360-055-1120X	21.57		8.37
C0360-055-1250M			31.75	21.69	16.94		8.9	C0360-055-1250S		7.41	C0360-055-1250X	23.98		7.41
C0360-055-1380M			35.05	23.85	18.39		7.99	C0360-055-1380S		6.66	C0360-055-1380X	26.39		6.65
C0360-055-1500M			38.1	25.83	19.74		7.3	C0360-055-1500S		6.08	C0360-055-1500X	28.63		6.08
C0360-055-1750M			44.45	29.97	22.53		6.18	C0360-055-1750S		5.15	C0360-055-1750X	33.27		5.15
C0360-055-2000M			50.8	34.11	25.32		5.38	C0360-055-2000S		4.48	C0360-055-2000X	37.94		4.48
C0360-055-2250M			57.15	38.25	28.12		4.75	C0360-055-2250S		3.96	C0360-055-2250X	42.58		3.95
C0360-055-2500M			63.5	42.42	30.91		4.24	C0360-055-2500S		3.53	C0360-055-2500X	47.19		3.53
C0360-055-2750M			69.85	46.56	33.71		3.85	C0360-055-2750S		3.21	C0360-055-2750X	51.90		3.21
C0360-055-3000M			76.2	50.7	36.5		3.52	C0360-055-3000S		2.93	C0360-055-3000X	56.56		2.93
C0360-055-3250M			82.55	54.84	39.29		3.24	C0360-055-3250S		2.7	C0360-055-3250X	61.21		2.7
C0360-055-3500M	9.14		88.9	58.98	42.09		2.99	C0360-055-3500S		2.49	C0360-055-3500X	65.81		2.49
C0360-059-0440M			11.18	8.59	8.15		41.67	C0360-059-0440S		34.71	C0360-059-0440X	9.14		34.72
C0360-059-0500M			12.7	9.63	9.04		35.13	C0360-059-0500S		29.26	C0360-059-0500X	10.29		29.26
C0360-059-0560M			14.22	10.67	9.86		30.36	C0360-059-0560S		25.29	C0360-059-0560X	11.44		25.29
C0360-059-0620M			15.75	11.71	10.69		26.74	C0360-059-0620S		22.27	C0360-059-0620X	12.58		22.28
C0360-059-0690M			17.53	12.9	11.63		23.46	C0360-059-0690S		19.54	C0360-059-0690X	13.92		19.55
C0360-059-0750M			19.05	13.94	12.4		21.24	C0360-059-0750S		17.69	C0360-059-0750X	15.06		17.69
C0360-059-0810M			20.57	14.99	13.13		19.4	C0360-059-0810S		16.16	C0360-059-0810X	16.21		16.16
C0360-059-0880M			22.35	16.21	14.02		17.62	C0360-059-0880S		14.68	C0360-059-0880X	17.55		14.67
C0360-059-0940M			23.88	17.25	14.76		16.32	C0360-059-0940S		13.59	C0360-059-0940X	18.69		13.6
C0360-059-1000M			25.4	18.29	15.52		15.22	C0360-059-1000S		12.68	C0360-059-1000X	19.84		12.68
C0360-059-1120M	1.5	28.45	20.37	17.02	108.22	13.4	C0360-059-1120S	90.15	11.16	C0360-059-1120X	22.13	70.5	11.16	
C0360-059-1250M			31.75	22.63	18.64		11.85	C0360-059-1250S		9.87	C0360-059-1250X	24.61		9.87
C0360-059-1380M			35.05	24.87	20.24		10.63	C0360-059-1380S		8.85	C0360-059-1380X	27.09		8.85
C0360-059-1500M			38.1	26.95	21.74		9.72	C0360-059-1500S		8.1	C0360-059-1500X	29.39		8.1
C0360-059-1750M			44.45	31.29	24.87		8.23	C0360-059-1750S		6.86	C0360-059-1750X	34.16		6.86
C0360-059-2000M			50.8	35.64	27.99		7.13	C0360-059-2000S		5.94	C0360-059-2000X	38.92		5.94
C0360-059-2250M			57.15	39.95	31.12		6.3	C0360-059-2250S		5.25	C0360-059-2250X	43.72		5.25
C0360-059-2500M			63.5	44.3	34.24		5.64	C0360-059-2500S		4.7	C0360-059-2500X	48.49		4.7
C0360-059-2750M			69.85	48.64	37.36		5.1	C0360-059-2750S		4.25	C0360-059-2750X	53.24		4.24
C0360-059-3000M			76.2	52.96	40.49		4.66	C0360-059-3000S		3.88	C0360-059-3000X	58.03		3.88
C0360-059-3250M			82.55	57.3	43.61		4.29	C0360-059-3250S		3.57	C0360-059-3250X	62.82		3.57
C0360-059-3500M			88.9	61.65	46.74		3.98	C0360-059-3500S		3.32	C0360-059-3500X	67.60		3.31
C0390-043-0500M			12.7	7.39	6.12		7.93	C0390-043-0500S		6.61	C0390-043-0500X	8.57		6.61
C0390-043-0560M			14.22	8.15	6.53		6.93	C0390-043-0560S		5.77	C0390-043-0560X	9.50		5.78
C0390-043-0620M			15.75	8.92	6.93		6.15	C0390-043-0620S		5.12	C0390-043-0620X	10.42		5.12
C0390-043-0690M			17.53	9.8	7.42		5.43	C0390-043-0690S		4.52	C0390-043-0690X	11.49		4.52
C0390-043-0750M			19.05	10.54	7.82		4.94	C0390-043-0750S		4.12	C0390-043-0750X	12.42		4.11
C0390-043-0810M			20.57	11.3	8.23		4.54	C0390-043-0810S		3.78	C0390-043-0810X	13.35		3.78
C0390-043-0880M	1.09	22.35	12.19	8.71	42.04	4.13	C0390-043-0880S	35.02	3.44	C0390-043-0880X	14.42	27.31	3.44	
C0390-043-0940M			23.88	13.03	9.12		3.87	C0390-043-0940S		3.22	C0390-043-0940X	15.41		3.22
C0390-043-1000M			25.4	13.69	9.55		3.59	C0390-043-1000S		2.99	C0390-043-1000X	16.27		2.99
C0390-043-1120M			28.45	15.21	10.36		3.17	C0390-043-1120S		2.64	C0390-043-1120X	18.11		2.64
C0390-043-1250M			31.75	16.87	11.25		2.82	C0390-043-1250S		2.35	C0390-043-1250X	20.13		2.35
C0390-043-1380M			35.05	18.49	12.14		2.54	C0390-043-1380S		2.12	C0390-043-1380X	22.15		2.12
C0390-043-1500M														

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX					
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)	
C0390-043-1750M			44.45	23.16	14.68	1.98		C0390-043-1750S	1.65		C0390-043-1750X	27.89		1.65	
C0390-043-2000M			50.8	26.31	16.38	1.72		C0390-043-2000S	1.43		C0390-043-2000X	31.71		1.43	
C0390-047-0500M			12.7	7.85	6.86	11.08		C0390-047-0500S	9.23		C0390-047-0500X	8.86		9.23	
C0390-047-0560M			14.22	8.66	7.34	9.67		C0390-047-0560S	8.06		C0390-047-0560X	9.82		8.05	
C0390-047-0620M			15.75	9.45	7.82	8.56		C0390-047-0620S	7.13		C0390-047-0620X	10.78		7.13	
C0390-047-0690M			17.53	10.39	8.38	7.55		C0390-047-0690S	6.29		C0390-047-0690X	11.89		6.29	
C0390-047-0750M			19.05	11.2	8.89	6.86		C0390-047-0750S	5.71		C0390-047-0750X	12.86		5.72	
C0390-047-0810M			20.57	12.01	9.37	6.29		C0390-047-0810S	5.24		C0390-047-0810X	13.81		5.24	
C0390-047-0880M	9.91	1.19	22.35	12.95	9.93	53.82	5.73	C0390-047-0880S	44.83	4.77	C0390-047-0880X	14.93	35.41	4.77	
C0390-047-0940M			23.88	13.77	10.41	5.32		C0390-047-0940S		4.43	C0390-047-0940X	15.89		4.43	
C0390-047-1000M			25.4	14.58	10.9	4.97		C0390-047-1000S		4.14	C0390-047-1000X	16.85		4.14	
C0390-047-1120M			28.45	16.18	11.86	4.4		C0390-047-1120S		3.67	C0390-047-1120X	18.77		3.66	
C0390-047-1250M			31.75	17.93	12.9	3.89		C0390-047-1250S		3.24	C0390-047-1250X	20.81		3.24	
C0390-047-1380M			35.05	19.69	13.97	3.5		C0390-047-1380S		2.92	C0390-047-1380X	22.91		2.92	
C0390-047-1500M			38.1	21.29	14.94	3.2		C0390-047-1500S		2.67	C0390-047-1500X	24.83		2.67	
C0390-047-1750M			44.45	24.66	16.94	2.71		C0390-047-1750S		2.26	C0390-047-1750X	28.78		2.26	
C0390-047-2000M			50.8	28.02	18.97	2.36		C0390-047-2000S		1.97	C0390-047-2000X	32.81		1.97	
C0420-035-0500M			12.7	6.35	4.37	3.45		C0420-035-0500S		2.87	C0420-035-0500X	7.77		2.87	
C0420-035-0620M			15.75	7.62	4.85	2.7		C0420-035-0620S		2.25	C0420-035-0620X	9.44		2.25	
C0420-035-0750M			19.05	8.99	5.36	2.19		C0420-035-0750S		1.82	C0420-035-0750X	11.28		1.82	
C0420-035-0880M	0.89		22.35	10.36	5.87	22.02	1.84	C0420-035-0880S	18.34	1.53	C0420-035-0880X	13.10	14.19	1.53	
C0420-035-1000M			25.4	11.63	6.35	1.59		C0420-035-1000S		1.33	C0420-035-1000X	14.73		1.33	
C0420-035-1250M			31.75	14.3	7.34	1.26		C0420-035-1250S		1.05	C0420-035-1250X	18.26		1.05	
C0420-035-1500M			38.1	16.94	8.33	1.03		C0420-035-1500S		0.86	C0420-035-1500X	21.64		0.86	
C0420-035-1750M			44.45	19.58	9.32	0.89		C0420-035-1750S		0.74	C0420-035-1750X	25.40		0.74	
C0420-038-0500M			12.7	5.08	4.37	3.85		C0420-038-0500S		3.21	C0420-038-0500X	7.07		3.21	
C0420-038-0560M			14.22	5.84	4.72	3.5		C0420-038-0560S		2.92	C0420-038-0560X	8.03		2.92	
C0420-038-0625M			15.75	6.43	4.93	3.15		C0420-038-0625S		2.62	C0420-038-0625X	8.87		2.63	
C0420-038-0750M			19.05	7.49	5.66	2.54		C0420-038-0750S		2.12	C0420-038-0750X	10.51		2.12	
C0420-038-0880M			22.35	8.94	6.25	2.19		C0420-038-0880S		1.82	C0420-038-0880X	12.44		1.82	
C0420-038-1000M	0.97		25.4	10.16	6.83	29.36	1.93	C0420-038-1000S	24.46	1.6	C0420-038-1000X	14.14	18.06	1.6	
C0420-038-1250M			31.75	12.07	8.28	1.49		C0420-038-1250S		1.24	C0420-038-1250X	17.18		1.24	
C0420-038-1500M			38.1	14.73	9.45	1.26		C0420-038-1500S		1.05	C0420-038-1500X	20.90		1.05	
C0420-038-1750M			44.45	19.05	10.74	1.16		C0420-038-1750S		0.96	C0420-038-1750X	25.68		0.96	
C0420-038-2000M			50.8	23.29	11.58	1.07		C0420-038-2000S		0.89	C0420-038-2000X	30.50		0.89	
C0420-038-2250M			57.15	26.09	12.55	0.95		C0420-038-2250S		0.79	C0420-038-2250X	34.21		0.79	
C0420-038-2500M			63.5	28.85	13.51	0.84		C0420-038-2500S		0.7	C0420-038-2500X	37.70		0.7	
C0420-042-0500M			12.7	6.05	4.83	5.95		C0420-042-0500S		4.96	C0420-042-0500X	7.91		4.96	
C0420-042-0560M			14.22	6.91	5.11	5.43		C0420-042-0560S		4.52	C0420-042-0560X	8.97		4.52	
C0420-042-0625M			15.75	7.67	5.41	4.9		C0420-042-0625S		4.08	C0420-042-0625X	9.93		4.08	
C0420-042-0750M			19.05	8.76	6.3	3.85		C0420-042-0750S		3.21	C0420-042-0750X	11.65		3.21	
C0420-042-0880M			22.35	10.03	7.11	3.24		C0420-042-0880S		2.7	C0420-042-0880X	13.55		2.7	
C0420-042-1000M	10.67	1.07	25.4	11.3	7.87	39.59	2.8	C0420-042-1000S	32.98	2.33	C0420-042-1000X	15.22	23.75	2.33	
C0420-042-1250M			31.75	14.35	9.22	2.28		C0420-042-1250S		1.9	C0420-042-1250X	19.22		1.9	
C0420-042-1500M			38.1	16.51	10.9	1.84		C0420-042-1500S		1.53	C0420-042-1500X	22.59		1.53	
C0420-042-1750M			44.45	20.14	12.73	1.63		C0420-042-1750S		1.36	C0420-042-1750X	26.94		1.36	
C0420-042-2000M			50.8	22.89	14.17	1.42		C0420-042-2000S		1.18	C0420-042-2000X	30.70		1.18	
C0420-042-2250M			57.15	27.74	15.04	1.35		C0420-042-2250S		1.12	C0420-042-2250X	36.00		1.12	
C0420-042-2500M			63.5	30.71	16	1.21		C0420-042-2500S		1.01	C0420-042-2500X	39.90		1.01	
C0420-045-0500M			12.7	6.35	5.44	7.35		C0420-045-0500S		6.12	C0420-045-0500X	7.95		6.13	
C0420-045-0625M			15.75	7.9	6.2	5.95		C0420-045-0625S		4.96	C0420-045-0625X	9.88		4.96	
C0420-045-0750M			19.05	9.14	7.21	4.73		C0420-045-0750S		3.94	C0420-045-0750X	11.66		3.94	
C0420-045-0880M			22.35	10.67	8.08	4.03		C0420-045-0880S		3.36	C0420-045-0880X	13.68		3.36	
C0420-045-1000M			25.4	12.07	8.94	3.5		C0420-045-1000S		2.92	C0420-045-1000X	15.43		2.92	
C0420-045-1250M	1.14		31.75	15.11	10.62	46.71	2.8	C0420-045-1250S	38.91	2.33	C0420-045-1250X	19.28	29.09	2.33	
C0420-045-1500M			38.1	17.53	12.52	2.28		C0420-045-1500S		1.9	C0420-045-1500X	22.76		1.9	
C0420-045-1750M			44.45	21.84	14.3	2.07		C0420-045-1750S		1.72	C0420-045-1750X	27.55		1.72	
C0420-045-2000M			50.8	24.66	15.93	1.79		C0420-045-2000S		1.49	C0420-045-2000X	31.24		1.49	
C0420-045-2250M			57.15	27.51	17.55	1.58		C0420-045-2250S		1.31	C0420-045-2250X	34.99		1.31	
C0420-045-2500M			63.5	30.58	19.2	1.42		C0420-045-2500S		1.18	C0420-045-2500X	38.87		1.18	
C0420-048-0500M			12.7	7.67	6.63	10.61		C0420-048-0500S		8.84	C0420-048-0500X	8.81		8.84	
C0420-048-0750M			19.05	10.92	8.48	6.55		C0420-048-0750S		5.46	C0420-048-0750X	12.74		5.45	
C0420-048-1000M			25.4	14.17	10.34	4.75		C0420-048-1000S		3.96	C0420-048-1000X	16.70		3.95	
C0420-048-1250M	1.22		31.75	17.4	12.19	53.25	3.71	C0420-048-1250S	44.36	3.09	C0420-048-1250X	20.62	34.38	3.09	
C0420-048-1500M			38.1	20.65	14.02	3.05		C0420-048-1500S		2.54	C0420-048-1500X	24.55		2.54	
C0420-048-1750M			44.45	23.9	15.88	2.59		C0420-048-1750S		2.16	C0420-048-1750X	28.51		2.16	
C0420-048-2000M			50.8	27.13	17.73	2.26		C0420-048-2000S		1.88	C0420-048-2000X	32.52		1.88	
C0420-051-0500M			12.7	8	7.16		13.38		C0420-051-0500S		11.15	C0420-051-0500X	9.01		11.14
C0420-051-0620M			15.75	9.63	8.15		10.28		C0420-051-0620S		8.56	C0420-051-0620X	10.95		8.56
C0420-051-0750M	1.3		19.05	11.38	9.22	63.03	8.21	C0420-051-0750S	52.5	6.84	C0420-051-0750X	13.04	41.1	6.84	
C0420-051-0880M			22.35												

COMPRESSION SPRINGS MUSIC WIRE						302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX					
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0420-051-1000M			25.4	14.78	11.3		5.94	C0420-051-1000S		4.95	C0420-051-1000X	17.09		4.95
C0420-051-1250M			31.75	18.16	13.36		4.64	C0420-051-1250S		3.87	C0420-051-1250X	21.12		3.86
C0420-051-1500M			38.1	21.56	15.42		3.8	C0420-051-1500S		3.17	C0420-051-1500X	25.12		3.17
C0420-051-1750M		1.3	44.45	24.94	17.48	63.03	3.22	C0420-051-1750S	52.5	2.68	C0420-051-1750X	29.14	41.1	2.68
C0420-051-2000M			50.8	28.35	19.53		2.8	C0420-051-2000S		2.33	C0420-051-2000X	33.19		2.33
C0420-051-2250M			57.15	31.72	21.59		2.49	C0420-051-2250S		2.07	C0420-051-2250X	37.31		2.07
C0420-051-2500M			63.5	35.13	23.67		2.22	C0420-051-2500S		1.85	C0420-051-2500X	41.32		1.85
C0420-055-0500M			12.7	7.87	6.93		16.64	C0420-055-0500S		13.86	C0420-055-0500X	9.09		13.86
C0420-055-0625M			15.75	9.65	8.03		13.13	C0420-055-0625S		10.94	C0420-055-0625X	11.17		10.94
C0420-055-0750M			19.05	11.68	9.14		10.86	C0420-055-0750S		9.05	C0420-055-0750X	13.51		9.04
C0420-055-0880M			22.35	13.56	10.36		9.11	C0420-055-0880S		7.59	C0420-055-0880X	15.75		7.59
C0420-055-1000M			25.4	15.24	11.53		7.88	C0420-055-1000S		6.56	C0420-055-1000X	17.77		6.57
C0420-055-1250M		1.4	31.75	18.67	14.05	80.07	6.13	C0420-055-1250S	66.7	5.11	C0420-055-1250X	21.94	50.08	5.11
C0420-055-1500M			38.1	22.35	16.38		5.08	C0420-055-1500S		4.23	C0420-055-1500X	26.26		4.23
C0420-055-1750M			44.45	25.78	19.61		4.29	C0420-055-1750S		3.57	C0420-055-1750X	30.43		3.57
C0420-055-2000M			50.8	29.34	21.97		3.73	C0420-055-2000S		3.11	C0420-055-2000X	34.68		3.11
C0420-055-2250M			57.15	32.77	24.31		3.29	C0420-055-2250S		2.74	C0420-055-2250X	38.88		2.74
C0420-055-2500M			63.5	36.32	26.67		2.94	C0420-055-2500S		2.45	C0420-055-2500X	43.06		2.45
C0420-059-0500M			12.7	8.76	8.18		23.94	C0420-059-0500S		19.94	C0420-059-0500X	9.62		19.94
C0420-059-0625M			15.75	10.52	9.65		18.04	C0420-059-0625S		15.03	C0420-059-0625X	11.66		15.03
C0420-059-0750M			19.05	12.52	11.15		14.46	C0420-059-0750S		12.05	C0420-059-0750X	13.95		12.05
C0420-059-0880M			22.35	14.5	12.6		11.99	C0420-059-0880S		9.99	C0420-059-0880X	16.20		9.99
C0420-059-1000M			25.4	16.31	13.87		10.37	C0420-059-1000S		8.64	C0420-059-1000X	18.28		8.64
C0420-059-1250M		1.5	31.75	20.07	16.54	94.3	8.07	C0420-059-1250S	78.55	6.72	C0420-059-1250X	22.61	61.47	6.72
C0420-059-1500M	10.67		38.1	23.85	19.18		6.62	C0420-059-1500S		5.51	C0420-059-1500X	26.95		5.51
C0420-059-1750M			44.45	27.61	21.84		5.6	C0420-059-1750S		4.66	C0420-059-1750X	31.28		4.67
C0420-059-2000M			50.8	31.39	24.51		4.85	C0420-059-2000S		4.04	C0420-059-2000X	35.59		4.04
C0420-059-2250M			57.15	35.15	27.15		4.29	C0420-059-2250S		3.57	C0420-059-2250X	39.95		3.57
C0420-059-2500M			63.5	20.96	29.82		3.84	C0420-059-2500S		3.2	C0420-059-2500X	44.26		3.19
C0420-063-0500M			12.7	9.17	8.76		31.89	C0420-063-0500S		26.56	C0420-063-0500X	9.97		26.56
C0420-063-0620M			15.75	11.07	10.57		24.15	C0420-063-0620S		20.12	C0420-063-0620X	12.14		20.12
C0420-063-0750M			19.05	13.16	12.09		19.12	C0420-063-0750S		15.93	C0420-063-0750X	14.49		15.93
C0420-063-0880M			22.35	15.21	13.61		15.81	C0420-063-0880S		13.17	C0420-063-0880X	16.84		13.17
C0420-063-1000M			25.4	17.15	15.01		13.64	C0420-063-1000S		11.36	C0420-063-1000X	19.01		11.36
C0420-063-1250M		1.6	31.75	21.11	17.93	112.85	10.61	C0420-063-1250S	94	8.84	C0420-063-1250X	23.53	72.64	8.84
C0420-063-1500M			38.1	25.1	20.85		8.69	C0420-063-1500S		7.24	C0420-063-1500X	28.06		7.24
C0420-063-1750M			44.45	29.08	23.8		7.34	C0420-063-1750S		6.11	C0420-063-1750X	32.56		6.11
C0420-063-2000M			50.8	33.07	26.72		6.36	C0420-063-2000S		5.3	C0420-063-2000X	37.08		5.3
C0420-063-2250M			57.15	37.06	29.64		5.62	C0420-063-2250S		4.68	C0420-063-2250X	41.64		4.68
C0420-063-2500M			63.5	41.05	32.56		5.03	C0420-063-2500S		4.19	C0420-063-2500X	46.15		4.19
C0420-067-0750M			19.05	13.77	12.88		25.27	C0420-067-0750S		21.05	C0420-067-0750X	14.93		21.05
C0420-067-1000M			25.4	17.98	16.03		17.98	C0420-067-1000S		14.98	C0420-067-1000X	19.61		14.98
C0420-067-1250M			31.75	22.17	19.18		13.96	C0420-067-1250S		11.63	C0420-067-1250X	24.29		11.63
C0420-067-1500M		1.7	38.1	26.39	22.33	133.53	11.4	C0420-067-1500S	111.23	9.5	C0420-067-1500X	28.96	86.78	9.5
C0420-067-1750M			44.45	30.58	25.48		9.63	C0420-067-1750S		8.02	C0420-067-1750X	33.63		8.02
C0420-067-2000M			50.8	34.8	28.63		8.34	C0420-067-2000S		6.95	C0420-067-2000X	38.30		6.94
C0420-067-2250M			57.15	39.01	31.78		7.35	C0420-067-2250S		6.12	C0420-067-2250X	42.98		6.13
C0420-067-2500M			63.5	43.21	34.93		6.58	C0420-067-2500S		5.48	C0420-067-2500X	47.68		5.48
C0420-072-1000M			25.4	18.75	17.53		24.37	C0420-072-1000S		20.3	C0420-072-1000X	20.27		20.3
C0420-072-1250M			31.75	23.14	21.06		18.86	C0420-072-1250S		15.71	C0420-072-1250X	25.11		15.71
C0420-072-1500M			38.1	27.53	24.56		15.39	C0420-072-1500S		12.82	C0420-072-1500X	29.97		12.82
C0420-072-1750M	1.83		44.45	31.95	28.07	162.49	12.99	C0420-072-1750S	135.35	10.82	C0420-072-1750X	34.82	104.26	10.82
C0420-072-2000M			50.8	36.35	31.6		11.24	C0420-072-2000S		9.36	C0420-072-2000X	39.67		9.37
C0420-072-2250M			57.15	40.74	35.1		9.91	C0420-072-2250S		8.26	C0420-072-2250X	44.52		8.26
C0420-072-2500M			63.5	45.16	38.63		8.86	C0420-072-2500S		7.38	C0420-072-2500X	49.38		7.38
C0455-039-0500M			12.7	6.53	4.75		4.48	C0455-039-0500S		3.73	C0455-039-0500X	7.86		3.73
C0455-039-0620M			15.75	7.82	5.26		3.48	C0455-039-0620S		2.9	C0455-039-0620X	9.52		2.9
C0455-039-0750M			19.05	9.25	5.82		2.82	C0455-039-0750S		2.35	C0455-039-0750X	11.35		2.35
C0455-039-0880M	0.99		22.35	10.64	6.38	27.62	2.36	C0455-039-0880S	23.01	1.97	C0455-039-0880X	13.17	18.07	1.97
C0455-039-1000M			25.4	11.94	6.88		2.05	C0455-039-1000S		1.71	C0455-039-1000X	14.81		1.71
C0455-039-1250M			31.75	14.63	7.92		1.61	C0455-039-1250S		1.34	C0455-039-1250X	18.28		1.34
C0455-039-1500M			38.1	17.32	8.99		1.33	C0455-039-1500S		1.11	C0455-039-1500X	21.80		1.11
C0455-039-1750M	11.56		44.45	20.04	10.06		1.14	C0455-039-1750S		0.95	C0455-039-1750X	25.39		0.95
C0455-046-0500M			12.7	7.21	5.92		7.99	C0455-046-0500S		6.66	C0455-046-0500X	8.37		6.65
C0455-046-0620M			15.75	8.64	6.63		6.18	C0455-046-0620S		5.15	C0455-046-0620X	10.16		5.15
C0455-046-0750M			19.05	10.19	7.39		4.96	C0455-046-0750S		4.13	C0455-046-0750X	12.08		4.13
C0455-046-0880M	1.17		22.35	11.76	8.15	43.86	4.13	C0455-046-0880S	36.54	3.44	C0455-046-0880X	13.99	28.79	3.44
C0455-046-1000M			25.4	13.18	8.86		3.59	C0455-046-1000S		2.99	C0455-046-1000X	15.77		2.99
C0455-046-1250M			31.75	16.18	10.34		2.82	C0455-046-1250S		2.35	C0455-046-1250X	19.49		2.35
C0455-046-1500M			38.1	19.15	11.81		2.31	C						

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>i</sub> (N)	R (N/mm)	Part Number	P <sub>i</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>i</sub> (N)	R (N/mm)
C0480-035-0500M			12.7	5.08	4.06		2.75	C0480-035-0500S	2.29		C0480-035-0500X	7.26		2.29
C0480-035-0620M			15.75	6.02	4.45		2.14	C0480-035-0620S	1.78		C0480-035-0620X	8.74		1.78
C0480-035-0750M			19.05	7.01	4.88		1.73	C0480-035-0750S	1.44		C0480-035-0750X	10.42		1.44
C0480-035-0880M			22.35	8	5.28		1.45	C0480-035-0880S	1.21		C0480-035-0880X	12.06	18.07	1.21
C0480-035-1000M			25.4	8.94	5.66		1.26	C0480-035-1000S	1.05		C0480-035-1000X	13.53		1.05
C0480-035-1250M	0.89		31.75	10.85	6.48	20.86	1	C0480-035-1250S	17.38	0.83	C0480-035-1250X	16.76		0.83
C0480-035-1500M			38.1	12.78	7.29		0.82	C0480-035-1500S	0.69		C0480-035-1500X	19.92		0.69
C0480-035-1750M			44.45	14.71	8.1		0.7	C0480-035-1750S	0.58		C0480-035-1750X	23.09		0.58
C0480-035-2000M			50.8	16.64	8.92		0.61	C0480-035-2000S	0.51		C0480-035-2000X	26.39		0.51
C0480-035-2500M			63.5	20.96	10.52		0.49	C0480-035-2500S	0.41		C0480-035-2500X	32.99	28.79	0.41
C0480-035-3000M			76.2	24.33	12.14		0.4	C0480-035-3000S	0.34		C0480-035-3000X	39.05		0.34
C0480-038-0500M			12.7	5.08	3.66		3.5	C0480-038-0500S	2.92		C0480-038-0500X	7.25		2.92
C0480-038-0625M			15.75	5.59	4.24		2.63	C0480-038-0625S	2.19		C0480-038-0625X	8.48		2.19
C0480-038-0750M			19.05	6.86	4.7		2.19	C0480-038-0750S	1.82		C0480-038-0750X	10.33		1.82
C0480-038-0880M			22.35	7.75	5.26		1.84	C0480-038-0880S	1.53		C0480-038-0880X	11.97		1.53
C0480-038-1000M			25.4	9.4	5.59		1.66	C0480-038-1000S	1.39		C0480-038-1000X	13.93		1.39
C0480-038-1250M			31.75	11.43	6.58		1.31	C0480-038-1250S	1.09		C0480-038-1250X	17.22		1.09
C0480-038-1500M	0.97		38.1	12.7	7.75	26.69	1.05	C0480-038-1500S	22.23	0.88	C0480-038-1500X	19.93	15.9	0.88
C0480-038-1750M			44.45	16.76	8.94		0.96	C0480-038-1750S	0.8		C0480-038-1750X	24.63		0.8
C0480-038-2000M			50.8	19.2	9.86		0.84	C0480-038-2000S	0.7		C0480-038-2000X	28.09		0.7
C0480-038-2250M			57.15	24.46	10.08		0.82	C0480-038-2250S	0.69		C0480-038-2250X	33.96		0.69
C0480-038-2500M			63.5	27.05	10.9		0.74	C0480-038-2500S	0.61		C0480-038-2500X	37.55		0.61
C0480-038-2750M			69.85	29.67	11.73		0.67	C0480-038-2750S	0.55		C0480-038-2750X	41.16		0.56
C0480-038-3000M			76.2	32.26	12.55		0.61	C0480-038-3000S	0.51		C0480-038-3000X	45.06		0.51
C0480-042-0500M			12.7	5.59	4.24		4.9	C0480-042-0500S	4.08		C0480-042-0500X	7.58		4.08
C0480-042-0625M			15.75	6.32	4.93		3.68	C0480-042-0625S	3.07		C0480-042-0625X	8.92		3.06
C0480-042-0750M			19.05	8	5.41		3.15	C0480-042-0750S	2.62		C0480-042-0750X	11.08		2.63
C0480-042-0880M			22.35	9.02	6.07		2.63	C0480-042-0880S	2.19		C0480-042-0880X	12.79		2.19
C0480-042-1000M			25.4	10.16	6.68		2.28	C0480-042-1000S	1.9		C0480-042-1000X	14.37		1.9
C0480-042-1250M			31.75	11.94	8.05		1.75	C0480-042-1250S	1.46		C0480-042-1250X	17.41		1.46
C0480-042-1500M	1.07		38.1	14.73	9.09	34.7	1.49	C0480-042-1500S	28.91	1.24	C0480-042-1500X	21.23	20.92	1.24
C0480-042-1750M			44.45	18.72	10.62		1.35	C0480-042-1750S	1.12		C0480-042-1750X	25.82		1.12
C0480-042-2000M			50.8	21.23	11.73		1.17	C0480-042-2000S	0.98		C0480-042-2000X	29.39		0.98
C0480-042-2250M			57.15	23.57	12.83		1.03	C0480-042-2250S	0.86		C0480-042-2250X	32.84		0.86
C0480-042-2500M	12.19		63.5	28.58	13.21		1	C0480-042-2500S	0.83		C0480-042-2500X	38.34		0.83
C0480-042-2750M			69.85	31.32	14.25		0.89	C0480-042-2750S	0.74		C0480-042-2750X	41.73		0.74
C0480-042-3000M			76.2	34.04	15.29		0.82	C0480-042-3000S	0.69		C0480-042-3000X	45.68		0.69
C0480-045-0500M			12.7	6.02	4.7		6.13	C0480-045-0500S	5.11		C0480-045-0500X	7.68		5.11
C0480-045-0625M			15.75	7.39	5.31		4.9	C0480-045-0625S	4.08		C0480-045-0625X	9.47		4.08
C0480-045-0750M			19.05	8.38	6.15		3.85	C0480-045-0750S	3.21		C0480-045-0750X	11.06		3.21
C0480-045-0880M			22.35	10.06	6.76		3.33	C0480-045-0880S	2.77		C0480-045-0880X	13.10		2.77
C0480-045-1000M			25.4	11.68	7.29		2.98	C0480-045-1000S	2.48		C0480-045-1000X	15.06		2.48
C0480-045-1250M			31.75	13.84	8.84		2.28	C0480-045-1250S	1.9		C0480-045-1250X	18.22		1.9
C0480-045-1500M	1.14		38.1	16.89	10.03	40.92	1.93	C0480-045-1500S	34.09	1.6	C0480-045-1500X	22.11	25.65	1.6
C0480-045-1750M			44.45	20.12	11.91		1.68	C0480-045-1750S	1.4		C0480-045-1750X	26.13		1.4
C0480-045-2000M			50.8	22.99	13.21		1.47	C0480-045-2000S	1.23		C0480-045-2000X	29.87		1.23
C0480-045-2250M			57.15	25.58	14.48		1.3	C0480-045-2250S	1.08		C0480-045-2250X	33.39		1.08
C0480-045-2500M			63.5	28.32	15.75		1.16	C0480-045-2500S	0.96		C0480-045-2500X	36.86		0.96
C0480-045-2750M			69.85	31.04	17.04		1.05	C0480-045-2750S	0.88		C0480-045-2750X	40.54		0.88
C0480-045-3000M			76.2	33.71	18.31		0.96	C0480-045-3000S	0.8		C0480-045-3000X	44.23		0.8
C0480-051-0500M			12.7	7.52	6.48		10.73	C0480-051-0500S	8.94		C0480-051-0500X	8.64		8.94
C0480-051-0620M			15.75	9.02	7.26		8.25	C0480-051-0620S	6.87		C0480-051-0620X	10.47		6.87
C0480-051-0750M			19.05	10.62	8.13		6.6	C0480-051-0750S	5.5		C0480-051-0750X	12.45		5.5
C0480-051-0880M			22.35	12.22	8.97		5.5	C0480-051-0880S	4.58		C0480-051-0880X	14.43		4.58
C0480-051-1000M			25.4	13.72	9.75		4.76	C0480-051-1000S	3.97		C0480-051-1000X	16.26		3.97
C0480-051-1250M			31.75	16.81	11.38		3.73	C0480-051-1250S	3.11		C0480-051-1250X	20.07		3.11
C0480-051-1500M	1.3		38.1	19.91	13.03	55.65	3.06	C0480-051-1500S	46.36	2.55	C0480-051-1500X	23.89	36.28	2.55
C0480-051-1750M			44.45	23.01	14.66		2.59	C0480-051-1750S	2.16		C0480-051-1750X	27.65		2.16
C0480-051-2000M			50.8	26.09	16.28		2.26	C0480-051-2000S	1.88		C0480-051-2000X	31.52		1.88
C0480-051-2250M			57.15	29.18	17.93		2	C0480-051-2250S	1.66		C0480-051-2250X	35.34		1.66
C0480-051-2500M			63.5	32.28	19.56		1.79	C0480-051-2500S	1.49		C0480-051-2500X	39.12		1.49
C0480-051-2750M			69.85	35.38	21.18		1.61	C0480-051-2750S	1.34		C0480-051-2750X	42.82		1.34
C0480-051-3000M			76.2	38.48	22.83		1.47	C0480-051-3000S	1.23		C0480-051-3000X	46.59		1.23
C0480-055-0500M			12.7	6.99	6.25		12.61	C0480-055-0500S	10.5		C0480-055-0500X	8.48		10.5
C0480-055-0625M			15.75	8.41	7.24		9.81	C0480-055-0625S	8.17		C0480-055-0625X	10.33		8.17
C0480-055-0750M			19.05	10.26	8.1		8.23	C0480-055-0750S	6.86		C0480-055-0750X	12.59		6.86
C0480-055-0880M	1.4		22.35	11.43	9.35	72.06	6.65	C0480-055-0880S	60.03	5.54	C0480-055-0880X	14.36	44.27	5.54
C0480-055-1000M			25.4	13.59	9.93		6.13	C0480-055-1000S	5.11		C0480-055-1000X	16.73		5.11
C0480-055-1250M			31.75	16.51	12.04		4.73	C0480-055-1250S	3.94		C0480-055-1250X	20.51		3.94
C0480-055-1500M			38.1	19.43	14.15		3.85	C0480-055-1500S	3.21		C0480-055-1500X	24.30		3.21
C0480-055-1750M			44.45	23.24	16.54		3.4	C0480-055-1750S</						

COMPRESSION SPRINGS MUSIC WIRE						302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX					
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0480-055-2000M			50.8	26.31	18.42		2.94	C0480-055-2000S		2.45	C0480-055-2000X	32.73		2.45
C0480-055-2250M			57.15	29.54	20.29		2.61	C0480-055-2250S		2.17	C0480-055-2250X	36.78		2.17
C0480-055-2500M	1.4	1.4	63.5	32.56	22.2	72.06	2.33	C0480-055-2500S	60.03	1.94	C0480-055-2500X	40.68	44.27	1.94
C0480-055-2750M			69.85	37.29	23.14		2.21	C0480-055-2750S		1.84	C0480-055-2750X	45.76		1.84
C0480-055-3000M			76.2	40.56	24.92		2.01	C0480-055-3000S		1.67	C0480-055-3000X	49.81		1.68
C0480-059-0500M			12.7	8.26	7.75		18.77	C0480-059-0500S		15.64	C0480-059-0500X	9.22		15.64
C0480-059-0620M			15.75	9.91	8.79		14.29	C0480-059-0620S		11.9	C0480-059-0620X	11.18		11.9
C0480-059-0750M			19.05	11.71	9.91		11.35	C0480-059-0750S		9.45	C0480-059-0750X	13.30		9.45
C0480-059-1000M			25.4	15.14	12.04		8.13	C0480-059-1000S		6.77	C0480-059-1000X	17.37		6.77
C0480-059-1250M			31.75	18.59	14.17		6.34	C0480-059-1250S		5.28	C0480-059-1250X	21.45		5.28
C0480-059-1500M	1.5	1.5	38.1	22.02	16.31	83.4	5.18	C0480-059-1500S	69.47	4.31	C0480-059-1500X	25.51	54.38	4.32
C0480-059-1750M			44.45	25.48	18.44		4.4	C0480-059-1750S		3.67	C0480-059-1750X	29.60		3.66
C0480-059-2000M			50.8	28.91	20.57		3.82	C0480-059-2000S		3.18	C0480-059-2000X	33.70		3.18
C0480-059-2250M			57.15	32.36	22.71		3.36	C0480-059-2250S		2.8	C0480-059-2250X	37.73		2.8
C0480-059-2500M			63.5	35.79	24.84		3.01	C0480-059-2500S		2.51	C0480-059-2500X	41.83		2.51
C0480-059-2750M			69.85	39.24	26.97		2.73	C0480-059-2750S		2.27	C0480-059-2750X	45.95		2.27
C0480-059-3000M			76.2	42.67	29.11		2.49	C0480-059-3000S		2.07	C0480-059-3000X	49.95		2.07
C0480-063-0500M			12.7	7.82	7.52		21.01	C0480-063-0500S		17.5	C0480-063-0500X	9.02		17.5
C0480-063-0625M			15.75	9.6	8.69		16.64	C0480-063-0625S		13.86	C0480-063-0625X	11.10		13.86
C0480-063-0750M			19.05	11.56	9.86		13.66	C0480-063-0750S		11.38	C0480-063-0750X	13.39		11.38
C0480-063-0880M			22.35	13.51	11.07		11.56	C0480-063-0880S		9.63	C0480-063-0880X	15.67		9.63
C0480-063-1000M			25.4	15.11	12.32		9.98	C0480-063-1000S		8.31	C0480-063-1000X	17.66		8.31
C0480-063-1250M			31.75	18.8	14.78		7.88	C0480-063-1250S		6.56	C0480-063-1250X	21.94		6.57
C0480-063-1380M	1.6	1.6	35.05	21.36	16.64	102.31	7.48	C0480-063-1380S	85.22	6.23	C0480-063-1380X	24.72	64.37	6.23
C0480-063-1500M			38.1	22.73	16.89		6.65	C0480-063-1500S		5.54	C0480-063-1500X	26.49		5.54
C0480-063-1750M			44.45	26.31	20.35		5.64	C0480-063-1750S		4.7	C0480-063-1750X	30.75		4.7
C0480-063-2000M			50.8	29.87	22.73		4.89	C0480-063-2000S		4.07	C0480-063-2000X	34.98		4.07
C0480-063-2250M			57.15	33.4	25.12		4.31	C0480-063-2250S		3.59	C0480-063-2250X	39.21		3.59
C0480-063-2500M			63.5	36.96	27.51		3.85	C0480-063-2500S		3.21	C0480-063-2500X	43.44		3.21
C0480-063-2750M			69.85	40.56	29.9		3.48	C0480-063-2750S		2.9	C0480-063-2750X	47.68		2.9
C0480-063-3000M			76.2	44.12	32.28		3.19	C0480-063-3000S		2.66	C0480-063-3000X	51.96		2.65
C0480-067-0500M			12.7	8.97	8.53		31.64	C0480-067-0500S		26.36	C0480-067-0500X	9.78		26.36
C0480-067-0620M			15.75	10.77	10.24		23.83	C0480-067-0620S		19.85	C0480-067-0620X	11.87		19.85
C0480-067-0750M	12.19	12.19	19.05	12.75	11.63		18.81	C0480-067-0750S		15.67	C0480-067-0750X	14.13		15.67
C0480-067-0880M			22.35	14.73	13		15.53	C0480-067-0880S		12.94	C0480-067-0880X	16.40		12.94
C0480-067-1000M			25.4	16.54	14.27		13.38	C0480-067-1000S		11.15	C0480-067-1000X	18.49		11.14
C0480-067-1250M			31.75	20.35	16.92		10.38	C0480-067-1250S		8.65	C0480-067-1250X	22.85		8.65
C0480-067-1500M			38.1	24.13	19.56	118.46	8.48	C0480-067-1500S	98.67	7.06	C0480-067-1500X	27.19	77	7.06
C0480-067-1750M			44.45	27.91	22.2		7.16	C0480-067-1750S		5.96	C0480-067-1750X	31.54		5.97
C0480-067-2000M			50.8	31.72	24.84		6.2	C0480-067-2000S		5.16	C0480-067-2000X	35.89		5.16
C0480-067-2250M			57.15	35.51	27.48		5.48	C0480-067-2250S		4.56	C0480-067-2250X	40.28		4.57
C0480-067-2500M			63.5	39.29	30.15		4.9	C0480-067-2500S		4.08	C0480-067-2500X	44.65		4.08
C0480-067-2750M			69.85	43.1	32.79		4.43	C0480-067-2750S		3.69	C0480-067-2750X	48.99		3.69
C0480-067-3000M			76.2	46.89	35.43		4.05	C0480-067-3000S		3.37	C0480-067-3000X	53.35		3.37
C0480-072-0500M			12.7	9.47	9.09		44.76	C0480-072-0500S		37.29	C0480-072-0500X	10.21		37.28
C0480-072-0620M			15.75	11.43	10.64		33.48	C0480-072-0620S		27.89	C0480-072-0620X	12.43		27.89
C0480-072-0750M			19.05	13.56	12.32		26.3	C0480-072-0750S		21.91	C0480-072-0750X	14.82		21.91
C0480-072-0880M			22.35	15.67	13.89		21.66	C0480-072-0880S		18.04	C0480-072-0880X	17.22		18.04
C0480-072-1000M			25.4	17.65	15.27		18.61	C0480-072-1000S		15.5	C0480-072-1000X	19.42		15.51
C0480-072-1250M			31.75	21.72	18.14		14.41	C0480-072-1250S		12	C0480-072-1250X	24.03		12.01
C0480-072-1500M			38.1	25.81	20.98		11.75	C0480-072-1500S		9.79	C0480-072-1500X	28.63		9.79
C0480-072-1750M	1.83	1.83	44.45	29.9	23.85	144.47	9.93	C0480-072-1750S	120.34	8.27	C0480-072-1750X	33.24	92.68	8.27
C0480-072-2000M			50.8	33.99	26.7		8.58	C0480-072-2000S		7.15	C0480-072-2000X	37.83		7.15
C0480-072-2250M			57.15	38.05	29.57		7.56	C0480-072-2250S		6.3	C0480-072-2250X	42.44		6.3
C0480-072-2500M			63.5	42.14	32.41		6.76	C0480-072-2500S		5.63	C0480-072-2500X	47.04		5.63
C0480-072-2750M			69.85	46.23	35.28		6.11	C0480-072-2750S		5.09	C0480-072-2750X	51.65		5.09
C0480-072-3000M			76.2	50.32	38.13		5.59	C0480-072-3000S		4.66	C0480-072-3000X	56.28		4.65
C0480-072-3250M			82.55	54.41	41		5.13	C0480-072-3250S		4.27	C0480-072-3250X	60.87		4.27
C0480-072-3500M			88.9	58.47	43.84		4.75	C0480-072-3500S		3.96	C0480-072-3500X	65.46		3.95
C0480-074-0500M			12.7	9.65	8.89		50.62	C0480-074-0500S		42.17	C0480-074-0500X	10.32		42.17
C0480-074-0620M			15.75	11.66	10.69		37.75	C0480-074-0620S		31.45	C0480-074-0620X	12.56		31.45
C0480-074-0750M			19.05	13.82	12.24		29.61	C0480-074-0750S		24.67	C0480-074-0750X	14.98		24.67
C0480-074-0880M			22.35	16	13.87		24.34	C0480-074-0880S		20.28	C0480-074-0880X	17.40		20.28
C0480-074-1000M			25.4	18.01	15.49		20.91	C0480-074-1000S		17.42	C0480-074-1000X	19.64		17.42
C0480-074-1250M			31.75	22.17	18.64		16.16	C0480-074-1250S		13.46	C0480-074-1250X	24.30		13.46
C0480-074-1500M			38.1	26.37	21.72		13.19	C0480-074-1500S		10.99	C0480-074-1500X	28.97		10.98
C0480-074-1750M	1.88	1.88	44.45	30.53	24.69	154.75	11.12	C0480-074-1750S	128.91	9.26	C0480-074-1750X	33.62	100.32	9.26
C0480-074-2000M			50.8	34.72	27.66		9.63	C0480-074-2000S		8.02	C			

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	L <sub>0</sub> (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>i</sub> (N)	R (N/mm)	Part Number	P <sub>i</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>i</sub> (N)	R (N/mm)
C0480-074-3000M			76.2	51.44	39.57		6.25	C0480-074-3000S	5.21		C0480-074-3000X	56.94		5.21
C0480-074-3250M		1.88	82.55	55.63	42.55	154.75	5.74	C0480-074-3250S	128.91	4.78	C0480-074-3250X	61.58	100.32	4.78
C0480-074-3500M			88.9	59.79	45.52		5.32	C0480-074-3500S	4.43		C0480-074-3500X	66.28		4.43
C0480-081-0500M			12.7	10.19	9.63		78.22	C0480-081-0500S		65.16	C0480-081-0500X	10.75		65.16
C0480-081-0620M			15.75	12.34	11.63		57.73	C0480-081-0620S		48.09	C0480-081-0620X	13.11		48.09
C0480-081-0750M			19.05	14.66	13.36		44.97	C0480-081-0750S		37.46	C0480-081-0750X	15.66		37.46
C0480-081-0880M			22.35	16.99	15.19		36.82	C0480-081-0880S		30.67	C0480-081-0880X	18.21		30.68
C0480-081-1000M			25.4	19.15	16.99		31.55	C0480-081-1000S		26.28	C0480-081-1000X	20.57		26.29
C0480-081-1250M			31.75	23.65	20.52		24.3	C0480-081-1250S		20.24	C0480-081-1250X	25.47		20.25
C0480-081-1500M			38.1	28.12	23.93		19.77	C0480-081-1500S		16.47	C0480-081-1500X	30.39		16.47
C0480-081-1750M		2.06	44.45	32.61	27.25	197.22	16.65	C0480-081-1750S	164.28	13.87	C0480-081-1750X	35.29	127.05	13.87
C0480-081-2000M			50.8	37.08	30.58		14.39	C0480-081-2000S		11.99	C0480-081-2000X	40.20		11.99
C0480-081-2250M			57.15	41.58	33.88		12.66	C0480-081-2250S		10.55	C0480-081-2250X	45.10		10.55
C0480-081-2500M			63.5	46.05	37.21		11.31	C0480-081-2500S		9.42	C0480-081-2500X	50.02		9.42
C0480-081-2750M			69.85	50.55	40.51		10.21	C0480-081-2750S		8.5	C0480-081-2750X	54.91		8.5
C0480-081-3000M			76.2	55.04	43.84		9.32	C0480-081-3000S		7.76	C0480-081-3000X	59.83		7.76
C0480-081-3250M			82.55	59.51	47.17		8.56	C0480-081-3250S		7.13	C0480-081-3250X	64.74		7.13
C0480-081-3500M			88.9	64.01	50.47		7.92	C0480-081-3500S		6.6	C0480-081-3500X	69.63		6.59
C0600-045-0500M			12.7	6.53	3.89		4.33	C0600-045-0500S		3.61	C0600-045-0500X	6.95		3.6
C0600-045-0625M			15.75	7.29	4.55		3.15	C0600-045-0625S		2.62	C0600-045-0625X	7.86		2.63
C0600-045-0750M			19.05	8.15	5.21		2.45	C0600-045-0750S		2.04	C0600-045-0750X	8.90		2.04
C0600-045-0880M			22.35	9.65	5.69		2.1	C0600-045-0880S		1.75	C0600-045-0880X	10.52		1.75
C0600-045-1000M			25.4	10.16	6.38		1.75	C0600-045-1000S		1.46	C0600-045-1000X	11.20		1.46
C0600-045-1250M			31.75	12.7	7.42		1.4	C0600-045-1250S		1.17	C0600-045-1250X	14.00		1.17
C0600-045-1380M	1.14		35.05	13.72	7.77	26.69	1.24	C0600-045-1380S	22.23	1.04	C0600-045-1380X	15.05	20.72	1.03
C0600-045-1500M			38.1	14.61	8.59		1.14	C0600-045-1500S		0.95	C0600-045-1500X	16.25		0.95
C0600-045-1750M			44.45	21.69	9.3		1.17	C0600-045-1750S		0.98	C0600-045-1750X	23.25		0.98
C0600-045-2000M			50.8	24.54	10.19		1.02	C0600-045-2000S		0.85	C0600-045-2000X	26.31		0.85
C0600-045-2250M			57.15	27.84	11.07		0.91	C0600-045-2250S		0.76	C0600-045-2250X	29.84		0.76
C0600-045-2500M			63.5	30.38	11.96		0.81	C0600-045-2500S		0.67	C0600-045-2500X	32.62		0.67
C0600-045-2750M			69.85	29.72	13.72		0.67	C0600-045-2750S		0.55	C0600-045-2750X	32.47		0.56
C0600-045-3000M			76.2	32.31	14.86		0.61	C0600-045-3000S		0.51	C0600-045-3000X	35.62		0.51
C0600-045-3500M			88.9	38.1	16.74		0.53	C0600-045-3500S		0.44	C0600-045-3500X	41.56		0.44
C0600-049-0620M			15.75	8.13	5.94		4.9	C0600-049-0620S		4.08	C0600-049-0620X	9.36		4.08
C0600-049-0750M			19.05	9.53	6.48		3.92	C0600-049-0750S		3.27	C0600-049-0750X	11.07		3.27
C0600-049-1000M	15.24		25.4	12.22	7.54		2.84	C0600-049-1000S		2.37	C0600-049-1000X	14.36		2.36
C0600-049-1250M			31.75	14.91	8.59		2.22	C0600-049-1250S		1.85	C0600-049-1250X	17.67		1.85
C0600-049-1500M			38.1	17.6	9.65		1.82	C0600-049-1500S		1.52	C0600-049-1500X	20.91		1.52
C0600-049-1750M	1.24		44.45	20.32	10.72	37.37	1.54	C0600-049-1750S	31.13	1.28	C0600-049-1750X	24.13	26.08	1.28
C0600-049-2000M			50.8	23.01	11.76		1.35	C0600-049-2000S		1.12	C0600-049-2000X	27.58		1.12
C0600-049-2250M			57.15	25.7	12.83		1.19	C0600-049-2250S		0.99	C0600-049-2250X	30.86		0.99
C0600-049-2500M			63.5	28.4	13.87		1.07	C0600-049-2500S		0.89	C0600-049-2500X	34.19		0.89
C0600-049-2750M			69.85	31.09	14.94		0.96	C0600-049-2750S		0.8	C0600-049-2750X	37.34		0.8
C0600-049-3000M			76.2	33.78	15.98		0.88	C0600-049-3000S		0.73	C0600-049-3000X	40.44		0.73
C0600-055-0625M			15.75	8.13	5.74		7	C0600-055-0625S		5.83	C0600-055-0625X	9.60		5.83
C0600-055-0750M			19.05	9.78	6.38		5.78	C0600-055-0750S		4.81	C0600-055-0750X	11.60		4.81
C0600-055-0880M			22.35	11.43	7.01		4.9	C0600-055-0880S		4.08	C0600-055-0880X	13.57		4.08
C0600-055-1000M			25.4	12.7	7.72		4.2	C0600-055-1000S		3.5	C0600-055-1000X	15.15		3.5
C0600-055-1250M			31.75	14.73	9.37		3.15	C0600-055-1250S		2.62	C0600-055-1250X	18.09		2.63
C0600-055-1500M	1.4		38.1	17.78	10.67	53.38	2.63	C0600-055-1500S	44.47	2.19	C0600-055-1500X	21.70	35.88	2.19
C0600-055-1750M			44.45	21.01	12.93		2.28	C0600-055-1750S		1.9	C0600-055-1750X	25.53		1.9
C0600-055-2000M			50.8	23.83	14.27		1.98	C0600-055-2000S		1.65	C0600-055-2000X	29.04		1.65
C0600-055-2250M			57.15	26.67	15.6		1.75	C0600-055-2250S		1.46	C0600-055-2250X	32.56		1.46
C0600-055-2500M			63.5	29.26	16.94		1.56	C0600-055-2500S		1.3	C0600-055-2500X	35.87		1.3
C0600-055-2750M			69.85	33.3	17.81		1.45	C0600-055-2750S		1.21	C0600-055-2750X	40.22		1.21
C0600-055-3000M			76.2	36.17	19.1		1.33	C0600-055-3000S		1.11	C0600-055-3000X	43.84		1.11
C0600-059-0620M			15.75	9.07	7.57		9.4	C0600-059-0620S		7.83	C0600-059-0620X	10.11		7.83
C0600-059-0750M			19.05	10.64	8.36		7.48	C0600-059-0750S		6.23	C0600-059-0750X	11.97		6.23
C0600-059-0880M			22.35	12.22	9.14		6.2	C0600-059-0880S		5.16	C0600-059-0880X	13.81		5.16
C0600-059-1000M			25.4	13.67	9.88		5.36	C0600-059-1000S		4.46	C0600-059-1000X	15.51		4.46
C0600-059-1250M			31.75	16.69	11.4		4.17	C0600-059-1250S		3.47	C0600-059-1250X	19.04		3.47
C0600-059-1500M	1.5		38.1	19.71	12.95	62.85	3.41	C0600-059-1500S	52.35	2.84	C0600-059-1500X	22.59	44.13	2.84
C0600-059-1750M			44.45	22.73	14.48		2.89	C0600-059-1750S		2.41	C0600-059-1750X	26.12		2.41
C0600-059-2000M			50.8	25.76	16		2.5	C0600-059-2000S		2.08	C0600-059-2000X	29.65		2.09
C0600-059-2250M			57.15	28.78	17.53		2.21	C0600-059-2250S		1.84	C0600-059-2250X	33.14		1.84
C0600-059-2500M			63.5	31.8	19.05		1.98	C0600-059-2500S		1.65	C0600-059-2500X	36.73		1.65
C0600-059-2750M			69.85	34.82	20.6		1.79	C0600-059-2750S		1.49	C0600-059-2750X	40.19		1.49
C0600-059-3000M			76.2	37.85	22.12		1.65	C0600-059-3000S		1.37	C0600-059-3000X	44.02		1.37
C0600-063-0625M			15.75	8.38	7.11		10.86	C0600-063-0625S		9.05	C0600-063-0625X	9.96		9.04
C0600-063-0750M	1.6		19.05	10.16	7.98	80.07	8.93	C0600-063-0750S	66.7	7.44	C0600-063-0750X	12.02	52	

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0600-063-1000M			25.4	13.34	9.6		6.65	C0600-063-1000S		5.54	C0600-063-1000X	15.96		5.54
C0600-063-1250M			31.75	17.02	11.05		5.43	C0600-063-1250S		4.52	C0600-063-1250X	20.18		4.52
C0600-063-1500M			38.1	19.05	13.36		4.2	C0600-063-1500S		3.5	C0600-063-1500X	23.16		3.5
C0600-063-1750M			44.45	22.48	16.05		3.64	C0600-063-1750S		3.03	C0600-063-1750X	27.21		3.03
C0600-063-2000M		1.6	50.8	25.4	17.78	80.07	3.15	C0600-063-2000S	66.7	2.62	C0600-063-2000X	30.88	52.31	2.63
C0600-063-2250M			57.15	28.4	19.51		2.78	C0600-063-2250S		2.32	C0600-063-2250X	34.60		2.32
C0600-063-2500M			63.5	31.29	21.23		2.49	C0600-063-2500S		2.07	C0600-063-2500X	38.25		2.07
C0600-063-2750M			69.85	36.4	21.92		2.4	C0600-063-2750S		2	C0600-063-2750X	43.67		2
C0600-063-3000M			76.2	39.57	23.55		2.19	C0600-063-3000S		1.82	C0600-063-3000X	47.51		1.82
C0600-063-3500M			88.9	45.9	26.8		1.86	C0600-063-3500S		1.55	C0600-063-3500X	55.07		1.55
C0600-067-0625M			15.75	9.14	7.62		14.01	C0600-067-0625S		11.67	C0600-067-0625X	10.38		11.67
C0600-067-0750M			19.05	10.92	8.53		11.56	C0600-067-0750S		9.63	C0600-067-0750X	12.54		9.63
C0600-067-0880M			22.35	11.68	10.19		8.76	C0600-067-0880S		7.3	C0600-067-0880X	13.76		7.29
C0600-067-1000M			25.4	13.46	10.92		7.88	C0600-067-1000S		6.56	C0600-067-1000X	15.85		6.57
C0600-067-1250M			31.75	16.89	12.83		6.3	C0600-067-1250S		5.25	C0600-067-1250X	19.81		5.25
C0600-067-1500M		1.7	38.1	19.81	15.09	93.41	5.08	C0600-067-1500S	77.81	4.23	C0600-067-1500X	23.28	62.68	4.23
C0600-067-1750M			44.45	21.08	18.16		4.03	C0600-067-1750S		3.36	C0600-067-1750X	25.77		3.36
C0600-067-2000M			50.8	27.1	19.58		3.94	C0600-067-2000S		3.28	C0600-067-2000X	31.70		3.28
C0600-067-2250M			57.15	30.2	21.51		3.47	C0600-067-2250S		2.89	C0600-067-2250X	35.45		2.89
C0600-067-2500M			63.5	33.38	23.44		3.1	C0600-067-2500S		2.58	C0600-067-2500X	39.22		2.58
C0600-067-2750M			69.85	38	24.54		2.92	C0600-067-2750S		2.43	C0600-067-2750X	44.12		2.44
C0600-067-3000M			76.2	41.3	26.42		2.68	C0600-067-3000S		2.23	C0600-067-3000X	48.12		2.23
C0600-072-0620M			15.75	10.41	9.68		20.05	C0600-072-0620S		16.7	C0600-072-0620X	11.22		16.7
C0600-072-0750M			19.05	11.3	10.06		13.66	C0600-072-0750S		11.38	C0600-072-0750X	12.41		11.38
C0600-072-0880M			22.35	13.39	11		11.91	C0600-072-0880S		9.92	C0600-072-0880X	14.73		9.92
C0600-072-1000M			25.4	14.35	12.75		9.63	C0600-072-1000S		8.02	C0600-072-1000X	15.98		8.02
C0600-072-1250M			31.75	18.21	14.76		7.88	C0600-072-1250S		6.56	C0600-072-1250X	20.23		6.57
C0600-072-1500M	1.83	38.1	21.08	17.55	106.76	6.3	C0600-072-1500S	88.93	5.25	C0600-072-1500X	23.70	75.6	5.25	
C0600-072-1750M			44.45	24.13	20.35		5.25	C0600-072-1750S		4.37	C0600-072-1750X	27.17		4.38
C0600-072-2000M			50.8	28.96	21.54		4.9	C0600-072-2000S		4.08	C0600-072-2000X	32.29		4.08
C0600-072-2250M			57.15	33.6	24.03		4.54	C0600-072-2250S		3.78	C0600-072-2250X	37.14		3.78
C0600-072-2500M			63.5	37.11	26.24		4.05	C0600-072-2500S		3.37	C0600-072-2500X	41.06		3.37
C0600-072-2750M			69.85	40.67	28.42		3.66	C0600-072-2750S		3.05	C0600-072-2750X	45.05		3.05
C0600-072-3000M			76.2	44.25	30.63		3.34	C0600-072-3000S		2.78	C0600-072-3000X	49.06		2.79
C0600-081-0620M			15.75	11.84	10.46		37.23	C0600-081-0620S		31.01	C0600-081-0620X	12.39		31.01
C0600-081-0750M	15.24		19.05	14.05	11.66		29	C0600-081-0750S		24.16	C0600-081-0750X	14.74		24.16
C0600-081-0880M			22.35	16.23	12.88		23.74	C0600-081-0880S		19.78	C0600-081-0880X	17.09		19.78
C0600-081-1000M			25.4	18.26	14.02		20.35	C0600-081-1000S		16.95	C0600-081-1000X	19.26		16.95
C0600-081-1250M			31.75	22.48	16.36		15.67	C0600-081-1250S		13.05	C0600-081-1250X	23.78		13.06
C0600-081-1500M			38.1	26.7	18.69		12.75	C0600-081-1500S		10.62	C0600-081-1500X	28.30		10.62
C0600-081-1750M		2.06	44.45	30.91	21.03		10.73	C0600-081-1750S		8.94	C0600-081-1750X	32.81		8.94
C0600-081-2000M			50.8	35.13	23.37	145.41	9.28	C0600-081-2000S	121.13	7.73	C0600-081-2000X	37.34	104.1	7.73
C0600-081-2250M			57.15	39.34	25.7		8.16	C0600-081-2250S		6.8	C0600-081-2250X	41.84		6.8
C0600-081-2500M			63.5	43.56	28.04		7.3	C0600-081-2500S		6.08	C0600-081-2500X	46.39		6.08
C0600-081-2750M			69.85	47.78	30.38		6.58	C0600-081-2750S		5.48	C0600-081-2750X	50.87		5.48
C0600-081-3000M			76.2	51.99	32.72		6.01	C0600-081-3000S		5.01	C0600-081-3000X	55.39		5
C0600-081-3250M			82.55	56.21	35.05		5.52	C0600-081-3250S		4.6	C0600-081-3250X	59.89		4.6
C0600-081-3500M			88.9	60.43	37.39		5.11	C0600-081-3500S		4.26	C0600-081-3500X	64.46		4.26
C0600-081-3750M			95.25	64.64	39.73		4.75	C0600-081-3750S		3.96	C0600-081-3750X	68.92		3.95
C0600-081-4000M			101.6	68.86	42.06		4.45	C0600-081-4000S		3.71	C0600-081-4000X	73.50		3.71
C0600-085-0620M			15.75	12.12	11		45.96	C0600-085-0620S		38.28	C0600-085-0620X	12.62		38.29
C0600-085-0750M			19.05	14.35	12.29		35.65	C0600-085-0750S		29.7	C0600-085-0750X	15.02		29.7
C0600-085-0880M			22.35	16.61	13.61		29.14	C0600-085-0880S		24.27	C0600-085-0880X	17.42		24.27
C0600-085-1000M			25.4	18.69	14.81		24.92	C0600-085-1000S		20.76	C0600-085-1000X	19.63		20.76
C0600-085-1250M			31.75	23.01	17.32		19.16	C0600-085-1250S		15.96	C0600-085-1250X	24.24		15.96
C0600-085-1500M			38.1	27.33	19.84		15.55	C0600-085-1500S		12.95	C0600-085-1500X	28.85		12.95
C0600-085-1750M			44.45	31.67	22.35		13.1	C0600-085-1750S		10.91	C0600-085-1750X	33.47		10.91
C0600-085-2000M	2.16		50.8	35.99	24.84	167.33	11.29	C0600-085-2000S	139.39	9.4	C0600-085-2000X	38.07	119.77	9.41
C0600-085-2250M			57.15	40.34	27.36		9.95	C0600-085-2250S		8.29	C0600-085-2250X	42.69		8.28
C0600-085-2500M			63.5	44.65	29.87		8.88	C0600-085-2500S		7.4	C0600-085-2500X	47.31		7.4
C0600-085-2750M			69.85	48.97	32.39		8.02	C0600-085-2750S		6.68	C0600-085-2750X	51.92		6.68
C0600-085-3000M			76.2	53.31	34.9		7.3	C0600-085-3000S		6.08	C0600-085-3000X	56.51		6.08
C0600-085-3250M			82.55	57.63	37.41		6.71	C0600-085-3250S		5.59	C0600-085-3250X	61.11		5.59
C0600-085-3500M			88.9	61.95	39.93		6.22	C0600-085-3500S		5.18	C0600-085-3500X	65.77		5.18
C0600-085-3750M			95.25	66.29	42.42		5.78	C0600-085-3750S		4.81	C0600-085-3750X	70.37		4.81
C0600-085-4000M			101.6	70.61	44.93		5.39	C0600-085-4000S		4.49	C0600-085-4000X	74.94		4.49
C0600-092-0750M			19.05	15.01	13.31		51.04	C0600-092-0750S		42.52	C0600-092-0750X	15.51		42.52
C0600-092-0880M			22.35	17.37	14.76		41.5	C0600-092-0880S		34.57	C0600-092-0880X	17.99		34.57
C0600-092-1000M	2.34		25.4	19.56	16.08	206.65	35.41	C0600-092-1000S	172.14	29.5	C0600-092-1000X	20.29	150.64	29.5
C0600-092-1250M			31.75	24.13	18.87		27.09	C0600-092-1250S		22.57	C0600-09			

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>i</sub> (N)	R (N/mm)	Part Number	P <sub>i</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>i</sub> (N)	R (N/mm)
C0600-092-1750M			44.45	33.25	24.43		18.44	C0600-092-1750S	15.36		C0600-092-1750X	34.64		15.36
C0600-092-2000M			50.8	37.8	27.23		15.9	C0600-092-2000S	13.24		C0600-092-2000X	39.43		13.25
C0600-092-2250M			57.15	42.37	30		13.97	C0600-092-2250S	11.64		C0600-092-2250X	44.21		11.64
C0600-092-2500M			63.5	46.94	32.79		12.47	C0600-092-2500S	172.14	10.39	C0600-092-2500X	49.00	150.64	10.39
C0600-092-2750M	2.34	69.85	51.49	35.56	206.65	11.26		C0600-092-2750S		9.38	C0600-092-2750X	53.79		9.38
C0600-092-3000M			76.2	56.06	38.35		10.26	C0600-092-3000S		8.55	C0600-092-3000X	58.58		8.55
C0600-092-3250M			82.55	60.6	41.12		9.42	C0600-092-3250S		7.85	C0600-092-3250X	63.35		7.85
C0600-092-3500M			88.9	65.18	43.92		8.7	C0600-092-3500S		7.25	C0600-092-3500X	68.12		7.25
C0600-092-3750M			95.25	69.75	46.69		8.11	C0600-092-3750S		6.76	C0600-092-3750X	72.95		6.75
C0600-092-4000M			101.6	74.3	49.48		7.56	C0600-092-4000S		6.3	C0600-092-4000X	77.69		6.3
C0600-098-0750M			19.05	15.44	14.2		67.9	C0600-098-0750S		56.56	C0600-098-0750X	15.93		56.57
C0600-098-0880M			22.35	17.88	15.77		55	C0600-098-0880S		45.82	C0600-098-0880X	18.50		45.82
C0600-098-1000M			25.4	20.17	17.22		46.79	C0600-098-1000S		38.98	C0600-098-1000X	20.88		38.98
C0600-098-1250M			31.75	24.89	20.27		35.7	C0600-098-1250S		29.74	C0600-098-1250X	25.82		29.74
C0600-098-1500M			38.1	29.59	23.29		28.86	C0600-098-1500S		24.04	C0600-098-1500X	30.76		24.04
C0600-098-1750M			44.45	34.32	26.34		24.22	C0600-098-1750S		20.18	C0600-098-1750X	35.71		20.17
C0600-098-2000M			50.8	39.04	29.36		20.85	C0600-098-2000S		17.37	C0600-098-2000X	40.65		17.37
C0600-098-2250M	2.49	57.15	43.76	32.41	245.26	18.32		C0600-098-2250S	204.3	15.26	C0600-098-2250X	45.59	176.35	15.26
C0600-098-2500M		63.5	48.49	35.43		16.34		C0600-098-2500S		13.61	C0600-098-2500X	50.54		13.61
C0600-098-2750M		69.85	53.21	38.48		14.73		C0600-098-2750S		12.27	C0600-098-2750X	55.48		12.27
C0600-098-3000M		76.2	57.91	41.5		13.41		C0600-098-3000S		11.17	C0600-098-3000X	60.42		11.17
C0600-098-3250M		82.55	62.64	44.55		12.33		C0600-098-3250S		10.27	C0600-098-3250X	65.38		10.27
C0600-098-3500M		88.9	67.36	47.57		11.38		C0600-098-3500S		9.48	C0600-098-3500X	70.30		9.48
C0600-098-3750M		95.25	72.09	50.62		10.59		C0600-098-3750S		8.82	C0600-098-3750X	75.27		8.83
C0600-098-4000M		101.6	76.81	53.64		9.89		C0600-098-4000S		8.24	C0600-098-4000X	80.20		8.24
C0720-055-0620M		15.75	8.13	6.12		5.69		C0720-055-0620S		4.74	C0720-055-0620X	9.39		4.74
C0720-055-0750M		19.05	8.28	5.61		4.03		C0720-055-0750S		3.36	C0720-055-0750X	10.07		3.36
C0720-055-0880M		22.35	9.98	6.05		3.5		C0720-055-0880S		2.92	C0720-055-0880X	12.02		2.92
C0720-055-1000M		25.4	12.01	6.3		3.24		C0720-055-1000S		2.7	C0720-055-1000X	14.23		2.7
C0720-055-1250M		31.75	15.24	7.14		2.63		C0720-055-1250S		2.19	C0720-055-1250X	17.98		2.19
C0720-055-1500M	1.4	38.1	16.56	8.46	43.37	2.01		C0720-055-1500S	36.13	1.67	C0720-055-1500X	20.14	30.13	1.68
C0720-055-1750M		44.45	17.53	9.86		1.61		C0720-055-1750S		1.34	C0720-055-1750X	22.00		1.34
C0720-055-2000M		50.8	21.67	10.44		1.49		C0720-055-2000S		1.24	C0720-055-2000X	26.50		1.24
C0720-055-2250M		57.15	25.2	12.24		1.37		C0720-055-2250S		1.14	C0720-055-2250X	30.67		1.14
C0720-055-2500M		63.5	27.81	13.18		1.21		C0720-055-2500S		1.01	C0720-055-2500X	33.56		1.01
C0720-055-2750M	18.29	69.85	30.43	14.12		1.1		C0720-055-2750S		0.92	C0720-055-2750X	37.06		0.92
C0720-055-3000M		76.2	33.07	15.06		1		C0720-055-3000S		0.83	C0720-055-3000X	39.96		0.83
C0720-059-0750M		19.05	9.88	7.24		5.76		C0720-059-0750S		4.8	C0720-059-0750X	11.32		4.8
C0720-059-0880M		22.35	11.28	7.82		4.78		C0720-059-0880S		3.98	C0720-059-0880X	13.04		3.98
C0720-059-1000M		25.4	12.6	8.33		4.12		C0720-059-1000S		3.43	C0720-059-1000X	14.58		3.43
C0720-059-1250M		31.75	15.32	9.42		3.2		C0720-059-1250S		2.67	C0720-059-1250X	17.86		2.67
C0720-059-1500M	1.5	38.1	18.03	10.52	52.84	2.63		C0720-059-1500S	44.02	2.19	C0720-059-1500X	21.15	37.09	2.19
C0720-059-1750M		44.45	20.75	11.61		2.22		C0720-059-1750S		1.85	C0720-059-1750X	24.43		1.85
C0720-059-2000M		50.8	23.47	12.67		1.93		C0720-059-2000S		1.6	C0720-059-2000X	27.68		1.6
C0720-059-2250M		57.15	26.19	13.77		1.7		C0720-059-2250S		1.41	C0720-059-2250X	30.94		1.41
C0720-059-2500M		63.5	28.91	14.86		1.52		C0720-059-2500S		1.27	C0720-059-2500X	34.27		1.27
C0720-063-0620M		15.75	8.92	7.26		9.11		C0720-063-0620S		7.59	C0720-063-0620X	9.95		7.59
C0720-063-0750M		19.05	8.26	7.21		5.78		C0720-063-0750S		4.81	C0720-063-0750X	9.91		4.81
C0720-063-0880M		22.35	9.65	7.95		4.9		C0720-063-0880S		4.08	C0720-063-0880X	11.58		4.08
C0720-063-1000M		25.4	10.67	8.74		4.2		C0720-063-1000S		3.5	C0720-063-1000X	12.83		3.5
C0720-063-1250M		31.75	12.45	10.39		3.24		C0720-063-1250S		2.7	C0720-063-1250X	15.44		2.7
C0720-063-1500M	1.6	38.1	14.48	12.07	62.28	2.63		C0720-063-1500S	51.88	2.19	C0720-063-1500X	17.99	44.01	2.19
C0720-063-1750M		44.45	17.27	13.44		2.28		C0720-063-1750S		1.9	C0720-063-1750X	21.24		1.9
C0720-063-2000M		50.8	18.54	15.29		1.93		C0720-063-2000S		1.6	C0720-063-2000X	23.37		1.6
C0720-063-2250M		57.15	27.76	15.37		2.12		C0720-063-2250S		1.77	C0720-063-2250X	32.22		1.77
C0720-063-2500M		63.5	30.58	16.61		1.89		C0720-063-2500S		1.58	C0720-063-2500X	35.57		1.58
C0720-063-2750M		69.85	33.55	17.83		1.72		C0720-063-2750S		1.43	C0720-063-2750X	39.07		1.43
C0720-063-3000M		76.2	36.25	19.08		1.56		C0720-063-3000S		1.3	C0720-063-3000X	42.30		1.3
C0720-065-0750M		19.05	10.44	8.23		8.06		C0720-065-0750S		6.71	C0720-065-0750X	11.86		6.71
C0720-065-0880M		22.35	11.94	8.92		6.65		C0720-065-0880S		5.54	C0720-065-0880X	13.65		5.54
C0720-065-1000M		25.4	13.34	9.55		5.74		C0720-065-1000S		4.78	C0720-065-1000X	15.31		4.78
C0720-065-1250M		31.75	16.21	10.87		4.45		C0720-065-1250S		3.71	C0720-065-1250X	18.72		3.71
C0720-065-1500M		38.1	19.1	12.19		3.64		C0720-065-1500S		3.03	C0720-065-1500X	22.19		3.03
C0720-065-1750M	1.65	44.45	21.97	13.51	69.26	3.08		C0720-065-1750S	57.69	2.57	C0720-065-1750X	25.65	48.26	2.57
C0720-065-2000M		50.8	24.84	14.83		2.66		C0720-065-2000S		2.22	C0720-065-2000X	29.03		2.22
C0720-065-2250M		57.15	27.74	16.15		2.35		C0720-065-2250S		1.96	C0720-065-2250X	32.46		1.95
C0720-065-2500M		63.5	30.61	17.5		2.1		C0720-065-2500S		1.75	C0720-065-2500X	35.93		1.75
C0720-065-2750M		69.85	33.5	18.14		1.91		C0720-065-2750S		1.59	C0720-065-2750X	39.50		1.59
C0720-065-3000M		76.2	36.37	20.14		1.73		C0720-065-3000S		1.44	C0720-065-3000X	42.78		1.44
C0720-067-0750M	1.7	19.05	9.91	7.09	80.07	8.76		C0720-067-0750S	66.7	7.3	C0720-067-0750X	11.		

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0720-067-1000M			25.4	11.43	8.99		5.78	C0720-067-1000S	4.81		C0720-067-1000X	14.44		4.81
C0720-067-1250M			31.75	14.73	10.24		4.73	C0720-067-1250S	3.94		C0720-067-1250X	18.35		3.94
C0720-067-1500M			38.1	17.27	11.79		3.85	C0720-067-1500S	3.21		C0720-067-1500X	21.65		3.21
C0720-067-1750M			44.45	19.05	13.67		3.15	C0720-067-1750S	2.62		C0720-067-1750X	24.35		2.63
C0720-067-2000M		1.7	50.8	21.59	15.32	80.07	2.71	C0720-067-2000S	66.7	2.26	C0720-067-2000X	27.46	52.78	2.26
C0720-067-2250M			57.15	26.47	16.99		2.61	C0720-067-2250S		2.17	C0720-067-2250X	32.87		2.17
C0720-067-2500M			63.5	29.13	18.39		2.33	C0720-067-2500S	1.94		C0720-067-2500X	36.30		1.94
C0720-067-3000M			76.2	34.65	21.21		1.93	C0720-067-3000S		1.6	C0720-067-3000X	43.31		1.6
C0720-067-3250M			82.55	40.01	21.59		1.87	C0720-067-3250S		1.56	C0720-067-3250X	48.74		1.56
C0720-067-3500M			88.9	42.95	22.91		1.75	C0720-067-3500S		1.46	C0720-067-3500X	52.72		1.46
C0720-072-0750M			19.05	11.13	9.35		11.78	C0720-072-0750S		9.81	C0720-072-0750X	12.56		9.82
C0720-072-0880M			22.35	11.25	9.27		8.41	C0720-072-0880S		7.01	C0720-072-0880X	13.25		7
C0720-072-1000M			25.4	12.7	10.08		7.35	C0720-072-1000S		6.12	C0720-072-1000X	15.00		6.13
C0720-072-1250M			31.75	16.51	11.38		6.13	C0720-072-1250S		5.11	C0720-072-1250X	19.27		5.11
C0720-072-1500M			38.1	17.78	14.07		4.55	C0720-072-1500S		3.79	C0720-072-1500X	21.30		3.79
C0720-072-1750M			44.45	20.19	15.95		3.85	C0720-072-1750S		3.21	C0720-072-1750X	24.59		3.21
C0720-072-2000M	1.83		50.8	24.13	17.2	93.41	3.5	C0720-072-2000S	77.81	2.92	C0720-072-2000X	28.95	63.73	2.92
C0720-072-2250M			57.15	29.24	19.08		3.34	C0720-072-2250S		2.78	C0720-072-2250X	34.27		2.79
C0720-072-2500M			63.5	32.39	20.7		2.99	C0720-072-2500S		2.49	C0720-072-2500X	37.95		2.49
C0720-072-2750M			69.85	35.2	22.3		2.7	C0720-072-2750S		2.25	C0720-072-2750X	41.48		2.25
C0720-072-3000M			76.2	38.38	23.93		2.47	C0720-072-3000S		2.06	C0720-072-3000X	45.21		2.06
C0720-072-3250M			82.55	41.38	25.53		2.28	C0720-072-3250S		1.9	C0720-072-3250X	48.94		1.9
C0720-072-3500M			88.9	44.42	27.15		2.1	C0720-072-3500S		1.75	C0720-072-3500X	52.49		1.75
C0720-072-4000M			101.6	51.18	30.02		1.86	C0720-072-4000S		1.55	C0720-072-4000X	60.38		1.55
C0720-081-0750M			19.05	11.99	10.9		18.12	C0720-081-0750S		15.09	C0720-081-0750X	13.22		15.1
C0720-081-0880M			22.35	13.74	11.94		14.83	C0720-081-0880S		12.35	C0720-081-0880X	15.23		12.36
C0720-081-1000M			25.4	15.34	12.9		12.71	C0720-081-1000S		10.59	C0720-081-1000X	17.09		10.59
C0720-081-1250M			31.75	18.69	14.91		9.79	C0720-081-1250S		8.16	C0720-081-1250X	20.96		8.15
C0720-081-1500M		2.06	38.1	22.05	16.89		7.97	C0720-081-1500S		6.64	C0720-081-1500X	24.85		6.64
C0720-081-1750M		2.06	44.45	25.4	18.9	127.75	6.71	C0720-081-1750S	106.42	5.59	C0720-081-1750X	28.71	87.96	5.59
C0720-081-2000M			50.8	28.75	20.9		5.8	C0720-081-2000S		4.83	C0720-081-2000X	32.58		4.83
C0720-081-2250M			57.15	32.11	22.91		5.1	C0720-081-2250S		4.25	C0720-081-2250X	36.43		4.24
C0720-081-2500M			63.5	35.46	24.92		4.55	C0720-081-2500S		3.79	C0720-081-2500X	40.31		3.79
C0720-081-2750M			69.85	38.81	26.92		4.12	C0720-081-2750S		3.43	C0720-081-2750X	44.19		3.43
C0720-081-3000M			76.2	42.16	28.93		3.75	C0720-081-3000S		3.12	C0720-081-3000X	48.02		3.12
C0720-081-3500M	18.29		88.9	48.87	32.94		3.19	C0720-081-3500S		2.66	C0720-081-3500X	55.77		2.65
C0720-081-4000M			101.6	55.52	36.96		2.78	C0720-081-4000S		2.32	C0720-081-4000X	63.68		2.32
C0720-085-0750M			19.05	12.9	11.02		24.34	C0720-085-0750S		20.28	C0720-085-0750X	14.05		20.28
C0720-085-0880M			22.35	14.83	12.04		19.87	C0720-085-0880S		16.55	C0720-085-0880X	16.23		16.56
C0720-085-1000M			25.4	16.61	13		17	C0720-085-1000S		14.16	C0720-085-1000X	18.25		14.16
C0720-085-1250M			31.75	20.32	14.96		13.06	C0720-085-1250S		10.88	C0720-085-1250X	22.44		10.88
C0720-085-1500M			38.1	24.03	16.92		10.61	C0720-085-1500S		8.84	C0720-085-1500X	26.64		8.84
C0720-085-1750M			44.45	27.74	18.87		8.93	C0720-085-1750S		7.44	C0720-085-1750X	30.83		7.44
C0720-085-2000M	2.16		50.8	31.42	20.85	149.41	7.7	C0720-085-2000S	124.46	6.41	C0720-085-2000X	35.02	101.31	6.42
C0720-085-2250M			57.15	35.13	22.81		6.78	C0720-085-2250S		5.65	C0720-085-2250X	39.20		5.65
C0720-085-2500M			63.5	38.84	24.77		6.06	C0720-085-2500S		5.05	C0720-085-2500X	43.43		5.05
C0720-085-2750M			69.85	42.55	26.72		5.46	C0720-085-2750S		4.55	C0720-085-2750X	47.59		4.55
C0720-085-3000M			76.2	46.25	28.7		4.99	C0720-085-3000S		4.16	C0720-085-3000X	51.83		4.16
C0720-085-3500M			88.9	53.64	32.61		4.24	C0720-085-3500S		3.53	C0720-085-3500X	60.20		3.53
C0720-085-4000M			101.6	61.06	36.55		3.68	C0720-085-4000S		3.07	C0720-085-4000X	68.53		3.06
C0720-096-0750M			19.05	14.22	12.45		41.78	C0720-096-0750S		34.8	C0720-096-0750X	15.00		34.8
C0720-096-0880M			22.35	16.41	13.64		33.9	C0720-096-0880S		28.24	C0720-096-0880X	17.36		28.24
C0720-096-1000M			25.4	18.42	14.76		28.86	C0720-096-1000S		24.04	C0720-096-1000X	19.53		24.04
C0720-096-1250M			31.75	22.61	17.04		22.05	C0720-096-1250S		18.37	C0720-096-1250X	24.07		18.36
C0720-096-1500M			38.1	26.8	19.35		17.83	C0720-096-1500S		14.85	C0720-096-1500X	28.60		14.85
C0720-096-1750M			44.45	30.99	21.64		14.97	C0720-096-1750S		12.47	C0720-096-1750X	33.14		12.47
C0720-096-2000M	2.44		50.8	35.18	23.95	201.63	12.91	C0720-096-2000S	167.96	10.75	C0720-096-2000X	37.68	141.05	10.75
C0720-096-2250M			57.15	39.34	26.26		11.33	C0720-096-2250S		9.44	C0720-096-2250X	42.20		9.44
C0720-096-2500M			63.5	43.54	28.55		10.1	C0720-096-2500S		8.41	C0720-096-2500X	46.74		8.42
C0720-096-2750M			69.85	47.73	30.86		9.12	C0720-096-2750S		7.6	C0720-096-2750X	51.29		7.6
C0720-096-3000M			76.2	51.92	33.15		8.3	C0720-096-3000S		6.91	C0720-096-3000X	55.80		6.91
C0720-096-3500M			88.9	60.3	37.74		7.06	C0720-096-3500S		5.88	C0720-096-3500X	64.91		5.88
C0720-096-4000M			101.6	68.68	42.37		6.13	C0720-096-4000S		5.11	C0720-096-4000X	73.97		5.11
C0720-105-0750M			19.05	14.86	13.64		62.11	C0720-105-0750S		51.74	C0720-105-0750X	15.51		51.74
C0720-105-0880M			22.35	17.15	15.01		50.06	C0720-105-0880S		41.7	C0720-105-0880X	17.96		41.7
C0720-105-1000M			25.4	19.25	16.26		42.46	C0720-105-1000S		35.37	C0720-105-1000X	20.23		35.37
C0720-105-1250M	2.67		31.75	23.67	18.87	260.65	32.25	C0720-105-1250S	217.12	26.86	C0720-105-1250X	24.94	183.03	26.87
C0720-105-1500M			38.1	28.07	21.49		26	C0720-105-1500S		21.66	C0720-105-1500X	29.65		21.66
C0720-105-1750M			44.45	32.49	24.1		21.78	C0720-105-1750S		18.14	C0720-105-1750X	34.36		18.15
C0720-105-2000M			50.8	36.88	26.72		18.74	C0720-105-200						

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	L <sub>0</sub> (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>i</sub> (N)	R (N/mm)	Part Number	P <sub>i</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>i</sub> (N)	R (N/mm)
C0720-105-2500M			63.5	45.69	31.95		14.64	C0720-105-2500S	12.2		C0720-105-2500X	48.49		12.2
C0720-105-2750M			69.85	50.11	34.57		13.2	C0720-105-2750S	11		C0720-105-2750X	53.21		11
C0720-105-3000M		2.67	76.2	54.51	37.19	260.65	12.03	C0720-105-3000S	217.12	10.02	C0720-105-3000X	57.94	183.03	10.02
C0720-105-3500M			88.9	63.32	42.42		10.19	C0720-105-3500S		8.49	C0720-105-3500X	67.34		8.49
C0720-105-4000M			101.6	72.14	47.65		8.84	C0720-105-4000S		7.36	C0720-105-4000X	76.75		7.37
C0720-112-0750M			19.05	15.29	14.63		82.09	C0720-112-0750S		68.38	C0720-112-0750X	15.90		68.39
C0720-112-0880M			22.35	17.65	16.15		65.82	C0720-112-0880S		54.83	C0720-112-0880X	18.43		54.83
C0720-112-1000M			25.4	19.84	17.55		55.63	C0720-112-1000S		46.34	C0720-112-1000X	20.76		46.34
C0720-112-1250M	18.29		31.75	24.38	20.45		42.08	C0720-112-1250S		35.05	C0720-112-1250X	25.61		35.05
C0720-112-1500M			38.1	28.96	23.34		33.83	C0720-112-1500S		28.18	C0720-112-1500X	30.47		28.18
C0720-112-1750M			44.45	33.5	26.26		28.3	C0720-112-1750S		23.57	C0720-112-1750X	35.33		23.57
C0720-112-2000M		2.84	50.8	38.07	29.16	309.54	24.3	C0720-112-2000S	257.85	20.24	C0720-112-2000X	40.18	215.1	20.25
C0720-112-2250M			57.15	42.62	32.05		21.31	C0720-112-2250S		17.75	C0720-112-2250X	45.03		17.75
C0720-112-2500M			63.5	47.19	34.95		18.96	C0720-112-2500S		15.79	C0720-112-2500X	49.88		15.8
C0720-112-2750M			69.85	51.74	37.87		17.09	C0720-112-2750S		14.24	C0720-112-2750X	54.74		14.24
C0720-112-3000M			76.2	56.29	40.77		15.55	C0720-112-3000S		12.95	C0720-112-3000X	59.59		12.95
C0720-112-3500M			88.9	65.41	46.58		13.19	C0720-112-3500S		10.99	C0720-112-3500X	69.32		10.98
C0720-112-4000M			101.6	74.52	52.37		11.43	C0720-112-4000S		9.52	C0720-112-4000X	79.02		9.52
C0850-068-0750M			19.05	11.3	7.42		6.29	C0850-068-0750S		5.24	C0850-068-0750X	10.06		5.24
C0850-068-0875M			22.35	13.03	8.05		5.22	C0850-068-0875S		4.35	C0850-068-0875X	11.53		4.35
C0850-068-1000M			25.4	14.5	8.69		4.47	C0850-068-1000S		3.72	C0850-068-1000X	12.75		3.72
C0850-068-1250M			31.75	17.68	9.93		3.47	C0850-068-1250S		2.89	C0850-068-1250X	15.46		2.89
C0850-068-1500M			38.1	20.88	11.2		2.82	C0850-068-1500S		2.35	C0850-068-1500X	18.06		2.35
C0850-068-1750M	1.73		44.45	24.08	12.45	48.66	2.38	C0850-068-1750S	40.53	1.98	C0850-068-1750X	20.73	47.06	1.98
C0850-068-2000M			50.8	27.28	13.72		2.07	C0850-068-2000S		1.72	C0850-068-2000X	23.46		1.72
C0850-068-2250M			57.15	30.48	14.99		1.82	C0850-068-2250S		1.52	C0850-068-2250X	26.13		1.52
C0850-068-2500M			63.5	33.66	16.23		1.63	C0850-068-2500S		1.36	C0850-068-2500X	28.81		1.36
C0850-068-3000M			76.2	40.06	18.77		1.35	C0850-068-3000S		1.12	C0850-068-3000X	34.31		1.12
C0850-068-3500M			88.9	46.43	21.29		1.14	C0850-068-3500S		0.95	C0850-068-3500X	39.27		0.95
C0850-068-4000M			101.6	52.83	23.8		1	C0850-068-4000S		0.83	C0850-068-4000X	45.01		0.83
C0850-074-0875M			22.35	13.56	9.02		7.02	C0850-074-0875S		5.85	C0850-074-0875X	12.26		5.85
C0850-074-1000M			25.4	15.11	9.75		5.99	C0850-074-1000S		4.99	C0850-074-1000X	13.57		4.99
C0850-074-1250M			31.75	18.47	11.25		4.64	C0850-074-1250S		3.87	C0850-074-1250X	16.48		3.86
C0850-074-1500M	1.88		38.1	21.79	12.73	61.65	3.78	C0850-074-1500S	51.35	3.15	C0850-074-1500X	19.37	59.02	3.15
C0850-074-2000M			50.8	28.45	15.7		2.77	C0850-074-2000S		2.31	C0850-074-2000X	25.19		2.3
C0850-074-2500M			63.5	35.13	18.67		2.17	C0850-074-2500S		1.81	C0850-074-2500X	30.87		1.81
C0850-074-3000M			76.2	41.78	21.64		1.79	C0850-074-3000S		1.49	C0850-074-3000X	36.53		1.49
C0850-074-3500M			88.9	48.46	24.61		1.52	C0850-074-3500S		1.27	C0850-074-3500X	42.40		1.27
C0850-081-0750M			19.05	12.34	9.27		11.85	C0850-081-0750S		9.87	C0850-081-0750X	11.43		9.87
C0850-081-0875M			22.35	14.22	10.16		9.77	C0850-081-0875S		8.14	C0850-081-0875X	13.11		8.14
C0850-081-1000M			25.4	15.85	11.05		8.32	C0850-081-1000S		6.93	C0850-081-1000X	14.54		6.93
C0850-081-1250M			31.75	19.35	12.8		6.41	C0850-081-1250S		5.34	C0850-081-1250X	17.66		5.34
C0850-081-1500M	21.59		38.1	22.86	14.55		5.2	C0850-081-1500S		4.33	C0850-081-1500X	20.74		4.33
C0850-081-1750M	2.06		44.45	26.37	16.31	79.31	4.4	C0850-081-1750S	66.06	3.67	C0850-081-1750X	23.90	75.23	3.66
C0850-081-2000M			50.8	29.87	18.08		3.78	C0850-081-2000S		3.15	C0850-081-2000X	26.92		3.15
C0850-081-2250M			57.15	33.38	19.84		3.34	C0850-081-2250S		2.78	C0850-081-2250X	30.15		2.79
C0850-081-2500M			63.5	36.88	21.59		2.98	C0850-081-2500S		2.48	C0850-081-2500X	33.16		2.48
C0850-081-2750M			69.85	40.39	23.37		2.7	C0850-081-2750S		2.25	C0850-081-2750X	36.36		2.25
C0850-081-3000M			76.2	43.89	25.12		2.45	C0850-081-3000S		2.04	C0850-081-3000X	39.36		2.04
C0850-081-3500M			88.9	50.9	28.63		2.08	C0850-081-3500S		1.73	C0850-081-3500X	45.56		1.74
C0850-085-0750M			19.05	12.67	9.86		14.24	C0850-085-0750S		11.86	C0850-085-0750X	11.74		11.86
C0850-085-0875M			22.35	14.61	10.82		11.71	C0850-085-0875S		9.75	C0850-085-0875X	13.47		9.76
C0850-085-1000M			25.4	16.28	11.76		9.95	C0850-085-1000S		8.29	C0850-085-1000X	14.93		8.28
C0850-085-1250M			31.75	19.89	13.69		7.63	C0850-085-1250S		6.36	C0850-085-1250X	18.12		6.36
C0850-085-1500M			38.1	23.5	15.62		6.2	C0850-085-1500S		5.16	C0850-085-1500X	21.31		5.16
C0850-085-1750M			44.45	27.1	17.53		5.22	C0850-085-1750S		4.35	C0850-085-1750X	24.50		4.35
C0850-085-2000M	2.16		50.8	30.68	19.46	90.69	4.52	C0850-085-2000S	75.55	3.77	C0850-085-2000X	27.76	86.71	3.76
C0850-085-2250M			57.15	34.29	21.36		3.98	C0850-085-2250S		3.32	C0850-085-2250X	30.96		3.31
C0850-085-2500M			63.5	37.9	23.29		3.54	C0850-085-2500S		2.95	C0850-085-2500X	34.07		2.95
C0850-085-2750M			69.85	41.5	25.2		3.2	C0850-085-2750S		2.67	C0850-085-2750X	37.37		2.67
C0850-085-3000M			76.2	45.11	27.13		2.92	C0850-085-3000S		2.43	C0850-085-3000X	40.60		2.44
C0850-085-3250M			82.55	48.72	29.06		2.68	C0850-085-3250S		2.23	C0850-085-3250X	43.70		2.23
C0850-085-3500M			88.9	52.3	30.96		2.49	C0850-085-3500S		2.07	C0850-085-3500X	47.04		2.07
C0850-085-4000M			101.6	59.51	34.8		2.15	C0850-085-4000S		1.79	C0850-085-4000X	53.27		1.79
C0850-092-0880M			22.35	15.19	11.96		15.78	C0850-092-0880S		13.14	C0850-092-0880X	14.03		13.14
C0850-092-1000M			25.4	17.02	13.03		13.47	C0850-092-1000S		11.22	C0850-092-1000X	15.64		11.22
C0850-092-1250M			31.75	20.78	15.24		10.3	C0850-092-1250S		8.58	C0850-092-1250X	18.99		8.58
C0850-092-1500M	2.34		38.1	24.56	17.42	112.93	8.35	C0850-092-1500S	94.07	6.96	C0850-092-1500X	22.37	109.44	6.96
C0850-092-1750M			44.45	28.35	19.63		7	C0850-092-1750S		5.83	C0850-092-1750X	25.69		5.83
C0850-092-2000M			50.8	32.13	21.84									

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C0850-092-2500M			63.5	39.67	26.24		4.75	C0850-092-2500S		3.96	C0850-092-2500X	35.82		3.95
C0850-092-2750M		2.34	69.85	43.46	28.45	112.93	4.27	C0850-092-2750S	94.07	3.56	C0850-092-2750X	39.10	109.44	3.56
C0850-092-3000M			76.2	47.24	30.66		3.91	C0850-092-3000S		3.26	C0850-092-3000X	42.56		3.25
C0850-092-3500M			88.9	54.79	35.05		3.31	C0850-092-3500S		2.76	C0850-092-3500X	49.20		2.76
C0850-098-1000M			25.4	17.63	14.1		17.28	C0850-098-1000S		14.39	C0850-098-1000X	16.47		14.4
C0850-098-1250M			31.75	21.54	16.54		13.19	C0850-098-1250S		10.99	C0850-098-1250X	20.05		10.98
C0850-098-1500M	21.59		38.1	25.48	18.97		10.65	C0850-098-1500S		8.87	C0850-098-1500X	23.61		8.87
C0850-098-1750M			44.45	29.41	21.41		8.95	C0850-098-1750S		7.46	C0850-098-1750X	27.21		7.45
C0850-098-2000M		2.49	50.8	33.32	23.88	134.51	7.7	C0850-098-2000S	112.04	6.41	C0850-098-2000X	30.78	128.53	6.42
C0850-098-2250M			57.15	37.26	26.31		6.76	C0850-098-2250S		5.63	C0850-098-2250X	34.32		5.63
C0850-098-2500M			63.5	41.2	28.75		6.02	C0850-098-2500S		5.01	C0850-098-2500X	37.89		5.02
C0850-098-2750M			69.85	45.11	31.22		5.45	C0850-098-2750S		4.54	C0850-098-2750X	41.52		4.54
C0850-098-3000M			76.2	49.05	33.66		4.96	C0850-098-3000S		4.13	C0850-098-3000X	45.07		4.13
C0850-098-3500M			88.9	56.9	38.53		4.2	C0850-098-3500S		3.5	C0850-098-3500X	52.19		3.5
C0975-074-0750M			19.05	11.3	7.49		6.97	C0975-074-0750S		5.81	C0975-074-0750X	10.14		5.81
C0975-074-0875M			22.35	13	8.05		5.78	C0975-074-0875S		4.81	C0975-074-0875X	11.60		4.81
C0975-074-1000M			25.4	14.43	8.64		4.92	C0975-074-1000S		4.1	C0975-074-1000X	12.78		4.1
C0975-074-1250M			31.75	17.55	9.8		3.8	C0975-074-1250S		3.17	C0975-074-1250X	15.40		3.17
C0975-074-1500M	1.88		38.1	20.68	10.95	54.04	3.1	C0975-074-1500S	45.02	2.58	C0975-074-1500X	18.06	51.74	2.58
C0975-074-2000M			50.8	26.95	13.26		2.26	C0975-074-2000S		1.88	C0975-074-2000X	23.30		1.88
C0975-074-2500M			63.5	33.2	15.57		1.79	C0975-074-2500S		1.49	C0975-074-2500X	28.72		1.49
C0975-074-3000M			76.2	39.47	17.88		1.47	C0975-074-3000S		1.23	C0975-074-3000X	33.97		1.23
C0975-074-3500M			88.9	45.72	20.19		1.24	C0975-074-3500S		1.04	C0975-074-3500X	38.94		1.03
C0975-074-4000M			101.6	51.99	22.5		1.09	C0975-074-4000S		0.9	C0975-074-4000X	44.39		0.9
C0975-085-0875M			22.35	13.89	9.68		9.42	C0975-085-0875S		7.85	C0975-085-0875X	12.65		7.85
C0975-085-1000M			25.4	15.44	10.44		8	C0975-085-1000S		6.66	C0975-085-1000X	13.98		6.67
C0975-085-1250M			31.75	18.8	11.94		6.15	C0975-085-1250S		5.12	C0975-085-1250X	16.88		5.12
C0975-085-1500M	2.16		38.1	22.15	13.46	79.62	4.99	C0975-085-1500S	66.32	4.16	C0975-085-1500X	19.79	76.12	4.16
C0975-085-2000M			50.8	28.85	16.48		3.63	C0975-085-2000S		3.02	C0975-085-2000X	25.59		3.02
C0975-085-2500M			63.5	35.56	19.53		2.85	C0975-085-2500S		2.37	C0975-085-2500X	31.49		2.38
C0975-085-3000M			76.2	42.27	22.56		2.35	C0975-085-3000S		1.96	C0975-085-3000X	37.26		1.95
C0975-085-3500M			88.9	48.97	25.58		2	C0975-085-3500S		1.66	C0975-085-3500X	43.13		1.66
C0975-092-0875M			22.35	14.48	10.69		12.61	C0975-092-0875S		10.5	C0975-092-0875X	13.20		10.5
C0975-092-1000M			25.4	16.1	11.58		10.68	C0975-092-1000S		8.9	C0975-092-1000X	14.59		8.9
C0975-092-1250M			31.75	19.61	13.34		8.18	C0975-092-1250S		6.81	C0975-092-1250X	17.64		6.81
C0975-092-1500M			38.1	23.11	15.09		6.62	C0975-092-1500S		5.51	C0975-092-1500X	20.66		5.51
C0975-092-2000M	2.34		50.8	30.12	18.59	99.23	4.8	C0975-092-2000S	82.66	4	C0975-092-2000X	26.74	96.15	4
C0975-092-2500M			63.5	37.11	22.12		3.77	C0975-092-2500S		3.14	C0975-092-2500X	32.84		3.14
C0975-092-3000M			76.2	44.12	25.63		3.1	C0975-092-3000S		2.58	C0975-092-3000X	38.96		2.58
C0975-092-3500M			88.9	51.13	29.13		2.63	C0975-092-3500S		2.19	C0975-092-3500X	44.96		2.19
C0975-092-4000M	24.77		101.6	58.14	32.66		2.28	C0975-092-4000S		1.9	C0975-092-4000X	50.90		1.9
C0975-096-0875M			22.35	14.81	11.28		14.81	C0975-096-0875S		12.34	C0975-096-0875X	13.74		12.34
C0975-096-1000M			25.4	16.48	12.22		12.52	C0975-096-1000S		10.43	C0975-096-1000X	15.20		10.43
C0975-096-1250M			31.75	20.07	14.12		9.56	C0975-096-1250S		7.96	C0975-096-1250X	18.40		7.96
C0975-096-1500M	2.44		38.1	23.65	16.03	111.69	7.74	C0975-096-1500S	93.04	6.45	C0975-096-1500X	21.61	106.34	6.45
C0975-096-2000M			50.8	30.84	19.81		5.59	C0975-096-2000S		4.66	C0975-096-2000X	27.95		4.65
C0975-096-2500M			63.5	38.02	23.62		4.38	C0975-096-2500S		3.65	C0975-096-2500X	34.34		3.65
C0975-096-3000M			76.2	45.19	27.41		3.61	C0975-096-3000S		3.01	C0975-096-3000X	40.81		3.01
C0975-096-3500M			88.9	52.37	31.19		3.06	C0975-096-3500S		2.55	C0975-096-3500X	47.24		2.55
C0975-105-0880M			22.35	15.49	12.6		20.85	C0975-105-0880S		17.37	C0975-105-0880X	14.38		17.37
C0975-105-1000M			25.4	17.3	13.67		17.69	C0975-105-1000S		14.74	C0975-105-1000X	16.00		14.73
C0975-105-1250M			31.75	21.08	15.9		13.43	C0975-105-1250S		11.19	C0975-105-1250X	19.38		11.19
C0975-105-1500M			38.1	24.87	18.11		10.82	C0975-105-1500S		9.01	C0975-105-1500X	22.75		9.02
C0975-105-1750M			44.45	28.68	20.32		9.07	C0975-105-1750S		7.56	C0975-105-1750X	26.13		7.56
C0975-105-2000M	2.67		50.8	32.46	22.56	143.18	7.81	C0975-105-2000S	119.27	6.51	C0975-105-2000X	29.52	138.42	6.51
C0975-105-2250M			57.15	36.25	24.77		6.85	C0975-105-2250S		5.71	C0975-105-2250X	32.88		5.7
C0975-105-2500M			63.5	40.03	26.97		6.09	C0975-105-2500S		5.07	C0975-105-2500X	36.23		5.08
C0975-105-2750M			69.85	43.82	29.18		5.5	C0975-105-2750S		4.58	C0975-105-2750X	39.63		4.58
C0975-105-3000M			76.2	47.6	31.42		5.01	C0975-105-3000S		4.17	C0975-105-3000X	43.02		4.17
C0975-105-3500M			88.9	55.19	35.84		4.26	C0975-105-3500S		3.55	C0975-105-3500X	49.85		3.54
C0975-105-4000M			101.6	62.76	40.28		3.7	C0975-105-4000S		3.08	C0975-105-4000X	56.63		3.08
C0975-112-0880M			22.35	16.03	13.59		27.09	C0975-112-0880S		22.57	C0975-112-0880X	15.12		22.57
C0975-112-1000M			25.4	17.93	14.76		22.9	C0975-112-1000S		19.08	C0975-112-1000X	16.85		19.08
C0975-112-1250M			31.75	21.87	17.25		17.32	C0975-112-1250S		14.43	C0975-112-1250X	20.44		14.43
C0975-112-1500M	2.84		38.1	25.81	19.71	171.16	13.92	C0975-112-1500S	142.58	11.6	C0975-112-1500X	24.03	163.12	11.6
C0975-112-2000M			50.8	33.71	24.64		10	C0975-112-2000S		8.33	C0975-112-2000X	31.22		8.33
C0975-112-2500M			63.5	41.58	29.57		7.81	C0975-112-2500S		6.51	C0975-112-2500X	38.43		6.51
C0975-112-3000M			76.2	49.45	34.49		6.41	C0975-112-3000S		5.34	C0975-112-3000X	45.65		5.34
C0975-112-3500M			88.9	57.35	39.45		5.43	C0975-112-3500S		4.52	C0975-112-3500X	52.83		4.52
C0975-125-0880M	3.18		22.35	16.99	15.29	231.47	43.18</							

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>i</sub> (N)	R (N/mm)	Part Number	P <sub>i</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>i</sub> (N)	R (N/mm)
C0975-125-1250M			31.75	23.24	19.61		27.21	C0975-125-1250S		22.67	C0975-125-1250X	22.34		22.67
C0975-125-1500M			38.1	27.46	22.53		21.77	C0975-125-1500S		18.13	C0975-125-1500X	26.33		18.13
C0975-125-1750M			44.45	31.7	25.45		18.14	C0975-125-1750S		15.11	C0975-125-1750X	30.33		15.11
C0975-125-2000M			50.8	35.92	28.37		15.55	C0975-125-2000S		12.95	C0975-125-2000X	34.33		12.95
C0975-125-2250M	3.18		57.15	40.13	31.29	231.47	13.61	C0975-125-2250S	192.82	11.34	C0975-125-2250X	38.32	213.39	11.33
C0975-125-2500M			63.5	44.35	34.21		12.1	C0975-125-2500S		10.08	C0975-125-2500X	42.33		10.08
C0975-125-2750M			69.85	48.59	37.13		10.89	C0975-125-2750S		9.07	C0975-125-2750X	46.33		9.07
C0975-125-3000M			76.2	52.81	40.06		9.89	C0975-125-3000S		8.24	C0975-125-3000X	50.31		8.24
C0975-125-3500M			88.9	61.24	45.9		8.37	C0975-125-3500S		6.97	C0975-125-3500X	58.30		6.97
C0975-125-4000M			101.6	69.7	51.74		7.25	C0975-125-4000S		6.04	C0975-125-4000X	66.26		6.04
C0975-135-0880M			22.35	17.75	16.33		62.44	C0975-135-0880S		52.01	C0975-135-0880X	17.22		52.02
C0975-135-1000M			25.4	19.91	17.86		52.18	C0975-135-1000S		43.47	C0975-135-1000X	19.26		43.47
C0975-135-1500M	24.77	3.43	38.1	28.83	24.21		30.96	C0975-135-1500S		25.79	C0975-135-1500X	27.75		25.79
C0975-135-2000M			50.8	37.77	30.56	286.72	22.01	C0975-135-2000S	238.84	18.33	C0975-135-2000X	36.24	267.04	18.34
C0975-135-2500M			63.5	46.71	36.91		17.07	C0975-135-2500S		14.22	C0975-135-2500X	44.72		14.22
C0975-135-3000M			76.2	55.65	43.26		13.96	C0975-135-3000S		11.63	C0975-135-3000X	53.23		11.63
C0975-135-3500M			88.9	64.59	49.61		11.78	C0975-135-3500S		9.81	C0975-135-3500X	61.70		9.82
C0975-135-4000M			101.6	73.53	55.96		10.21	C0975-135-4000S		8.5	C0975-135-4000X	70.20		8.5
C0975-148-1000M			25.4	20.83	19.38		80.37	C0975-148-1000S		66.95	C0975-148-1000X	20.19		66.96
C0975-148-1500M			38.1	30.3	26.47		47	C0975-148-1500S		39.15	C0975-148-1500X	29.19		39.15
C0975-148-2000M			50.8	39.75	33.58		33.2	C0975-148-2000S		27.66	C0975-148-2000X	38.19		27.66
C0975-148-2500M	3.76		63.5	49.2	40.67	367.09	25.67	C0975-148-2500S	305.79	21.38	C0975-148-2500X	47.20	348.67	21.39
C0975-148-3000M			76.2	58.65	47.75		20.92	C0975-148-3000S		17.43	C0975-148-3000X	56.20		17.43
C0975-148-3500M			88.9	68.12	54.84		17.67	C0975-148-3500S		14.72	C0975-148-3500X	65.21		14.72
C0975-148-4000M			101.6	77.57	61.95		15.27	C0975-148-4000S		12.72	C0975-148-4000X	74.19		12.72
C0975-162-1500M			38.1	31.65	28.55		72.7	C0975-162-1500S		60.56	C0975-162-1500X	30.83		60.57
C0975-162-2000M			50.8	41.61	36.32		51.01	C0975-162-2000S		42.49	C0975-162-2000X	40.44		42.49
C0975-162-2500M	4.11		63.5	51.56	44.07	468.82	39.29	C0975-162-2500S	390.53	32.73	C0975-162-2500X	50.05	440.25	32.73
C0975-162-3000M			76.2	61.52	51.84		31.96	C0975-162-3000S		26.62	C0975-162-3000X	59.66		26.62
C0975-162-3500M			88.9	71.48	59.61		26.91	C0975-162-3500S		22.42	C0975-162-3500X	69.26		22.42
C0975-162-4000M			101.6	81.43	67.36		23.25	C0975-162-4000S		19.37	C0975-162-4000X	78.87		19.37
C1100-085-0875M			22.35	13.39	8.84		7.9	C1100-085-0875S		6.58	C1100-085-0875X	12.05		6.58
C1100-085-1000M			25.4	14.83	9.45		6.71	C1100-085-1000S		5.59	C1100-085-1000X	13.26		5.59
C1100-085-1250M			31.75	18.01	10.67		5.17	C1100-085-1250S		4.31	C1100-085-1250X	15.99		4.3
C1100-085-1500M			38.1	21.16	11.86		4.19	C1100-085-1500S		3.49	C1100-085-1500X	18.65		3.49
C1100-085-2000M			50.8	27.51	14.3		3.05	C1100-085-2000S		2.54	C1100-085-2000X	24.09		2.54
C1100-085-2500M	2.16		63.5	33.83	16.74	70.9	2.4	C1100-085-2500S	59.06	2	C1100-085-2500X	29.57	67.81	2
C1100-085-3000M			76.2	40.06	19.18		1.96	C1100-085-3000S		1.63	C1100-085-3000X	34.70		1.63
C1100-085-3500M			88.9	46.51	21.62		1.68	C1100-085-3500S		1.4	C1100-085-3500X	40.48		1.4
C1100-085-4000M			101.6	52.86	24.05		1.45	C1100-085-4000S		1.21	C1100-085-4000X	45.60		1.21
C1100-085-4500M			114.3	59.18	26.49		1.28	C1100-085-4500S		1.06	C1100-085-4500X	50.62		1.06
C1100-085-5000M			127	65.53	28.93		1.16	C1100-085-5000S		0.96	C1100-085-5000X	56.57		0.96
C1100-096-0875M			22.35	14.2	10.31		12.22	C1100-096-0875S		10.18	C1100-096-0875X	13.04		10.18
C1100-096-1000M			25.4	15.77	11.07		10.33	C1100-096-1000S		8.6	C1100-096-1000X	14.38		8.61
C1100-096-1250M	27.94		31.75	19.13	12.62		7.9	C1100-096-1250S		6.58	C1100-096-1250X	17.34		6.58
C1100-096-1500M			38.1	22.5	14.17		6.39	C1100-096-1500S		5.32	C1100-096-1500X	20.29		5.32
C1100-096-2000M	2.44		50.8	29.24	17.25	99.59	4.62	C1100-096-2000S	82.96	3.85	C1100-096-2000X	26.18	94.82	3.85
C1100-096-2500M			63.5	35.99	20.32		3.63	C1100-096-2500S		3.02	C1100-096-2500X	32.10		3.02
C1100-096-3000M			76.2	42.72	23.42		2.98	C1100-096-3000S		2.48	C1100-096-3000X	37.96		2.48
C1100-096-3500M			88.9	49.45	26.49		2.52	C1100-096-3500S		2.1	C1100-096-3500X	43.76		2.1
C1100-096-4000M			101.6	56.18	29.59		2.19	C1100-096-4000S		1.82	C1100-096-4000X	49.60		1.82
C1100-096-4500M			114.3	62.94	32.66		1.94	C1100-096-4500S		1.62	C1100-096-4500X	55.74		1.62
C1100-105-0875M			22.35	14.88	11.51		17.11	C1100-105-0875S		14.25	C1100-105-0875X	13.68		14.25
C1100-105-1000M			25.4	16.54	12.42		14.39	C1100-105-1000S		11.99	C1100-105-1000X	15.10		11.99
C1100-105-1250M			31.75	20.07	14.25		10.94	C1100-105-1250S		9.11	C1100-105-1250X	18.20		9.12
C1100-105-1500M	2.67		38.1	23.62	16.05	127.79	8.83	C1100-105-1500S	106.45	7.36	C1100-105-1500X	21.30	123.53	7.35
C1100-105-2000M			50.8	30.68	19.71		6.36	C1100-105-2000S		5.3	C1100-105-2000X	27.47		5.3
C1100-105-2500M			63.5	37.77	23.34		4.97	C1100-105-2500S		4.14	C1100-105-2500X	33.68		4.14
C1100-105-3000M			76.2	44.86	26.97		4.08	C1100-105-3000S		3.4	C1100-105-3000X	39.86		3.4
C1100-105-3500M			88.9	51.94	30.63		3.45	C1100-105-3500S		2.87	C1100-105-3500X	45.91		2.87
C1100-112-0875M			22.35	15.39	12.42		21.98	C1100-112-0875S		18.31	C1100-112-0875X	14.40		18.31
C1100-112-1000M			25.4	17.12	13.46		18.44	C1100-112-1000S		15.36	C1100-112-1000X	15.92		15.36
C1100-112-1250M			31.75	20.78	15.49		13.94	C1100-112-1250S		11.61	C1100-112-1250X	19.21		11.61
C1100-112-1500M			38.1	24.46	17.53		11.21	C1100-112-1500S		9.34	C1100-112-1500X	22.50		9.34
C1100-112-1750M			44.45	28.14	19.58		9.37	C1100-112-1750S		7.81	C1100-112-1750X	25.79		7.81
C1100-112-2000M	2.84		50.8	31.83	21.62	152.83	8.06	C1100-112-2000S	127.31	6.71	C1100-112-2000X	29.09	145.66	6.71
C1100-112-2250M			57.15	35.51	23.67		7.06	C1100-112-2250S		5.88	C1100-112-2250X	32.37		5.88
C1100-112-2500M			63.5	39.19	25.7		6.29	C1100-112-2500S		5.24	C1100-112-2500X	35.68		5.24
C1100-112-3000M			76.2	46.53	29.79		5.15	C1100-112-3000S		4.29	C1100-112-3000X	42.24		4.29
C1														

COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C1100-112-4500M		2.84	114.3	68.61	42.04	152.83	3.34	C1100-112-4500S	127.31	2.78	C1100-112-4500X	62.02	145.66	2.79
C1100-125-0880M			22.35	16.26	14.12		34.02	C1100-125-0880S		28.34	C1100-125-0880X	15.62		28.34
C1100-125-1000M			25.4	18.16	15.32		28.58	C1100-125-1000S		23.81	C1100-125-1000X	17.38		23.81
C1100-125-1250M			31.75	22.1	17.75		21.43	C1100-125-1250S		17.85	C1100-125-1250X	21.06		17.86
C1100-125-1500M			38.1	26.04	20.22		17.14	C1100-125-1500S		14.28	C1100-125-1500X	24.74		14.28
C1100-125-1750M			44.45	29.97	22.68		14.29	C1100-125-1750S		11.9	C1100-125-1750X	28.42		11.9
C1100-125-2000M		3.18	50.8	33.91	25.12	207.01	12.24	C1100-125-2000S	172.44	10.2	C1100-125-2000X	32.09	190.82	10.2
C1100-125-2250M			57.15	37.85	27.58		10.72	C1100-125-2250S		8.93	C1100-125-2250X	35.77		8.93
C1100-125-2500M	27.94		63.5	41.76	30.05		9.53	C1100-125-2500S		7.94	C1100-125-2500X	39.45		7.94
C1100-125-3000M			76.2	49.63	34.95		7.79	C1100-125-3000S		6.49	C1100-125-3000X	46.80		6.49
C1100-125-3500M			88.9	57.51	39.85		6.6	C1100-125-3500S		5.5	C1100-125-3500X	54.20		5.5
C1100-125-4000M			101.6	65.38	44.78		5.71	C1100-125-4000S		4.76	C1100-125-4000X	61.47		4.76
C1100-125-4500M			114.3	73.25	49.68		5.04	C1100-125-4500S		4.2	C1100-125-4500X	68.88		4.2
C1100-135-1500M			38.1	27.18	22.2		23.41	C1100-135-1500S		19.5	C1100-135-1500X	25.84		19.5
C1100-135-2000M			50.8	35.43	27.74		16.65	C1100-135-2000S		13.87	C1100-135-2000X	33.57		13.87
C1100-135-2500M			63.5	43.69	33.27		12.92	C1100-135-2500S		10.76	C1100-135-2500X	41.29		10.77
C1100-135-3000M	3.43		76.2	51.94	38.81	255.8	10.56	C1100-135-3000S	213.09	8.8	C1100-135-3000X	49.02	239.08	8.8
C1100-135-3500M			88.9	60.22	44.35		8.91	C1100-135-3500S		7.42	C1100-135-3500X	56.70		7.43
C1100-135-4000M			101.6	68.48	49.89		7.72	C1100-135-4000S		6.43	C1100-135-4000X	64.44		6.43
C1100-135-4500M			114.3	76.73	55.42		6.81	C1100-135-4500S		5.67	C1100-135-4500X	72.17		5.67
C1100-135-5000M			127	84.99	60.96		6.09	C1100-135-5000S		5.07	C1100-135-5000X	79.90		5.08
C1225-085-0875M			22.35	12.37	8.38		6.41	C1225-085-0875S		5.34	C1225-085-0875X	10.90		5.34
C1225-085-1000M			25.4	13.64	8.92		5.45	C1225-085-1000S		4.54	C1225-085-1000X	11.93		4.54
C1225-085-1500M			38.1	19.28	11.02		3.4	C1225-085-1500S		2.83	C1225-085-1500X	16.50		2.83
C1225-085-2000M			50.8	24.89	13.16		2.47	C1225-085-2000S		2.06	C1225-085-2000X	21.08		2.06
C1225-085-2500M	2.16		63.5	30.51	15.27	64.05	1.94	C1225-085-2500S	53.35	1.62	C1225-085-2500X	25.75	61.12	1.62
C1225-085-3000M			76.2	36.14	17.37		1.59	C1225-085-3000S		1.33	C1225-085-3000X	30.15		1.33
C1225-085-3500M			88.9	41.76	19.51		1.37	C1225-085-3500S		1.14	C1225-085-3500X	35.18		1.14
C1225-085-4000M			101.6	47.37	21.62		1.17	C1225-085-4000S		0.98	C1225-085-4000X	39.06		0.98
C1225-085-4500M			114.3	53.01	23.72		1.05	C1225-085-4500S		0.88	C1225-085-4500X	44.46		0.88
C1225-085-5000M			127	58.62	25.86		0.93	C1225-085-5000S		0.77	C1225-085-5000X	47.94		0.77
C1225-096-0875M			22.35	13.74	9.58		10.44	C1225-096-0875S		8.7	C1225-096-0875X	12.51		8.69
C1225-096-1000M			25.4	15.21	10.21		8.83	C1225-096-1000S		7.36	C1225-096-1000X	13.77		7.35
C1225-096-1250M			31.75	18.42	11.48		6.74	C1225-096-1250S		5.61	C1225-096-1250X	16.52		5.62
C1225-096-1500M			38.1	21.62	12.75		5.45	C1225-096-1500S		4.54	C1225-096-1500X	19.25		4.54
C1225-096-1750M			44.45	24.82	14.02		4.57	C1225-096-1750S		3.81	C1225-096-1750X	21.98		3.81
C1225-096-2000M			50.8	28.02	15.29		3.94	C1225-096-2000S		3.28	C1225-096-2000X	24.74		3.28
C1225-096-2250M	2.44		57.15	31.22	16.56	89.85	3.47	C1225-096-2250S	74.84	2.89	C1225-096-2250X	27.54	85.53	2.89
C1225-096-2500M			63.5	34.42	17.83		3.08	C1225-096-2500S		2.57	C1225-096-2500X	30.18		2.57
C1225-096-2750M			69.85	37.62	19.1		2.78	C1225-096-2750S		2.32	C1225-096-2750X	32.97		2.32
C1225-096-3000M			76.2	40.82	20.37		2.54	C1225-096-3000S		2.12	C1225-096-3000X	35.76		2.12
C1225-096-3500M			88.9	47.22	22.91		2.15	C1225-096-3500S		1.79	C1225-096-3500X	41.23		1.79
C1225-096-4000M			101.6	53.62	25.45		1.87	C1225-096-4000S		1.56	C1225-096-4000X	46.80		1.56
C1225-096-4500M	31.12		114.3	60.02	27.99		1.66	C1225-096-4500S		1.39	C1225-096-4500X	52.58		1.39
C1225-096-5000M			127	66.42	30.53		1.49	C1225-096-5000S		1.24	C1225-096-5000X	58.02		1.24
C1225-105-0875M			22.35	14.38	10.69		14.45	C1225-105-0875S		12.04	C1225-105-0875X	13.09		12.03
C1225-105-1000M			25.4	15.93	11.43		12.17	C1225-105-1000S		10.14	C1225-105-1000X	14.40		10.14
C1225-105-1250M			31.75	19.28	12.95		9.25	C1225-105-1250S		7.71	C1225-105-1250X	17.27		7.7
C1225-105-1500M			38.1	22.63	14.45		7.44	C1225-105-1500S		6.2	C1225-105-1500X	20.12		6.2
C1225-105-2000M			50.8	29.31	17.48		5.38	C1225-105-2000S		4.48	C1225-105-2000X	25.90		4.48
C1225-105-2500M	2.67		63.5	36.02	20.5	115.34	4.2	C1225-105-2500S	96.08	3.5	C1225-105-2500X	31.65	111.5	3.5
C1225-105-3000M			76.2	42.72	23.52		3.45	C1225-105-3000S		2.87	C1225-105-3000X	37.40		2.87
C1225-105-3500M			88.9	49.43	26.54		2.92	C1225-105-3500S		2.43	C1225-105-3500X	43.13		2.44
C1225-105-4000M			101.6	56.11	29.57		2.54	C1225-105-4000S		2.12	C1225-105-4000X	48.89		2.12
C1225-105-4500M			114.3	62.81	32.59		2.24	C1225-105-4500S		1.87	C1225-105-4500X	54.59		1.87
C1225-105-5000M			127	69.52	35.61		2.01	C1225-105-5000S		1.67	C1225-105-5000X	60.54		1.68
C1225-112-0875M			22.35	14.86	11.56		18.4	C1225-112-0875S		15.33	C1225-112-0875X	13.77		15.33
C1225-112-1000M			25.4	16.46	12.4		15.44	C1225-112-1000S		12.86	C1225-112-1000X	15.18		12.87
C1225-112-1250M			31.75	19.94	14.12		11.68	C1225-112-1250S		9.73	C1225-112-1250X	18.23		9.73
C1225-112-1500M			38.1	23.39	15.82		9.39	C1225-112-1500S		7.82	C1225-112-1500X	21.28		7.82
C1225-112-2000M	2.84		50.8	30.35	19.23	138.02	6.74	C1225-112-2000S	114.97	5.61	C1225-112-2000X	27.38	131.54	5.62
C1225-112-2500M			63.5	37.29	22.63		5.27	C1225-112-2500S		4.39	C1225-112-2500X	33.54		4.39
C1225-112-3000M			76.2	44.22	26.06		4.31	C1225-112-3000S		3.59	C1225-112-3000X	39.54		3.59
C1225-112-3500M			88.9	51.16	29.46		3.66	C1225-112-3500S		3.05	C1225-112-3500X	45.75		3.05
C1225-112-4000M			101.6	58.12	32.87		3.17	C1225-112-4000S		2.64	C1225-112-4000X	51.78		2.64
C1225-125-0875M			22.35	15.72	13.13		28.24	C1225-125-0875S		23.52	C1225-125-0875X	15.02		23.53
C1225-125-1000M			25.4	17.45	14.17		23.53	C1225-125-1000S		19.6	C1225-125-1000X	16.60		19.61
C1225-125-1250M	3.18		31.75	21.16	16.23	187.13	17.65	C1225-125-1250S	155.88	14.7	C1225-125-1250X	20.02	172.49	14.7
C1225-125-1500M			38.1	24.84	18.31		14.11	C1225-125-1500S		11.75	C1225-125-1500X	23.43		11.76
C1225-125-1750M			44.45</td											

## COMPRESSION SPRINGS MUSIC WIRE

Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>i</sub> (N)	R (N/ mm)	302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX			
								Part Number	P <sub>i</sub> (N)	R (N/ mm)	Part Number	L <sub>1</sub> (mm)	P <sub>i</sub> (N)	R (N/mm)
C1225-125-2250M			57.15	35.94	24.54		8.83	C1225-125-2250S	7.36		C1225-125-2250X	33.69		7.35
C1225-125-2500M			63.5	39.65	26.62		7.84	C1225-125-2500S	6.53		C1225-125-2500X	37.11		6.54
C1225-125-2750M			69.85	43.36	28.7		7.06	C1225-125-2750S	5.88		C1225-125-2750X	40.51		5.88
C1225-125-3000M		3.18	76.2	47.04	30.78	187.13	6.43	C1225-125-3000S	155.88	5.36	C1225-125-3000X	43.98	172.49	5.35
C1225-125-3500M			88.9	54.46	34.93		5.43	C1225-125-3500S	4.52		C1225-125-3500X	50.76		4.52
C1225-125-4000M			101.6	61.85	39.09		4.71	C1225-125-4000S	3.92		C1225-125-4000X	57.64		3.92
C1225-125-4500M			114.3	69.24	43.23		4.15	C1225-125-4500S	3.46		C1225-125-4500X	64.41		3.46
C1225-125-5000M			127	76.66	47.37		3.71	C1225-125-5000S	3.09		C1225-125-5000X	71.22		3.09
C1225-135-0880M			22.35	16.33	14.35		38.38	C1225-135-0880S	31.97		C1225-135-0880X	15.59		31.97
C1225-135-1000M			25.4	18.19	15.47		32.06	C1225-135-1000S	26.71		C1225-135-1000X	17.30		26.71
C1225-135-1250M			31.75	22.07	17.83		23.88	C1225-135-1250S	19.89		C1225-135-1250X	20.88		19.9
C1225-135-1500M		3.43	38.1	25.93	20.19	231.43	19.03	C1225-135-1500S	192.78	15.85	C1225-135-1500X	24.46	216.29	15.86
C1225-135-2000M			50.8	33.71	24.94		13.54	C1225-135-2000S		11.28	C1225-135-2000X	31.62		11.28
C1225-135-2500M			63.5	41.45	29.67		10.51	C1225-135-2500S		8.75	C1225-135-2500X	38.79		8.75
C1225-135-3000M			76.2	49.23	34.39		8.58	C1225-135-3000S		7.15	C1225-135-3000X	45.94		7.15
C1225-135-3500M			88.9	56.97	39.12		7.25	C1225-135-3500S		6.04	C1225-135-3500X	53.09		6.04
C1225-148-0880M			22.35	17.12	15.77		56.91	C1225-148-0880S		47.41	C1225-148-0880X	16.38		47.41
C1225-148-1000M			25.4	19.08	17.09		47.21	C1225-148-1000S		39.33	C1225-148-1000X	18.20		39.33
C1225-148-1250M			31.75	23.19	19.84		34.83	C1225-148-1250S		29.01	C1225-148-1250X	21.99		29.01
C1225-148-1500M			38.1	27.31	22.56		27.6	C1225-148-1500S		22.99	C1225-148-1500X	25.78		22.99
C1225-148-2000M			50.8	35.51	28.04		19.51	C1225-148-2000S		16.25	C1225-148-2000X	33.37		16.25
C1225-148-2500M		3.76	63.5	43.74	33.5	298.02	15.08	C1225-148-2500S	248.25	12.56	C1225-148-2500X	40.95	283.2	12.56
C1225-148-3000M			76.2	51.94	38.96		12.29	C1225-148-3000S		10.24	C1225-148-3000X	48.55		10.24
C1225-148-3500M			88.9	60.17	44.42		10.37	C1225-148-3500S		8.64	C1225-148-3500X	56.11		8.64
C1225-148-4000M			101.6	68.38	49.91		8.97	C1225-148-4000S		7.47	C1225-148-4000X	63.68		7.47
C1225-148-4500M			114.3	76.61	55.37		7.9	C1225-148-4500S		6.58	C1225-148-4500X	71.25		6.58
C1225-148-5000M			127	84.81	60.83		7.06	C1225-148-5000S		5.88	C1225-148-5000X	78.83		5.88
C1225-162-1000M			25.4	20.14	18.47		72.6	C1225-162-1000S		60.48	C1225-162-1000X	19.47		60.48
C1225-162-1500M			38.1	28.96	24.51		41.73	C1225-162-1500S		34.76	C1225-162-1500X	27.78		34.76
C1225-162-2000M			50.8	37.74	30.58		29.28	C1225-162-2000S		24.39	C1225-162-2000X	36.09		24.39
C1225-162-2500M		4.11	63.5	46.56	36.63	382.08	22.55	C1225-162-2500S	318.28	18.78	C1225-162-2500X	44.40	358.8	18.79
C1225-162-3000M			76.2	55.37	42.67		18.33	C1225-162-3000S		15.27	C1225-162-3000X	52.71		15.27
C1225-162-3500M	31.12		88.9	64.16	48.72		15.44	C1225-162-3500S		12.86	C1225-162-3500X	61.01		12.87
C1225-162-4000M			101.6	72.97	54.79		13.34	C1225-162-4000S		11.11	C1225-162-4000X	69.32		11.11
C1225-162-4500M			114.3	81.79	60.83		11.75	C1225-162-4500S		9.79	C1225-162-4500X	77.64		9.79
C1225-162-5000M			127	90.6	66.88		10.49	C1225-162-5000S		8.74	C1225-162-5000X	85.94		8.74
C1225-177-1500M			38.1	30.23	26.85		61.81	C1225-177-1500S		51.49	C1225-177-1500X	29.59		51.49
C1225-177-2000M			50.8	39.5	33.66		43.04	C1225-177-2000S		35.85	C1225-177-2000X	38.57		35.86
C1225-177-2500M			63.5	48.77	40.49		33.01	C1225-177-2500S		27.5	C1225-177-2500X	47.56		27.5
C1225-177-3000M		4.5	76.2	58.04	47.29	486.43	26.77	C1225-177-3000S	405.2	22.3	C1225-177-3000X	56.54	438.42	22.3
C1225-177-3500M			88.9	67.31	54.1		22.52	C1225-177-3500S		18.76	C1225-177-3500X	65.53		18.76
C1225-177-4000M			101.6	76.56	60.91		19.42	C1225-177-4000S		16.18	C1225-177-4000X	74.50		16.18
C1225-177-4500M			114.3	85.83	67.72		17.09	C1225-177-4500S		14.24	C1225-177-4500X	83.51		14.24
C1225-177-5000M			127	95.1	74.52		15.25	C1225-177-5000S		12.7	C1225-177-5000X	92.49		12.7
C1225-192-1500M			38.1	31.39	28.93		90.37	C1225-192-1500S		75.28	C1225-192-1500X	31.16		75.29
C1225-192-2000M			50.8	41.1	36.45		62.41	C1225-192-2000S		51.99	C1225-192-2000X	40.76		51.99
C1225-192-2500M			63.5	50.8	43.94		47.66	C1225-192-2500S		39.7	C1225-192-2500X	50.35		39.71
C1225-192-3000M		4.88	76.2	60.5	51.44	605.51	38.56	C1225-192-3000S	504.39	32.12	C1225-192-3000X	59.94	522.17	32.12
C1225-192-3500M			88.9	70.21	58.95		32.36	C1225-192-3500S		26.96	C1225-192-3500X	69.53		26.96
C1225-192-4000M			101.6	79.88	66.45		27.89	C1225-192-4000S		23.23	C1225-192-4000X	79.13		23.24
C1225-192-4500M			114.3	89.59	73.96		24.5	C1225-192-4500S		20.41	C1225-192-4500X	88.71		20.41
C1225-192-5000M			127	99.29	81.46		21.85	C1225-192-5000S		18.2	C1225-192-5000X	98.32		18.21
C1225-207-2000M			50.8	42.39	39.19		88.39	C1225-207-2000S		73.63	C1225-207-2000X	41.99		73.64
C1225-207-2500M			63.5	52.45	47.42		67.2	C1225-207-2500S		55.98	C1225-207-2500X	51.92		55.99
C1225-207-3000M			76.2	62.51	55.63		54.21	C1225-207-3000S		45.16	C1225-207-3000X	61.84		45.16
C1225-207-3500M		5.26	88.9	72.57	63.86	742.5	45.42	C1225-207-3500S	618.51	37.83	C1225-207-3500X	71.76	648.39	37.84
C1225-207-4000M			101.6	82.6	72.06		39.08	C1225-207-4000S		32.55	C1225-207-4000X	81.69		32.56
C1225-207-4500M			114.3	92.66	80.29		34.3	C1225-207-4500S		28.57	C1225-207-4500X	91.61		28.58
C1225-207-5000M			127	102.72	88.49		30.57	C1225-207-5000S		25.46	C1225-207-5000X	101.54		25.47
C1460-112-1500M			38.1	21.95	13.49		7.23	C1460-112-1500S		6.02	C1460-112-1500X	19.64		6.02
C1460-112-2000M			50.8	28.32	15.98		5.18	C1460-112-2000S		4.31	C1460-112-2000X	25.05		4.32
C1460-112-2500M		2.84	63.5	34.7	18.47	116.67	4.05	C1460-112-2500S	97.19	3.37	C1460-112-2500X	30.50	111.2	3.37
C1460-112-3000M			76.2	41.07	20.96		3.33	C1460-112-3000S		2.77	C1460-112-3000X	36.08		2.77
C1460-112-3500M			88.9	47.45	23.47		2.82	C1460-112-3500S		2.35	C1460-112-3500X	41.55		2.35
C1460-112-4000M			101.6	53.82	25.96		2.43	C1460-112-4000S		2.02	C1460-112-4000X	46.76		2.03
C1460-125-1500M	37.08		38.1	23.19	15.65		10.63	C1460-125-1500S		8.85	C1460-125-1500X	21.61		8.85
C1460-125-2000M			50.8	29.95	18.75		7.6	C1460-125-2000S		6.33	C1460-125-2000X	27.74		6.33
C1460-125-2500M		3.18	63.5	36.68	21.82	158.39	5.9	C1460-125-2500S						

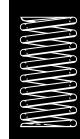
COMPRESSION SPRINGS MUSIC WIRE							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX				
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)	Part Number	P <sub>1</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>1</sub> (N)	R (N/mm)
C1460-135-1500M			38.1	24.16	17.32		14.06	C1460-135-1500S	11.71	C1460-135-1500X	22.45		11.71	
C1460-135-2000M			50.8	31.19	20.9		10	C1460-135-2000S	8.33	C1460-135-2000X	28.80		8.33	
C1460-135-2500M		3.43	63.5	38.23	24.46	196.11	7.76	C1460-135-2500S	163.36	6.46	C1460-135-2500X	35.14	183.27	6.46
C1460-135-3000M			76.2	45.26	28.02		6.34	C1460-135-3000S		5.28	C1460-135-3000X	41.49		5.28
C1460-135-3500M			88.9	52.3	31.57		5.36	C1460-135-3500S		4.46	C1460-135-3500X	47.84		4.46
C1460-135-4000M			101.6	59.33	35.38		4.64	C1460-135-4000S		3.87	C1460-135-4000X	54.19		3.86
C1460-148-1500M			38.1	25.4	19.51		19.91	C1460-148-1500S		16.59	C1460-148-1500X	23.61		16.59
C1460-148-2000M			50.8	32.82	23.7		14.06	C1460-148-2000S		11.71	C1460-148-2000X	30.28		11.71
C1460-148-2500M	37.08	3.76	63.5	40.26	27.89	252.91	10.87	C1460-148-2500S	210.68	9.05	C1460-148-2500X	36.97	240.31	9.06
C1460-148-3000M			76.2	47.68	32.08		8.86	C1460-148-3000S		7.38	C1460-148-3000X	43.64		7.38
C1460-148-3500M			88.9	55.09	36.27		7.48	C1460-148-3500S		6.23	C1460-148-3500X	50.32		6.23
C1460-148-4000M			101.6	62.53	40.46		6.48	C1460-148-4000S		5.4	C1460-148-4000X	57.08		5.4
C1460-162-1500M			38.1	26.7	21.77		28.44	C1460-162-1500S		23.69	C1460-162-1500X	25.23		23.69
C1460-162-2000M			50.8	34.54	26.64		19.96	C1460-162-2000S		16.63	C1460-162-2000X	32.46		16.63
C1460-162-2500M			63.5	42.39	31.52		15.37	C1460-162-2500S		12.8	C1460-162-2500X	39.69		12.81
C1460-162-3000M		4.11	76.2	50.24	36.4	324.44	12.5	C1460-162-3000S	270.26	10.41	C1460-162-3000X	46.92	304.98	10.42
C1460-162-3500M			88.9	58.09	41.28		10.52	C1460-162-3500S		8.76	C1460-162-3500X	54.11		8.77
C1460-162-4000M			101.6	65.94	46.15		9.11	C1460-162-4000S		7.59	C1460-162-4000X	61.39		7.59
C1460-162-4500M			114.3	73.79	51.03		8	C1460-162-4500S		6.66	C1460-162-4500X	68.55		6.67
C1460-162-5000M			127	81.64	55.91		7.14	C1460-162-5000S		5.95	C1460-162-5000X	75.76		5.95
C1687-135-1500M			38.1	22.94	15.37		11.28	C1687-135-1500S		9.4	C1687-135-1500X	21.11		9.4
C1687-135-2000M			50.8	29.49	18.14		8.02	C1687-135-2000S		6.68	C1687-135-2000X	26.91		6.68
C1687-135-2500M		3.43	63.5	36.02	20.9		6.22	C1687-135-2500S		5.18	C1687-135-2500X	32.67		5.18
C1687-135-3000M			76.2	42.57	23.67	170.8	5.08	C1687-135-3000S	142.28	4.23	C1687-135-3000X	38.46	159.63	4.23
C1687-135-3500M			88.9	49.1	26.44		4.29	C1687-135-3500S		3.57	C1687-135-3500X	44.23		3.57
C1687-135-4000M			101.6	55.65	29.21		3.71	C1687-135-4000S		3.09	C1687-135-4000X	49.98		3.09
C1687-135-4500M			114.3	62.2	31.98		3.27	C1687-135-4500S		2.72	C1687-135-4500X	55.78		2.73
C1687-135-5000M			127	68.73	34.75		2.92	C1687-135-5000S		2.43	C1687-135-5000X	61.47		2.44
C1687-148-1500M			38.1	24.05	17.32		15.71	C1687-148-1500S		13.09	C1687-148-1500X	22.09		13.08
C1687-148-2000M			50.8	30.94	20.62		11.1	C1687-148-2000S		9.25	C1687-148-2000X	28.15		9.25
C1687-148-2500M		3.76	63.5	37.8	23.93		8.58	C1687-148-2500S		7.15	C1687-148-2500X	34.19		7.15
C1687-148-3000M			76.2	44.65	27.2	220.49	6.99	C1687-148-3000S	183.67	5.82	C1687-148-3000X	40.21	209.5	5.82
C1687-148-3500M			88.9	51.54	30.51		5.9	C1687-148-3500S		4.91	C1687-148-3500X	46.28		4.92
C1687-148-4000M			101.6	58.39	33.81		5.1	C1687-148-4000S		4.25	C1687-148-4000X	52.25		4.24
C1687-148-4500M			114.3	65.28	37.11		4.5	C1687-148-4500S		3.75	C1687-148-4500X	58.42		3.75
C1687-148-5000M			127	72.14	40.39		4.01	C1687-148-5000S		3.34	C1687-148-5000X	64.28		3.34
C1687-162-1500M			38.1	25.25	19.43		22.03	C1687-162-1500S		18.35	C1687-162-1500X	23.60		18.35
C1687-162-2000M			50.8	32.49	23.32		15.44	C1687-162-2000S		12.86	C1687-162-2000X	30.11		12.87
C1687-162-2500M	42.85	4.11	63.5	39.7	27.18		11.91	C1687-162-2500S		9.92	C1687-162-2500X	36.67		9.92
C1687-162-3000M			76.2	46.94	31.06	283.12	9.68	C1687-162-3000S	235.83	8.06	C1687-162-3000X	43.21	266.15	8.07
C1687-162-3500M			88.9	54.18	34.95		8.16	C1687-162-3500S		6.8	C1687-162-3500X	49.75		6.8
C1687-162-4000M			101.6	61.42	38.84		7.04	C1687-162-4000S		5.86	C1687-162-4000X	56.21		5.86
C1687-162-4500M			114.3	68.66	42.72		6.2	C1687-162-4500S		5.16	C1687-162-4500X	62.76		5.16
C1687-162-5000M			127	75.87	46.61		5.53	C1687-162-5000S		4.61	C1687-162-5000X	69.26		4.61
C1687-177-1500M			38.1	26.49	21.62		31.12	C1687-177-1500S		25.92	C1687-177-1500X	25.51		25.92
C1687-177-2000M			50.8	34.11	26.14		21.66	C1687-177-2000S		18.04	C1687-177-2000X	32.72		18.04
C1687-177-2500M		4.5	63.5	41.76	30.66		16.62	C1687-177-2500S		13.84	C1687-177-2500X	39.93		13.84
C1687-177-3000M			76.2	49.38	35.18	361.44	13.47	C1687-177-3000S	301.08	11.22	C1687-177-3000X	47.12	326.25	11.22
C1687-177-3500M			88.9	57	39.7		11.33	C1687-177-3500S		9.44	C1687-177-3500X	54.33		9.44
C1687-177-4000M			101.6	64.64	44.22		9.77	C1687-177-4000S		8.14	C1687-177-4000X	61.52		8.14
C1687-177-4500M			114.3	72.26	48.77		8.6	C1687-177-4500S		7.16	C1687-177-4500X	68.75		7.16
C1687-177-5000M			127	79.91	53.29		7.67	C1687-177-5000S		6.39	C1687-177-5000X	75.94		6.39
C1687-192-1500M			38.1	27.66	23.72		43.32	C1687-192-1500S		36.09	C1687-192-1500X	27.30		36.09
C1687-192-2000M			50.8	35.69	28.88		29.93	C1687-192-2000S		24.93	C1687-192-2000X	35.16		24.93
C1687-192-2500M		4.88	63.5	43.71	34.04		22.85	C1687-192-2500S		19.03	C1687-192-2500X	43.02		19.04
C1687-192-3000M			76.2	51.74	39.19	451.92	18.49	C1687-192-3000S	376.45	15.4	C1687-192-3000X	50.89	389.93	15.4
C1687-192-3500M			88.9	59.77	44.37		15.51	C1687-192-3500S		12.92	C1687-192-3500X	58.73		12.92
C1687-192-4000M			101.6	67.79	49.53		13.38	C1687-192-4000S		11.15	C1687-192-4000X	66.61		11.14
C1687-192-4500M			114.3	75.82	54.69		11.75	C1687-192-4500S		9.79	C1687-192-4500X	74.46		9.79
C1687-192-5000M			127	83.87	59.84		10.47	C1687-192-5000S		8.72	C1687-192-5000X	82.30		8.72
C1937-148-2000M			50.8	29.41	18.19		9.04	C1937-148-2000S		7.53	C1937-148-2000X	26.42		7.53
C1937-148-2500M			63.5	35.84	20.75		6.99	C1937-148-2500S		5.82	C1937-148-2500X	31.97		5.82
C1937-148-3000M		3.76	76.2	42.27	23.34		5.69	C1937-148-3000S		4.74	C1937-148-3000X	37.49		4.74
C1937-148-3500M			88.9	48.69	25.91	193.13	4.8	C1937-148-3500S	160.88	4	C1937-148-3500X	42.99	183.52	4
C1937-148-4000M			101.6	55.12	28.5		4.15	C1937-148-4000S		3.46	C1937-148-4000X	48.52		3.46
C1937-148-4500M	49.2		114.3	61.52	31.06		3.66	C1937-148-4500S		3.05	C1937-148-4500X	54.11		3.05
C1937-148-5000M			127	67.95	33.63		3.27	C1937-148-5000S		2.72	C1937-148-5000X	59.72		2.73
C1937-148-5500M			139.7	74.37	36.22		2.96	C1937-148-5500S		2.47	C1937-148-5500X	65.26		2.47
C1937-162-2000M			50.8	30.78	20.57		12.4	C1937-162-2000S		10.33	C1937-162-2000X	28.21		10.33
C1937-162														

COMPRESSION SPRINGS MUSIC WIRE								302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX			
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>i</sub> (N)	R (N/mm)	Part Number	P <sub>i</sub> (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P <sub>i</sub> (N)	R (N/mm)
C1937-162-3500M			88.9	50.98	29.79		6.55	C1937-162-3500S	5.46		C1937-162-3500X	46.13		5.45
C1937-162-4000M			101.6	57.71	32.84		5.66	C1937-162-4000S	4.71		C1937-162-4000X	52.08		4.71
C1937-162-4500M		4.11	114.3	64.44	35.92	248.2	4.97	C1937-162-4500S	206.75	4.14	C1937-162-4500X	57.98	233.32	4.14
C1937-162-5000M			127	71.15	38.99		4.45	C1937-162-5000S		3.71	C1937-162-5000X	64.03		3.71
C1937-162-5500M			139.7	77.88	42.06		4.01	C1937-162-5500S		3.34	C1937-162-5500X	69.85		3.34
C1937-177-2500M			63.5	39.34	26.77		13.12	C1937-177-2500S		10.93	C1937-177-2500X	37.30		10.93
C1937-177-3000M			76.2	46.41	30.38		10.65	C1937-177-3000S		8.87	C1937-177-3000X	43.92		8.87
C1937-177-3500M			88.9	53.47	34.01		8.95	C1937-177-3500S		7.46	C1937-177-3500X	50.50		7.45
C1937-177-4000M		4.5	101.6	60.53	37.62	317.1	7.72	C1937-177-4000S	264.14	6.43	C1937-177-4000X	57.10	286.25	6.43
C1937-177-4500M			114.3	67.61	41.25		6.79	C1937-177-4500S		5.66	C1937-177-4500X	63.72		5.66
C1937-177-5000M			127	74.68	44.86		6.06	C1937-177-5000S		5.05	C1937-177-5000X	70.28		5.05
C1937-177-5500M			139.7	81.74	48.46		5.46	C1937-177-5500S		4.55	C1937-177-5500X	76.80		4.55
C1937-177-6000M			152.4	88.82	52.1		4.99	C1937-177-6000S		4.16	C1937-177-6000X	83.55		4.16
C1937-192-2500M	49.2		63.5	41.15	29.87		17.76	C1937-192-2500S		14.79	C1937-192-2500X	40.35		14.79
C1937-192-3000M			76.2	48.56	34.06		14.36	C1937-192-3000S		11.96	C1937-192-3000X	47.57		11.96
C1937-192-3500M			88.9	55.98	38.23		12.05	C1937-192-3500S		10.04	C1937-192-3500X	54.78		10.04
C1937-192-4000M		4.88	101.6	63.4	42.42	396.9	10.38	C1937-192-4000S	330.61	8.65	C1937-192-4000X	62.01	342.45	8.65
C1937-192-4500M			114.3	70.82	46.58		9.12	C1937-192-4500S		7.6	C1937-192-4500X	69.24		7.6
C1937-192-5000M			127	78.23	50.77		8.14	C1937-192-5000S		6.78	C1937-192-5000X	76.51		6.78
C1937-192-5500M			139.7	85.65	54.97		7.34	C1937-192-5500S		6.11	C1937-192-5500X	83.67		6.11
C1937-192-6000M			152.4	93.07	59.13		6.69	C1937-192-6000S		5.57	C1937-192-6000X	90.95		5.57
C1937-207-2500M			63.5	42.93	32.94		23.71	C1937-207-2500S		19.75	C1937-207-2500X	41.87		19.75
C1937-207-3000M			76.2	50.67	37.67		19.12	C1937-207-3000S		15.93	C1937-207-3000X	49.38		15.93
C1937-207-3500M			88.9	58.45	42.42		16.02	C1937-207-3500S		13.34	C1937-207-3500X	56.89		13.35
C1937-207-4000M		5.26	101.6	66.22	47.17	488.08	13.8	C1937-207-4000S	406.57	11.5	C1937-207-4000X	64.43	427.29	11.49
C1937-207-4500M			114.3	73.99	51.92		12.1	C1937-207-4500S		10.08	C1937-207-4500X	71.91		10.08
C1937-207-5000M			127	81.76	56.64		10.79	C1937-207-5000S		8.99	C1937-207-5000X	79.45		8.99
C1937-207-5500M			139.7	89.51	61.39		9.72	C1937-207-5500S		8.1	C1937-207-5500X	86.92		8.1
C1937-207-6000M			152.4	97.28	66.14		8.86	C1937-207-6000S		7.38	C1937-207-6000X	94.51		7.38

COMPRESSION SPRINGS MUSIC WIRE								302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX		
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>i</sub> (N)	R (N/mm)	Part Number	P <sub>i</sub> (N)	R (N/mm)	Part Number	P <sub>i</sub> (N)	R (N/mm)
D10100			2	1.4	1.3		4.91				D20100		4.09
D10110			2.7	1.9	1.7		3.12				D20110		2.6
D10120		1.2	3.9	2.6	2.3	2.57	2.03				D20120	2.14	1.69
D10130			5.5	3.6	3.1		1.38				D20130		1.15
D10140			7.8	5	4.3		0.92				D20140		0.77
D10150			2.3	1.5	1.3		2.83				D20150		2.36
D10160			3.2	1.9	1.7		1.81				D20160		1.51
D10170	1.4		4.6	2.7	2.3	2.27	1.16				D20170	1.89	0.97
D10180			6.5	3.7	3.1		0.8				D20180		0.67
D10190			9.3	5.1	4.3		0.54				D20190		0.45
D10200			3	1.5	1.3		1.2				D20200		1
D10210			4.4	2	1.7		0.77				D20210		0.64
D10220	1.8	0.2	6.4	2.8	2.3	1.8	0.49				D20220	1.5	0.41
D10230			9.2	3.8	3.1		0.34				D20230		0.28
D10240			13.3	5.3	4.3		0.23				D20240		0.19
D10250			4	1.5	1.3		0.61				D20250		0.51
D10260			5.9	2.1	1.7		0.38				D20260		0.32
D10270	2.2		8.7	2.9	2.3	1.49	0.25				D20270	1.24	0.21
D10280			12.6	4	3.1		0.18				D20280		0.15
D10290			18.3	5.6	4.3		0.12				D20290		0.1
D10300			5.4	1.6	1.3		0.31				D20300		0.26
D10310			8.2	2.2	1.7		0.2				D20310		0.17
D10320	2.7		12.4	3.1	2.3	1.2	0.13				D20320	1	0.11
D10330			17.9	4.2	3.1		0.08				D20330		0.07
D10340			26.2	5.9	4.3		0.06				D20340		0.05
D10350			2.4	1.8	1.63		6.95				D20350		5.79
D10360			3.3	2.4	2.13		4.42				D20360		3.68
D10370	1.45		4.7	3.3	2.88	4.11	2.86				D20370	3.42	2.38
D10380			6.6	4.5	3.88		1.94				D20380		1.62
D10390			9.4	6.3	5.38		1.32				D20390		1.1
D10400		0.25	3	1.8	1.63		2.93				D20400		2.44
D10410			4.3	2.4	2.13		1.86				D20410		1.55
D10420	1.85		6.2	3.4	2.88	3.37	1.2				D20420	2.81	1
D10430			8.7	4.6	3.88		0.83				D20430		0.69
D10440			12.5	6.5	5.38		0.55				D20440		0.46
D10450	2.25		3.7	1.9	1.63	2.81	1.5				D20450	2.34	1.25
D10460			5.5	2.5	2.13		0.95				D20460		0.79

## COMPRESSION SPRINGS MUSIC WIRE

## 302 STAINLESS STEEL / INOX



Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)		Part Number	P <sub>1</sub> (N)	R (N/mm)
D10470	2.25		8	3.5	2.88	2.81	0.61		D20470	2.34	0.51
D10480			11.4	4.7	3.88		0.42		D20480		0.35
D10490			16.6	6.7	5.38		0.29		D20490		0.24
D10500			4.9	1.9	1.63		0.77		D20500		0.64
D10510			7.3	2.6	2.13		0.49		D20510		0.41
D10520	2.75	0.25	10.9	3.6	2.88	2.31	0.31		D20520	1.92	0.26
D10530			15.7	5	3.88		0.22		D20530		0.18
D10540			22.9	7	5.38		0.14		D20540		0.12
D10550			7.1	2	1.63		0.36		D20550		0.3
D10560			10.7	2.8	2.13		0.24		D20560		0.2
D10570	3.45		16.1	3.8	2.88	1.84	0.16		D20570	1.53	0.13
D10580			23.3	5.3	3.88		0.11		D20580		0.09
D10590			34.1	7.5	5.38		0.07		D20590		0.06
D10600			3.1	2.3	2.08		7.86		D20600		6.55
D10610			4.4	3.1	2.72		5		D20610		4.17
D10620	1.92		6.3	4.2	3.68	6.57	3.24		D20620	5.47	2.7
D10630			8.7	5.8	4.96		2.2		D20630		1.83
D10640			12.5	8.1	6.88		1.49		D20640		1.24
D10650			3.7	2.3	2.08		4.02		D20650		3.35
D10660			5.3	3.1	2.72		2.57		D20660		2.14
D10670	2.32		7.7	4.3	3.68	5.63	1.66		D20670	4.69	1.38
D10680			10.9	5.9	4.96		1.13		D20680		0.94
D10690			15.6	8.2	6.88		0.77		D20690		0.64
D10700		0.32	4.7	2.4	2.08		2.06		D20700		1.72
D10710			6.8	3.2	2.72		1.31		D20710		1.09
D10720	2.82		10	4.4	3.68	4.69	0.85		D20720	3.91	0.71
D10730			14.2	6.1	4.96		0.58		D20730		0.48
D10740			20.6	8.5	6.88		0.38		D20740		0.32
D10750			6.3	2.5	2.08		0.97		D20750		0.81
D10760			9.4	3.3	2.72		0.62		D20760		0.52
D10770	3.52		14	4.6	3.68	3.79	0.4		D20770	3.16	0.33
D10780			20.1	6.3	4.96		0.28		D20780		0.23
D10790			29.3	8.9	6.88		0.19		D20790		0.16
D10800	4.32		8.7	2.6	2.08	3.09	0.5		D20800	2.57	0.42
D10810			13.1	3.5	2.72		0.31		D20810		0.26
D10820	4.32	0.32	19.8	4.9	3.68	3.09	0.22		D20820	2.57	0.18
D10830			28.6	6.7	4.96		0.14		D20830		0.12
D10840			41.9	9.5	6.88		0.1		D20840		0.08
D10850			3.5	2.7	2.6		9.31		D20850		7.76
D10860			5	3.7	3.4		5.88		D20860		4.9
D10870	2.4		7	5.1	4.6	7.45	3.83		D20870	6.21	3.19
D10880			10	7	6.2		2.61		D20880		2.17
D10890			14	9.9	8.6		1.76		D20890		1.47
D10900			4.3	2.8	2.6		4.77		D20900		3.97
D10910			6.3	3.9	3.4		3.04		D20910		2.53
D10920	2.9		9.1	5.4	4.6	7.16	1.96		D20920	5.96	1.63
D10930			13	7.5	6.2		1.33		D20930		1.11
D10940			18.5	10.6	8.6		0.9		D20940		0.75
D10950			5.6	2.8	2.6		2.28		D20950		1.9
D10960			8.3	3.9	3.4		1.45		D20960		1.21
D10970	3.6	0.4	12	5.4	4.6	6.37	0.94		D20970	5.31	0.78
D10980			17.5	7.5	6.2		0.64		D20980		0.53
D10990			25.5	10.6	8.6		0.43		D20990		0.36
D11000			7.5	3	2.6		1.17		D21000		0.97
D11010			11	4.1	3.4		0.74		D21010		0.62
D11020	4.4		16.5	5.8	4.6	5.25	0.48		D21020	4.37	0.4
D11030			24	8	6.2		0.32		D21030		0.27
D11040			35.5	11.4	8.6		0.22		D21040		0.18
D11050			10.5	3.2	2.6		0.6		D21050		0.5
D11060			16	4.5	3.4		0.38		D21060		0.32
D11070	5.4		24	6.4	4.6	4.36	0.25		D21070	3.63	0.21
D11080			35	9	6.2		0.17		D21080		0.14
D11090			53	12.8	8.6		0.11		D21090		0.09
D11100			4.4	3.5	3.25		11.58		D21100		9.65
D11110			6.1	4.7	4.25		7.42		D21110		6.18
D11120	3		8.7	6.5	5.75	10.4	4.8		D21120	8.66	4
D11130		0.5	12	9	7.75		3.27		D21130		2.72
D11140			17.5	12.8	10.75		2.21		D21140		1.84
D11150	3.7		5.5	3.7	3.25	10	5.57		D21150	8.33	4.64
D11160			7.9	5.1	4.25		3.53		D21160		2.94
D11170			11.5	7.1	5.75		2.28		D21170		1.9

## COMPRESSION SPRINGS MUSIC WIRE

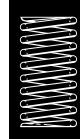
## 302 STAINLESS STEEL / INOX



Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)		Part Number	P <sub>1</sub> (N)	R (N/mm)
D11180	3.7		16	9.8	7.75	10	1.56		D21180	8.33	1.3
D11190			23.5	14	10.75		1.05		D21190		0.87
D11200			7	3.7	3.25		2.83		D21200		2.36
D11210			10	5.1	4.25		1.81		D21210		1.51
D11220	4.5		15	7.1	5.75	9.32	1.17		D21220	7.76	0.97
D11230			21.5	9.8	7.75		0.79		D21230		0.66
D11240			31	14	10.75		0.54		D21240		0.45
D11250		0.5	9.4	3.9	3.25		1.46		D21250		1.22
D11260			14	5.4	4.25		0.93		D21260		0.77
D11270	5.5		20.5	7.6	5.75	8.04	0.61		D21270	6.7	0.51
D11280			30	10.6	7.75		0.41		D21280		0.34
D11290			44.5	15.1	10.75		0.27		D21290		0.22
D11300			13.5	4.3	3.25		0.73		D21300		0.61
D11310			20	6	4.25		0.46		D21310		0.38
D11320	6.8		30	8.7	5.75	6.57	0.3		D21320	5.47	0.25
D11330			44	12.2	7.75		0.21		D21330		0.17
D11340			65	17.4	10.75		0.14		D21340		0.12
D11350			5.5	4	4.1		14.02		D21350		11.68
D11360			7.8	5.4	5.36		8.9		D21360		7.41
D11370	3.83		11	7.5	7.25	20.99	5.77		D21370	17.48	4.81
D11380			15.5	10.3	9.77		3.93		D21380		3.27
D11390			22.5	14.7	13.55		2.65		D21390		2.21
D11400			6.7	4.3	4.1		7.16		D21400		5.96
D11410			9.6	5.8	5.36		4.55		D21410		3.79
D11420	4.57		14	8.2	7.25	17.16	2.94		D21420	14.29	2.45
D11430		0.63	20	11.3	9.77		2		D21430		1.67
D11440			29	16.2	13.55		1.35		D21440		1.12
D11450			8.5	4.3	4.1		3.69		D21450		3.07
D11460			12.5	5.8	5.36		2.35		D21460		1.96
D11470	5.63		18.5	8.2	7.25	15.49	1.55		D21470	12.9	1.29
D11480			26	11.3	9.77		1.03		D21480		0.86
D11490			38.5	16.2	13.55		0.7		D21490		0.58
D11500	6.93		11.5	4.6	4.1	12.45	1.83		D21500	10.37	1.52
D11510			17	6.2	5.36		1.17		D21510		0.97
D11520			25.5	8.9	7.25		0.76		D21520		0.63
D11530	6.93		36.5	12.3	9.77	12.45	0.51		D21530	10.37	0.42
D11540			54	17.7	13.55		0.34		D21540		0.28
D11550		0.63	16	5.1	4.1		0.89		D21550		0.74
D11560			24.5	7.1	5.36		0.57		D21560		0.47
D11570	8.63		37	10.2	7.25	10	0.37		D21570	8.33	0.31
D11580			55	14.3	9.77		0.25		D21580		0.21
D11590			80.5	20.6	13.55		0.17		D21590		0.14
D11600			6.9	5.2	5.2		18.53		D21600		15.44
D11610			9.7	7	6.8		11.87		D21610		9.89
D11620	4.8		14	9.8	9.2	31.87	7.67		D21620	26.55	6.39
D11630			19.5	13.5	12.4		5.22		D21630		4.35
D11640			28	19.1	17.2		3.52		D21640		2.93
D11650			8.3	5.6	5.2		9.53		D21650		7.94
D11660			12	7.7	6.8		6.07		D21660		5.06
D11670	5.8		17.5	10.9	9.2	25.99	3.92		D21670	21.65	3.27
D11680			24.5	15.1	12.4		2.67		D21680		2.22
D11690			36	21.5	17.2		1.8		D21690		1.5
D11700			10.5	5.6	5.2		4.77		D21700		3.97
D11710			15.5	7.7	6.8		3.03		D21710		2.52
D11720	7.1	0.8	23	10.9	9.2	24.03	1.96		D21720	20.02	1.63
D11730			33	15.1	12.4		1.33		D21730		1.11
D11740			48	21.5	17.2		0.9		D21740		0.75
D11750			14.5	6.1	5.2		2.32		D21750		1.93
D11760			21.5	8.4	6.8		1.48		D21760		1.23
D11770	8.8		32	12	9.2	19.52	0.96		D21770	16.26	0.8
D11780			47	16.7	12.4		0.65		D21780		0.54
D11790			68	23.8	17.2		0.44		D21790		0.37
D11800			20	6.9	5.2		1.2		D21800		1
D11810			30	9.8	6.8		0.76		D21810		0.63
D11820	10.8		45.5	14.3	9.2	15.4	0.49		D21820	12.83	0.41
D11830			66	19.9	12.4		0.33		D21830		0.27
D11840			96.5	28.5	17.2		0.23		D21840		0.19
D11850			8.5	6.6	5.5		23.24		D21850		19.36
D11860			12	9	7.5		14.81		D21860		12.34
D11870	6		17	12.6	10.5	43.74	9.57		D21870	36.44	7.97
D11880			24	17.4	14.5		6.51		D21880		5.42

## COMPRESSION SPRINGS MUSIC WIRE

## 302 STAINLESS STEEL / INOX



Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)		Part Number	P <sub>1</sub> (N)	R (N/mm)
D11890			34.5	24.6	20.5		4.4		D21890	3.67	
D11900			10	7.3	5.5		11.57		D21900	9.64	
D11910			14.5	10.1	7.5		7.39		D21910	6.16	
D11920	7.3		21.5	14.3	10.5	34.13	4.79		D21920	28.43	3.99
D11930			30.5	19.9	14.5		3.26		D21930	2.72	
D11940			43.5	28.3	20.5		2.2		D21940	1.83	
D11950			13	7.3	5.5		5.68		D21950	4.73	
D11960			19	10.1	7.5		3.61		D21960	3.01	
D11970	9	1	28.5	14.3	10.5	33.15	2.33		D21970	27.61	1.94
D11980			40.5	19.9	14.5		1.59		D21980	1.32	
D11990			59	28.3	20.5		1.08		D21990	0.9	
D12000			17.5	8	5.5		2.9		D22000	2.42	
D12010			26	11.2	7.5		1.85		D22010	1.54	
D12020	11		39	16	10.5	27.36	1.2		D22020	22.79	1
D12030			56	22.4	14.5		0.81		D22030	0.67	
D12040			81.5	32	20.5		0.55		D22040	0.46	
D12050			24	9.4	5.5		1.49		D22050	1.24	
D12060			36.5	13.4	7.5		0.95		D22060	0.79	
D12070	13.5		55.5	19.4	10.5	21.97	0.61		D22070	18.3	0.51
D12080			80.5	27.4	14.5		0.41		D22080	0.34	
D12090			115	39.4	20.5		0.28		D22090	0.23	
D12100			12	7.2	6.88		29.03		D22100	24.18	
D12110			17	9.8	9.38		18.04		D22110	15.03	
D12120	7.55		25	13.8	13.13	133.37	11.77		D22120	111.1	9.8
D12130			35.5	19.2	18.13		8.09		D22130	6.74	
D12140			51.5	27.1	25.63		5.39		D22140	4.49	
D12150			15	7.4	6.88		14.32		D22150	11.93	
D12160		1.25	22	10.5	9.38		8.92		D22160	7.43	
D12170	9.25		33	14.9	13.13	104.93	5.83		D22170	87.41	4.86
D12180			47.5	21	18.13		3.96		D22180	3.3	
D12190			69	30	25.63		2.69		D22190	2.24	
D12200			20	7.7	6.88		7.09		D22200	5.91	
D12210	11.25		29.5	10.8	9.38	85.42	4.51		D22210	71.15	3.76
D12220			44.5	15.2	13.13		2.92		D22220	2.43	
D12230	11.25		64	21.1	18.13	85.42	1.99		D22230	71.15	1.66
D12240			93.5	30	25.63		1.34		D22240		1.12
D12250			27	8.2	6.88		3.63		D22250		3.02
D12260			41.5	11.6	9.38		2.31		D22260		1.92
D12270	13.75		62.5	16.5	13.13	69.04	1.49		D22270	57.51	1.24
D12280		1.25	90.5	23.1	18.13		1.02		D22280		0.85
D12290			130	32.9	25.63		0.69		D22290		0.57
D12300			40.5	9.1	6.88		1.73		D22300		1.44
D12310			62	12.9	9.38		1.1		D22310		0.92
D12320	17.25		94	18.5	13.13	54.23	0.72		D22320	45.17	0.6
D12330			140	26	18.13		0.48		D22330		0.4
D12340			205	37.3	25.63		0.32		D22340		0.27
D12350			14.5	9	8.8		37.27		D22350		31.05
D12360			21.5	12.6	12		23.73		D22360		19.77
D12370	9.6		31.5	17.9	16.8	211.82	15.4		D22370	176.45	12.83
D12380			45	24.8	23.2		10.4		D22380		8.66
D12390			65.5	35.2	32.8		7.05		D22390		5.87
D12400			18.5	9.4	8.8		19.12		D22400		15.93
D12410			27	13.2	12		12.16		D22410		10.13
D12420	11.6		40.5	18.9	16.8	169.66	7.87		D22420	141.33	6.56
D12430			58.5	26.5	23.2		5.33		D22430		4.44
D12440			85	37.9	32.8		3.61		D22440		3.01
D12450			24	10	8.8		9.76		D22450		8.13
D12460			36	14.1	12		6.23		D22460		5.19
D12470	14.1	1.6	53.5	20.1	16.8	135.33	4.04		D22470	112.73	3.37
D12480			78	28	23.2		2.73		D22480		2.27
D12490			115	39.9	32.8		1.84		D22490		1.53
D12500			34	11	8.8		4.65		D22500		3.87
D12510			51.5	15.5	12		2.96		D22510		2.47
D12520	17.6		77.5	22.2	16.8	105.91	1.92		D22520	88.22	1.6
D12530			110	31.2	23.2		1.3		D22530		1.08
D12540			165	44.6	32.8		0.88		D22540		0.73
D12550			48	12.4	8.8		2.38		D22550		1.98
D12560			73.5	17.6	12		1.52		D22560		1.27
D12570	21.6		110	25.5	16.8	84.83	0.99		D22570	70.66	0.82
D12580			165	36	23.2		0.67		D22580		0.56
D12590	21.6		240	51.8	32.8	84.83	0.45		D22590	70.66	0.37

## COMPRESSION SPRINGS MUSIC WIRE

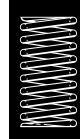
## 302 STAINLESS STEEL / INOX



Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)		Part Number	P <sub>1</sub> (N)	R (N/mm)
D12600			18	11.2	11		46.58		D22600		38.8
D12610			26.5	15.6	15		29.71		D22610		24.75
D12620	12		38.5	22	21	317.74	19.22		D22620	264.68	16.01
D12630			55	30.6	29		13.04		D22630		10.86
D12640			79.5	43.4	41		8.81		D22640		7.34
D12650			22.5	11.7	11		23.93		D22650		19.93
D12660			33	16.4	15		15.2		D22660		12.66
D12670	14.5		49.5	23.5	21	253.99	9.81		D22670	211.57	8.17
D12680			71	33	29		6.69		D22680		5.57
D12690			105	47.2	41		4.52		D22690		3.77
D12700			30	12.5	11		11.38		D22700		9.48
D12710	18	2	45	17.7	15		7.24		D22710		6.03
D12720			68	25.5	21	198.09	4.69		D22720	165.01	3.91
D12730			98	35.9	29		3.19		D22730		2.66
D12740			145	51.4	41		2.16		D22740		1.8
D12750			41	13.6	11		5.83		D22750		4.86
D12760			62	19.2	15		3.71		D22760		3.09
D12770		22	94	27.6	21	158.87	2.39		D22770	132.34	1.99
D12780			135	38.8	29		1.63		D22780		1.36
D12790			200	55.6	41		1.1		D22790		0.92
D12800			58	15	11		2.98		D22800		2.48
D12810			88.5	21.4	15		1.9		D22810		1.58
D12820	27		135	31	21	127.49	1.23		D22820	106.2	1.02
D12830			195	43.8	29		0.83		D22830		0.69
D12840			290	63	41		0.57		D22840		0.47
D12850			16.2	12.9	12.1		100.03		D22850		83.32
D12860	11		23	17.7	16.5	337.35	63.55		D22860	281.01	52.94
D12870			36.5	27.4	25.3		36.87		D22870		30.71
D12880			56.8	41.9	38.5		22.56		D22880		18.79
D12890	15	2.2	20	12.9	12.1		32.46		D22890		27.04
D12900			30.2	17.7	16.5	256.93	20.69		D22900	214.02	17.23
D12910			48.9	27.4	25.3		11.96		D22910		9.96
D12920	24		39.2	14	12.1	165.73	6.57		D22920	138.05	5.47
D12930			59.1	19.5	16.5		4.19		D22930		3.49
D12940			22	14	13.75		58.35		D22940		48.61
D12950			32	19.5	18.75		37.17		D22950		30.96
D12960	15		47.5	27.8	26.25	467.78	24.03		D22960	389.66	20.02
D12970			67.5	38.7	36.25		16.28		D22970		13.56
D12980			98	55.1	51.25		10.98		D22980		9.15
D12990			27.5	14.6	13.75		27.75		D22990		23.12
D13000			41	20.5	18.75		17.65		D23000	303.89	14.7
D13010	18.5		61	29.3	26.25	364.81	11.47		D23010		9.55
D13020			88	41.1	36.25		7.78		D23020		6.48
D13030			130	58.9	51.25		5.25		D23030		4.37
D13040			36	15.5	13.75		14.22		D23040		11.85
D13050			54	21.9	18.75		9.05		D23050		7.54
D13060	22	2.5	81.5	31.5	26.25	292.24	5.85		D23060	243.44	4.87
D13070			120	44.3	36.25		3.98		D23070		3.32
D13080			175	63.6	51.25		2.69		D23080		2.24
D13090			49	16.8	13.75		7.29		D23090		6.07
D13100			74.5	24	18.75		4.64		D23100		3.87
D13110	27.5		115	34.8	26.25	233.4	3		D23110	194.42	2.5
D13120			165	49.2	36.25		2.04		D23120		1.7
D13130			240	70.8	51.25		1.38		D23130		1.15
D13140			71.5	19.3	13.75		3.48		D23140		2.9
D13150			110	27.9	18.75		2.22		D23150		1.85
D13160	34.5		170	41	26.25	182.4	1.43		D23160	151.94	1.19
D13170			245	58.1	36.25		0.97		D23170		0.81
D13180			360	83.9	51.25		0.66		D23180		0.55
D13190			20.5	16.4	15.4		127.49		D23190		106.2
D13200	14		29	22.3	21	518.77	62.86		D23200	432.14	52.36
D13210			45.9	34.9	32.2		46.88		D23210		39.05
D13220			71.4	53.3	49		28.73		D23220		23.93
D13230		2.8	27.2	16.4	15.4		35.11		D23230		29.25
D13240			39.5	22.5	21	379.52	22.36		D23240	316.14	18.63
D13250			64.2	34.9	32.2		12.94		D23250		10.78
D13260	30		47	17.9	15.4	258.9	8.88		D23260	215.66	7.4
D13270			70.7	24.9	21		5.65		D23270		4.71
D13280			27.5	17.8	17.6		74.33		D23280		61.92
D13290			40	24.9	24		47.37		D23290		39.46
D13300	19.2		59	35.4	33.6	720.79	30.69		D23300	600.42	25.56

## COMPRESSION SPRINGS MUSIC WIRE

## 302 STAINLESS STEEL / INOX

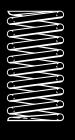


Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)		Part Number	P <sub>1</sub> (N)	R (N/mm)
D13300	19.2	3.2	59	35.4	33.6	720.79	30.69		D23300	600.42	25.56
D13310			83.5	49	46.4		20.79		D23310		17.32
D13320			120	69.4	65.6		14.12		D23320		11.76
D13330			33.5	18.5	17.6		38.15		D23330		31.78
D13340			49.5	25.9	24		24.22		D23340		20.18
D13350			74	37.1	33.6	576.63	15.69		D23350	480.33	13.07
D13360			105	51.6	46.4		10.69		D23360		8.9
D13370			155	73.2	65.6		7.21		D23370		6.01
D13380			42.5	19.1	17.6		19.42		D23380		16.18
D13390			63.5	26.3	24		12.36		D23390		10.3
D13400	28.2	3.2	94.5	37.1	33.6	460.91	8.02		D23400	383.94	6.68
D13410			135	51.6	46.4		5.45		D23410		4.54
D13420			200	73.2	65.6		3.68		D23420		3.07
D13430			58.5	19.8	17.6		9.31		D23430		7.76
D13440			88.5	27.4	24		5.92		D23440		4.93
D13450			135	38.8	33.6	360.88	3.82		D23450	300.61	3.18
D13460			190	54.1	46.4		2.61		D23460		2.17
D13470			280	77	65.6		1.76		D23470		1.47
D13480			82	21.2	17.6		4.76		D23480		3.97
D13490			125	29.7	24		3.03		D23490		2.52
D13500	43.2	4	190	42.3	33.6	288.32	1.96		D23500	240.17	1.63
D13510			275	59.2	46.4		1.33		D23510		1.11
D13520			405	84.5	65.6		0.9		D23520		0.75
D13530			33.5	22.2	22		93.07		D23530		77.53
D13540			49	31	30		59.23		D23540		49.34
D13550			72	44.2	42	1068.92	38.34		D23550	890.41	31.94
D13560			105	61.7	58		26.09		D23560		21.73
D13570			150	87.7	82		17.55		D23570		14.62
D13580			41	22.9	22		47.66		D23580		39.7
D13590			60.5	32.2	30		30.3		D23590		25.24
D13600	29	4	89.5	46	42	852.2	19.61		D23600	709.88	16.34
D13610			130	64.5	58		13.34		D23610		11.11
D13620			185	92.1	82		9.02		D23620		7.51
D13630			53.5	24	22		665.87	22.75	D23630	554.67	18.95
D13640			79.5	33.3	30		14.42		D23640		12.01
D13650			120	47.2	42		9.35		D23650		7.79
D13660			170	65.8	58	665.87	6.35		D23660	554.67	5.29
D13670			250	93.6	82		4.3		D23670		3.58
D13680			71	25.2	22		11.67		D23680		9.72
D13690			105	35.1	30		7.4		D23690		6.16
D13700			160	50	42	532.5	4.79		D23700	443.57	3.99
D13710	44	4	235	69.8	58		3.26		D23710		2.72
D13720			340	99.6	82		2.2		D23720		1.83
D13730			99	27.4	22		5.95		D23730		4.96
D13740			150	38.6	30		3.79		D23740		3.16
D13750			230	55.4	42	426.59	2.45		D23750	355.35	2.04
D13760			335	77.8	58		1.67		D23760		1.39
D13770			490	111	82		1.13		D23770		0.94
D13780			41	27.6	27.5		116.7		D23780		97.21
D13790			60	38.5	37.5		74.04		D23790		61.68
D13800	30	5	87.5	54.9	52.5	1569.06	47.86		D23800	1307.03	39.87
D13810			125	76.7	72.5		32.59		D23810		27.15
D13820			180	109	102.5		21.97		D23820		18.3
D13830			51	28.7	27.5		55.41		D23830		46.16
D13840			75	40.2	37.5		35.3		D23840		29.4
D13850			110	57.5	52.5	1225.83	22.85		D23850	1021.12	19.03
D13860			160	80.5	72.5		15.49		D23860		12.9
D13870			230	115	102.5		10.49		D23870		8.74
D13880			64	29.6	27.5		28.34		D23880		23.61
D13890			95.5	41.1	37.5		18.04		D23890		15.03
D13900	44	5	140	58.4	52.5	980.67	11.67		D23900	816.9	9.72
D13910			205	81.4	72.5		7.94		D23910		6.61
D13920			300	116	102.5		5.36		D23920		4.46
D13930			85	30.9	27.5		14.51		D23930		12.09
D13940			130	43.2	37.5		9.25		D23940		7.71
D13950			195	61.6	52.5	784.53	5.98		D23950	653.51	4.98
D13960			280	86.1	72.5		4.07		D23960		3.39
D13970			410	123	102.5		2.75		D23970		2.29
D13980			120	32.3	27.5		7.27		D23980		6.06
D13990			180	45.3	37.5		4.63		D23990		3.86
D14000	68		275	64.8	52.5	622.72	2.99		D24000	518.73	2.49

**COMPRESSION SPRINGS MUSIC WIRE**


Part Number	D <sub>o</sub> (mm)	d (mm)	L <sub>o</sub> (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (N)	R (N/mm)
DH14030	34.5		100	78.5	71	1161.6	52.8
DH14040			160	117	110	1427.1	33.19
DH14050	37		380	215	180	2656	16.1
DH14060	42		125	75	68	1370	27.4
DH14070	42.5		120	75	68	1184.85	26.33
DH14080			200	120	113	1228.8	15.36
DH14090	47.5	6	110	63	56	1040.11	22.13
DH14100			200	105	95	1153.3	12.14
DH14110	52.5		120	63	56	896.61	15.73
DH14120			250	164	110	676.82	7.87
DH14130	57.5		110	51	44	893.2	15.14
DH14140			250	102	95	970.88	6.56
DH14150	62.5		120	48	41	894.96	12.43
DH14160			250	90	83	916.8	5.73
DH14170	39.5			147	138	2024.07	38.19
DH14180	44.5		200	136.5	128	1713.87	26.99
DH14190	49.5			122.5	114.5	1622.85	20.94
DH14200	54.5			130	77	1368.99	25.83
DH14210		7	250	136.5	126	1507.63	13.28
DH14220	59.5		120	59.5	54	1401.03	24.59
DH14230			250	112	103	1697.4	12.3
DH14240	64.5		130	63	54	1254.81	18.73
DH14250			250	112	103	1291.68	9.36
DH14260	41.5		100	80	66	2825.8	141.29
DH14270			160	128	117	2583.68	80.74
DH14280	46.5		110	80	69	2790	93
DH14290			200	144	134	2606.29	46.54
DH14300	50		190	128	92	3385.2	54.6
DH14310	51.5		120	80	69	2581.2	64.53
DH14320	56.5	8	130	88	77	1738.38	41.39
DH14330			250	152	142	2147.18	21.9
DH14340	61.5		300	168	158	1927.2	14.6
DH14350	66.5			152	141	1848.52	12.49
DH14360	71		205	85	73	2400	20
DH14370	76.5		300	128	117	1623.68	9.44
DH14380	88		180	62	49	1781.8	15.1
DH14390	44		120	92.5	84	4977.5	181
DH14400	48.5		110	90	77	2761.2	138.06
DH14410	53.5		120	90	78	2896.8	96.56
DH14420	59	9	130	94.5	82.5	2274.4	64.07
DH14430	64		160	108	96	2123.37	40.91
DH14440	69		130	81	69	2205.98	45.02
DH14450	79		160	85.5	73.5	1971.27	26.46
DH14460	46		130	102.5	93	6985	254
DH14470	51		110	90	76	4301	215.05
DH14480	56		120	95	81	3553	142.12
DH14490	60	10	110	75	61	5285	151
DH14500	61		250	180	166	3421.6	48.88
DH14510	73		135	79.5	61	4181.7	75.4
DH14520	81		160	95	81	2521.25	38.65
DH14530	91		150	80	66	2272.9	32.54
DH14540	74	12	470	333	262	5891	43

NOTES





## HIGH PERFORMANCE COMPRESSION SPRINGS

These items offer high performance, in dimensions not available in our standard music wire or stainless steel lines.

### MATERIALS

Either chrome vanadium or chrome silicon will be supplied, based on availability at time of shipment. Not recommended for application where the temperature exceeds 220°C (425°F).

### COILED

Right hand or left hand, as per the following tables (to allow springs to be used in tandem if required).

### ENDS

Part numbers starting with C00168, C00170, C00186, C00200, C00257, C00309, C00347, C00395 are squared only. All others are squared and ground.

### ID & OD TOLERANCES

High performance springs are designed to fit in a hole and over a shaft as specified in the table.

### LOADS & SPRING RATES

Rate is calculated and should be used as a reference only. Load (P) at L<sub>1</sub> is +/-10%

### SURFACE FINISH

Standard finish is oil. Special finishes available upon request.

### KEY TO MEASUREMENTS

Do = Outside Diameter  
d = Wire diameter  
Sh = Approx. Solid Height  
Lo = Free Length  
L<sub>1</sub> = Loaded length  
P<sub>1</sub> = Load at L<sub>1</sub>  
R = Spring Rate  
Dh = Hole Diameter  
Dr = Rod Diameter

## RESSORTS DE COMPRESSION HAUTE PERFORMANCE

Ces ressorts offrent des performances élevées, dans des dimensions non disponibles dans nos gammes Corde à Piano et Inox.

### MATERIAUX

Selon la disponibilité du stock, les matériaux fournis sont le chrome vanadium ou le chrome silicium. Pas recommandé pour les applications où la température excède 220°C (425°F).

### ENROULEMENT

Enroulement à droite (RH) ou à gauche (LH), comme indiqué sur le tableau suivant, afin de permettre l'usage des ressorts en tandem.

### EXTREMITES

Les références commençant par C00168, C00170, C00186, C00200, C00257, C00309, C00347, C00395 ont les extrémités rapprochées uniquement. Les autres les ont rapprochées et meulées.

### TOLERANCES DES DIAMETRES INT. & EXT.

Cette gamme est conçue pour travailler dans un logement et autour d'un axe, comme spécifié dans le tableau.

### CHARGES ET RAIDEURS

La raideur n'est donnée que pour référence. La charge (P) à L<sub>1</sub> est +/-10%.

### ETAT DE SURFACE

Finition standard huilée. Finitions spéciales sur demande.

### INDEX DES MESURES

Do = Diamètre extérieur  
d = Diamètre du fil  
Sh = Hauteur à bloc approx.  
Lo = Longueur libre  
L<sub>1</sub> = Longueur en charge  
P<sub>1</sub> = Charge à L<sub>1</sub>  
R = Raideur  
Dh = Diamètre de logement  
Dr = Diamètre d'arbre

## MUELLES/RESORTES DE ALTO RENDIMIENTO

Estos muelles/resortes proporcionan un alto rendimiento en aquellas dimensiones fuera del rango de nuestros muelles/resortes standard.

### MATERIALES

Se suministran en cromo-vanadio o cromo-silicio, en función de disponibilidad de material. No se recomienda en aplicaciones las que se superen los 220°C (425°F).

### ESPIRAS

A derechas o izquierdas como se muestra en las tablas (para permitir uso en tandem).

### EXTREMOS

Referencias comenzando con C00168, C00170, C00186, C00200, C00257, C00309, C00347 y C00395 sólo refrentadas. Resto refrentadas y rectificadas.

### TOLERANCIAS DI Y DE

Los muelles/resortes de alto rendimiento están diseñados para entrar en el alojamiento y ejes de la tabla.

### CARGAS Y COEFICIENTES COMPRESIÓN

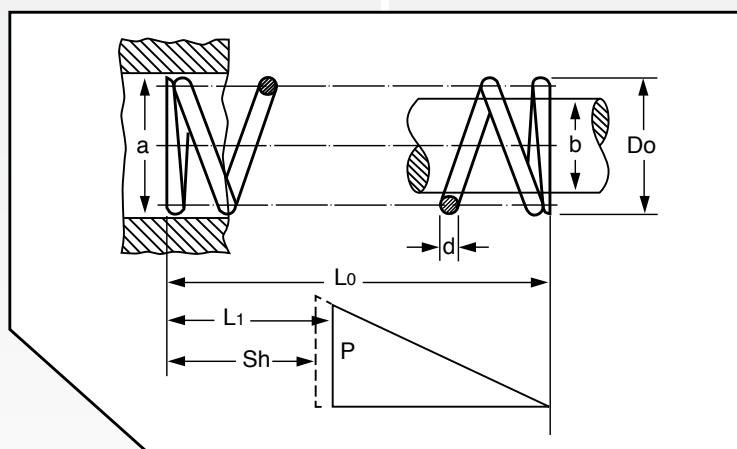
Utilizar el coeficiente de compresión como referencia solamente. Fuerza (P) a L<sub>1</sub> +/-10%.

### ACABADO SUPERFICIAL

Ligeramente lubricados. Acabados especiales bajo pedido.

### CLAVES DE DIMENSIONES

Do = Diámetro Externo  
d = Diámetro hilo  
Sh = Longitud bloque  
Lo = Longitud libre  
L<sub>1</sub> = Longitud cargada  
P<sub>1</sub> = Carga a L<sub>1</sub>  
R = Coeficiente carga  
Dh = Diámetro alojamiento  
Dr = Diámetro eje



### United Kingdom

**Tel:** (44) 1386 443366  
**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363  
**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542  
**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04  
**E-mail:** info@asraymond.de

## HOCHLEISTUNG DRUCKFEDERN

Diese Druckfedern bieten eine Hochleistung bei Länge und Durchmesser, die bei unseren standard Federn nicht zur Verfügung stellen.

### WERKSTOFFEN

Chrom Vanadium oder Chrom Silizium, abhängig von Verfügbarkeit. Nicht geeignet für Arbeitstemperaturen höher als 220°C (425°F).

### AUSFÜHRUNG

Rechts- oder Linksgewickelt, nach nächsten Tabellen (ermöglicht Tandem Ausführung der Federn).

### FEDERNDEN

Teile anfangen mit C00168, C00170, C00186, C00200, C00257, C00309, C00347, C00395 nur angelegt. Andere, angelegt und geschliffen.

### AD UND ID TOLERANZEN

Geignet für in Tabellen angegebenen Hülsen- und Dordurchmessern.

### FEDERKRAFT UND FEDERRATE

Federrate nur als Referenz berücksichtigen.. Federkraft (p) bei L<sub>1</sub> ist +/-10%.

### OBERFLÄCHE

Standardmäßig leicht eingelötet. Sondern Behandlungen verfügbar.

### KENNZEICHNEN DER ABMESSUNGEN

Do = Äußerer Windungsdurchmesser  
d = Drahtdurchmesser  
Sh = Blocklänge der Feder  
Lo = Länge der unbelasteten Feder  
L<sub>1</sub> = Länge der belasteten Feder  
P<sub>1</sub> = Federkraft bei Federlänge L<sub>1</sub>  
R = Federrate  
Dh = Hülsendurchmesser  
Dr = Dordurchmesser

## MOLLE A COMPRESSIONE HIGH PERFORMANCE

Questi articoli offrono alte prestazioni con dimensioni non disponibili nelle nostre molle standard in filo armonico o acciaio inossidabile.

### MATERIALI

Sono fornibili sia in cromo vanadio che in cromo silicio, la scelta sarà basata a seconda della disponibilità al momento della spedizione. Si suggerisce di non utilizzarle per applicazioni che superano i 220°C (425°F).

### AVVOLGIMENTO

Avvolgimento destro o sinistro secondo le seguenti tabelle ( per permettere alle molle di essere utilizzate in tandem se richiesto)

### ESTREMITÀ

Codici che iniziano per C00168, C00170, C00186, C00200, C00257, C00309, C00347, C00395 sono solo squadrati. Tutti gli altri codici sono squadrati e rettificati.

### TOLLERANZE DIAMETRI

Le molle high performance sono progettate per lavorare all'interno di una sede o all'esterno di un perno come specificato nella tabella.

### CARICHI

Il carico flessionale unitario è calcolato e deve essere utilizzato solo come riferimento. Carico (P) a L<sub>1</sub> +/- 10%

### FINITURE

Da standard la molla è oliata. Finiture speciali fornibili su richiesta.

### LEGENDA

Do = Diametro Esterno  
d = Diametro Filo  
Sh = Lunghezza a blocco  
(misura approssimativa)  
Lo = Lunghezza Libera  
L<sub>1</sub> = Lunghezza minima di lavoro  
P<sub>1</sub> = Carico a L<sub>1</sub>  
R = Carico flessionale unitario  
Dh = Diametro sede  
Dr = Diametro perno

## MOLAS DE COMPRESSÃO DE ALTA RENTABILIDADE

Esses itens oferecem alta rentabilidade em dimensões não oferecidas em fio corda de piano ou aço inox .



### MATERIAL

Podemos fornecer em aço cromo vanádio ou silício, baseado na disponibilidade no embarque. Não recomendamos para temperaturas acima de 220 graus celcius (425 graus F).

### SENTIDO DO ENROLAMENTO

Direito ou esquerdo, consultar tabela.( Permitir molas para serem usadas apertadas quando necessário)

### EXTREMIDADES

Peças que começam com C00168, C00170, C00186, C00200, C00257, C00309, C00347, C00395 , São em esquadro. Todas as outras são em esquadro e retificadas.

### DIAMETROS INTERNOS E EXTERNOS (TOLERANCIAS )

Essa molas são projetadas para entrarem nos furos e hastes conforme tabela.

### CARGAS E CONSTANTES

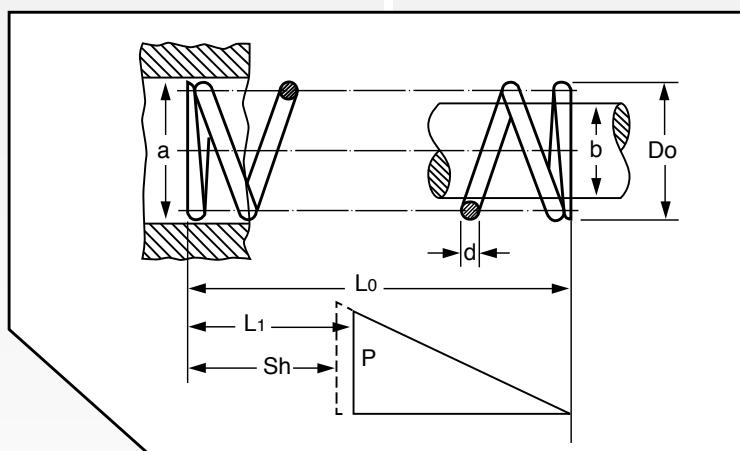
A constante é calculada e deverá ser usada como referência: Carga (P) em L<sub>1</sub> esta em + ou - 10%.

### SUPERFÍCIE

Oleada ou sob consulta.

### LEGENDA

Do = Diam externo  
d = Diam do fio  
Sh = Approx. Solido  
Lo = Comprimento livre  
L<sub>1</sub> = Comp min de trabalho  
P<sub>1</sub> = Força em L<sub>1</sub>  
R = Constante  
Dh = Diâmetro do Orifício  
Dr = Diâmetro do Eixo



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



## HIGH PERFORMANCE COMPRESSION SPRINGS



Part Number	L/R	Do (mm)	d (mm)	L (mm)	a (mm)	b (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (mm)	R (N/mm)
C00168003003				3.2			2.2	1.6		2.5
C00168003004				4.0			2.8	2.0		2.0
C00168003005				5.0			3.4	2.5		1.5
C00168003006				6.3			4.3	3.1		1.2
C00168003008	LH	1.68	0.25	8.0		1.1	5.5	4.0	2.45	1.0
C00168003010				10.0			6.8	5.0		0.8
C00168003013				12.5			8.5	6.2		0.6
C00168003016				16.0			11	8.0		0.5
C00168003020				20.0			13.7	10.0		0.4
C00168003025				25.0		1.8	17	12.5		0.3
C00170003003				3.2			2.5	2.1		6.4
C00170003004				4.0			3.1	2.6		5.0
C00170003005				5.0			3.9	3.2		3.9
C00170003006				6.3			4.9	4.1		3.2
C00170003008	RH	1.70	0.32	8.0			6.2	5.2	4.41	2.5
C00170003010				10.0			7.7	6.4		1.9
C00170003013				12.5		1.0	9.7	8.0		1.6
C00170003016				16.0			12.5	10.4		1.3
C00170003020				20.0			15.6	13.0		1.0
C00170003025				25.0			19.3	16.0		0.8
C00186004010				10.0			8.3	7.3		4.6
C00186004013	LH	1.86	0.4	12.5			10.5	9.3	7.85	3.9
C00186004016				16.0			13.5	12.0		3.1
C00186004020				20.0			16.9	15.0		2.5
C00188003003				3.2			2.2	1.6		3.1
C00188003004				4.0			2.8	2.0		2.5
C00188003005				5.0			3.4	2.5		2.0
C00188003006				6.3			4.3	3.1		1.6
C00188003008	RH	1.88	0.28	8.0		1.3	5.5	4.0	3.14	1.3
C00188003010				10.0			6.8	5.0		1.0
C00188003013				12.5			8.5	6.2		0.8
C00188003016				16.0		2.0	11	8.0		0.6
C00188003020				20.0			13.7	10.0		0.5
C00188003025				25.0			17	12.5		0.4
C00190004010				10.0			7.7	6.4		2.4
C00190004013				12.5			9.7	8.0		1.9
C00190004016				16.0			12.5	10.4		1.6
C00190004020		1.90	0.36	20.0		1.1	15.6	13.0	5.49	1.2
C00190004025				25.0			19.3	16.0		1.0
C00190004032				32.0			24.9	20.8		0.8
C00190004040				40.0			31.2	26.0		0.6
C00200003006				6.3			3.9	2.5		0.9
C00200003008				8.0			5	3.2		0.7
C00200003010				10.0			6.2	4.0		0.6
C00200003013	LH	2.00	0.25	12.5	2.1	1.4	7.7	5.0	2.16	0.4
C00200003016				16.0			10	6.4		0.4
C00200003020				20.0			12.5	8.0		0.3
C00200003025				25.0			15.4	10.0		0.2
C00200003032				32.0			20	13.0		0.2
C00208005003				3.2			2.7	2.4		19.5
C00208005004				4.0			3.4	3.0		15.6
C00208005005				5.0			4.2	3.8		12.5
C00208005006		2.08	0.45	6.3			5.3	4.7		9.7
C00208005008				8.0		1.1	6.7	6.0	9.81	7.8
C00208005010				10.0			8.3	7.3		5.8
C00208005013				12.5			10.5	9.3		4.9
C00208005016				16.0			13.5	12.0		3.9
C00208005020				20.0			16.9	15.0		3.1
C00212004004		2.12	0.4	4.0			3.1	2.6		7.8
C00212004005				5.0		2.3	3.9	3.2		6.1
C00212004006				6.3			4.9	4.1		5.0
C00212004008				8.0			6.2	5.2		3.9
C00212004010				10.0			7.7	6.4		3.0
C00212004013				12.5		1.3	9.7	8.0	6.86	2.4
C00212004016	RH			16.0			12.5	10.4		1.9
C00212004020				20.0			15.6	13.0		1.6
C00212004025				25.0			19.3	16.0		1.2
C00212004032				32.0			24.9	20.8		1.0
C00212004040				40.0			31.2	26.0		0.8
C00214003003		2.14	0.32	3.2		1.4	2.2	1.6	3.92	3.9
C00214003004				4.0			2.8	2.0		3.1

**HIGH PERFORMANCE COMPRESSION SPRINGS**

Part Number	L/R	Do (mm)	d (mm)	L (mm)	a (mm)	b (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (mm)	R (N/mm)
C00214003005				5.0			3.4	2.5		2.5
C00214003006				6.3			4.3	3.1		2.0
C00214003008				8.0			5.5	4.0		1.6
C00214003010		2.14	0.32	10.0	2.3	1.4	6.8	5.0	3.92	1.2
C00214003013				12.5			8.5	6.2		1.0
C00214003016				16.0			11	8.0		0.8
C00214003020				20.0			13.7	10.0		0.6
C00214003025				25.0			17	12.5		0.5
C00232005004				4.0			3.4	3.0		19.5
C00232005005	RH			5.0			4.2	3.8		15.6
C00232005006				6.3			5.3	4.7		12.2
C00232005008				8.0			6.7	6.0		9.7
C00232005010		2.32	0.5	10.0		1.3	8.3	7.3	12.26	7.2
C00232005013				12.5			10.5	9.3		6.1
C00232005016				16.0			13.5	12.0		4.9
C00232005020				20.0			16.9	15.0		3.9
C00232005025				25.0			21	18.7		3.1
C00240003040				40.0			22	12.0		0.1
C00240003050			0.25	50.0		1.8	27.5	14.0	1.77	0.1
C00240003063				63.0			35	18.0		0.1
C00240005013				12.5			9.7	8.0		3.1
C00240005016		2.40		16.0			12.5	10.4		2.5
C00240005020	LH		0.45	20.0	2.5	1.4	15.6	13.0	8.83	2.0
C00240005025				25.0			19.3	16.0		1.6
C00240005032				32.0			24.9	20.8		1.3
C00240005040				40.0			31.2	26.0		1.0
C00242004003				3.2			2.2	1.6		4.9
C00242004004				4.0			2.8	2.0		3.9
C00242004005				5.0			3.4	2.5		3.1
C00242004006				6.3			4.3	3.1		2.5
C00242004008				8.0			5.5	4.0		2.0
C00242004010		2.42	0.36	10.0		1.6	6.8	5.0	4.90	1.5
C00242004013				12.5			8.5	6.2		1.2
C00242004016				16.0			11	8.0		1.0
C00242004020				20.0			13.7	10.0		0.8
C00242004025				25.0			17	12.5		0.6
C00242004032				32.0			22	16.0		0.5
C00242004040				40.0			27.5	20.0		0.4
C00242004050				50.0			34	25.0		0.3
C00257003008				8.0			5	3.2		1.2
C00257003010				10.0			6.2	4.0		0.9
C00257003013				12.5			7.7	5.0		0.7
C00257003016		2.57	0.32	16.0	2.7	1.8	10	6.4	3.53	0.6
C00257003020				20.0			12.5	8.0		0.5
C00257003025				25.0			15.4	10.0		0.4
C00257003032	RH			32.0			20	13.0		0.3
C00257003040				40.0			25	16.0		0.2
C00262005005				5.0			4.2	3.8		19.9
C00262005006				6.3			5.3	4.7		15.6
C00262005008				8.0			6.7	6.0		12.5
C00262005010	2.62	0.56		10.0		1.4	8.3	7.3	15.69	9.2
C00262005013				12.5			10.5	9.3		7.8
C00262005016				16.0			13.5	12.0		6.2
C00262005020				20.0			16.9	15.0		5.0
C00262005025				25.0			21	18.7		4.0
C00268003004				4.0			2.2	1.2		1.2
C00268003016				16.0			9	4.8		0.3
C00268003020				20.0			11	6.0		0.2
C00268003025	2.68	0.28		25.0	2.8	2.0	13.8	7.0	2.16	0.2
C00268003032				32.0			18	9.5		0.2
C00268003040				40.0			22	12.0		0.1
C00268003050				50.0			27.5	14.0		0.1
C00268003063				63.0			35	18.0		0.1
C00270004005				5.0			3.4	2.5		3.9
C00270004006				6.3			4.3	3.1		3.1
C00270004008				8.0			5.5	4.0		2.5
C00270004010		2.70	0.4	10.0		1.8	6.8	5.0	6.18	1.9
C00270004013				12.5			8.5	6.2		1.5
C00270004016				16.0			11	8.0		1.2
C00270004020				20.0			13.7	10.0		1.0
C00270004025				25.0			17	12.5		0.8



**HIGH PERFORMANCE COMPRESSION SPRINGS**


Part Number	L/R	Do (mm)	d (mm)	L (mm)	a (mm)	b (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (mm)	R (N/mm)
C00270004032	RH	2.70	0.4	32.0	1.8	2.8	22	16.0	6.18	0.6
C00270004040				40.0			27.5	20.0		0.5
C00270004050				50.0			34	25.0		0.4
C00270005005				5.0			3.9	3.2		9.5
C00270005006				6.3			4.9	4.1		7.8
C00270005008				8.0			6.2	5.2		6.1
C00270005010				10.0			7.7	6.4		4.8
C00270005013				12.5			9.7	8.0	10.79	3.8
C00270005016				16.0			12.5	10.4		3.1
C00270005020				20.0			15.6	13.0		2.4
C00270005025				25.0			19.3	16.0		1.9
C00270005032				32.0			24.9	20.8		1.5
C00270005040				40.0			31.2	26.0		1.2
C00284004008	LH	2.84	0.36	8.0	3.0	2.0	5	3.2	4.41	1.5
C00300003004				4.0			2.2	1.2		1.5
C00300003005				5.0			2.8	1.4		1.2
C00300003006				6.3			3.5	1.8		1.0
C00300003008				8.0			4.4	2.4		0.8
C00300003010				10.0			5.5	3.0		0.6
C00300003013				12.5			6.9	4.5		0.5
C00300003016				16.0		2.2	9	4.8	2.75	0.4
C00300003020				20.0			11	6.0		0.3
C00300003025				25.0			13.8	7.0		0.2
C00300003032				32.0			18	9.5		0.2
C00300003040				40.0			22	12.0		0.2
C00300003050				50.0			27.5	14.0		0.1
C00300003063				63.0			35	18.0		0.1
C00300005016	LH	3.00	0.56	16.0	3.2	1.8	12.5	10.4	13.73	3.9
C00300005020				20.0			15.6	13.0		3.1
C00300005025				25.0			19.3	16.0		2.4
C00300005032				32.0			24.9	20.8		1.9
C00300005040				40.0			31.2	26.0		1.6
C00300006005				5.0			4.2	3.8		24.9
C00300006006				6.3			5.3	4.7		19.5
C00300006008				8.0			6.7	6.0		15.6
C00300006010				10.0			8.3	7.3		11.5
C00300006013				12.5			10.5	9.3		9.7
C00300006016				16.0		1.6	13.5	12.0	19.61	7.8
C00300006020				20.0			16.9	15.0		6.2
C00300006025				25.0			21	18.7		4.9
C00300006032				32.0			27	24.0		3.9
C00300006040				40.0			33.7	30.0		3.1
C00300006050				50.0			42.1	37.5		2.5
C00300006063				63.0			52.9	47.0		1.9
C00309003010	LH	3.09	0.25	10.0	3.3	2.5	5	2.0	1.23	0.2
C00309003013				12.5			6.2	2.5		0.2
C00309003016				16.0			8	3.2		0.2
C00309003020				20.0			10	4.0		0.1
C00309003025				25.0			12.5	5.0		0.1
C00309003032				32.0			16	6.4		0.1
C00309003040				40.0			20	8.0		0.1
C00320004010				10.0			6.2	4.0		1.4
C00320004013				12.5			7.7	5.0		1.1
C00320004016				16.0			10	6.4		0.9
C00320004020				20.0		2.3	12.5	8.0	5.49	0.7
C00320004025				25.0			15.4	10.0		0.6
C00320004032				32.0			20	13.0		0.5
C00320004040				40.0			25	16.0		0.4
C00330007005	LH	3.30	0.7	5.0	3.6	1.8	4.2	3.8	24.52	31.1
C00330007006				6.3			5.3	4.7		24.3
C00330007008				8.0			6.7	6.0		19.5
C00330007010				10.0			8.3	7.3		14.4
C00330007013				12.5			10.5	9.3		12.2
C00330007016				16.0			13.5	12.0		9.7
C00330007020				20.0			16.9	15.0		7.8
C00330007025				25.0			21	18.7		6.2
C00330007032				32.0			27	24.0		4.9
C00330007040				40.0			33.7	30.0		3.9
C00330007050				50.0			42.1	37.5		3.1
C00330007063				63.0			52.9	47.0		2.4
C00332005006				3.32			2.3	4.3	9.81	4.9

**HIGH PERFORMANCE COMPRESSION SPRINGS**

Part Number	L/R	Do (mm)	d (mm)	L (mm)	a (mm)	b (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (mm)	R (N/mm)
C00332005008				8.0			5.5	4.0		3.9
C00332005010				10.0			6.8	5.0		3.1
C00332005013				12.5			8.5	6.2		2.5
C00332005016				16.0			11	8.0		2.0
C00332005020	LH	3.32	0.5	20.0		2.3	13.7	10.0	9.81	1.6
C00332005025				25.0			17	12.5		1.2
C00332005032				32.0			22	16.0		1.0
C00332005040				40.0			27.5	20.0		0.8
C00332005050				50.0			34	25.0		0.6
C00336006006				6.3			4.9	4.1		12.7
C00336006008				8.0			6.2	5.2		10.0
C00336006010				10.0			7.7	6.4		7.8
C00336006013				12.5			9.7	8.0		6.2
C00336006016	RH	3.36	0.63	16.0			12.5	10.4		5.0
C00336006020				20.0			15.6	13.0	17.65	4.0
C00336006025				25.0			19.3	16.0		3.1
C00336006032				32.0	3.6		24.9	20.8		2.5
C00336006040				40.0			31.2	26.0		2.0
C00336006050				50.0			38.7	32.0		1.6
C00336006063				63.0			48.8	40.5		1.2
C00337004005				5.0			2.8	1.4		1.6
C00337004006				6.3			3.5	1.8		1.3
C00337004008				8.0			4.4	2.4		1.0
C00337004010				10.0			5.5	3.0		0.8
C00337004013				12.5			6.9	4.5		0.6
C00337004016	LH	3.37	0.36	16.0			9	4.8	3.53	0.5
C00337004020				20.0			11	6.0		0.4
C00337004025				25.0			13.8	7.0		0.3
C00337004032				32.0			18	9.5		0.3
C00337004040				40.0			22	12.0		0.2
C00337004050				50.0			27.5	14.0		0.2
C00337004063				63.0			35	18.0		0.1
C00347003010				10.0			5	2.0		0.3
C00347003013				12.5			6.2	2.5		0.2
C00347003016				16.0			8	3.2		0.2
C00347003020		3.47	0.3	20.0	3.7	2.8	10	4.0	1.57	0.2
C00347003025				25.0			12.5	5.0		0.1
C00347003032				32.0			16	6.4		0.1
C00347003040				40.0			20	8.0		0.1
C00347003050	RH			50.0			25	10.0		0.1
C00355005013				12.5			7.7	5.0		1.4
C00355005016				16.0			10	6.4		1.1
C00355005020				20.0			12.5	8.0		0.9
C00355005025		3.55	0.45	25.0	3.8	2.5	15.4	10.0	6.86	0.7
C00355005032				32.0			20	13.0		0.6
C00355005040				40.0			25	16.0		0.5
C00355005050				50.0			31	20.0		0.4
C00355005063				63.0			39	25.0		0.3
C00376007032				32.0			24.9	20.8		3.1
C00376007040		3.76	0.7	40.0			31.2	26.0	22.07	2.5
C00376007050				50.0			38.7	32.0		1.9
C00376007063				63.0			48.8	40.5		1.6
C00377005006				6.3			4.3	3.1		6.1
C00377005008				8.0			5.5	4.0		4.9
C00377005010				10.0			6.8	5.0		3.8
C00377005013				12.5			8.5	6.2		3.1
C00377005016		3.77	0.56	16.0			11	8.0		2.5
C00377005020				20.0			13.7	10.0	12.26	1.9
C00377005025				25.0	4.0		17	12.5		1.5
C00377005032	LH			32.0			22	16.0		1.2
C00377005040				40.0			27.5	20.0		1.0
C00377005050				50.0			34	25.0		0.8
C00377005063				63.0			43	31.0		0.6
C00377005080				80.0			55	40.0		0.5
C00380004005				5.0			2.8	1.4		2.0
C00380004006				6.3			3.5	1.8		1.6
C00380004008				8.0			4.4	2.4		1.2
C00380004010		3.80	0.4	10.0			2.8	5.5	4.41	1.0
C00380004013				12.5			6.9	4.5		0.8
C00380004016				16.0			9	4.8		0.6
C00380004020				20.0			11	6.0		0.5



## HIGH PERFORMANCE COMPRESSION SPRINGS



Part Number	L/R	Do (mm)	d (mm)	L (mm)	a (mm)	b (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (mm)	R (N/mm)
C00380004025				25.0			13.8	7.0		0.4
C00380004032				32.0			18	9.5		0.3
C00380004040	LH	3.80	0.4	40.0	4.0	2.8	22	12.0	4.41	0.2
C00380004050				50.0			27.5	14.0		0.2
C00380004063				63.0			35	18.0		0.2
C00380004080				80.0			44	24.0		0.1
C00395003010				10.0			5	2.0		0.4
C00395003013				12.5			6.2	2.5		0.3
C00395003016				16.0			8	3.2		0.2
C00395003020	RH	3.95	0.32	20.0	4.3	3.2	10	4.0	1.96	0.2
C00395003025				25.0			12.5	5.0		0.2
C00395003032				32.0			16	6.4		0.1
C00395003040				40.0			20	8.0		0.1
C00395003050				50.0			25	10.0		0.1
C00400005013				12.5			7.7	5.0		1.8
C00400005016				16.0			10	6.4		1.5
C00400005020				20.0			12.5	8.0		1.2
C00400005025	LH	4.00	0.5	25.0	4.2	2.8	15.4	10.0	8.83	0.9
C00400005032				32.0			20	13.0		0.7
C00400005040				40.0			25	16.0		0.6
C00400005050				50.0			31	20.0		0.5
C00400005063				63.0			39	25.0		0.4
C00416009006				6.3			5.3	4.7		38.9
C00416009008				8.0			6.7	6.0		31.1
C00416009010				10.0			8.3	7.3		23.1
C00416009013				12.5			10.5	9.3		19.5
C00416009016	4.16	0.9	16.0	16.0	2.3	13.5	12.0		39.23	15.6
C00416009020				20.0			16.9	15.0		12.5
C00416009025				25.0			21	18.7		9.9
C00416009032				32.0			27	24.0		7.8
C00416009040				40.0			33.7	30.0		6.2
C00416009050				50.0			42.1	37.5		5.0
C00416009063				63.0			52.9	47.0		3.9
C00420005006				6.3			3.5	1.8		2.0
C00420005008				8.0			4.4	2.4		1.5
C00420005010				10.0			5.5	3.0		1.2
C00420005013				12.5			6.9	4.5		1.0
C00420005016				16.0			9	4.8		0.8
C00420005020	RH	4.20	0.45	20.0	3.2	11	6.0		5.49	0.6
C00420005025				25.0			13.8	7.0		0.5
C00420005032				32.0			18	9.5		0.4
C00420005040				40.0			22	12.0		0.3
C00420005050				50.0			27.5	14.0		0.2
C00420005063				63.0			35	18.0		0.2
C00420005080				80.0	4.5	44	24.0			0.2
C00425008006				6.3			4.9	4.1		19.8
C00425008008				8.0			6.2	5.2		15.6
C00425008010				10.0			7.7	6.4		12.1
C00425008013				12.5			9.7	8.0		9.7
C00425008016				16.0			12.5	10.4		7.8
C00425008020	4.25	0.8	20.0		2.5	15.6	13.0		27.46	6.2
C00425008025				25.0			19.3	16.0		4.8
C00425008032				32.0			24.9	20.8		3.9
C00425008040				40.0			31.2	26.0		3.1
C00425008050				50.0			38.7	32.0		2.4
C00425008063				63.0			48.8	40.5		1.9
C00426006006				6.3			4.3	3.1		7.8
C00426006008				8.0			5.5	4.0		6.3
C00426006010				10.0			6.8	5.0		4.9
C00426006013				12.5			8.5	6.2		3.9
C00426006016				16.0			11	8.0		3.1
C00426006020	LH	4.26	0.63	20.0	2.8	13.7	10.0		15.69	2.5
C00426006025				25.0			17	12.5		2.0
C00426006032				32.0			22	16.0		1.6
C00426006040				40.0			27.5	20.0		1.3
C00426006050				50.0			34	25.0		1.0
C00426006063				63.0			43	31.0		0.8
C00426006080				80.0			55	40.0		0.6
C00465010020				20.0			16.9	15.0		15.6
C00465010025		4.65	1	25.0	5.0	2.5	21	18.7	49.04	12.4
C00465010032				32.0			27	24.0		9.7

**HIGH PERFORMANCE COMPRESSION SPRINGS**

Part Number	L/R	Do (mm)	d (mm)	L (mm)	a (mm)	b (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (mm)	R (N/mm)
C00465010040	LH	4.65	1	40.0			33.7	30.0		7.8
C00465010050				50.0	5.0	2.5	42.1	37.5	49.04	6.2
C00465010063				63.0			52.9	47.0		4.9
C00470007008	LH			8.0			5.5	4.0		7.8
C00470007010				10.0			6.8	5.0		6.1
C00470007013				12.5			8.5	6.2		4.9
C00470007016	LH			16.0			11	8.0		3.9
C00470007020				20.0			13.7	10.0		3.1
C00470007025				25.0		3.2	17	12.5	19.61	2.5
C00470007032	RH	4.70	0.7	32.0			22	16.0		2.0
C00470007040				40.0			27.5	20.0		1.6
C00470007050				50.0			34	25.0		1.2
C00470007063	RH			63.0	5.0		43	31.0		1.0
C00470007080				80.0			55	40.0		0.8
C00470007100				100.0			68	50.0		0.6
C00480009020	LH			20.0			15.6	13.0		8.0
C00480009025				25.0			19.3	16.0		6.2
C00480009032				32.0			24.9	20.8		5.0
C00480009040	LH	4.80	0.9	40.0		2.8	31.2	26.0	35.31	4.0
C00480009050				50.0			38.7	32.0		3.1
C00480009063				63.0			48.8	40.5		2.5
C00480009080	LH			80.0			62.4	52.0		2.0
C00494004013				12.5			6.2	2.5		0.5
C00494004016				16.0			8	3.2		0.4
C00494004020	LH			20.0			10	4.0		0.3
C00494004025				25.0	5.2	4.0	12.5	5.0	3.14	0.3
C00494004032				32.0			16	6.4		0.2
C00494004040	LH			40.0			20	8.0		0.2
C00494004050				50.0			25	10.0		0.1
C00494004063				63.0			31	12.6		0.1
C00510007016	LH			16.0			10	6.4		2.3
C00510007020				20.0			12.5	8.0		1.8
C00510007025				25.0			15.4	10.0		1.4
C00510007032	LH			32.0			20	13.0		1.1
C00510007040				40.0	5.4	3.6	25	16.0	13.73	0.9
C00510007050				50.0			31	20.0		0.7
C00510007063	LH			63.0			39	25.0		0.6
C00510007080				80.0			50	32.0		0.5
C00510007100				100.0			62	40.0		0.4
C00512011006	LH			6.3			5.3	4.7		61.3
C00512011008				8.0			6.7	6.0		49.0
C00512011010				10.0			8.3	7.3		36.3
C00512011013	LH			12.5			10.5	9.3		30.7
C00512011016				16.0			13.5	12.0		24.5
C00512011020				20.0	5.6	2.8	16.9	15.0	61.78	19.6
C00512011025	LH			25.0			21	18.7		15.6
C00512011032				32.0			27	24.0		12.3
C00512011040				40.0			33.7	30.0		9.8
C00512011050	LH			50.0			42.1	37.5		7.8
C00512011063				63.0			52.9	47.0		6.1
C00512011080				80.0			67.4	60.0		4.9
C00640008025	LH			25.0			15.4	10.0		2.2
C00640008032				32.0			20	13.0		1.8
C00640008040				40.0			25	16.0		1.4
C00640008050	LH	6.40	0.8	50.0	6.8	4.5	31	20.0	21.58	1.1
C00640008063				63.0			39	25.0		0.9
C00640008080				80.0			50	32.0		0.7
C00640008100	LH			100.0			62	40.0		0.6
C00640008125				125.0			77	50.0		0.4
C00660014008	RH			8.0			6.7	6.0		77.8
C00660014010				10.0			8.3	7.3		57.7
C00660014013				12.5			10.5	9.3		48.7
C00660014016	RH			16.0			13.5	12.0		38.9
C00660014020				20.0			16.9	15.0		31.1
C00660014025				25.0	7.0	3.6	21	18.7	98.07	24.7
C00660014032	RH			32.0			27	24.0		19.5
C00660014040				40.0			33.7	30.0		15.6
C00660014050				50.0			42.1	37.5		12.5
C00660014063	RH			63.0			52.9	47.0		9.7
C00660014080				80.0			67.4	60.0		7.8
C00670007010	LH	6.70	0.7	10.0			5.0	5.5	3.0	13.73



## HIGH PERFORMANCE COMPRESSION SPRINGS



Part Number	L/R	Do (mm)	d (mm)	L (mm)	a (mm)	b (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (mm)	R (N/mm)
C00670007013				12.5			6.9	4.5		2.5
C00670007016				16.0			9	4.8		2.0
C00670007020				20.0			11	6.0		1.5
C00670007025				25.0			13.8	7.0		1.2
C00670007032				32.0			18	9.5		1.0
C00670007040	LH	6.70	0.7	40.0	7.0	5.0	22	12.0	13.73	0.8
C00670007050				50.0			27.5	14.0		0.6
C00670007063				63.0			35	18.0		0.5
C00670007080				80.0			44	24.0		0.4
C00670007100				100.0			55	30.0		0.3
C00670007125				125.0			69	35.0		0.2
C00670007160				160.0			90	48.0		0.2
C00800010025				25.0			15.4	10.0		3.7
C00800010032				32.0			20	13.0		2.9
C00800010040				40.0			25	16.0		2.4
C00800010050	RH	8.00	1	50.0	8.4	5.6	31	20.0	35.31	1.9
C00800010063				63.0			39	25.0		1.5
C00800010080				80.0			50	32.0		1.2
C00800010100				100.0			62	40.0		0.9
C00800010125				125.0			77	50.0		0.7
C00850016016				16.0			12.5	10.4		31.1
C00850016020				20.0			15.6	13.0		24.9
C00850016025				25.0			19.3	16.0		19.4
C00850016032				32.0			24.9	20.8		15.6
C00850016040	LH	8.50	1.6	40.0		5.0	31.2	26.0	109.84	12.5
C00850016050				50.0			38.7	32.0		9.7
C00850016063				63.0			48.8	40.5		7.8
C00850016080				80.0			62.4	52.0		6.2
C00850016100				100.0			77.3	64.0		4.8
C00850016125				125.0			96.7	80.0		3.9
C00860009010				10.0			5.5	3.0		4.8
C00860009013				12.5	9.0		6.9	4.5		3.9
C00860009016				16.0			9	4.8		3.1
C00860009020				20.0			11	6.0		2.4
C00860009025				25.0			13.8	7.0		1.9
C00860009032				32.0			18	9.5		1.5
C00860009040				40.0			22	12.0		1.2
C00860009050	RH	8.60	0.9	50.0		6.3	27.5	14.0	21.58	1.0
C00860009063				63.0			35	18.0		0.8
C00860009080				80.0			44	24.0		0.6
C00860009100				100.0			55	30.0		0.5
C00860009125				125.0			69	35.0		0.4
C00860009160				160.0			90	48.0		0.3
C00860009200				200.0			110	60.0		0.2
C00860009250				250.0			138	70.0		0.2
C00865007025				25.0			12.5	5.0		0.8
C00865007032				32.0			16	6.4		0.6
C00865007040				40.0			20	8.0		0.5
C00865007050	RH	8.65	0.7	50.0	9.1	7.0	25	10.0	9.81	0.4
C00865007063				63.0			31	12.6		0.3
C00865007080				80.0			40	16.0		0.2
C00865007100				100.0			50	20.0		0.2
C00865007125				125.0			62	25.0		0.2
C00990008025				25.0			12.5	5.0		1.0
C00990008032				32.0			16	6.4		0.8
C00990008040				40.0			20	8.0		0.6
C00990008050	RH	9.90	0.8	50.0		8.0	25	10.0	12.26	0.5
C00990008063				63.0			31	12.6		0.4
C00990008080				80.0			40	16.0		0.3
C00990008100				100.0			50	20.0		0.2
C00990008125				125.0	10.5		62	25.0		0.2
C01000013032	LH			32.0			20	13.0		4.6
C01000013040				40.0			25	16.0		3.7
C01000013050				50.0			31	20.0		2.9
C01000013063		10.00	1.25	63.0		7.0	39	25.0		2.3
C01000013080				80.0			50	32.0	54.92	1.8
C01000013100				100.0			62	40.0		1.4
C01000013125				125.0			77	50.0		1.1
C01000013160				160.0			100	64.0		0.9
C01340014016		13.40	1.4	16.0	14.0	10.0	9	4.8		7.8
C01340014020				20.0			11	6.0		6.1

**HIGH PERFORMANCE COMPRESSION SPRINGS**

Part Number	L/R	Do (mm)	d (mm)	L (mm)	a (mm)	b (mm)	L <sub>1</sub> (mm)	Sh (mm)	P <sub>1</sub> (mm)	R (N/mm)
C01340014025				25.0			13.8	7.0		4.9
C01340014032				32.0			18	9.5		3.9
C01340014040				40.0			22	12.0		3.1
C01340014050				50.0			27.5	14.0		2.4
C01340014063				63.0			35	18.0		2.0
C01340014080	LH	13.40	1.4	80.0	14.0	10.0	44	24.0	54.92	1.5
C01340014100				100.0			55	30.0		1.2
C01340014125				125.0			69	35.0		1.0
C01340014160				160.0			90	48.0		0.8
C01340014200				200.0			110	60.0		0.6
C01340014250				250.0			138	70.0		0.5
C01340014320				320.0			180	95.0		0.4
C01380011040				40.0			20	8.0		1.2
C01380011050				50.0			25	10.0		1.0
C01380011063				63.0			31	12.6		0.8
C01380011080	RH	13.80	1.1	80.0	14.6	11.2	40	16.0	24.52	0.6
C01380011100				100.0			50	20.0		0.5
C01380011125				125.0			62	25.0		0.4
C01380011160				160.0			80	32.0		0.3
C01380011200				200.0			100	40.0		0.2



## HEAVY DUTY CV COMPRESSION SPRINGS



The use of high quality chrome alloy steel combines maximum load with long life. Designed to work in a pocket or over a shaft, our SPEC heavy duty springs are ideally suited for applications where high loads are needed, and limited space is available.

### Material

Chrome Silicon as per SV 9254 - rectangular wire with rounded corners.

### Coiled

Right hand.

### Ends

Squared and ground.

### KEY TO DIMENSIONS

d	= Wire Diameter
Lo	= Free Length
L1	= Loaded length
P	= Load at L1
Sh	= Approx. Solid Height
R	= Rod Diameter
H	= Hole Diameter

## RESSORTS DE COMPRESSION A CHARGE ELEVEE

L'utilisation d'acier au chrome de haute qualité marie une force maximale avec une longue durée de vie. Conçus pour travailler dans un logement ou autour d'un axe, nos ressorts à charge élevée SPEC sont parfaitement adaptés pour toutes applications nécessitant des charges élevées dans des encombrements réduits.

### Materiaux

Chrome Silicium selon SV 9254 - Fil rectangulaire avec angles arrondis (méplat).

### Enroulement

A droite.

### Extremites

Rapprochées, meulées.

### INDEX DES MESURES

d	= Diamètre Extérieur
Lo	= Diamètre Intérieur
L1	= Longueur en charge
P	= Charge à L1
Sh	= Hauteur à bloc approximative.
R	= Diamètre de l'axe
H	= Diamètre de logement

## MUELLES EXTRA FUERTE CV

El uso de acero de aleación de cromo de alta calidad combina la carga máxima con una larga vida. Diseñados para trabajar en un espacio reducido o sobre un eje, nuestros muelles SPEC de alto rendimiento son ideales para aplicaciones donde cargas muy fuertes son necesarias y el espacio disponible es limitado.

Pueden consultar los precios desplazando el ratón sobre el recuadro de cantidad.

### Materiales

Cromo Silicio según SV 9254 - alambre rectangular con esquinas redondeadas.

### Espiras

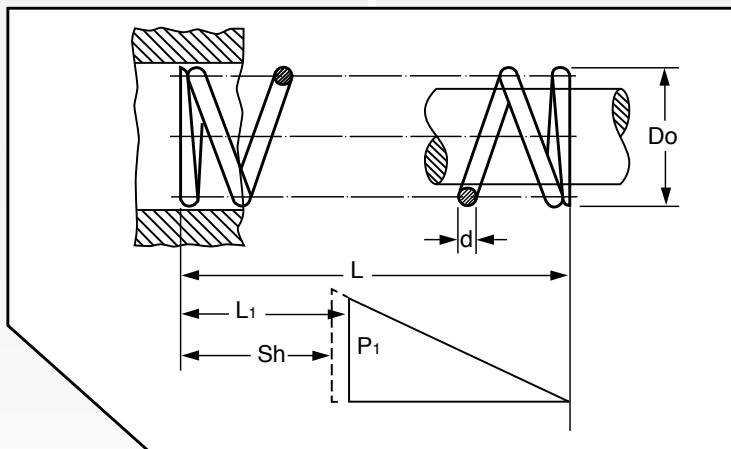
A derecha.

### Extremos

Cuadrado y redondeado.

### LEYENDA

d	= Diámetro del alambre
Lo	= Altura libre
L1	= Altura cargado
P	= Carga en L1
Sh	= aprox. Altura sólida
R	= Diámetro del eje
H	= Diámetro del agujero



### United Kingdom

Tel: (44) 1386 443366  
E-mail: sales@assocspring.co.uk

### France

Tel: (33) 01 30 68 6363  
E-mail: info@ressortsspec.com

### Spain

Tel: (34) 945 147542  
E-mail: ventas@bgespana.com

### Germany

Tel: (49) 6251 93-3252-04  
E-mail: info@asraymond.de

## CV DRUCKFEDERN IN SCHWERER AUSFÜHRUNG

Die Verwendung von hochwertigem Chrom-Aluminiumstahl ermöglicht maximale Lasten und eine lange Nutzungsdauer. Unsere SPEC-Schwerlastfedern sind für Taschen und Schafte gleichermaßen sowie hervorragend für Anwendungen geeignet, in denen schwere Lasten verwendet werden und nur wenig Raum zur Verfügung steht.

### Material

Chrom-Silizium gemäß SV 9254 – rechteckiger Draht mit geschliffenen Kanten.

### Gespult rechts.

### Enden

Viereckig und geschliffen

### ABKÜRZUNGEN – ABMESSUNGEN

d = Drahtdurchmesser

Lo = Freie Länge

L1 = Länge unter Last

P = Last bei L1

Sh = Ungefähr feste Höhe

R = Stangendurchmesser

H = Bohrungsdurchmesser

## COMPRESSIONE PER IMPIEGHI PESANTI CV MOLLE

L'uso della lega di acciaio di cromo di alta qualità combina il carico massimo con una lunga durata. Progettate per funzionare in un alloggiamento o su un albero, le nostre molle SPEC per impieghi pesanti sono idealmente adatte per applicazioni in cui sono necessari carichi elevati e lo spazio disponibile è limitato.

### Materiale

Cromo silicio secondo SV 9254 - filo rettangolare con angoli arrotondati.

### Avvolto in matassa

Destra.

### Estremità

Squadrato e molato.

### LEGENDA DIMENSIONI

d = Diametro del filo

Lo = Lunghezza libera

L1 = Lunghezza di carico

P = Carico a L1

Sh = Altezza piena approssimativa

R = Diametro dello stelo

H = Diametro del foro

## COMPRESSÃO PARA CARGA INTENSIVA VC MOLAS

A utilização aço cromo vanádio de alta qualidade conjuga carga máxima com uma vida útil longa. Concebidas para funcionar numa cavidade ou sobre um eixo, as nossas molas de carga intensiva SPEC adequam-se idealmente a aplicações nas quais são necessárias cargas elevadas, encontrando-se disponível um espaço limitado.

### Material

Silício de acordo com SV 9254 - arame retangular com cantos arredondados.

### Direção do enrolamento

Direito.

### Extremidades

Quadradas e retificadas.

### LEGENDA DAS DIMENSÕES

d = Diâmetro do Arame

Lo = Comprimento Livre

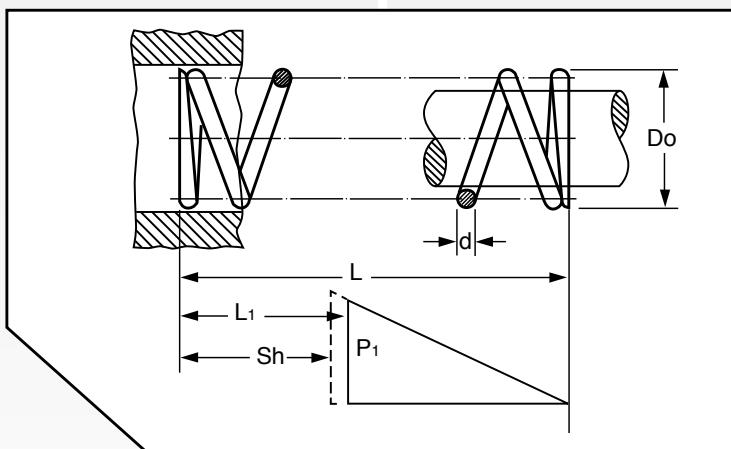
L1 = Comprimento em Carga

P = Carga em L1

Sh = Altura Bloco Aprox.

R = Diâmetro da Haste

H = Diâmetro do Orifício



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



**HEAVY DUTY CV COMPRESSION SPRINGS**

Part Number	H (mm)	R (mm)	L0 (mm)	L1 (mm)	Sh (mm)	P1 (N)	R (N/mm)
CV0375-1000-039				19.05	12.70	66.68	10.50
CV0375-1000-046			25.40	19.05	16.00	93.35	14.70
CV0375-1000-054				20.32	17.78	103.12	20.30
CV0375-1000-059				20.32	19.05	186.69	36.75
CV0375-1200-0039				228.60	152.40	80.01	1.05
CV0375-1200-0046			304.80	228.60	192.02	106.68	1.40
CV0375-1200-0054				243.84	213.36	117.35	1.93
CV0375-1200-0059				243.84	228.60	160.02	2.63
CV0375-1250-039				23.83	16.00	69.34	8.75
CV0375-1250-046			31.75	23.83	20.07	101.24	12.78
CV0375-1250-054				25.40	22.35	108.90	17.15
CV0375-1250-059				25.40	23.88	162.24	25.55
CV0375-1500-039				28.58	19.05	70.01	7.35
CV0375-1500-046	9.53	4.78	38.10	28.58	24.13	111.68	11.73
CV0375-1500-054				30.48	26.67	106.68	14.00
CV0375-1500-059				30.48	28.70	166.69	21.88
CV0375-1750-039				33.35	22.35	71.87	6.48
CV0375-1750-046			44.45	33.35	27.94	112.66	10.15
CV0375-1750-054				35.56	31.24	116.68	13.13
CV0375-1750-059				35.56	33.27	163.35	18.38
CV0375-2000-039				38.10	25.40	68.90	5.43
CV0375-2000-046			50.80	38.10	32.00	111.13	8.75
CV0375-2000-054				40.64	35.56	110.24	10.85
CV0375-2000-059				40.64	38.10	160.02	15.75
CV0375-2500-039				47.63	31.75	72.23	4.55
CV0375-2500-046			63.50	47.63	40.13	102.79	6.48
CV0375-2500-054				50.80	44.45	111.13	8.75
CV0375-2500-059				50.80	47.75	166.69	13.13
CV0375-3000-039				57.15	38.10	70.01	3.68
CV0375-3000-046			76.20	57.15	48.01	100.01	5.25
CV0375-3000-054				60.96	53.34	109.35	7.18
CV0375-3000-059				60.96	57.15	168.02	11.03
CV0500-1000-052				19.05	12.70	122.24	19.25
CV0500-1000-061			25.40	19.05	16.00	172.24	27.13
CV0500-1000-072				20.32	17.78	200.03	39.38
CV0500-1000-084				20.32	19.05	275.59	54.25
CV0500-1200-0052				228.60	152.40	93.34	1.23
CV0500-1200-0061			304.80	228.60	192.02	146.69	1.93
CV0500-1200-0072				243.84	213.36	181.36	2.98
CV0500-1200-0084				243.84	228.60	256.03	4.20
CV0500-1250-052				23.83	16.00	113.72	14.35
CV0500-1250-061			31.75	23.83	20.07	169.19	21.35
CV0500-1250-072				25.40	22.35	202.25	31.85
CV0500-1250-084				25.40	23.88	266.70	42.00
CV0500-1500-052				28.58	19.05	113.35	11.90
CV0500-1500-061			38.10	28.58	24.13	163.35	17.15
CV0500-1500-072				30.48	26.67	197.36	25.90
CV0500-1500-084				30.48	28.70	256.03	33.60
CV0500-1750-052				33.35	22.35	116.55	10.50
CV0500-1750-061			44.45	33.35	27.94	165.11	14.88
CV0500-1750-072	12.70	7.14		35.56	31.24	196.02	22.05
CV0500-1750-084				35.56	33.27	264.48	29.75
CV0500-2000-052				38.10	25.40	122.24	9.63
CV0500-2000-061			50.80	38.10	32.00	166.69	13.13
CV0500-2000-072				40.64	35.56	195.58	19.25
CV0500-2000-084				40.64	38.10	248.92	24.50
CV0500-2500-052				47.63	31.75	125.02	7.88
CV0500-2500-061			63.50	47.63	40.13	166.69	10.50
CV0500-2500-072				50.80	44.45	191.14	15.05
CV0500-2500-084				50.80	47.75	255.59	20.13
CV0500-3000-052				57.15	38.10	116.68	6.13
CV0500-3000-061			76.20	57.15	48.01	170.02	8.93
CV0500-3000-072				60.96	53.34	197.36	12.95
CV0500-3000-084				60.96	57.15	250.70	16.45
CV0500-3500-052				66.68	44.45	116.68	5.25
CV0500-3500-061			88.90	66.68	56.13	155.58	7.00
CV0500-3500-072				71.12	62.23	186.69	10.50
CV0500-3500-084				71.12	66.80	248.92	14.00
CV0500-4500-052				114.30	85.73	57.15	4.03
CV0500-5500-052				139.70	104.78	69.85	122.24
CV0500-6500-052				165.10	123.83	82.55	3.50



**HEAVY DUTY CV COMPRESSION SPRINGS**

Part Number	H (mm)	R (mm)	L0 (mm)	L1 (mm)	Sh (mm)	P1 (N)	R (N/mm)
CV0500-7500-052	12.70	7.14	190.50	142.88	95.25	100.01	2.10
CV0625-1000-069				19.05	13.46	182.25	28.70
CV0625-1000-081			25.40	19.05	16.00	333.38	52.50
CV0625-1000-093				20.32	17.78	376.94	74.20
CV0625-1000-110				20.32	19.05	560.07	110.25
CV0625-1200-0069				228.60	152.40	200.03	2.63
CV0625-1200-0081			304.80	228.60	192.02	346.71	4.55
CV0625-1200-0093				243.84	213.36	320.04	5.25
CV0625-1200-0110				243.84	228.60	480.06	7.88
CV0625-1250-069				23.83	17.27	171.97	21.70
CV0625-1250-081			31.75	23.83	20.07	298.17	37.63
CV0625-1250-093				25.40	22.35	361.16	56.88
CV0625-1250-110				25.40	23.88	486.73	76.65
CV0625-1500-069				28.58	19.05	180.02	18.90
CV0625-1500-081			38.10	28.58	24.13	316.71	33.25
CV0625-1500-093				30.48	26.67	373.38	49.00
CV0625-1500-110				30.48	28.70	493.40	64.75
CV0625-1750-069				33.35	22.35	186.48	16.80
CV0625-1750-081			44.45	33.35	27.94	326.33	29.40
CV0625-1750-093				35.56	31.24	373.38	42.00
CV0625-1750-110				35.56	33.27	482.28	54.25
CV0625-2000-069	15.88	8.74		38.10	25.40	191.14	15.05
CV0625-2000-081			50.80	38.10	32.00	344.49	27.13
CV0625-2000-093				40.64	35.56	369.82	36.40
CV0625-2000-110				40.64	38.10	497.84	49.00
CV0625-2500-069				47.63	31.75	180.58	11.38
CV0625-2500-081			63.50	47.63	40.13	319.48	20.13
CV0625-2500-093				50.80	44.45	377.83	29.75
CV0625-2500-110				50.80	47.75	488.95	38.50
CV0625-3000-069				57.15	38.10	193.36	10.15
CV0625-3000-081			76.20	57.15	48.01	333.38	17.50
CV0625-3000-093				60.96	53.34	373.38	24.50
CV0625-3000-110				60.96	57.15	506.73	33.25
CV0625-3500-069				66.68	44.45	194.47	8.75
CV0625-3500-081			88.90	66.68	56.13	330.60	14.88
CV0625-3500-093				71.12	62.23	379.60	21.35
CV0625-3500-110				71.12	66.80	479.17	26.95
CV0625-4000-069				76.20	50.80	195.58	7.70
CV0625-4000-081			101.60	76.20	64.01	337.82	13.30
CV0625-4000-093				81.28	71.12	384.05	18.90
CV0625-4000-110				81.28	76.20	480.06	23.63
CV0750-1000-075				19.05	12.70	355.60	56.00
CV0750-1000-093			25.40	19.05	16.00	555.63	87.50
CV0750-1000-125				20.32	18.54	960.12	189.00
CV0750-1000-135				20.32	19.05	1244.60	245.00
CV0750-1200-0075				228.60	152.40	320.04	4.20
CV0750-1200-0093			304.80	228.60	192.02	466.73	6.13
CV0750-1200-0125				243.84	213.36	853.44	14.00
CV0750-1200-0135				243.84	228.60	1013.46	16.63
CV0750-1250-075				23.83	16.51	355.03	44.80
CV0750-1250-093			31.75	23.83	20.07	527.00	66.50
CV0750-1250-125				25.40	22.86	977.90	154.00
CV0750-1250-135				25.40	23.88	1222.38	192.50
CV0750-1500-075				28.58	19.81	333.38	35.00
CV0750-1500-093			38.10	28.58	24.13	516.73	54.25
CV0750-1500-125	19.05	9.53		30.48	26.67	920.12	120.75
CV0750-1500-135				30.48	28.70	1186.82	155.75
CV0750-1750-075				33.35	22.35	341.87	30.80
CV0750-1750-093			44.45	33.35	27.94	524.47	47.25
CV0750-1750-125				35.56	31.24	933.45	105.00
CV0750-1750-135				35.56	33.27	1166.81	131.25
CV0750-2000-075				38.10	25.40	333.38	26.25
CV0750-2000-093			50.80	38.10	32.00	533.40	42.00
CV0750-2000-125				40.64	35.56	915.67	90.13
CV0750-2000-135				40.64	38.10	1173.48	115.50
CV0750-2500-075				47.63	31.75	333.38	21.00
CV0750-2500-093			63.50	47.63	40.13	522.29	32.90
CV0750-2500-125				50.80	44.45	889.00	70.00
CV0750-2500-135				50.80	47.75	1111.25	87.50
CV0750-3000-075			76.20	57.15	38.10	336.71	17.68
CV0750-3000-093				57.15	48.01	496.73	26.08



**HEAVY DUTY CV COMPRESSION SPRINGS**

Part Number	H (mm)	R (mm)	L0 (mm)	L1 (mm)	Sh (mm)	P1 (N)	R (N/mm)	
CV0750-3000-125			76.20	60.96	53.34	880.11	57.75	
CV0750-3000-135				60.96	57.15	1080.14	70.88	
CV0750-3500-075				66.68	44.45	322.82	14.53	
CV0750-3500-093			88.90	66.68	56.13	497.84	22.40	
CV0750-3500-125				71.12	62.23	902.34	50.75	
CV0750-3500-135				71.12	66.80	1073.47	60.38	
CV0750-4000-075				76.20	50.80	333.38	13.13	
CV0750-4000-093			101.60	76.20	64.01	488.95	19.25	
CV0750-4000-125				81.28	71.12	889.00	43.75	
CV0750-4000-135				81.28	76.20	1066.80	52.50	
CV0750-4500-075				85.73	57.15	320.04	11.20	
CV0750-4500-093			114.30	85.73	72.14	500.06	17.50	
CV0750-4500-125				91.44	80.01	880.11	38.50	
CV0750-4500-135				91.44	85.85	1060.13	46.38	
CV0750-5000-075	19.05	9.53		95.25	63.50	333.38	10.50	
CV0750-5000-093			127.00	95.25	80.01	500.06	15.75	
CV0750-5000-125				101.60	88.90	866.78	34.13	
CV0750-5000-135				101.60	95.25	1044.58	41.13	
CV0750-5500-075				104.78	69.85	336.15	9.63	
CV0750-5500-093			139.70	104.78	88.14	488.95	14.00	
CV0750-5500-125				111.76	97.79	870.33	31.15	
CV0750-5500-135				111.76	104.90	1051.24	37.63	
CV0750-6000-075				114.30	76.20	333.38	8.75	
CV0750-6000-093			152.40	114.30	96.01	500.06	13.13	
CV0750-6000-125				121.92	106.68	853.44	28.00	
CV0750-6000-135				121.92	114.30	1040.13	34.13	
CV0750-6500-075				165.10	123.83	82.55	339.49	8.23
CV0750-7500-075				190.50	142.88	95.25	316.71	6.65
CV1000-1000-100					19.05	15.24	611.19	96.25
CV1000-1000-115				25.40	19.05	17.27	919.00	144.73
CV1000-1000-158					20.32	18.54	1717.55	338.10
CV1000-1200-0100					228.60	152.40	533.40	7.00
CV1000-1200-0115				304.80	228.60	192.02	866.78	11.38
CV1000-1200-0158					243.84	213.36	1365.50	22.40
CV1000-1200-0188					243.84	228.60	1877.57	30.80
CV1000-1250-100					23.83	17.78	624.08	78.75
CV1000-1250-115				31.75	23.83	20.07	905.61	114.28
CV1000-1250-158					25.40	22.35	1627.98	256.38
CV1000-1500-100					28.58	20.32	621.74	65.28
CV1000-1500-115				38.10	28.58	24.13	896.78	94.15
CV1000-1500-158					30.48	26.67	1600.20	210.00
CV1000-1500-188					30.48	28.70	2133.60	280.00
CV1000-1750-100					33.35	22.35	621.59	56.00
CV1000-1750-115				44.45	33.35	27.94	895.48	80.68
CV1000-1750-158					35.56	31.24	1617.98	182.00
CV1000-2000-100					38.10	25.40	595.63	46.90
CV1000-2000-115				50.80	38.10	32.00	889.00	70.00
CV1000-2000-158	25.40	12.70			40.64	35.56	1550.42	152.60
CV1000-2000-188					40.64	38.10	2062.48	203.00
CV1000-2500-100					47.63	31.75	580.63	36.58
CV1000-2500-115				63.50	47.63	40.13	894.56	56.35
CV1000-2500-158					50.80	44.45	1477.96	116.38
CV1000-2500-188					50.80	47.75	1991.36	156.80
CV1000-3000-100					57.15	38.10	570.07	29.93
CV1000-3000-115				76.20	57.15	48.01	890.11	46.73
CV1000-3000-158					60.96	53.34	1450.85	95.20
CV1000-3000-188					60.96	57.15	1962.91	128.80
CV1000-3500-100					66.68	44.45	563.96	25.38
CV1000-3500-115				88.90	66.68	56.13	890.67	40.08
CV1000-3500-158					71.12	62.23	1418.84	79.80
CV1000-3500-188					71.12	66.80	1941.58	109.20
CV1000-4000-100					76.20	50.80	555.63	21.88
CV1000-4000-115				101.60	76.20	64.01	897.89	35.35
CV1000-4000-158					81.28	71.12	1422.40	70.00
CV1000-4000-188					81.28	76.20	1962.91	96.60
CV1000-4500-100					85.73	57.15	555.07	19.43
CV1000-4500-115				114.30	85.73	72.14	890.11	31.15
CV1000-4500-158					91.44	80.01	1408.18	61.60
CV1000-4500-188					91.44	85.85	1952.24	85.40
CV1000-5000-100				127.00	95.25	63.50	533.40	16.80
CV1000-5000-115					95.25	80.01	872.33	27.48



**HEAVY DUTY CV COMPRESSION SPRINGS**

Part Number	H (mm)	R (mm)	L0 (mm)	L1 (mm)	Sh (mm)	P1 (N)	R (N/mm)
CV1000-5000-158	25.40	12.70	127.00	101.60	88.90	1386.84	54.60
CV1000-5000-188				101.60	95.25	1920.24	75.60
CV1000-5500-100				104.78	69.85	537.85	15.40
CV1000-5500-115			139.70	104.78	88.14	837.33	23.98
CV1000-5500-158				111.76	97.79	1408.18	50.40
CV1000-6000-100				114.30	76.20	533.40	14.00
CV1000-6000-115			152.40	114.30	96.01	833.44	21.88
CV1000-6000-158				121.92	106.68	1365.50	44.80
CV1000-6000-188				121.92	114.30	1920.24	63.00
CV1000-7000-100				133.35	88.90	560.07	12.60
CV1000-7000-115			177.80	133.35	112.01	847.88	19.08
CV1000-7000-158				142.24	124.46	1393.95	39.20
CV1000-8000-100				152.40	101.60	533.40	10.50
CV1000-8000-115			203.20	152.40	128.02	853.44	16.80
CV1000-8000-158				162.56	142.24	1365.50	33.60
CV1250-1000-0115	38.10	44.45		190.50	127.00	800.10	12.60
CV1250-1000-0156			254.00	190.50	160.02	1611.31	25.38
CV1250-1000-0200				203.20	177.80	2275.84	44.80
CV1250-1000-0225				203.20	190.50	3067.05	60.38
CV1250-1200-0115				228.60	152.40	800.10	10.50
CV1250-1200-0156			304.80	228.60	192.02	1653.54	21.70
CV1250-1200-0200				243.84	213.36	2346.96	38.50
CV1250-1200-0225				243.84	228.60	2880.36	47.25
CV1250-1500-115				28.58	21.08	826.77	86.80
CV1250-1500-156			38.10	28.58	24.89	1906.91	200.20
CV1250-1500-200				30.48	26.67	2933.70	385.00
CV1250-1750-115				33.35	22.86	788.64	71.05
CV1250-1750-156			44.45	33.35	27.94	1958.00	176.40
CV1250-1750-200				35.56	31.24	2825.24	317.80
CV1250-2000-115				38.10	25.40	835.66	65.80
CV1250-2000-156			50.80	38.10	32.00	1862.46	146.65
CV1250-2000-200				40.64	36.32	2659.89	261.80
CV1250-2000-225				40.64	38.10	3644.90	358.75
CV1250-2500-115	31.75	15.88		47.63	31.75	800.10	50.40
CV1250-2500-156			63.50	47.63	40.13	1733.55	109.20
CV1250-2500-200				50.80	44.45	2613.66	205.80
CV1250-2500-225				50.80	47.75	3389.31	266.88
CV1250-3000-115				57.15	38.10	800.10	42.00
CV1250-3000-156			76.20	57.15	48.01	1706.88	89.60
CV1250-3000-200				60.96	53.34	2538.98	166.60
CV1250-3000-225				60.96	57.15	3253.74	213.50
CV1250-3500-115				66.68	44.45	777.88	35.00
CV1250-3500-156			88.90	66.68	56.13	1711.33	77.00
CV1250-3500-200				71.12	62.23	2426.97	136.50
CV1250-3500-225				71.12	66.80	3375.98	189.88
CV1250-4000-115				76.20	50.80	782.32	30.80
CV1250-4000-156			101.60	76.20	64.01	1693.55	66.68
CV1250-4000-200				81.28	71.12	2361.18	116.20
CV1250-4000-225				81.28	76.20	3164.84	155.75
CV1250-4500-115				85.73	57.15	800.10	28.00
CV1250-4500-156			114.30	85.73	72.14	1645.21	57.58
CV1250-4500-200				91.44	80.01	2336.29	102.20
CV1250-4500-225				91.44	85.85	3340.42	146.13
CV1250-5000-115				95.25	63.50	794.54	25.03
CV1250-5000-156			127.00	95.25	80.01	1666.88	52.50
CV1250-5000-200				101.60	88.90	2355.85	92.75
CV1250-5000-225				101.60	95.25	3111.50	122.50
CV1250-5500-115				104.78	69.85	782.32	22.40
CV1250-5500-156			139.70	104.78	88.14	1613.54	46.20
CV1250-5500-200				111.76	97.79	2307.84	82.60
CV1250-6000-115				114.30	76.20	800.10	21.00
CV1250-6000-156			152.40	114.30	96.01	1666.88	43.75
CV1250-6000-200				121.92	106.68	2400.30	78.75
CV1250-6000-225				121.92	114.30	3067.05	100.63
CV1250-7000-115				133.35	88.90	808.99	18.20
CV1250-7000-156			177.80	133.35	112.01	1633.54	36.75
CV1250-7000-200				142.24	124.46	2290.06	64.40
CV1250-8000-115				152.40	101.60	782.32	15.40
CV1250-8000-156			203.20	152.40	128.02	1635.76	32.20
CV1250-8000-200				162.56	142.24	2332.74	57.40
CV1250-8000-225				162.56	152.40	3271.52	80.50



**HEAVY DUTY CV COMPRESSION SPRINGS**

Part Number	H (mm)	R (mm)	L0 (mm)	L1 (mm)	Sh (mm)	P1 (N)	R (N/mm)
CV1500-1000-0135				190.50	127.00	1177.93	18.55
CV1500-1000-0187			254.00	190.50	160.02	1955.80	30.80
CV1500-1000-0225				203.20	177.80	3218.18	63.35
CV1500-1000-0300				203.20	190.50	6311.90	124.25
CV1500-1200-0135				228.60	152.40	1133.48	14.88
CV1500-1200-0187			304.80	228.60	192.02	1920.24	25.20
CV1500-1200-0225				243.84	213.36	3200.40	52.50
CV1500-1200-0300				243.84	228.60	5867.40	96.25
CV1500-2000-135				38.10	27.43	1177.93	92.75
CV1500-2000-187			50.80	38.10	32.00	2289.18	180.25
CV1500-2000-225				40.64	35.56	3520.44	346.50
CV1500-2000-300				40.64	39.37	7263.13	714.88
CV1500-2500-135				47.63	31.75	1186.26	74.73
CV1500-2500-187			63.50	47.63	40.13	2255.84	142.10
CV1500-2500-225				50.80	44.45	3444.88	271.25
CV1500-2500-300				50.80	47.75	7300.91	574.88
CV1500-3000-135				57.15	38.10	1200.15	63.00
CV1500-3000-187			76.20	57.15	48.01	2080.26	109.20
CV1500-3000-225				60.96	53.34	3467.10	227.50
CV1500-3000-300				60.96	57.15	6800.85	446.25
CV1500-3500-135				66.68	44.45	1166.81	52.50
CV1500-3500-187			88.90	66.68	56.13	2100.26	94.50
CV1500-3500-225				71.12	62.23	3310.64	186.20
CV1500-3500-300				71.12	66.80	6643.05	373.63
CV1500-4000-135	38.10	19.05		76.20	50.80	1106.81	43.58
CV1500-4000-187			101.60	76.20	64.01	2066.93	81.38
CV1500-4000-225				81.28	71.12	3243.07	159.60
CV1500-4000-300				81.28	76.20	6560.82	322.88
CV1500-4500-135				85.73	57.15	1150.14	40.25
CV1500-4500-187			114.30	85.73	72.14	2050.26	71.75
CV1500-4500-225				91.44	80.01	3264.41	142.80
CV1500-4500-300				91.44	85.85	6500.81	284.38
CV1500-5000-135				95.25	63.50	1166.81	36.75
CV1500-5000-187			127.00	95.25	80.01	2044.70	64.40
CV1500-5000-225				101.60	88.90	3244.85	127.75
CV1500-5000-300				101.60	95.25	6445.25	253.75
CV1500-5500-135				104.78	69.85	1130.70	32.38
CV1500-5500-187			139.70	104.78	88.14	2016.92	57.75
CV1500-5500-225				111.76	97.79	3275.97	117.25
CV1500-6000-135				114.30	76.20	1133.48	29.75
CV1500-6000-187			152.40	114.30	96.01	1966.91	51.63
CV1500-6000-225				121.92	106.68	3115.06	102.20
CV1500-6000-300				121.92	114.30	6427.47	210.88
CV1500-7000-135				133.35	88.90	1190.15	26.78
CV1500-7000-187			177.80	133.35	112.01	1983.58	44.63
CV1500-7000-225				142.24	124.46	3086.61	86.80
CV1500-8000-135				152.40	101.60	1173.48	23.10
CV1500-8000-187			203.20	152.40	128.02	1955.80	38.50
CV1500-8000-225				162.56	142.24	3072.38	75.60
CV1500-8000-300				162.56	152.40	6436.36	158.38
CV2000-1000-0195				190.50	127.00	2400.30	37.80
CV2000-1000-0225			254.00	190.50	160.02	2889.25	45.50
CV2000-1000-0280				203.20	177.80	5085.08	100.10
CV2000-1000-0365				203.20	190.50	7858.76	154.70
CV2000-1200-0195				228.60	152.40	2466.98	32.38
CV2000-1200-0225			304.80	228.60	192.02	2867.03	37.63
CV2000-1200-0280				243.84	213.36	5088.64	83.48
CV2000-1200-0365				243.84	228.60	7595.62	124.60
CV2000-2500-195				47.63	35.56	2778.13	175.00
CV2000-2500-225			63.50	47.63	40.13	3289.30	207.20
CV2000-2500-280	50.80	25.40		50.80	44.45	5582.92	439.60
CV2000-2500-365				56.52	48.26	5023.96	719.25
CV2000-3000-195				57.15	40.64	2767.01	145.25
CV2000-3000-225			76.20	57.15	48.01	3100.39	162.75
CV2000-3000-280				60.96	53.34	5494.02	360.50
CV2000-3000-365				60.96	58.42	8507.73	558.25
CV2000-3500-195				66.68	46.48	2633.11	118.48
CV2000-3500-225			88.90	66.68	56.13	3041.49	136.85
CV2000-3500-280				71.12	62.23	5289.55	297.50
CV2000-3500-365				71.12	66.80	8600.19	483.70
CV2000-4000-195				101.60	76.20	2667.00	105.00



**HEAVY DUTY CV COMPRESSION SPRINGS**

<b>Part Number</b>	<b>H (mm)</b>	<b>R (mm)</b>	<b>L0 (mm)</b>	<b>L1 (mm)</b>	<b>Sh (mm)</b>	<b>P1 (N)</b>	<b>R (N/mm)</b>
CV2000-4000-225				76.20	64.01	2951.48	116.20
CV2000-4000-280			101.60	81.28	71.12	5334.00	262.50
CV2000-4000-365				81.28	76.96	8217.92	404.43
CV2000-4500-195				85.73	59.69	2650.33	92.75
CV2000-4500-225			114.30	85.73	72.14	3000.38	105.00
CV2000-4500-280				91.44	80.01	5088.64	222.60
CV2000-4500-365				91.44	85.85	7552.94	330.40
CV2000-5000-195				95.25	64.77	2611.44	82.25
CV2000-5000-225			127.00	95.25	80.01	2967.04	93.45
CV2000-5000-280				101.60	88.90	5271.77	207.55
CV2000-5000-365				101.60	95.25	8018.78	315.70
CV2000-5500-195	50.80	25.40		104.78	69.85	2475.31	70.88
CV2000-5500-225			139.70	104.78	88.14	2994.82	85.75
CV2000-5500-280				111.76	97.79	5265.99	188.48
CV2000-6000-195				114.30	76.20	2600.33	68.25
CV2000-6000-225			152.40	114.30	96.01	3000.38	78.75
CV2000-6000-280				121.92	106.68	5211.32	170.98
CV2000-6000-365				121.92	114.30	7856.98	257.78
CV2000-7000-195				133.35	88.90	2426.97	54.60
CV2000-7000-225			177.80	133.35	112.01	2909.25	65.45
CV2000-7000-280				142.24	124.46	5102.86	143.50
CV2000-8000-195				152.40	101.60	2533.65	49.88
CV2000-8000-225			203.20	152.40	128.02	2933.70	57.75
CV2000-8000-280				162.56	142.24	5191.76	127.75
CV2000-8000-365				162.56	152.40	7936.99	195.30



## EXTENSION SPRINGS

SPEC extension springs have a wide application for experimental, development, prototype and maintenance work and have been specified and designed to high precision standards.



### MATERIALS

#### 'E' part numbers

Music wire: ASTM A228 or AMS 5112

Stainless steel: Type 302 as per ASTM A313 or AMS 5688 spring temper (Chemical and Physical only); Type 316 as per ASTM A313

#### 'T' part numbers

Music wire: DIN 17223 or JIS G4314 A313 SWP-A/B or AMS 5112

Stainless steel: Type 301, 302 or 304 as per DIN 17224 or JIS G4314 SUS 302/304 or AMS 5688 spring temper (chemical and physical only)

### TOLERANCES

#### 'E' part numbers

Outside Diameter	
1.45 to 3.02mm	+/-0.08mm
3.05 to 6.10mm	+/-0.13mm
6.12 to 12.70mm	+/-0.20mm
12.73 to 25.40mm	+/-0.38mm
25.43 to 31.12mm	+/-0.51mm
31.14 to 37.08mm	+/-0.76mm
37.11 to 50.08mm	+/-1.02mm
Load P	+/- 10%
Spring Rate R	+/- 10%

#### 'T' part numbers

All dimension and forces to DIN 2097 (Grade 2)

### KEY TO MEASUREMENTS

Do = Outside diameter

d = Wire diameter

Lo = Free length (reference use only inside hooks)

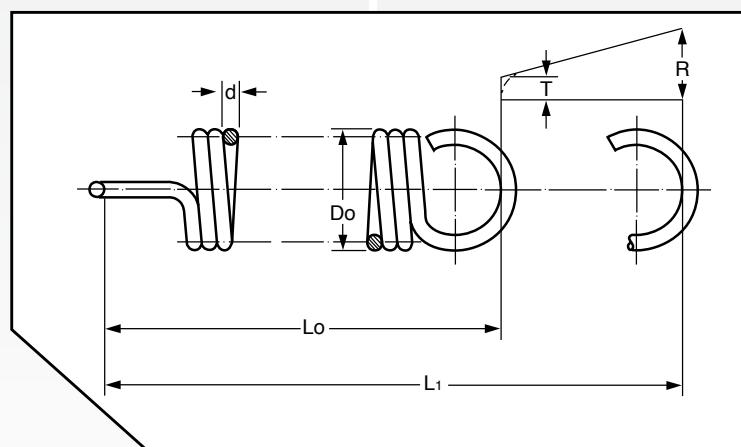
L<sub>1</sub> = Maximum extended length

P = Load at L<sub>1</sub>

T = Initial tension

R = Spring rate

Initial tension is for reference only and may vary.



## RESSORTS DE TRACTION

Les ressorts de traction SPEC offrent de larges possibilités d'application pour les travaux expérimentaux, l'étude de prototypes et les travaux de maintenance. Ils ont été étudiés selon des critères de haute précision.

### MATÉRIAUX

#### Références commençant par 'E'

Corde à piano conforme à la norme DIN 17223, Classe C. No. 1,1200. - BS5216 ND3 ou HD3 - AMS 5112.

Fil en acier inoxydable suivant le norme DIN 17224. No. 1,4310, BS2056 EN58A. Commercial 302 AMS 5688 acier trempé pour ressorts; Acier Inoxydable type 316 L suivant ASTM A313.

#### Références commençant par 'T'

Corde à Piano suivant DIN 17223 ou JIS G4314 SWP-A/B ou AMS 5112.

Fil en acier inoxydable type 301, 302 ou 304 suivant DIN 17224 ou JIS G4314 SUS 302/304 ou AMS 5688 acier trempé pour ressorts.

### TOLÉRANCES

#### Références commençant par 'E'

Do=Diamètre extérieur	
1.45 à 3.02 mm	+/-0.08mm
3.05 à 6.10 mm	+/-0.13mm
6.12 à 12.70 mm	+/-0.20mm
12.73 à 25.40 mm	+/-0.38mm
25.43 à 31.12 mm	+/-0.51mm
31.14 à 37.08 mm	+/-0.76mm
37.11 à 50.08 mm	+/-1.02mm
Charge P	+/-10%
Raideur H/mm, R	+/-10%

## MUELLES/RESORTES DE TRACCION

Los muelles/resortes de tracción de SPEC tienen un amplio número de aplicaciones en trabajos experimentales, de desarrollo, prototipos y de mantenimiento y han sido concebidos y diseñados según los más altos niveles de precisión.

### MATERIALES

#### Referencia "E"

Alambre de piano: ASTM A228 ó AMS 5112

Acero inoxidable: Tipo 302 según ASTM A313 ó AMS 5688 templado (químico y mecánico solamente); En AISI 316 según ASTM A313.

#### Referencia "T"

Alambre de piano: DIN 17223 ó JIS G4314 A313 SWP-A/B ó AMS 5112

Acero inoxidable : Tipo 301, 302 ó 304 según DIN 17224 ó JIS G4314 SUS 302/304 ó templado de resorte AMS 5688 (químico y mecánico solamente).

### TOLERANCIAS

#### Referencia "E"

Diámetro externo
1.45 a 3.02mm
3.05 a 6.10mm
6.12 a 12.70mm
12.73 a 25.40mm
25.43 a 31.12mm
31.14 a 37.08mm
37.11 a 50.08mm
Carga P
Coeficiente tracción R

#### Referencia "T"

Todas las dimensiones y fuerzas según DIN 2097 (Grado 2).

### CLAVES DE CARACTERÍSTICAS

Do = Diámetro exterior

d = Diámetro del alambre

Lo = Longitud libre

L<sub>1</sub> = Longitud máxima extendida

P<sub>1</sub> = Carga a L<sub>1</sub>

T = Tensión inicial

R = Coeficiente de tracción

La tensión inicial es solamente referencial y puede variar.



### United Kingdom

Tel: (44) 1386 443366

E-mail: sales@assocspring.co.uk

### France

Tel: (33) 01 30 68 6363

E-mail: info@ressortsspec.com

### Spain

Tel: (34) 945 147542

E-mail: ventas@bgespana.com

### Germany

Tel: (49) 6251 93-3252-04

E-mail: info@asraymond.de

## ZUGFEDERN

SPEC Zugfedern versehen Konstrukteure, Zeichner, Produktion und Wartung Abteilungen mit Präzision ausgeführten Federn in einer ökonomischen und zeitsparenden Weise.

### WERKSTOFFE

#### 'E' Teilen

Gezogener Federstahldraht: ASTM A228 oder AMS 5112

Rostfreier Federstahldraht: 302 nach ASTM A313 oder AMS 5688 gehärtete Feder. (Chemisch und mechanisch ausschliesslich); Typ 316 gemäß ASTM A313.

#### 'T' Teilen

Gezogener Federstahldraht: DIN 17223 oder JIS G4314 A313 SWP-A/B oder AMS 5112

Rostfreier Federstahldraht: 301, 302 oder 304 nach DIN 17224 oder JIS G4314 SUS 302/304 oder AMS 5688 gehärtete feder. (Chemisch und mechanisch ausschliesslich).

### TOLERANZEN

#### 'E' Teilen

Äußerer Durchmesser	
1.45 bis 3.02 mm	$\pm 0.08\text{mm}$
3.05 bis 6.10 mm	$\pm 0.13\text{mm}$
6.12 bis 12.70 mm	$\pm 0.20\text{mm}$
12.73 bis 25.40 mm	$\pm 0.38\text{mm}$
25.43 bis 31.12 mm	$\pm 0.51\text{mm}$
31.14 bis 37.08 mm	$\pm 0.76\text{mm}$
37.11 bis 50.08 mm	$\pm 1.02\text{mm}$
Federkraft, P	$\pm 10\%$
Federrate, R	$\pm 10\%$

## MOLLE A TRAZIONE

Le molle a trazione SPEC offrono una vasta gamma di applicazioni per sperimentazione, sviluppo, prototipi, manutenzione e vengono progettate e fabbricate secondo i migliori standard di precisione.

### MATERIALE

#### Codici 'E' iniziale

Filo Armonico: ASTM A228 o AMS 5112

Acciaio Inossidabile: Tipo 302 secondo ASTM A313 o AMS 5688 molla temprata (solo chimico o fisico). Type 316 secondo ASTM A313.

#### Codici 'T' iniziale

Filo Armonico: DIN 17223 o JIS G4314 A313 SWP-A/B o AMS 5112

Acciaio inossidabile: Tipo 301, 302 o 304 secondo DIN 17224 o JIS G4314 SUS 302/304 o AMS 5688 molla temprata (solo chimico o fisico)

### TOLLERANZE

#### Codici 'E' iniziale

Do = Diametro esterno	
da 1.45 a 3.02 mm	$\pm 0.08\text{mm}$
da 3.05 a 6.10 mm	$\pm 0.13\text{mm}$
da 6.12 a 12.70 mm	$\pm 0.20\text{mm}$
da 12.73 a 25.40 mm	$\pm 0.38\text{mm}$
da 25.43 a 31.12 mm	$\pm 0.51\text{mm}$
da 31.14 a 37.08 mm	$\pm 0.76\text{mm}$
da 37.11 a 50.08 mm	$\pm 1.02\text{mm}$
Carico P	$\pm 10\%$
Compressione R	$\pm 10\%$

## MOLAS DE TRACÇÃO

As molas de tracção SPEC têm um vasto campo de aplicações em projectos experimentais, de desenvolvimento, protótipos e de manutenção, sendo especificadas e concebidas em função dos mais elevados padrões de precisão.

### MATERIAIS

#### PEÇAS "E"

Arame de aço conforme à norma DIN 17223 Classe C. Nº 1,1200, BS5216 ND3 ou HD3 – AMS 5112.

Arame de aço inoxidável conforme à norma DIN 17224 Nº 1,4310 BS 2056 EN58A. Têmpera de mola comercial 302 MAS 5688; AISI 316 conforme à norma ASTM A313.

#### PEÇAS "T"

Fio de corda de piano: Din 17233 ou JIS G4314 A313 SWP-A/B AMS 5112

Aço inox: Tipo 301, 302 ou 304 , DIN 17224 ou JIS G4314 SUS 302/304 ou AMS 5688 ( tempera de mola comercial )

### TOLERÂNCIAS

#### PEÇAS QUE COMEÇAM COM "E"

Do = Diâmetro exterior	
1.45 a 3.02 mm	$\pm 0.08\text{mm}$
3.05 a 6.10 mm	$\pm 0.13\text{mm}$
6.12 a 12.70 mm	$\pm 0.20\text{mm}$
12.73 a 25.40 mm	$\pm 0.38\text{mm}$
25.43 a 31.12 mm	$\pm 0.51\text{mm}$
31.14 a 37.08 mm	$\pm 0.76\text{mm}$
37.11 a 50.08 mm	$\pm 1.02\text{mm}$
Carga P	$\pm 10\%$
Coeficiente de compressão de mola, R	$\pm 10\%$

#### Codici 'T' iniziale

Dimensioni e forze secondo DIN 2097 (grado 2).

### LEGENDA

Do = Diametro esterno  
d = Diametro filo  
Lo = Lunghezza libera  
L<sub>1</sub> = Massima lung. estensione  
P = Carico a L<sub>1</sub> Newtons  
T = Tensione iniziale  
R = Carico di trazione unit

La tensione iniziale è solo una misura di riferimento e può variare.

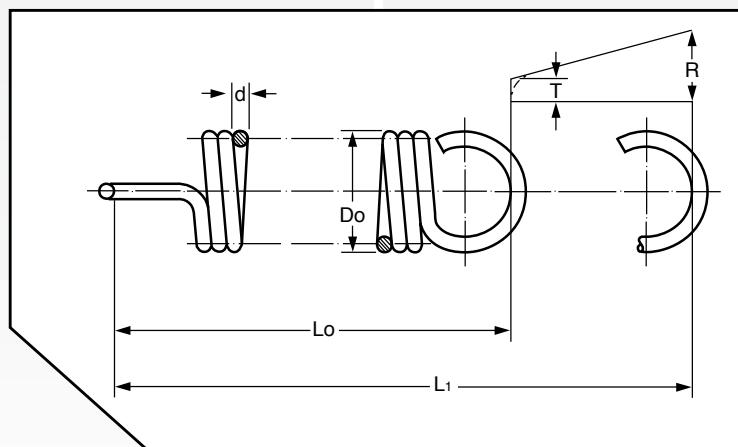
#### PEÇAS "T"

Todas as dimensões e forças conformes à especificação DIN 2097 (Graduação 2)

### LEGENDA

Do Diâmetro exterior  
D Diâmetro do arame  
Lo Comprimento livre  
(só para efeitos de referência entre ganchos)  
L<sub>1</sub> Comprimento máximo em extensão  
P Carga a L<sub>1</sub>  
T Tensão inicial  
R Coeficiente de tracção

A tensão inicial é para a referência somente e pode variar.



### United Kingdom

Tel: (44) 1386 443366

E-mail: sales@assocspring.co.uk

### France

Tel: (33) 01 30 68 6363

E-mail: info@ressortsspec.com

### Spain

Tel: (34) 945 147542

E-mail: ventas@bgespana.com

### Germany

Tel: (49) 6251 93-3252-04

E-mail: info@asraymond.de

## ADDITIONAL TECHNICAL DATA

### EXTENSION SPRINGS

All SPEC extension springs have uniform body diameter and are produced with full twist loops the same diameter as the body. They are wound with initial tension, therefore some force is required before the coils are initially separated.



### ENDS

German style closed loop. End position may vary. Special ends are available on request.

### LOADS

Initial tension T is for reference only and will vary. To determine the load at any working length use the formula:

$$P = (\text{rate} \times \text{deflection}) + \text{Initial Tension}$$

1lb = 4,448 Newtons

1 Newton = 0,225 lb

### SURFACE FINISH

Music wire - oiled.

Stainless steel - plain wire.

Shot-peened and plated finishes supplied on request.

Allow sufficient additional time for special finishes.

## DONNEES TECHNIQUES ADDITIONNELLES

### RESSORTS DE TRACTION

Tous les ressorts de traction SPEC possèdent un diamètre de corps uniforme et sont produits avec des boucles d'accrochage fermées et de même diamètre que le corps du ressort.

Ils sont enroulés avec une tension initiale, donc un certain effort est nécessaire avant que les spires ne se séparent.

### EXTREMITES

Boucles fermées allemandes. La position angulaire peut varier.

### CHARGES

La tension initiale T est donnée pour référence uniquement et peut varier. Pour déterminer la charge à toute longueur de fonctionnement utiliser la formule:

$$P = (\text{raideur} \times \text{déflexion}) + \text{tension initiale.}$$

1 kg = 9,80665N

1 N = 0,10197 kg.

### ETAT DE SURFACE

Fil standard huilé. Finition par grevage et finition plaquée fournies à la demande. Prévoyez suffisamment de temps de livraison supplémentaire pour des états de surface spéciaux.

## INFORMACIÓN TÉCNICA ADICIONAL

### MUELLES/RESORTES DE TRACCION

Todos los muelles/resortes de tracción de SPEC tienen un diámetro uniforme de cuerpo y se fabrican con espiras enteras, cuyo diámetro es igual que el cuerpo. Se enrollan con una tensión inicial. Por lo tanto, es preciso aplicar un poco de fuerza antes de que se puedan separar las espiras.

### EXTREMOS

Espiras alemanas cerradas. La posición del extremo puede variar.

### CARGAS

La tensión inicial T es solamente referencial y puede variar. Para determinar la carga a cualquier longitud de trabajo, utilice la fórmula P = (coeficiente tracción R x medida deflexión) + T (tensión inicial).

1 lb = 4,448 Newtons

1 Newton = 0,225 lb

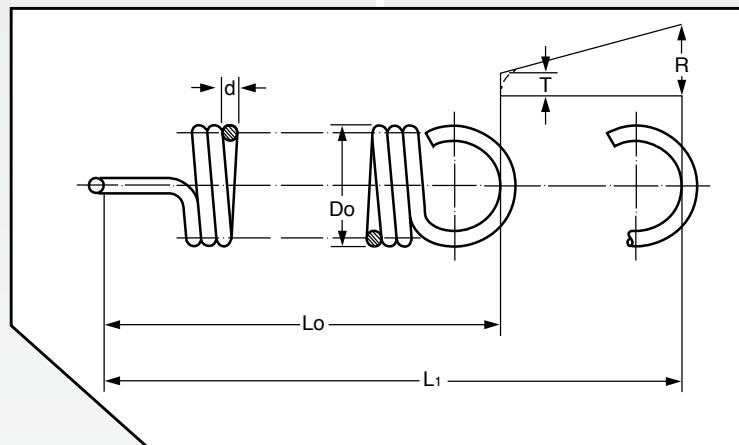
### ACABADO SUPERFICIAL

Alambre de piano lubricado.

Acero inoxidable – alambre normal.

Bajo pedido granallado y con acabados especiales.

Requieran de un plazo superior.



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de

## ZUSÄTZLICHE TECHNISCHEN ANGABEN

### ZUGFEDERN

Alle SPEC Zugfedern haben einen gleichmässigen äuseren Windungsdurchmesser. Die Ösenhöhe ist gleich wie die äusere Windungsdurchmesser. Die Zugfedern sind mit einer inneren Vorspannkraft hergestellt, die überwunden sein muss die Zugfedern zu öffnen.

### FERDERENDEN

Deutsche Ösenform. Ösenstellung kann abwandeln. Sondernösen verfügbare.

### KRAFTWERTE

Die innere Vorspannkraft als Referenz nur berücksichtigen, da sie abwandeln könnte. Um die Kraft bei einer bestimmten Federlänge auszurechnen,  $P = (Lo - Lx) \times P/f + T$ , wo  $Lx$  die neue Belastetenlänge ist. 1 lb = 4.448 Newtons  
1 Newton = 0,225 lb.

### OBERFLÄCHE

Gezogener Federstahldraht: Leicht eingeoilt.  
Rostfreier Federstahldraht: Nicht weiterbehandelt.  
Kügelgestrahlt und andere sondern Behandlungen verfügbar.

## ULTERIORI INFORMAZIONI TECNICHE

### MOLLE A TRAZIONE

Tutte le molle a trazione SPEC hanno un diametro uniforme e vengono prodotte con ganci completamente avvolti, aventi lo stesso diametro del corpo molla.

Le molle sono avvolte con una tensione iniziale in modo che si debba esercitare una certa quantità di forza per separarne le spire.

### ESTREMITÀ

Occhielli chiusi. Posizione estremità variabile.

### CARICHI

La tensione iniziale riportata in tabella è indicativa e può variare. Per calcolare il carico di ogni lunghezza utilizzata moltiplicare: (carico traz. unit x deflessione) + tensione iniziale.

1 lb = 4.448 Newtons  
1 Newtons = 0.225 lb.

### FINITURA SUPERFICI

Acciaio armonico : Filo normale oliato.  
Acciaio inossidabile : Filo liscio  
Pallinatura e placcatura a richiesta.  
Per finiture speciali la consegna è da concordare.

## INFORMAÇÕES TÉCNICAS ADICIONAIS

### MOLAS DE TRACÇÃO

Todas as molas de tracção SPEC têm um diâmetro uniforme do corpo e são fabricadas com espiras torcidas inteiras, cujo diâmetro é igual ao do corpo.

O enrolamento é sujeito a uma tensão inicial. Para tanto, é necessária a aplicação de um pouco de força antes de se poder separar inicialmente as espiras.



### EXTREMIDADES

Espiras alemãs fechadas. A posição da extremidade pode variar.

### CARGAS

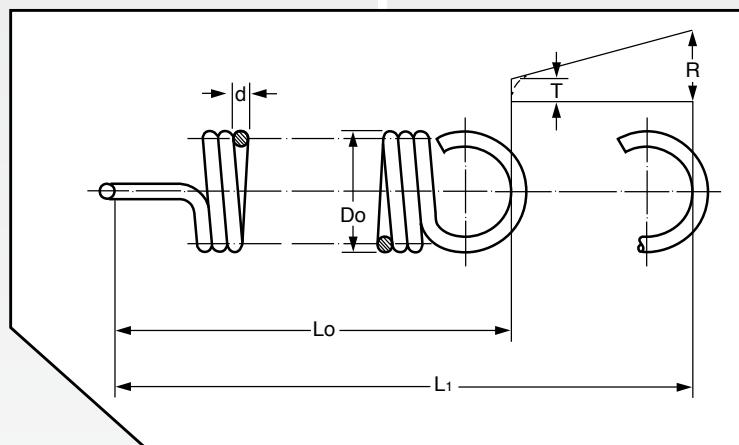
A tensão inicial é indicada apenas a título de referência e pode variar.

Para determinar a carga com qualquer comprimento de trabalho, utilize a seguinte fórmula (coeficiente de tracção x deflexão) + tensão inicial.

1 lb = 4,448 Newton  
1 Newton = 0,225 lb

### ACABAMENTO DE SUPERFÍCIE

Arame normal lubrificado. A pedido, podem ser fornecidas com acabamento granulado, e com acabamentos galvanizados. Deve ser tida em conta um período adicional para entrega de produtos com acabamento especial.



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



EXTENSION SPRINGS							302 STAINLESS STEEL / INOX			316 STAINLESS STEEL / INOX						
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L1 (mm)	P (N)	T (N)	R (N/mm)
E0063-007-0250M	0.18	1.60	6.35	13.72			0.18	E0063-007-0250S			0.15	E0063-007-0250X	9.15		0.15	
E0063-007-0310M			7.87	18.54			0.12	E0063-007-0310S			0.10	E0063-007-0310X	11.88		0.10	
E0063-007-0380M			9.65	23.62	1.42	0.13	0.09	E0063-007-0380S	1.18	0.11	0.07	E0063-007-0380X	15.26	0.52	0.07	
E0063-007-0440M			11.18	28.45			0.07	E0063-007-0440S			0.06	E0063-007-0440X	18.18		0.06	
E0063-007-0500M			12.70	33.27			0.07	E0063-007-0500S			0.06	E0063-007-0500X	19.71		0.06	
E0063-008-0250M			6.35	11.68			0.35	E0063-008-0250S			0.29	E0063-008-0250X	8.55		0.29	
E0063-008-0310M			7.87	15.24			0.25	E0063-008-0310S			0.20	E0063-008-0310X	11.02		0.20	
E0063-008-0380M			9.65	19.05			0.19	E0063-008-0380S			0.16	E0063-008-0380X	13.65		0.16	
E0063-008-0440M			11.18	23.11	2.00	0.18	0.16	E0063-008-0440S	1.67	0.15	0.13	E0063-008-0440X	16.06	0.79	0.13	
E0063-008-0500M			12.70	26.67			0.12	E0063-008-0500S			0.10	E0063-008-0500X	18.99		0.10	
E0063-008-0620M			15.75	34.04			0.11	E0063-008-0620S			0.09	E0063-008-0620X	23.08		0.09	
E0063-008-0750M			19.05	41.66			0.09	E0063-008-0750S			0.07	E0063-008-0750X	27.85		0.07	
E0063-009-0250M			6.35	10.16			0.65	E0063-009-0250S			0.54	E0063-009-0250X	8.07		0.54	
E0063-009-0310M			7.87	13.21			0.47	E0063-009-0310S			0.39	E0063-009-0310X	10.23		0.39	
E0063-009-0380M			9.65	16.51			0.37	E0063-009-0380S			0.31	E0063-009-0380X	12.68		0.31	
E0063-009-0440M	0.23		11.18	19.56	2.76	0.27	0.30	E0063-009-0440S	2.30	0.22	0.25	E0063-009-0440X	14.92	1.15	0.25	
E0063-009-0500M			12.70	22.86			0.25	E0063-009-0500S			0.20	E0063-009-0500X	17.24		0.20	
E0063-009-0620M			15.75	28.70			0.19	E0063-009-0620S			0.16	E0063-009-0620X	21.53		0.16	
E0063-009-0750M			19.05	35.56			0.16	E0063-009-0750S			0.13	E0063-009-0750X	26.12		0.13	
E0063-011-0250M			6.35	8.64			1.94	E0063-011-0250S			1.62	E0063-011-0250X	7.47		1.62	
E0063-011-0310M			7.87	11.18			1.38	E0063-011-0310S			1.15	E0063-011-0310X	9.44		1.15	
E0063-011-0380M			9.65	13.97			1.03	E0063-011-0380S			0.86	E0063-011-0380X	11.75		0.86	
E0063-011-0440M	0.28		11.18	16.51	4.85	0.44	0.84	E0063-011-0440S	4.04	0.37	0.70	E0063-011-0440X	13.76	2.18	0.37	
E0063-011-0500M			12.70	18.80			0.72	E0063-011-0500S			0.60	E0063-011-0500X	15.73		0.60	
E0063-011-0620M			15.75	23.62			0.56	E0063-011-0620S			0.47	E0063-011-0620X	19.62		0.47	
E0063-011-0750M			19.05	28.96			0.44	E0063-011-0750S			0.37	E0063-011-0750X	24.01		0.37	
E0094-010-0380M			9.65	21.34			0.21	E0094-010-0380S			0.18	E0094-010-0380X	14.36		0.18	
E0094-010-0440M			11.18	26.16			0.16	E0094-010-0440S			0.13	E0094-010-0440X	17.46		0.13	
E0094-010-0500M			12.70	31.24			0.14	E0094-010-0500S			0.12	E0094-010-0500X	19.77		0.12	
E0094-010-0620M	0.25		15.75	40.64	2.67	0.22	0.11	E0094-010-0620S	2.22	0.18	0.09	E0094-010-0620X	25.17	1.01	0.09	
E0094-010-0750M			19.05	50.80			0.07	E0094-010-0750S			0.06	E0094-010-0750X	33.18		0.06	
E0094-010-0880M			22.35	59.18			0.05	E0094-010-0880S			0.04	E0094-010-0880X	41.20		0.04	
E0094-010-1000M			25.40	68.33			0.05	E0094-010-1000S			0.04	E0094-010-1000X	44.25		0.04	
E0094-011-0380M			9.65	18.29			0.33	E0094-011-0380S			0.28	E0094-011-0380X	13.76		0.28	
E0094-011-0440M			11.18	22.10			0.26	E0094-011-0440S			0.22	E0094-011-0440X	16.38		0.22	
E0094-011-0500M			12.70	26.16			0.21	E0094-011-0500S			0.18	E0094-011-0500X	19.20		0.18	
E0094-011-0620M	0.28		15.75	34.04	3.11	0.27	0.16	E0094-011-0620S	2.59	0.22	0.13	E0094-011-0620X	24.41	1.36	0.13	
E0094-011-0750M			19.05	42.67			0.12	E0094-011-0750S			0.10	E0094-011-0750X	30.19		0.10	
E0094-011-0880M			22.35	51.31			0.11	E0094-011-0880S			0.09	E0094-011-0880X	35.35		0.09	
E0094-011-1000M			25.40	59.18			0.09	E0094-011-1000S			0.07	E0094-011-1000X	41.00		0.07	
E0094-012-0380M			9.65	16.76			0.56	E0094-012-0380S			0.47	E0094-012-0380X	12.69		0.47	
E0094-012-0440M			11.18	20.83			0.42	E0094-012-0440S			0.35	E0094-012-0440X	15.23		0.35	
E0094-012-0500M			12.70	24.13			0.35	E0094-012-0500S			0.29	E0094-012-0500X	17.57		0.29	
E0094-012-0620M	2.39	0.30	15.75	30.99	4.45	0.44	0.26	E0094-012-0620S	3.71	0.37	0.22	E0094-012-0620X	22.24	1.79	0.22	
E0094-012-0750M			19.05	38.10			0.21	E0094-012-0750S			0.18	E0094-012-0750X	27.16		0.18	
E0094-012-0880M			22.35	46.23			0.18	E0094-012-0880S			0.15	E0094-012-0880X	32.08		0.15	
E0094-012-1000M			25.40	53.34			0.14	E0094-012-1000S			0.12	E0094-012-1000X	37.56		0.12	
E0094-013-0380M			9.65	15.24			0.81	E0094-013-0380S			0.67	E0094-013-0380X	12.53		0.67	
E0094-013-0440M			11.18	18.54			0.63	E0094-013-0440S			0.53	E0094-013-0440X	14.85		0.53	
E0094-013-0500M			12.70	21.59			0.53	E0094-013-0500S			0.44	E0094-013-0500X	17.11		0.44	
E0094-013-0620M	0.33		15.75	27.69	5.12	0.44	0.39	E0094-013-0620S	4.26	0.37	0.32	E0094-013-0620X	21.76	2.30	0.32	
E0094-013-0750M			19.05	34.29			0.30	E0094-013-0750S			0.25	E0094-013-0750X	26.83		0.25	
E0094-013-0880M			22.35	41.15			0.25	E0094-013-0880S			0.20	E0094-013-0880X	31.80		0.20	
E0094-013-1000M			25.40	47.24			0.21	E0094-013-1000S			0.18	E0094-013-1000X	36.42		0.18	
E0094-014-0380M			9.65	14.48			1.24	E0094-014-0380S			1.04	E0094-014-0380X	11.84		1.04	
E0094-014-0440M			11.18	17.27			0.96	E0094-014-0440S			0.80	E0094-014-0440X	14.01		0.80	
E0094-014-0500M			12.70	20.07			0.81	E0094-014-0500S			0.67	E0094-014-0500X	16.08		0.67	
E0094-014-0620M	0.36		15.75	25.65	6.67	0.76	0.60	E0094-014-0620S	5.56	0.63	0.50	E0094-014-0620X	20.33	2.90	0.50	
E0094-014-0750M			19.05	31.24			0.47	E0094-014-0750S			0.39	E0094-014-0750X	24.81		0.39	
E0094-014-0880M			22.35	37.85			0.39	E0094-014-0880S			0.32	E0094-014-0880X	29.43		0.32	
E0094-014-1000M			25.40	43.18			0.33	E0094-014-1000S			0.28	E0094-014-1000X	33.59		0.28	
E0094-016-0380M			9.65	13.21			2.49	E0094-016-0380S			2.07	E0094-016-0380X	11.45		2.07	
E0094-016-0440M			11.18	15.75			1.93	E0094-016-0440S			1.60	E0094-016-0440X	13.50		1.61	
E0094-016-0500M			12.70	18.03			1.61	E0094-016-0500S			1.34	E0094-016-0500X	15.48		1.34	
E0094-016-0620M	0.41		15.75	23.11	9.56	0.85	1.19	E0094-016-0620S	7.96	0.71	0.99	E0094-016-0620X	19.50	4.43	0.99	
E0094-016-0750M			19.05	28.45			0.93	E0094-016-0750S			0.77	E0094-016-0750X	23.87		0.77	
E0094-016-0880M			22.35	33.78			0.77	E0094-016-0880S			0.64	E0094-016-0880X	28.16		0.64	
E0094-016-1000M			25.40	38.61			0.65	E0094-016-1000S			0.54	E0094-016-1000X	32.30		0.54	
E0120-014-0620M			15.75	31.75			0.28	E0120-014-0620S			0.23	E0120-014-0620X	23.54		0.23	
E0120-014-0																

EXTENSION SPRINGS						302 STAINLESS STEEL / INOX				316 STAINLESS STEEL / INOX						
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)
E0120-014-1000M	0.36		25.40	56.64			0.14	E0120-014-1000S			0.12	E0120-014-1000X	40.99			0.12
E0120-014-1120M			28.45	64.26			0.12	E0120-014-1120S			0.10	E0120-014-1120X	46.27			0.10
E0120-014-1250M			31.75	72.90	4.98	0.44	0.11	E0120-014-1250S	4.15	0.37	0.09	E0120-014-1250X	52.54	2.19	0.37	0.09
E0120-014-1370M			34.80	80.52			0.11	E0120-014-1370S			0.09	E0120-014-1370X	55.59			0.09
E0120-014-1500M			38.10	89.15			0.09	E0120-014-1500S			0.07	E0120-014-1500X	63.05			0.07
E0120-016-0380M	0.41		9.65	14.48			1.38	E0120-016-0380S			1.15	E0120-016-0380X	11.89			1.15
E0120-016-0500M			12.70	20.83			0.81	E0120-016-0500S			0.67	E0120-016-0500X	16.54			0.67
E0120-016-0620M			15.75	27.18			0.58	E0120-016-0620S			0.48	E0120-016-0620X	21.11			0.48
E0120-016-0750M			19.05	34.04			0.44	E0120-016-0750S			0.37	E0120-016-0750X	26.12			0.37
E0120-016-0880M			22.35	41.15			0.35	E0120-016-0880S			0.29	E0120-016-0880X	31.19			0.29
E0120-016-1000M	0.46	25.40	45.97	7.12	0.89	0.30	E0120-016-1000S	5.93	0.74	0.25	E0120-016-1000X	35.80	3.32	0.74	0.25	
E0120-016-1120M			28.45	52.58			0.25	E0120-016-1120S			0.20	E0120-016-1120X	41.08			0.20
E0120-016-1250M			31.75	58.67			0.23	E0120-016-1250S			0.19	E0120-016-1250X	45.35			0.19
E0120-016-1370M			34.80	65.28			0.19	E0120-016-1370S			0.16	E0120-016-1370X	50.87			0.16
E0120-016-1500M			38.10	71.63			0.18	E0120-016-1500S			0.15	E0120-016-1500X	55.78			0.15
E0120-016-1750M	3.05		44.45	87.63			0.16	E0120-016-1750S			0.13	E0120-016-1750X	64.09			0.13
E0120-016-2000M			50.80	100.84			0.12	E0120-016-2000S			0.10	E0120-016-2000X	76.06			0.10
E0120-018-0380M	0.46		9.65	13.21			2.52	E0120-018-0380S			2.10	E0120-018-0380X	11.58			2.10
E0120-018-0500M			12.70	18.80			1.51	E0120-018-0500S			1.25	E0120-018-0500X	15.94			1.26
E0120-018-0620M			15.75	24.13			1.07	E0120-018-0620S			0.89	E0120-018-0620X	20.31			0.89
E0120-018-0750M			19.05	30.23			0.82	E0120-018-0750S			0.69	E0120-018-0750X	24.97			0.69
E0120-018-0880M			22.35	36.07			0.67	E0120-018-0880S			0.55	E0120-018-0880X	29.67			0.55
E0120-018-1000M	0.51		25.40	40.64			0.58	E0120-018-1000S			0.48	E0120-018-1000X	33.83			0.48
E0120-018-1120M			28.45	45.97	9.79	0.89	0.49	E0120-018-1120S	8.16	0.74	0.41	E0120-018-1120X	38.39	4.80	0.74	0.41
E0120-018-1250M			31.75	51.56			0.44	E0120-018-1250S			0.37	E0120-018-1250X	42.88			0.37
E0120-018-1370M			34.80	57.15			0.39	E0120-018-1370S			0.32	E0120-018-1370X	47.45			0.32
E0120-018-1500M			38.10	62.74			0.35	E0120-018-1500S			0.29	E0120-018-1500X	52.01			0.29
E0120-018-1750M	0.56		44.45	73.66			0.30	E0120-018-1750S			0.25	E0120-018-1750X	60.82			0.25
E0120-018-2000M			50.80	84.84			0.25	E0120-018-2000S			0.20	E0120-018-2000X	70.68			0.20
E0120-018-2250M			57.15	98.81			0.23	E0120-018-2250S			0.19	E0120-018-2250X	78.55			0.19
E0120-020-0500M	0.51		12.70	17.27			2.64	E0120-020-0500S			2.20	E0120-020-0500X	15.24			2.20
E0120-020-0620M			15.75	22.10			1.89	E0120-020-0620S			1.58	E0120-020-0620X	19.30			1.58
E0120-020-0750M			19.05	27.43			1.45	E0120-020-0750S			1.21	E0120-020-0750X	23.67			1.21
E0120-020-0880M			22.35	32.77			1.17	E0120-020-0880S			0.98	E0120-020-0880X	28.07			0.98
E0120-020-1000M			25.40	36.83			1.05	E0120-020-1000S			0.88	E0120-020-1000X	31.79			0.88
E0120-020-1120M	0.56	28.45	41.66	13.34	1.33	0.91	E0120-020-1120S	11.11	1.11	0.76	E0120-020-1120X	35.82	6.70	1.11	0.76	
E0120-020-1250M			31.75	46.74			0.79	E0120-020-1250S			0.66	E0120-020-1250X	40.26			0.66
E0120-020-1370M			34.80	51.82			0.70	E0120-020-1370S			0.58	E0120-020-1370X	44.38			0.58
E0120-020-1500M			38.10	56.64			0.65	E0120-020-1500S			0.54	E0120-020-1500X	48.45			0.54
E0120-020-1750M			44.45	66.55			0.54	E0120-020-1750S			0.45	E0120-020-1750X	56.81			0.45
E0120-020-2000M	4.57		50.80	76.45			0.46	E0120-020-2000S			0.38	E0120-020-2000X	65.53			0.38
E0120-020-2250M			57.15	88.14			0.39	E0120-020-2250S			0.32	E0120-020-2250X	74.56			0.32
E0120-022-0620M	0.56		15.75	20.57			3.20	E0120-022-0620S			2.67	E0120-022-0620X	18.64			2.67
E0120-022-0750M			19.05	25.40			2.45	E0120-022-0750S			2.04	E0120-022-0750X	22.83			2.04
E0120-022-0880M			22.35	30.23			2.00	E0120-022-0880S			1.66	E0120-022-0880X	26.99			1.66
E0120-022-1000M			25.40	34.54			1.70	E0120-022-1000S			1.42	E0120-022-1000X	30.85			1.42
E0120-022-1120M			28.45	39.12			1.49	E0120-022-1120S			1.24	E0120-022-1120X	34.67			1.24
E0120-022-1250M	4.57	31.75	43.94	17.30	1.56	1.30	E0120-022-1250S	14.41	1.30	1.08	E0120-022-1250X	38.90	9.01	1.30	1.08	
E0120-022-1370M			34.80	48.26			1.17	E0120-022-1370S			0.98	E0120-022-1370X	42.69			0.98
E0120-022-1500M			38.10	53.09			1.05	E0120-022-1500S			0.88	E0120-022-1500X	46.91			0.88
E0120-022-1750M			44.45	62.23			0.88	E0120-022-1750S			0.73	E0120-022-1750X	55.03			0.73
E0120-022-2000M			50.80	71.63			0.75	E0120-022-2000S			0.63	E0120-022-2000X	63.10			0.63
E0120-022-2250M	4.57		57.15	80.77			0.67	E0120-022-2250S			0.55	E0120-022-2250X	71.06			0.55
E0120-022-2500M			63.50	89.92			0.60	E0120-022-2500S			0.50	E0120-022-2500X	79.05			0.50
E0180-014-0620M	0.36		15.75	44.45			0.11	E0180-014-0620S			0.09	E0180-014-0620X	28.78			0.09
E0180-014-0750M			19.05	60.96			0.07	E0180-014-0750S			0.06	E0180-014-0750X	38.60			0.06
E0180-014-1000M			25.40	93.73	3.42	0.31	0.05	E0180-014-1000S	2.85	0.26	0.04	E0180-014-1000X	51.46	1.40	0.26	0.04
E0180-014-1250M			31.75	126.75			0.04	E0180-014-1250S			0.03	E0180-014-1250X	70.85			0.03
E0180-014-1500M			38.10	159.51			0.02	E0180-014-1500S			0.02	E0180-014-1500X	93.77			0.02
E0180-018-0620M	0.46		15.75	31.75			0.39	E0180-018-0620S			0.32	E0180-018-0620X	23.54			0.32
E0180-018-0750M			19.05	42.16			0.26	E0180-018-0750S			0.22	E0180-018-0750X	30.48			0.22
E0180-018-0880M			22.35	52.83			0.21	E0180-018-0880S			0.18	E0180-018-0880X	36.64			0.18
E0180-018-1000M			25.40	62.48			0.18	E0180-018-1000S			0.15	E0180-018-1000X	42.55			0.15
E0180-018-1120M			28.45	72.39			0.14	E0180-018-1120S			0.12	E0180-018-1120X	49.88			0.12
E0180-018-1250M	4.57		31.75	82.80	6.89	0.62	0.12	E0180-018-1250S	5.74	0.52	0.10	E0180-018-1250X	56.25	3.02	0.52	0.10
E0180-018-1370M			34.80	92.71												

EXTENSION SPRINGS							302 STAINLESS STEEL / INOX				316 STAINLESS STEEL / INOX					
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)
E0180-020-0620M	0.51		15.75	28.19			0.67	E0180-020-0620S			0.55	E0180-020-0620X	22.02		0.55	
E0180-020-0750M			19.05	37.08			0.47	E0180-020-0750S			0.39	E0180-020-0750X	27.88		0.39	
E0180-020-0880M			22.35	45.97			0.35	E0180-020-0880S			0.29	E0180-020-0880X	34.27		0.29	
E0180-020-1000M			25.40	54.10			0.30	E0180-020-1000S			0.25	E0180-020-1000X	39.42		0.25	
E0180-020-1120M			28.45	62.23			0.25	E0180-020-1120S			0.20	E0180-020-1120X	45.47		0.20	
E0180-020-1250M			31.75	71.12	9.25	0.85	0.21	E0180-020-1250S	7.71	0.71	0.18	E0180-020-1250X	51.61	4.18	0.18	
E0180-020-1370M			34.80	79.25			0.19	E0180-020-1370S			0.16	E0180-020-1370X	56.46		0.16	
E0180-020-1500M			38.10	88.14			0.18	E0180-020-1500S			0.15	E0180-020-1500X	61.93		0.15	
E0180-020-1750M			44.45	105.16			0.14	E0180-020-1750S			0.12	E0180-020-1750X	74.24		0.12	
E0180-020-2000M			50.80	122.17			0.12	E0180-020-2000S			0.10	E0180-020-2000X	84.84		0.10	
E0180-020-2250M	0.56		57.15	139.19			0.11	E0180-020-2250S			0.09	E0180-020-2250X	96.86		0.09	
E0180-020-2500M			63.50	156.46			0.09	E0180-020-2500S			0.07	E0180-020-2500X	111.16		0.07	
E0180-022-0500M			12.70	18.54			1.84	E0180-022-0500S			1.53	E0180-022-0500X	15.89		1.53	
E0180-022-0620M			15.75	25.65			1.10	E0180-022-0620S			0.92	E0180-022-0620X	21.06		0.92	
E0180-022-0750M			19.05	33.27			0.77	E0180-022-0750S			0.64	E0180-022-0750X	26.65		0.64	
E0180-022-0880M			22.35	40.89			0.60	E0180-022-0880S			0.50	E0180-022-0880X	32.19		0.50	
E0180-022-1000M			25.40	47.24			0.49	E0180-022-1000S			0.41	E0180-022-1000X	37.35		0.41	
E0180-022-1120M			28.45	54.10			0.42	E0180-022-1120S			0.35	E0180-022-1120X	42.38		0.35	
E0180-022-1250M			31.75	61.72	11.56	0.89	0.35	E0180-022-1250S	9.63	0.74	0.29	E0180-022-1250X	48.47	5.62	0.29	
E0180-022-1370M			34.80	68.58			0.32	E0180-022-1370S			0.26	E0180-022-1370X	53.38		0.26	
E0180-022-1500M			38.10	75.95			0.28	E0180-022-1500S			0.23	E0180-022-1500X	59.00		0.23	
E0180-022-1750M			44.45	90.17			0.23	E0180-022-1750S			0.19	E0180-022-1750X	70.18		0.19	
E0180-022-2000M			50.80	103.38			0.21	E0180-022-2000S			0.18	E0180-022-2000X	78.67		0.18	
E0180-022-2250M	0.61		57.15	121.41			0.18	E0180-022-2250S			0.15	E0180-022-2250X	90.60		0.15	
E0180-022-2500M			63.50	136.14			0.16	E0180-022-2500S			0.13	E0180-022-2500X	100.66		0.13	
E0180-024-0620M			15.75	23.88			1.73	E0180-024-0620S			1.44	E0180-024-0620X	20.04		1.44	
E0180-024-0750M			19.05	30.48			1.21	E0180-024-0750S			1.01	E0180-024-0750X	25.21		1.01	
E0180-024-0880M			22.35	37.34			0.93	E0180-024-0880S			0.77	E0180-024-0880X	30.37		0.77	
E0180-024-1000M			25.40	43.43			0.77	E0180-024-1000S			0.64	E0180-024-1000X	35.06		0.64	
E0180-024-1120M			28.45	49.78			0.65	E0180-024-1120S			0.54	E0180-024-1120X	39.94		0.54	
E0180-024-1250M			31.75	56.64	15.35	1.38	0.56	E0180-024-1250S	12.79	1.15	0.47	E0180-024-1250X	45.04	7.35	1.15	
E0180-024-1370M			34.80	62.74			0.51	E0180-024-1370S			0.42	E0180-024-1370X	49.46		0.42	
E0180-024-1500M			38.10	69.60			0.44	E0180-024-1500S			0.37	E0180-024-1500X	55.10		0.37	
E0180-024-1750M			44.45	82.55			0.37	E0180-024-1750S			0.31	E0180-024-1750X	64.69		0.31	
E0180-024-2000M			50.80	95.50			0.32	E0180-024-2000S			0.26	E0180-024-2000X	74.42		0.26	
E0180-024-2250M	0.66		57.15	108.46			0.28	E0180-024-2250S			0.23	E0180-024-2250X	83.72		0.23	
E0180-024-2500M			63.50	121.41			0.25	E0180-024-2500S			0.20	E0180-024-2500X	93.87		0.20	
E0180-026-0500M			12.70	16.76			4.26	E0180-026-0500S			3.55	E0180-026-0500X	14.95		3.55	
E0180-026-0620M			15.75	22.35			2.63	E0180-026-0620S			2.19	E0180-026-0620X	19.38		2.19	
E0180-026-0750M			19.05	28.45			1.86	E0180-026-0750S			1.55	E0180-026-0750X	24.20		1.55	
E0180-026-0880M			22.35	34.54			1.44	E0180-026-0880S			1.20	E0180-026-0880X	29.00		1.20	
E0180-026-1000M			25.40	39.88			1.19	E0180-026-1000S			0.99	E0180-026-1000X	33.42		0.99	
E0180-026-1120M			28.45	45.21			1.03	E0180-026-1120S			0.86	E0180-026-1120X	37.69		0.86	
E0180-026-1250M			31.75	51.05	18.68	1.78	0.89	E0180-026-1250S	15.56	1.48	0.74	E0180-026-1250X	42.45	9.44	1.48	
E0180-026-1370M			34.80	56.90			0.79	E0180-026-1370S			0.66	E0180-026-1370X	46.92		0.66	
E0180-026-1500M			38.10	62.74			0.70	E0180-026-1500S			0.58	E0180-026-1500X	51.74		0.58	
E0180-026-1750M			44.45	73.91			0.58	E0180-026-1750S			0.48	E0180-026-1750X	60.98		0.48	
E0180-026-2000M			50.80	85.34			0.49	E0180-026-2000S			0.41	E0180-026-2000X	70.28		0.41	
E0180-026-2250M	0.74		57.15	98.55			0.42	E0180-026-2250S			0.35	E0180-026-2250X	79.88		0.35	
E0180-026-2500M			63.50	110.24			0.37	E0180-026-2500S			0.31	E0180-026-2500X	89.48		0.31	
E0180-029-0620M			15.75	20.83			4.64	E0180-029-0620S			3.87	E0180-029-0620X	18.68		3.87	
E0180-029-0750M			19.05	26.16			3.31	E0180-029-0750S			2.76	E0180-029-0750X	23.16		2.76	
E0180-029-0880M			22.35	31.50			2.57	E0180-029-0880S			2.14	E0180-029-0880X	27.64		2.14	
E0180-029-1000M			25.40	36.32			2.14	E0180-029-1000S			1.78	E0180-029-1000X	31.77		1.78	
E0180-029-1120M			28.45	41.40			1.82	E0180-029-1120S			1.52	E0180-029-1120X	35.93		1.52	
E0180-029-1250M			31.75	46.74	25.89	2.31	1.58	E0180-029-1250S	21.57	1.92	1.31	E0180-029-1250X	40.39	13.27	1.93	
E0180-029-1370M			34.80	51.56			1.40	E0180-029-1370S			1.17	E0180-029-1370X	44.52		1.17	
E0180-029-1500M			38.10	56.90			1.24	E0180-029-1500S			1.04	E0180-029-1500X	49.05		1.04	
E0180-029-1750M			44.45	67.31			1.03	E0180-029-1750S			0.86	E0180-029-1750X	57.63		0.86	
E0180-029-2000M			50.80	77.47			0.88	E0180-029-2000S			0.73	E0180-029-2000X	66.35		0.73	
E0180-029-2250M	0.79		57.15	87.88			0.77	E0180-029-2250S			0.64	E0180-029-2250X	74.82		0.64	
E0180-029-2500M			63.50	98.04			0.68	E0180-029-2500S			0.57	E0180-029-2500X	83.44		0.57	
E0180-031-0500M			12.70	15.49			10.40	E0180-031-0500S			8.66	E0180-031-0500X	14.34		8.67	
E0180-031-0620M			15.75	20.07			6.62	E0180-031-0620S			5.51	E0180-031-0620X	18.32		5.51	
E0180-031-0750M			19.05	24.89			4.75	E0180-031-0750S			3.96	E0180-031-0750X	22.64		3.95	
E0180-031-0880M			22.35	29.97			3.70	E0180-031-0880S			3.08	E0180-031-0880X	26.97		3.08	
E0180-031-1000M			25.40	34.29	30.25	2.67	3.12	E0180-031-1000S	25.20	2.22	2.60	E0180-031-1000X	30.87	16.43	2.22	
E0180-031-1120M			28.45	38.86			2.66	E0180-031-1120S			2.22	E0180-031-1120X	34.86		2.22</td	

## EXTENSION SPRINGS

**302 STAINLESS STEEL / INOX**

316 STAINLESS STEEL / INOX

Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L1 (mm)	P (N)	T (N)	R (N/mm)			
E0180-031-1750M			44.45	62.48			1.52	E0180-031-1750S			1.27	E0180-031-1750X	55.64			1.27			
E0180-031-2000M			50.80	71.88			1.31	E0180-031-2000S			1.09	E0180-031-2000X	63.79			1.09			
E0180-031-2250M	0.79	57.15	81.28	30.25	2.67		1.14	E0180-031-2250S	25.20	2.22	0.95	E0180-031-2250X	72.13	16.43	2.22	0.95			
E0180-031-2500M								E0180-031-2500S				E0180-031-2500X							
E0180-031-2750M								E0180-031-2750S				E0180-031-2750X							
E0180-034-0620M			15.75	19.05			10.82	E0180-034-0620S			9.01	E0180-034-0620X	17.83			9.02			
E0180-034-0750M			19.05	23.62			7.83	E0180-034-0750S			6.52	E0180-034-0750X	21.93			6.52			
E0180-034-0880M			22.35	28.19			6.13	E0180-034-0880S			5.11	E0180-034-0880X	26.03			5.11			
E0180-034-1000M	4.57	25.40	32.51				5.11	E0180-034-1000S			4.26	E0180-034-1000X	29.81	21.80	3.00	4.26			
E0180-034-1120M								E0180-034-1120S				E0180-034-1120X							
E0180-034-1250M								E0180-034-1250S				E0180-034-1250X							
E0180-034-1370M		0.86	34.80	45.47	39.90	3.60	3.38	E0180-034-1370S	33.24	3.00	2.82	E0180-034-1370X	41.48						
E0180-034-1500M								E0180-034-1500S				E0180-034-1500X							
E0180-034-1750M			44.45	58.93			2.50	E0180-034-1750S			2.08	E0180-034-1750X	53.46			2.09			
E0180-034-2000M			50.80	67.82			2.14	E0180-034-2000S			1.78	E0180-034-2000X	61.36			1.78			
E0180-034-2250M			57.15	76.71			1.87	E0180-034-2250S			1.56	E0180-034-2250X	69.19			1.56			
E0180-034-2500M			63.50	85.34			1.66	E0180-034-2500S			1.39	E0180-034-2500X	77.07			1.39			
E0180-034-2750M			69.85	94.23			1.49	E0180-034-2750S			1.24	E0180-034-2750X	85.01			1.24			
E0240-018-0620M			15.75	32.51			0.28	E0240-018-0620S			0.23	E0240-018-0620X	23.43			0.23			
E0240-018-0750M			19.05	49.78			0.16	E0240-018-0750S			0.13	E0240-018-0750X	32.70			0.13			
E0240-018-0880M			22.35	68.07			0.11	E0240-018-0880S			0.09	E0240-018-0880X	42.83			0.09			
E0240-018-1000M			25.40	83.82			0.09	E0240-018-1000S			0.07	E0240-018-1000X	49.98			0.07			
E0240-018-1250M	0.46	31.75	118.11	5.25	0.49		0.05	E0240-018-1250S	4.37	0.41	0.04	E0240-018-1250X	72.71	2.20	0.41	0.04			
E0240-018-1500M								E0240-018-1500S				E0240-018-1500X							
E0240-018-2000M								E0240-018-2000S				E0240-018-2000X							
E0240-018-2500M								E0240-018-2500S				E0240-018-2500X							
E0240-018-2750M								E0240-018-2750S				E0240-018-2750X							
E0240-022-0620M			15.75	26.92			0.75	E0240-022-0620S			0.63	E0240-022-0620X	21.11			0.63			
E0240-022-0750M			19.05	38.86			0.42	E0240-022-0750S			0.35	E0240-022-0750X	28.66			0.35			
E0240-022-0880M			22.35	50.80			0.30	E0240-022-0880S			0.25	E0240-022-0880X	35.93			0.25			
E0240-022-1000M			25.40	61.98			0.23	E0240-022-1000S			0.19	E0240-022-1000X	43.15			0.19			
E0240-022-1120M			28.45	73.15			0.19	E0240-022-1120S			0.16	E0240-022-1120X	49.43			0.16			
E0240-022-1250M			31.75	85.09			0.16	E0240-022-1250S			0.13	E0240-022-1250X	57.39			0.13			
E0240-022-1370M	0.56	34.80	96.01	9.21	0.85		0.14	E0240-022-1370S	7.67	0.71	0.12	E0240-022-1370X	63.64	4.07	0.70	0.12			
E0240-022-1500M								E0240-022-1500S				E0240-022-1500X							
E0240-022-1750M								E0240-022-1750S				E0240-022-1750X							
E0240-022-2000M								E0240-022-2000S				E0240-022-2000X							
E0240-022-2250M								E0240-022-2250S				E0240-022-2250X							
E0240-022-2500M			57.15	177.29			0.07	E0240-022-2500S			0.06	E0240-022-2500X	114.84			0.06			
E0240-022-2750M			63.50	200.41			0.05	E0240-022-2750S			0.04	E0240-022-2750X	129.78			0.05			
E0240-022-3000M			69.85	223.52			0.05	E0240-022-3000S			0.04	E0240-022-3000X	146.77			0.04			
E0240-026-0500M			12.70	15.24			5.06	E0240-026-0500S			4.22	E0240-026-0500X	14.05			4.22			
E0240-026-0620M			15.75	23.62			1.70	E0240-026-0620S			1.42	E0240-026-0620X	19.76			1.42			
E0240-026-0750M			19.05	32.77			0.98	E0240-026-0750S			0.82	E0240-026-0750X	26.00			0.82			
E0240-026-0880M			22.35	41.66			0.70	E0240-026-0880S			0.58	E0240-026-0880X	32.08			0.58			
E0240-026-1000M			25.40	50.04			0.53	E0240-026-1000S			0.44	E0240-026-1000X	38.38			0.44			
E0240-026-1120M			28.45	58.67			0.44	E0240-026-1120S			0.37	E0240-026-1120X	44.02			0.37			
E0240-026-1250M	6.10	31.75	67.06		0.37		0.37	E0240-026-1250S	12.23	1.11	0.19	E0240-026-1250X	50.29	6.79	1.11	0.19			
E0240-026-1370M								E0240-026-1370S				E0240-026-1370X							
E0240-026-1500M								E0240-026-1500S				E0240-026-1500X							
E0240-026-1750M		0.66	44.45	100.33	14.68	1.33	0.23	E0240-026-1750S				E0240-026-1750X							
E0240-026-2000M								E0240-026-2000S				E0240-026-2000X							
E0240-026-2250M			50.80	116.84			0.19	E0240-026-2250S			0.15	E0240-026-2250X	96.08			0.15			
E0240-026-2500M			57.15	136.65			0.18	E0240-026-2500S			0.12	E0240-026-2500X	112.16			0.12			
E0240-026-2750M			63.50	153.92			0.14	E0240-026-2750S			0.12	E0240-026-2750X	118.51			0.12			
E0240-026-3000M			69.85	171.20			0.14	E0240-026-3000S			0.10	E0240-026-3000X	131.81			0.10			
E0240-026-3500M			76.20	188.47			0.12	E0240-026-3500S			0.09	E0240-026-3500X	153.78			0.09			
E0240-026-4000M			88.90	222.50			0.11	E0240-026-4000S			0.07	E0240-026-4000X	179.45			0.07			
E0240-026-4500M			101.60	257.56			0.09	E0240-026-4500S			0.06	E0240-026-4500X	211.62			0.06			
E0240-026-5000M			114.30	291.85			0.07	E0240-026-5000S			0.06	E0240-026-5000X	224.32			0.06			
E0240-029-0620M			15.75	22.10			2.89	E0240-029-0620S			2.41	E0240-029-0620X	19.08			2.41			
E0240-029-0750M			19.05	29.72			1.72	E0240-029-0750S			1.43	E0240-029-0750X	24.65			1.43			
E0240-029-0880M			22.35	37.34			1.23	E0240-029-0880S			1.02	E0240-029-0880X	30.19			1.02			
E0240-029-1000M			25.40	44.20			0.96	E0240-029-1000S			0.80	E0240-029-1000X	35.38			0.80			
E0240-029-1120M			28.45	51.31			0.79	E0240-029-1120S			0.66	E0240-029-1120X	40.65			0.66			
E0240-029-1250M	0.74	31.75	58.93	20.02	1.78		0.67	E0240-029-1250S	16.68	1.48	0.55	E0240-029-1250X	46.20	9.49	1.48	0.55			
E0240-029-1370M								E0240-029-1370S				E0240-029-1370X							



EXTENSION SPRINGS							302 STAINLESS STEEL / INOX				316 STAINLESS STEEL / INOX					
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)
E0240-029-2750M			69.85	146.56			0.25	E0240-029-2750S			0.20	E0240-029-2750X	109.06			0.20
E0240-029-3000M			76.20	161.04			0.21	E0240-029-3000S			0.18	E0240-029-3000X	121.95			0.18
E0240-029-3500M	0.74		88.90	190.75	20.02	1.78	0.18	E0240-029-3500S	16.68	1.48	0.15	E0240-029-3500X	143.80	9.49	1.48	0.15
E0240-029-4000M			101.60	219.71			0.16	E0240-029-4000S			0.13	E0240-029-4000X	162.60			0.13
E0240-029-4500M			114.30	249.43			0.14	E0240-029-4500S			0.12	E0240-029-4500X	182.92			0.12
E0240-029-5000M			127.00	278.38			0.12	E0240-029-5000S			0.10	E0240-029-5000X	205.42			0.10
E0240-031-0620M			15.75	21.34			2.52	E0240-031-0620S			3.32	E0240-031-0620X	18.70			3.33
E0240-031-0750M			19.05	28.19			2.42	E0240-031-0750S			2.02	E0240-031-0750X	23.93			2.01
E0240-031-0880M			22.35	35.05			1.73	E0240-031-0880S			1.44	E0240-031-0880X	29.15			1.44
E0240-031-1000M			25.40	41.66			1.31	E0240-031-1000S			1.09	E0240-031-1000X	34.37			1.09
E0240-031-1120M			28.45	48.01			1.14	E0240-031-1120S			0.95	E0240-031-1120X	38.80			0.95
E0240-031-1250M			31.75	54.36			0.93	E0240-031-1250S			0.77	E0240-031-1250X	44.45			0.77
E0240-031-1370M			34.80	59.94			0.84	E0240-031-1370S			0.70	E0240-031-1370X	48.82			0.70
E0240-031-1500M			38.10	67.06			0.74	E0240-031-1500S			0.61	E0240-031-1500X	54.12			0.61
E0240-031-1750M	0.79		44.45	80.01	23.58	2.22	0.60	E0240-031-1750S	19.64	1.85	0.50	E0240-031-1750X	64.24	11.67	1.85	0.50
E0240-031-2000M			50.80	92.71			0.51	E0240-031-2000S			0.42	E0240-031-2000X	74.01			0.42
E0240-031-2250M			57.15	105.66			0.44	E0240-031-2250S			0.37	E0240-031-2250X	84.07			0.37
E0240-031-2500M			63.50	118.36			0.39	E0240-031-2500S			0.32	E0240-031-2500X	94.09			0.32
E0240-031-2750M			69.85	134.37			0.33	E0240-031-2750S			0.28	E0240-031-2750X	105.27			0.28
E0240-031-3000M			76.20	147.57			0.30	E0240-031-3000S			0.25	E0240-031-3000X	115.79			0.25
E0240-031-3500M			88.90	172.21			0.26	E0240-031-3500S			0.22	E0240-031-3500X	133.77			0.22
E0240-031-4000M			101.60	198.37			0.23	E0240-031-4000S			0.19	E0240-031-4000X	153.37			0.19
E0240-031-4500M			114.30	224.54			0.19	E0240-031-4500S			0.16	E0240-031-4500X	175.48			0.16
E0240-031-5000M			127.00	250.70			0.18	E0240-031-5000S			0.15	E0240-031-5000X	194.30			0.15
E0240-034-0620M			15.75	20.32			6.30	E0240-034-0620S			5.25	E0240-034-0620X	18.24			5.25
E0240-034-0750M			19.05	26.42			3.87	E0240-034-0750S			3.22	E0240-034-0750X	23.11			3.22
E0240-034-0880M			22.35	32.00			2.80	E0240-034-0880S			2.33	E0240-034-0880X	27.97			2.33
E0240-034-1000M			25.40	38.10			2.22	E0240-034-1000S			1.85	E0240-034-1000X	32.47			1.85
E0240-034-1120M			28.45	43.69			1.86	E0240-034-1120S			1.55	E0240-034-1120X	36.92			1.55
E0240-034-1250M			31.75	49.78			1.56	E0240-034-1250S			1.30	E0240-034-1250X	41.84			1.30
E0240-034-1370M			34.80	55.37			1.37	E0240-034-1370S			1.14	E0240-034-1370X	46.31			1.14
E0240-034-1500M			38.10	61.47			1.21	E0240-034-1500S			1.01	E0240-034-1500X	51.12			1.01
E0240-034-1750M	0.86		44.45	73.41	31.14	2.89	0.98	E0240-034-1750S	25.94	2.41	0.82	E0240-034-1750X	60.49	15.51	2.41	0.82
E0240-034-2000M			50.80	85.09			0.82	E0240-034-2000S			0.69	E0240-034-2000X	69.91			0.69
E0240-034-2250M			57.15	96.77			0.72	E0240-034-2250S			0.60	E0240-034-2250X	79.06			0.60
E0240-034-2500M	6.10		63.50	108.46			0.63	E0240-034-2500S			0.53	E0240-034-2500X	88.45			0.53
E0240-034-2750M			69.85	120.40			0.56	E0240-034-2750S			0.47	E0240-034-2750X	97.92			0.47
E0240-034-3000M			76.20	132.08			0.51	E0240-034-3000S			0.42	E0240-034-3000X	107.17			0.42
E0240-034-3500M			88.90	155.70			0.42	E0240-034-3500S			0.35	E0240-034-3500X	126.32			0.35
E0240-034-4000M			101.60	179.07			0.37	E0240-034-4000S			0.31	E0240-034-4000X	144.37			0.31
E0240-034-4500M			114.30	202.44			0.32	E0240-034-4500S			0.26	E0240-034-4500X	164.20			0.26
E0240-034-5000M			127.00	226.06			0.28	E0240-034-5000S			0.23	E0240-034-5000X	183.13			0.23
E0240-037-0620M			15.75	19.56			9.58	E0240-037-0620S			7.98	E0240-037-0620X	17.90			7.98
E0240-037-0750M			19.05	24.89			6.01	E0240-037-0750S			5.01	E0240-037-0750X	22.49			5.00
E0240-037-1000M			25.40	35.56			3.47	E0240-037-1000S			2.89	E0240-037-1000X	31.35			2.89
E0240-037-1120M			28.45	40.89			2.87	E0240-037-1120S			2.39	E0240-037-1120X	35.64			2.39
E0240-037-1250M			31.75	45.97			2.45	E0240-037-1250S			2.04	E0240-037-1250X	40.17			2.04
E0240-037-1370M			34.80	51.05			2.17	E0240-037-1370S			1.81	E0240-037-1370X	44.30			1.81
E0240-037-1500M			38.10	55.88			1.96	E0240-037-1500S			1.63	E0240-037-1500X	48.63			1.63
E0240-037-1750M			44.45	66.80			1.56	E0240-037-1750S			1.30	E0240-037-1750X	57.70			1.30
E0240-037-2000M	0.94		50.80	77.22	38.70	3.56	1.33	E0240-037-2000S	32.24	2.97	1.11	E0240-037-2000X	66.31	20.16	2.96	1.11
E0240-037-2250M			57.15	87.63			1.14	E0240-037-2250S			0.95	E0240-037-2250X	75.29			0.95
E0240-037-2500M			63.50	97.79			1.02	E0240-037-2500S			0.85	E0240-037-2500X	83.82			0.85
E0240-037-2750M			69.85	108.46			0.91	E0240-037-2750S			0.76	E0240-037-2750X	92.52			0.76
E0240-037-3000M			76.20	118.62			0.82	E0240-037-3000S			0.69	E0240-037-3000X	101.28			0.69
E0240-037-3250M			82.55	131.06			0.74	E0240-037-3250S			0.61	E0240-037-3250X	110.62			0.61
E0240-037-3500M			88.90	141.73			0.67	E0240-037-3500S			0.55	E0240-037-3500X	119.92			0.55
E0240-037-4000M			101.60	162.05			0.58	E0240-037-4000S			0.48	E0240-037-4000X	137.32			0.48
E0240-037-4500M			114.30	183.39			0.51	E0240-037-4500S			0.42	E0240-037-4500X	154.95			0.42
E0240-037-5000M			127.00	204.47			0.46	E0240-037-5000S			0.38	E0240-037-5000X	172.34			0.38
E0240-041-0750M			19.05	23.62			10.24	E0240-041-0750S			8.53	E0240-041-0750X	21.84			8.53
E0240-041-1000M			25.40	33.27			6.06	E0240-041-1000S			5.05	E0240-041-1000X	30.13			5.05
E0240-041-1120M			28.45	37.85			5.06	E0240-041-1120S			4.22	E0240-041-1120X	34.11			4.22
E0240-041-1250M			31.75	42.67			4.29	E0240-041-1250S			3.57	E0240-041-1250X	38.42			3.57
E0240-041-1370M			34.80	47.24			3.77	E0240-041-1370S			3.14	E0240-041-1370X	42.40			3.14
E0240-041-1500M	1.04		38.10	52.32	51.82	4.67	3.33	E0240-041-1500S	43.17	3.89	2.77	E0240-041-1500X	46.70	27.74	3.89	2.77
E0240-041-1750M			44.45	61.72			2.71	E0240-041-1750S			2.26	E0240-041-1750X	55.00			2.26
E0240-041-2000M			50.80	71.37			2.29	E0240-041-2000S			1.91	E0240-041-2000X	63.28			

EXTENSION SPRINGS						302 STAINLESS STEEL / INOX				316 STAINLESS STEEL / INOX						
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)
E0240-041-3000M	6.10	1.04	76.20	109.47	51.82	4.67	1.42	E0240-041-3000S	43.17	3.89	1.18	E0240-041-3000X	96.38	27.74	3.89	1.18
E0240-041-3500M								E0240-041-3500S				E0240-041-3500X				0.99
E0240-041-4000M								E0240-041-4000S				E0240-041-4000X				0.86
E0240-041-4500M								E0240-041-4500S				E0240-041-4500X				0.74
E0240-041-5000M								E0240-041-5000S				E0240-041-5000X				0.67
E0300-031-1000M	0.79	19.53	25.40	46.74	1.73	0.82	E0300-031-1000S	16.27	1.44	0.69	E0300-031-1000X	36.51	9.06	1.45	0.69	
E0300-031-1120M								E0300-031-1120S				E0300-031-1120X				0.54
E0300-031-1250M								E0300-031-1250S				E0300-031-1250X				0.44
E0300-031-1370M								E0300-031-1370S				E0300-031-1370X				0.38
E0300-031-1500M								E0300-031-1500S				E0300-031-1500X				0.32
E0300-031-1750M								E0300-031-1750S				E0300-031-1750X				0.26
E0300-031-2000M								E0300-031-2000S				E0300-031-2000X				0.22
E0300-031-2250M								E0300-031-2250S				E0300-031-2250X				0.18
E0300-031-2500M								E0300-031-2500S				E0300-031-2500X				0.16
E0300-031-2750M								E0300-031-2750S				E0300-031-2750X				0.15
E0300-031-3000M								E0300-031-3000S				E0300-031-3000X				0.13
E0300-037-0750M	7.62	32.03	19.05	25.65	2.89	4.45	E0300-037-0750S	26.68	2.41	3.71	E0300-037-0750X	22.60	15.56	2.41	0.71	
E0300-037-1000M								E0300-037-1000S				E0300-037-1000X				1.72
E0300-037-1120M								E0300-037-1120S				E0300-037-1120X				1.37
E0300-037-1250M								E0300-037-1250S				E0300-037-1250X				1.12
E0300-037-1370M								E0300-037-1370S				E0300-037-1370X				0.96
E0300-037-1500M								E0300-037-1500S				E0300-037-1500X				0.83
E0300-037-1750M								E0300-037-1750S				E0300-037-1750X				0.66
E0300-037-2000M								E0300-037-2000S				E0300-037-2000X				0.54
E0300-037-2250M								E0300-037-2250S				E0300-037-2250X				0.47
E0300-037-2500M								E0300-037-2500S				E0300-037-2500X				0.41
E0300-037-2750M								E0300-037-2750S				E0300-037-2750X				0.37
E0300-037-3000M								E0300-037-3000S				E0300-037-3000X				0.32
E0300-049-1000M	1.24	69.39	25.40	32.51	6.23	8.88	E0300-049-1000S	57.80	5.19	7.40	E0300-049-1000X	29.69	36.90	5.19	2.98	
E0300-049-1120M								E0300-049-1120S				E0300-049-1120X				5.98
E0300-049-1250M								E0300-049-1250S				E0300-049-1250X				4.95
E0300-049-1370M								E0300-049-1370S				E0300-049-1370X				4.27
E0300-049-1500M								E0300-049-1500S				E0300-049-1500X				3.72
E0300-049-1750M								E0300-049-1750S				E0300-049-1750X				2.98
E0300-049-2000M								E0300-049-2000S				E0300-049-2000X				2.48
E0300-049-2250M								E0300-049-2250S				E0300-049-2250X				2.13
E0300-049-2500M								E0300-049-2500S				E0300-049-2500X				1.87
E0300-049-2750M								E0300-049-2750S				E0300-049-2750X				1.66
E0300-049-3000M								E0300-049-3000S				E0300-049-3000X				1.49
E0300-055-1000M	9.14	69.71	25.40	30.73	10.01	8.54	16.34	E0300-055-1000S	78.96	7.11	13.61	E0300-055-1000X	28.73	36.90	7.11	5.62
E0300-055-1120M								E0300-055-1120S				E0300-055-1120X				11.09
E0300-055-1250M								E0300-055-1250S				E0300-055-1250X				9.23
E0300-055-1370M								E0300-055-1370S				E0300-055-1370X				7.99
E0300-055-1500M								E0300-055-1500S				E0300-055-1500X				6.99
E0300-055-1750M								E0300-055-1750S				E0300-055-1750X				5.62
E0300-055-2000M								E0300-055-2000S				E0300-055-2000X				4.70
E0300-055-2250M								E0300-055-2250S				E0300-055-2250X				4.04
E0300-055-2500M								E0300-055-2500S				E0300-055-2500X				3.55
E0300-055-2750M								E0300-055-2750S				E0300-055-2750X				3.15
E0300-055-3000M								E0300-055-3000S				E0300-055-3000X				2.85
E0360-026-1000M	0.66	10.01	25.40	58.93	10.01	0.89	0.26	E0360-026-1000S	8.34	0.74	0.22	E0360-026-1000X	41.89	4.35	0.74	0.22
E0360-026-1120M								E0360-026-1120S				E0360-026-1120X				0.16
E0360-026-1250M								E0360-026-1250S				E0360-026-1250X				0.12
E0360-026-1370M								E0360-026-1370S				E0360-026-1370X				0.

EXTENSION SPRINGS							302 STAINLESS STEEL / INOX				316 STAINLESS STEEL / INOX					
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)
E0360-034-1370M			34.80	75.44			0.47	E0360-034-1370S			0.39	E0360-034-1370X	55.63			0.39
E0360-034-1500M			38.10	86.36			0.40	E0360-034-1500S			0.34	E0360-034-1500X	62.56			0.34
E0360-034-1750M			44.45	107.44			0.32	E0360-034-1750S			0.26	E0360-034-1750X	75.71			0.26
E0360-034-2000M			50.80	128.52			0.25	E0360-034-2000S			0.20	E0360-034-2000X	90.99			0.20
E0360-034-2250M			57.15	149.86			0.21	E0360-034-2250S			0.18	E0360-034-2250X	104.03			0.18
E0360-034-2500M	0.86	63.50	170.18	21.26	1.91		0.18	E0360-034-2500S	17.71	1.59	0.15	E0360-034-2500X	119.76	9.80	1.59	0.15
E0360-034-2750M		69.85	191.52				0.16	E0360-034-2750S			0.13	E0360-034-2750X	132.36			0.13
E0360-034-3000M		76.20	212.60				0.14	E0360-034-3000S			0.12	E0360-034-3000X	146.52			0.12
E0360-034-3500M		88.90	254.25				0.12	E0360-034-3500S			0.10	E0360-034-3500X	169.27			0.10
E0360-034-4000M		101.60	296.93				0.11	E0360-034-4000S			0.09	E0360-034-4000X	195.37			0.09
E0360-034-4500M		114.30	338.58				0.09	E0360-034-4500S			0.07	E0360-034-4500X	226.82			0.07
E0360-034-5000M		127.00	379.98				0.07	E0360-034-5000S			0.06	E0360-034-5000X	267.65			0.06
E0360-037-0750M		19.05	23.11				6.18	E0360-037-0750S			5.15	E0360-037-0750X	21.15			5.15
E0360-037-1000M		25.40	42.67				1.38	E0360-037-1000S			1.15	E0360-037-1000X	34.79			1.15
E0360-037-1120M		28.45	51.82				1.03	E0360-037-1120S			0.86	E0360-037-1120X	41.02			0.86
E0360-037-1250M		31.75	60.71				0.82	E0360-037-1250S			0.69	E0360-037-1250X	47.53			0.69
E0360-037-1370M		34.80	68.83				0.70	E0360-037-1370S			0.58	E0360-037-1370X	53.34			0.58
E0360-037-1500M		38.10	77.72				0.60	E0360-037-1500S			0.50	E0360-037-1500X	59.91			0.50
E0360-037-1750M		44.45	95.76				0.46	E0360-037-1750S			0.38	E0360-037-1750X	72.97			0.38
E0360-037-2000M	0.94	50.80	112.78	26.24	2.22		0.39	E0360-037-2000S	21.86	1.85	0.32	E0360-037-2000X	84.51	12.67	1.85	0.32
E0360-037-2250M		57.15	130.56				0.32	E0360-037-2250S			0.26	E0360-037-2250X	98.35			0.26
E0360-037-2500M		63.50	147.57				0.28	E0360-037-2500S			0.23	E0360-037-2500X	109.85			0.23
E0360-037-2750M		69.85	168.66				0.25	E0360-037-2750S			0.20	E0360-037-2750X	122.82			0.20
E0360-037-3000M		76.20	186.69				0.23	E0360-037-3000S			0.19	E0360-037-3000X	133.24			0.19
E0360-037-3500M		88.90	220.22				0.18	E0360-037-3500S			0.15	E0360-037-3500X	163.06			0.15
E0360-037-4000M		101.60	256.03				0.16	E0360-037-4000S			0.13	E0360-037-4000X	184.00			0.13
E0360-037-4500M		114.30	291.85				0.14	E0360-037-4500S			0.12	E0360-037-4500X	207.00			0.12
E0360-037-5000M		127.00	327.66				0.12	E0360-037-5000S			0.10	E0360-037-5000X	232.94			0.10
E0360-039-1000M		25.40	39.62				2.01	E0360-039-1000S			1.67	E0360-039-1000X	32.87			1.68
E0360-039-1120M		28.45	47.50				1.49	E0360-039-1120S			1.24	E0360-039-1120X	38.55			1.24
E0360-039-1250M		31.75	56.13				1.16	E0360-039-1250S			0.96	E0360-039-1250X	44.76			0.96
E0360-039-1370M		34.80	64.26				0.96	E0360-039-1370S			0.80	E0360-039-1370X	50.41			0.80
E0360-039-1500M		38.10	72.90				0.82	E0360-039-1500S			0.69	E0360-039-1500X	56.37			0.69
E0360-039-1750M	0.99	44.45	89.66	31.23	2.80		0.63	E0360-039-1750S	26.01	2.33	0.53	E0360-039-1750X	68.30	14.86	2.33	0.53
E0360-039-2000M		50.80	106.43				0.51	E0360-039-2000S			0.42	E0360-039-2000X	80.41			0.42
E0360-039-2250M	9.14	57.15	122.94				0.44	E0360-039-2250S			0.37	E0360-039-2250X	91.50			0.37
E0360-039-2500M		63.50	139.70				0.37	E0360-039-2500S			0.31	E0360-039-2500X	104.39			0.31
E0360-039-2750M		69.85	156.46				0.33	E0360-039-2750S			0.28	E0360-039-2750X	115.04			0.28
E0360-039-3000M		76.20	173.23				0.30	E0360-039-3000S			0.25	E0360-039-3000X	126.71			0.25
E0360-041-0750M		19.05	22.61				9.23	E0360-041-0750S			7.69	E0360-041-0750X	20.96			7.69
E0360-041-1000M		25.40	39.37				2.26	E0360-041-1000S			1.88	E0360-041-1000X	33.22			1.88
E0360-041-1120M		28.45	46.99				1.73	E0360-041-1120S			1.44	E0360-041-1120X	38.63			1.44
E0360-041-1250M		31.75	54.36				1.42	E0360-041-1250S			1.18	E0360-041-1250X	44.20			1.18
E0360-041-1370M		34.80	61.72				1.19	E0360-041-1370S			0.99	E0360-041-1370X	49.62			0.99
E0360-041-1500M		38.10	69.09				1.03	E0360-041-1500S			0.86	E0360-041-1500X	55.19			0.86
E0360-041-1750M		44.45	83.82				0.81	E0360-041-1750S			0.67	E0360-041-1750X	66.37			0.67
E0360-041-2000M	1.04	50.80	98.81	35.14	3.11		0.67	E0360-041-2000S	29.27	2.59	0.55	E0360-041-2000X	77.33	17.30	2.59	0.55
E0360-041-2250M		57.15	114.30				0.56	E0360-041-2250S			0.47	E0360-041-2250X	88.65			0.47
E0360-041-2500M		63.50	129.03				0.47	E0360-041-2500S			0.39	E0360-041-2500X	100.84			0.39
E0360-041-2750M		69.85	146.05				0.42	E0360-041-2750S			0.35	E0360-041-2750X	111.86			0.35
E0360-041-3000M		76.20	161.54				0.39	E0360-041-3000S			0.32	E0360-041-3000X	122.03			0.32
E0360-041-3500M		88.90	192.53				0.32	E0360-041-3500S			0.26	E0360-041-3500X	144.91			0.26
E0360-041-4000M		101.60	220.73				0.26	E0360-041-4000S			0.22	E0360-041-4000X	168.81			0.22
E0360-041-4500M		114.30	251.71				0.23	E0360-041-4500S			0.19	E0360-041-4500X	191.85			0.19
E0360-041-5000M		127.00	281.94				0.21	E0360-041-5000S			0.18	E0360-041-5000X	211.01			0.18
E0360-045-0750M		19.05	22.10				13.40	E0360-045-0750S			11.16	E0360-045-0750X	20.81			11.16
E0360-045-1000M		25.40	36.32				3.82	E0360-045-1000S			3.18	E0360-045-1000X	31.58			3.18
E0360-045-1120M		28.45	42.93				2.87	E0360-045-1120S			2.39	E0360-045-1120X	36.66			2.39
E0360-045-1250M		31.75	49.02				2.38	E0360-045-1250S			1.98	E0360-045-1250X	41.65			1.98
E0360-045-1370M		34.80	55.88				1.96	E0360-045-1370S			1.63	E0360-045-1370X	46.82			1.63
E0360-045-1500M		38.10	62.74				1.68	E0360-045-1500S			1.40	E0360-045-1500X	52.13			1.40
E0360-045-1750M		44.45	75.69				1.31	E0360-045-1750S			1.09	E0360-045-1750X	62.41			1.09
E0360-045-2000M	1.14	50.80	88.65	45.37	4.00		1.09	E0360-045-2000S	37.79	3.33	0.91	E0360-045-2000X	72.52	22.98	3.33	0.90
E0360-045-2250M		57.15	101.60				0.93	E0360-045-2250S			0.77	E0360-045-2250X	82.56			0.77
E0360-045-2500M		63.50	114.55				0.81	E0360-045-2500S			0.67	E0360-045-2500X	92.78			0.67
E0360-045-2750M		69.85	127.51				0.72	E0360-045-2750S			0.60	E0360-045-2750X	102.70			0.60
E0360-045-3000M		76.20	140.46				0.63	E0360-045-3000S			0.53	E0360-045-3000X	113.61			0.53
E0360-045-3500M		88.90	170.43				0.53	E0360-045-3500S			0.44	E0360-045-3500X	1			

EXTENSION SPRINGS						302 STAINLESS STEEL / INOX				316 STAINLESS STEEL / INOX							
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	
E0360-045-5500M		1.14	139.70	275.08	45.37	4.00	0.30	E0360-045-5500S	37.79	3.33	0.25	E0360-045-5500X	218.92	22.98	3.33	0.25	
E0360-045-6000M			152.40	301.50			0.28	E0360-045-6000S			0.23	E0360-045-6000X	236.57			0.23	
E0360-049-1000M			25.40	33.78			6.30	E0360-049-1000S			5.25	E0360-049-1000X	30.22			5.25	
E0360-049-1120M			28.45	39.62			4.78	E0360-049-1120S			3.98	E0360-049-1120X	34.81			3.98	
E0360-049-1250M			31.75	45.97			3.78	E0360-049-1250S			3.15	E0360-049-1250X	39.79			3.15	
E0360-049-1370M			34.80	51.56			3.17	E0360-049-1370S			2.64	E0360-049-1370X	44.39			2.64	
E0360-049-1500M			38.10	57.91			2.70	E0360-049-1500S			2.25	E0360-049-1500X	49.38			2.25	
E0360-049-1750M			44.45	69.85			2.10	E0360-049-1750S			1.75	E0360-049-1750X	58.92			1.75	
E0360-049-2000M			50.80	82.04			1.72	E0360-049-2000S			1.43	E0360-049-2000X	68.52			1.43	
E0360-049-2250M			57.15	93.98			1.45	E0360-049-2250S			1.21	E0360-049-2250X	78.07			1.21	
E0360-049-2500M		1.24	63.50	105.92	58.72	5.34	1.26	E0360-049-2500S	48.91	4.45	1.05	E0360-049-2500X	87.62	29.78	4.45	1.05	
E0360-049-2750M			69.85	118.11			1.12	E0360-049-2750S			0.93	E0360-049-2750X	96.99			0.93	
E0360-049-3000M			76.20	130.05			1.00	E0360-049-3000S			0.83	E0360-049-3000X	106.67			0.83	
E0360-049-3500M			88.90	154.18			0.82	E0360-049-3500S			0.69	E0360-049-3500X	125.85			0.69	
E0360-049-4000M			101.60	178.05			0.70	E0360-049-4000S			0.58	E0360-049-4000X	145.02			0.58	
E0360-049-4500M			114.30	202.18			0.61	E0360-049-4500S			0.51	E0360-049-4500X	163.92			0.51	
E0360-049-5000M			127.00	226.06			0.54	E0360-049-5000S			0.45	E0360-049-5000X	183.02			0.45	
E0360-049-5500M			139.70	249.68			0.49	E0360-049-5500S			0.41	E0360-049-5500X	201.72			0.41	
E0360-049-6000M			152.40	273.56			0.44	E0360-049-6000S			0.37	E0360-049-6000X	221.87			0.37	
E0360-055-1000M			25.40	32.00			11.31	E0360-055-1000S			9.42	E0360-055-1000X	29.27			9.42	
E0360-055-1120M			28.45	37.85			8.04	E0360-055-1120S			6.70	E0360-055-1120X	33.90			6.70	
E0360-055-1250M			31.75	42.16			6.76	E0360-055-1250S			5.63	E0360-055-1250X	38.23			5.63	
E0360-055-1370M			34.80	47.50			5.62	E0360-055-1370S			4.68	E0360-055-1370X	42.59			4.68	
E0360-055-1500M			38.10	52.32			4.97	E0360-055-1500S			4.14	E0360-055-1500X	46.90			4.14	
E0360-055-1750M			44.45	62.48			3.92	E0360-055-1750S			3.27	E0360-055-1750X	55.61			3.27	
E0360-055-2000M			50.80	72.90			3.19	E0360-055-2000S			2.66	E0360-055-2000X	64.54			2.66	
E0360-055-2250M	9.14		57.15	83.31			2.71	E0360-055-2250S			2.26	E0360-055-2250X	73.28			2.26	
E0360-055-2500M		1.40	63.50	93.47	78.29	7.12	2.38	E0360-055-2500S	65.22	5.93	1.98	E0360-055-2500X	81.88	42.40	5.93	1.98	
E0360-055-2750M			69.85	103.38			2.10	E0360-055-2750S			1.75	E0360-055-2750X	90.69			1.75	
E0360-055-3000M			76.20	113.54			1.89	E0360-055-3000S			1.58	E0360-055-3000X	99.35			1.58	
E0360-055-3500M			88.90	133.86			1.58	E0360-055-3500S			1.31	E0360-055-3500X	116.68			1.31	
E0360-055-4000M			101.60	154.94			1.35	E0360-055-4000S			1.12	E0360-055-4000X	134.07			1.12	
E0360-055-4500M			114.30	172.97			1.17	E0360-055-4500S			0.98	E0360-055-4500X	151.62			0.98	
E0360-055-5000M			127.00	199.39			1.02	E0360-055-5000S			0.85	E0360-055-5000X	170.11			0.85	
E0360-055-5500M			139.70	220.47			0.91	E0360-055-5500S			0.76	E0360-055-5500X	187.78			0.76	
E0360-055-6000M			152.40	241.30			0.82	E0360-055-6000S			0.69	E0360-055-6000X	205.60			0.69	
E0360-058-1000M			25.40	31.24			14.80	E0360-058-1000S			12.33	E0360-058-1000X	28.88			12.33	
E0360-058-1120M			28.45	35.81			11.42	E0360-058-1120S			9.51	E0360-058-1120X	32.96			9.51	
E0360-058-1250M			31.75	41.15			9.16	E0360-058-1250S			7.63	E0360-058-1250X	37.38			7.63	
E0360-058-1370M			34.80	45.72			7.74	E0360-058-1370S			6.45	E0360-058-1370X	41.45			6.45	
E0360-058-1500M			38.10	51.05			6.62	E0360-058-1500S			5.51	E0360-058-1500X	45.88			5.51	
E0360-058-1750M			44.45	60.96			5.20	E0360-058-1750S			4.33	E0360-058-1750X	54.36			4.33	
E0360-058-2000M			50.80	70.61			4.27	E0360-058-2000S			3.56	E0360-058-2000X	62.86			3.56	
E0360-058-2250M	1.47	57.15	80.52	93.50	8.41	3.63	3.63	E0360-058-2250S	77.89	7.01	3.02	E0360-058-2250X	71.36	49.92	7.00	3.02	
E0360-058-2500M			63.50	90.42			3.15	E0360-058-2500S			2.62	E0360-058-2500X	79.84			2.62	
E0360-058-2750M			69.85	100.33			2.78	E0360-058-2750S			2.32	E0360-058-2750X	88.35			2.32	
E0360-058-3000M			76.20	110.24			2.49	E0360-058-3000S			2.07	E0360-058-3000X	96.92			2.07	
E0360-058-3500M			88.90	130.05			2.07	E0360-058-3500S			1.72	E0360-058-3500X	113.83			1.72	
E0360-058-4000M			101.60	149.61			1.77	E0360-058-4000S			1.47	E0360-058-4000X	130.73			1.47	
E0360-058-4500M			114.30	169.93			1.52	E0360-058-4500S			1.27	E0360-058-4500X	148.12			1.27	
E0360-058-5000M			127.00	189.48			1.37	E0360-058-5000S			1.14	E0360-058-5000X	164.72			1.14	
E0360-058-5500M			139.70	209.30			1.23	E0360-058-5500S			1.02	E0360-058-5500X	181.73			1.02	
E0360-058-6000M			152.40	228.85			1.12	E0360-058-6000S			0.93	E0360-058-6000X	198.37			0.93	
E0420-037-1000M			25.40	39.12			1.54	E0420-037-1000S			1.28	E0420-037-1000X	32.28			1.28	
E0420-037-1120M			28.45	50.29			0.96	E0420-037-1120S			0.80	E0420-037-1120X	39.45			0.80	
E0420-037-1250M			31.75	62.48			0.68	E0420-037-1250S			0.57	E0420-037-1250X	47.27			0.57	
E0420-037-1370M			34.80	73.91			0.54	E0420-037-1370S			0.45	E0420-037-1370X	54.32			0.45	
E0420-037-1500M			38.10	86.11			0.44	E0420-037-1500S			0.37	E0420-037-1500X	62.31			0.37	
E0420-037-1750M	0.94	44.45	109.47	23.13	2.22	0.33	0.33	E0420-037-1750S	19.27	1.85	0.28	E0420-037-1750X	76.30	10.68	1.85	0.28	
E0420-037-2000M			50.80	132.84			0.26	E0420-037-2000S			0.22	E0420-037-2000X	91.14			0.22	
E0420-037-2250M			57.15	156.21			0.21	E0420-037-2250S			0.18	E0420-037-2250X	107.58			0.18	
E0420-037-2500M			63.50	179.58			0.18	E0420-037-2500S			0.15	E0420-037-2500X	124.01			0.15	
E0420-037-2750M	10.67		69.85	202.95			0.16	E0420-037-2750S			0.13	E0420-037-2750X	137.09			0.13	
E0420-037-3000M			76.20	226.57			0.14	E0420-037-3000S			0.12	E0420-037-3000X	151.84			0.12	
E0420-045-1000M			25.40	35.05			3.85	E0420-045-1000S			3.21	E0420-045-1000X	30.47			3.21	
E0420-045-1120M			28.45	42.93			2.52	E0420-045-1120S			2.10	E0420-045-1120X	36.19			2.10	
E0420-045-1250M			31.75	51.82			1.84	E0420-045-1250S			1.53	E0420-045-1250X	42.37			1.53	
E0420-045-1370M	1.14	34.80	59.69	40.30	3.65	1.											

EXTENSION SPRINGS							302 STAINLESS STEEL / INOX				316 STAINLESS STEEL / INOX					
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)
E0420-045-2250M	10.67	1.14	57.15	118.62			0.60	E0420-045-2250S			0.50	E0420-045-2250X	89.94	19.30	3.04	0.50
E0420-045-2500M			63.50	135.38	40.30	3.65	0.51	E0420-045-2500S	33.57	3.04	0.42	E0420-045-2500X	101.94			
E0420-045-2750M			69.85	152.15			0.44	E0420-045-2750S			0.37	E0420-045-2750X	114.44			
E0420-045-3000M			76.20	168.91			0.40	E0420-045-3000S			0.34	E0420-045-3000X	124.67			
E0420-055-1000M			25.40	31.75			9.91	E0420-055-1000S			8.26	E0420-055-1000X	29.06			8.26
E0420-055-1120M			28.45	37.85			6.79	E0420-055-1120S			5.66	E0420-055-1120X	33.79			5.66
E0420-055-1250M			31.75	44.45			5.08	E0420-055-1250S			4.23	E0420-055-1250X	38.90			4.23
E0420-055-1370M			34.80	50.29			4.12	E0420-055-1370S			3.43	E0420-055-1370X	43.62			3.43
E0420-055-1500M			38.10	56.90			3.41	E0420-055-1500S			2.84	E0420-055-1500X	48.73			2.85
E0420-055-1750M	1.40	44.45	69.34	70.28	6.23		2.57	E0420-055-1750S	58.54	5.19	2.14	E0420-055-1750X	58.55	35.43	5.19	2.14
E0420-055-2000M		50.80	81.79				2.07	E0420-055-2000S			1.72	E0420-055-2000X	68.37			1.72
E0420-055-2250M		57.15	94.23				1.72	E0420-055-2250S			1.43	E0420-055-2250X	78.31			1.43
E0420-055-2500M		63.50	106.93				1.47	E0420-055-2500S			1.23	E0420-055-2500X	88.18			1.23
E0420-055-2750M		69.85	119.38				1.30	E0420-055-2750S			1.08	E0420-055-2750X	97.87			1.08
E0420-055-3000M		76.20	131.83				1.16	E0420-055-3000S			0.96	E0420-055-3000X	107.61			0.96
E0500-034-1250M		31.75	65.02				0.42	E0500-034-1250S			0.35	E0500-034-1250X	48.04			0.35
E0500-034-1370M		34.80	83.06				0.30	E0500-034-1370S			0.25	E0500-034-1370X	57.79			0.25
E0500-034-1500M	0.86	38.10	102.62	15.52	1.38		0.23	E0500-034-1500S	12.93	1.15	0.19	E0500-034-1500X	68.17	6.85	1.15	0.19
E0500-034-1750M		44.45	140.21				0.14	E0500-034-1750S			0.12	E0500-034-1750X	93.31			0.12
E0500-034-2000M		50.80	177.80				0.11	E0500-034-2000S			0.09	E0500-034-2000X	115.94			0.09
E0500-034-2250M		57.15	215.39				0.09	E0500-034-2250S			0.07	E0500-034-2250X	135.32			0.07
E0500-037-1250M		31.75	67.31				0.49	E0500-037-1250S			0.41	E0500-037-1250X	49.76			0.41
E0500-037-1370M		34.80	81.28				0.37	E0500-037-1370S			0.31	E0500-037-1370X	58.82			0.31
E0500-037-1500M		38.10	96.77				0.30	E0500-037-1500S			0.25	E0500-037-1500X	67.77			0.25
E0500-037-1750M		44.45	126.49				0.21	E0500-037-1750S			0.18	E0500-037-1750X	86.48			0.18
E0500-037-2000M		50.80	155.45				0.18	E0500-037-2000S			0.15	E0500-037-2000X	101.24			0.15
E0500-037-2250M	0.94	57.15	187.20	19.57	1.78		0.14	E0500-037-2250S	16.30	1.48	0.12	E0500-037-2250X	120.20	8.84	1.48	0.12
E0500-037-2500M		63.50	216.92				0.12	E0500-037-2500S			0.10	E0500-037-2500X	135.56			0.10
E0500-037-2750M		69.85	249.43				0.11	E0500-037-2750S			0.09	E0500-037-2750X	153.92			0.09
E0500-037-3000M		76.20	281.94				0.09	E0500-037-3000S			0.07	E0500-037-3000X	177.08			0.07
E0500-037-3500M		88.90	345.19				0.07	E0500-037-3500S			0.06	E0500-037-3500X	215.00			0.06
E0500-037-4000M		101.60	408.43				0.05	E0500-037-4000S			0.04	E0500-037-4000X	269.73			0.04
E0500-037-4500M		114.30	471.68				0.05	E0500-037-4500S			0.04	E0500-037-4500X	282.43			0.04
E0500-037-5000M		127.00	534.92				0.04	E0500-037-5000S			0.03	E0500-037-5000X	337.08			0.04
E0500-041-1250M		31.75	59.44				0.84	E0500-041-1250S			0.70	E0500-041-1250X	46.29			0.70
E0500-041-1370M		34.80	71.88				0.63	E0500-041-1370S			0.53	E0500-041-1370X	54.18			0.53
E0500-041-1500M		38.10	84.33				0.51	E0500-041-1500S			0.42	E0500-041-1500X	62.16			0.42
E0500-041-1750M	12.70	44.45	108.97				0.35	E0500-041-1750S			0.29	E0500-041-1750X	79.33			0.29
E0500-041-2000M		50.80	135.38				0.26	E0500-041-2000S			0.22	E0500-041-2000X	97.31			0.22
E0500-041-2250M		57.15	160.02				0.23	E0500-041-2250S			0.19	E0500-041-2250X	110.82			0.19
E0500-041-2500M	1.04	63.50	185.67	25.80	2.22		0.19	E0500-041-2500S	21.49	1.85	0.16	E0500-041-2500X	126.93	12.03	1.85	0.16
E0500-041-2750M		69.85	211.84				0.18	E0500-041-2750S			0.15	E0500-041-2750X	139.62			0.15
E0500-041-3000M		76.20	238.25				0.14	E0500-041-3000S			0.12	E0500-041-3000X	163.41			0.12
E0500-041-3500M		88.90	287.53				0.12	E0500-041-3500S			0.10	E0500-041-3500X	188.57			0.10
E0500-041-4000M		101.60	338.84				0.11	E0500-041-4000S			0.09	E0500-041-4000X	217.88			0.09
E0500-041-4500M		114.30	391.41				0.09	E0500-041-4500S			0.07	E0500-041-4500X	253.84			0.07
E0500-041-5000M		127.00	442.72				0.07	E0500-041-5000S			0.06	E0500-041-5000X	301.42			0.06
E0500-045-1250M		31.75	50.80				1.63	E0500-045-1250S			1.36	E0500-045-1250X	41.57			1.36
E0500-045-1370M		34.80	65.53				0.98	E0500-045-1370S			0.82	E0500-045-1370X	51.10			0.82
E0500-045-1500M		38.10	74.68				0.81	E0500-045-1500S			0.67	E0500-045-1500X	57.95			0.67
E0500-045-1750M		44.45	96.27				0.58	E0500-045-1750S			0.48	E0500-045-1750X	72.11			0.48
E0500-045-2000M		50.80	117.09				0.46	E0500-045-2000S			0.38	E0500-045-2000X	85.91			0.38
E0500-045-2250M		57.15	139.45				0.37	E0500-045-2250S			0.31	E0500-045-2250X	100.62			0.31
E0500-045-2500M	1.14	63.50	161.54	33.36	3.11		0.32	E0500-045-2500S	27.79	2.59	0.26	E0500-045-2500X	114.22	15.91	2.59	0.26
E0500-045-2750M		69.85	183.64				0.28	E0500-045-2750S			0.23	E0500-045-2750X	126.90			0.23
E0500-045-3000M		76.20	205.74				0.25	E0500-045-3000S			0.20	E0500-045-3000X	141.41			0.20
E0500-045-3500M		88.90	244.86				0.19	E0500-045-3500S			0.16	E0500-045-3500X	171.89			0.16
E0500-045-4000M		101.60	289.31				0.16	E0500-045-4000S			0.13	E0500-045-4000X	203.03			0.13
E0500-045-4500M		114.30	332.23				0.14	E0500-045-4500S			0.12	E0500-045-4500X	228.41			0.12
E0500-045-5000M		127.00	375.41				0.12	E0500-045-5000S			0.10	E0500-045-5000X	257.41			0.10
E0500-049-1250M		31.75	47.75				2.45	E0500-049-1250S			2.04	E0500-049-1250X	40.22			2.04
E0500-049-1370M		34.80	57.15				1.77	E0500-049-1370S			1.47	E0500-049-1370X	46.53			1.47
E0500-049-1500M		38.10	67.06				1.37	E0500-049-1500S			1.14	E0500-049-1500X	53.30			1.14
E0500-049-1750M		44.45	86.11				0.95	E0500-049-1750S			0.79	E0500-049-1750X	66.40			0.79
E0500-049-2000M		50.80	105.16				0.74	E0500-049-2000S			0.61	E0500-049-2000X	79.02			0.61
E0500-049-2250M	1.24	57.15	124.21	43.37	3.91		0.60	E0500-049-2250S	36.13	3.26	0.50	E0500-049-2250X	92.01	20.55	3.26	0.50
E0500-049-2500M		63.50	143.26				0.49	E0500-049-2500S								

EXTENSION SPRINGS							302 STAINLESS STEEL / INOX				316 STAINLESS STEEL / INOX					
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)
E0500-049-4500M		1.24	114.30	296.42	43.37	3.91	0.21	E0500-049-4500S	36.13	3.26	0.18	E0500-049-4500X	213.07	20.55	3.26	0.18
E0500-049-5000M			127.00	334.01			0.19	E0500-049-5000S			0.16	E0500-049-5000X	234.75			0.16
E0500-055-1250M			31.75	44.45			4.27	E0500-055-1250S			3.56	E0500-055-1250X	38.67			3.56
E0500-055-1370M			34.80	54.36			2.73	E0500-055-1370S			2.27	E0500-055-1370X	45.61			2.28
E0500-055-1500M			38.10	61.21			2.28	E0500-055-1500S			1.90	E0500-055-1500X	51.08			1.90
E0500-055-1750M			44.45	76.45			1.58	E0500-055-1750S			1.31	E0500-055-1750X	63.20			1.31
E0500-055-2000M			50.80	91.44			1.30	E0500-055-2000S			1.08	E0500-055-2000X	73.60			1.08
E0500-055-2250M			57.15	108.97			1.07	E0500-055-2250S			0.89	E0500-055-2250X	84.81			0.89
E0500-055-2500M		1.40	63.50	122.43	58.27	5.34	0.89	E0500-055-2500S	48.54	4.45	0.74	E0500-055-2500X	96.59	29.06	4.45	0.74
E0500-055-2750M			69.85	137.41			0.77	E0500-055-2750S			0.64	E0500-055-2750X	108.20			0.64
E0500-055-3000M			76.20	152.65			0.68	E0500-055-3000S			0.57	E0500-055-3000X	119.47			0.57
E0500-055-3500M			88.90	182.63			0.56	E0500-055-3500S			0.47	E0500-055-3500X	141.63			0.47
E0500-055-4000M			101.60	212.85			0.47	E0500-055-4000S			0.39	E0500-055-4000X	164.09			0.39
E0500-055-4500M			114.30	242.82			0.40	E0500-055-4500S			0.34	E0500-055-4500X	187.66			0.34
E0500-055-5000M			127.00	281.94			0.35	E0500-055-5000S			0.29	E0500-055-5000X	211.37			0.29
E0500-063-1250M			31.75	41.40			8.21	E0500-063-1250S			6.84	E0500-063-1250X	37.22			6.84
E0500-063-1370M			34.80	48.77			5.46	E0500-063-1370S			4.55	E0500-063-1370X	43.02			4.55
E0500-063-1500M			38.10	55.12			4.47	E0500-063-1500S			3.72	E0500-063-1500X	48.16			3.72
E0500-063-1750M			44.45	67.56			3.27	E0500-063-1750S			2.72	E0500-063-1750X	58.17			2.73
E0500-063-2000M			50.80	80.26			2.59	E0500-063-2000S			2.16	E0500-063-2000X	68.13			2.16
E0500-063-2250M			57.15	92.71			2.14	E0500-063-2250S			1.78	E0500-063-2250X	78.18			1.78
E0500-063-2500M		1.60	63.50	104.65	83.63	7.56	1.82	E0500-063-2500S	69.66	6.30	1.52	E0500-063-2500X	88.17	43.72	6.30	1.52
E0500-063-2750M			69.85	116.84			1.61	E0500-063-2750S			1.34	E0500-063-2750X	97.73			1.34
E0500-063-3000M			76.20	129.54			1.42	E0500-063-3000S			1.18	E0500-063-3000X	107.87			1.18
E0500-063-3500M			88.90	154.43			1.16	E0500-063-3500S			0.96	E0500-063-3500X	127.77			0.96
E0500-063-4000M			101.60	179.58			0.96	E0500-063-4000S			0.80	E0500-063-4000X	148.24			0.80
E0500-063-4500M	12.70		114.30	204.72			0.84	E0500-063-4500S			0.70	E0500-063-4500X	167.74			0.70
E0500-063-5000M			127.00	229.62			0.74	E0500-063-5000S			0.61	E0500-063-5000X	188.08			0.61
E0500-069-1250M			31.75	39.37			12.96	E0500-069-1250S			10.80	E0500-069-1250X	36.33			10.80
E0500-069-1370M			34.80	45.21			9.51	E0500-069-1370S			7.92	E0500-069-1370X	41.04			7.92
E0500-069-1500M			38.10	50.55			7.92	E0500-069-1500S			6.60	E0500-069-1500X	45.60			6.59
E0500-069-1750M			44.45	62.23			5.48	E0500-069-1750S			4.57	E0500-069-1750X	55.27			4.57
E0500-069-2000M			50.80	73.41			4.33	E0500-069-2000S			3.61	E0500-069-2000X	64.52			3.60
E0500-069-2250M			57.15	84.58			3.56	E0500-069-2250S			2.97	E0500-069-2250X	73.84			2.96
E0500-069-2500M		1.75	63.50	95.76	107.69	9.70	3.03	E0500-069-2500S	89.71	8.08	2.52	E0500-069-2500X	83.08	57.50	8.08	2.52
E0500-069-2750M			69.85	107.70			2.59	E0500-069-2750S			2.16	E0500-069-2750X	92.74			2.16
E0500-069-3000M			76.20	118.87			2.29	E0500-069-3000S			1.91	E0500-069-3000X	102.06			1.91
E0500-069-3500M			88.90	141.22			1.87	E0500-069-3500S			1.56	E0500-069-3500X	120.56			1.56
E0500-069-4000M			101.60	164.08			1.56	E0500-069-4000S			1.30	E0500-069-4000X	139.67			1.30
E0500-069-4500M			114.30	186.44			1.37	E0500-069-4500S			1.14	E0500-069-4500X	157.74			1.14
E0500-069-5000M			127.00	209.55			1.19	E0500-069-5000S			0.99	E0500-069-5000X	176.82			0.99
E0500-075-1250M			31.75	38.35			18.86	E0500-075-1250S			15.71	E0500-075-1250X	35.80			15.71
E0500-075-1370M			34.80	43.18			14.81	E0500-075-1370S			12.34	E0500-075-1370X	39.95			12.34
E0500-075-1500M			38.10	48.26			12.20	E0500-075-1500S			10.16	E0500-075-1500X	44.36			10.17
E0500-075-1750M			44.45	58.67			8.65	E0500-075-1750S			7.21	E0500-075-1750X	53.28			7.21
E0500-075-2000M			50.80	69.34			6.69	E0500-075-2000S			5.57	E0500-075-2000X	62.22			5.57
E0500-075-2250M			57.15	79.25			5.60	E0500-075-2250S			4.67	E0500-075-2250X	70.78			4.67
E0500-075-2500M		1.91	63.50	89.66	135.71	12.23	4.71	E0500-075-2500S		10.19	3.92	E0500-075-2500X	79.72	73.83	10.19	3.92
E0500-075-2750M			69.85	100.33			4.06	E0500-075-2750S			3.38	E0500-075-2750X	88.65			3.38
E0500-075-3000M			76.20	110.24			3.64	E0500-075-3000S			3.03	E0500-075-3000X	97.17			3.03
E0500-075-3500M			88.90	131.06			2.92	E0500-075-3500S			2.43	E0500-075-3500X	115.02			2.44
E0500-075-4000M			101.60	151.64			2.47	E0500-075-4000S			2.06	E0500-075-4000X	132.54			2.06
E0500-075-4500M			114.30	171.96			2.14	E0500-075-4500S			1.78	E0500-075-4500X	150.06			1.78
E0500-075-5000M			127.00	193.04			1.87	E0500-075-5000S			1.56	E0500-075-5000X	167.77			1.56
E0650-055-1500M			38.10	56.13			2.35	E0650-055-1500S			1.96	E0650-055-1500X	47.51			1.96
E0650-055-1750M			44.45	80.26			1.19	E0650-055-1750S			0.99	E0650-055-1750X	62.99			0.99
E0650-055-2000M			50.80	106.68			0.72	E0650-055-2000S			0.60	E0650-055-2000X	81.56			0.60
E0650-055-2250M			57.15	130.30			0.56	E0650-055-2250S			0.47	E0650-055-2250X	96.56			0.47
E0650-055-2500M		1.40	63.50	151.89	44.93	4.00	0.46	E0650-055-2500S	37.43	3.33	0.38	E0650-055-2500X	112.00	21.73	3.33	0.38
E0650-055-2750M			69.85	176.28			0.39	E0650-055-2750S			0.32	E0650-055-2750X	127.17			0.32
E0650-055-3000M			76.20	198.88			0.33	E0650-055-3000S			0.28	E0650-055-3000X	142.57			0.28
E0650-055-3500M	16.51		88.90	244.09			0.26	E0650-055-3500S			0.22	E0650-055-3500X	172.97			0.22
E0650-055-4000M			101.60	289.05			0.21	E0650-055-4000S			0.18	E0650-055-4000X	206.69			0.18
E0650-063-1500M			38.10	52.32			4.34	E0650-063-1500S			3.62	E0650-063-1500X	45.66			3.62
E0650-063-1750M			44.45	71.37			2.31	E0650-063-1750S			1.92	E0650-063-1750X	58.66			1.93
E0650-063-2000M			50.80	91.69			1.45	E0650-063-2000S			1.21	E0650-063-2000X	73.39			1.21
E0650-063-2250M		1.60	57.15	109.73	65.83	6.23	1.12	E0650-063-2250S	54.84	5.19	0.93	E0650-063-2250X	86.45	32.54	5.19	0.93
E0650-063-2500M																

## EXTENSION SPRINGS

## 302 STAINLESS STEEL / INOX

## 316 STAINLESS STEEL / INOX

Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)
E0650-063-4000M			101.60	235.97			0.44	E0650-063-4000S			0.37	E0650-063-4000X	176.60			0.37
E0650-063-4500M		1.60	114.30	272.03	65.83	6.23	0.37	E0650-063-4500S	54.84	5.19	0.31	E0650-063-4500X	203.59	32.54	5.19	0.31
E0650-063-5000M			127.00	317.25			0.33	E0650-063-5000S			0.28	E0650-063-5000X	225.69			0.28
E0650-069-1750M			44.45	66.55			3.63	E0650-069-1750S			3.02	E0650-069-1750X	56.25			3.02
E0650-069-2000M			50.80	82.80			2.49	E0650-069-2000S			2.07	E0650-069-2000X	68.00			2.07
E0650-069-2250M			57.15	99.06			1.91	E0650-069-2250S			1.59	E0650-069-2250X	79.55			1.59
E0650-069-2500M	16.51		63.50	115.57			1.54	E0650-069-2500S			1.28	E0650-069-2500X	91.25			1.28
E0650-069-2750M		1.75	69.85	131.83	88.07	8.45	1.30	E0650-069-2750S	73.36	7.04	1.08	E0650-069-2750X	102.85	42.66	7.04	1.08
E0650-069-3000M			76.20	148.08			1.12	E0650-069-3000S			0.93	E0650-069-3000X	114.35			0.93
E0650-069-3500M			88.90	180.85			0.88	E0650-069-3500S			0.73	E0650-069-3500X	137.74			0.73
E0650-069-4000M			101.60	213.36			0.72	E0650-069-4000S			0.60	E0650-069-4000X	161.16			0.60
E0650-069-4500M			114.30	245.87			0.61	E0650-069-4500S			0.51	E0650-069-4500X	184.07			0.51
E0650-069-5000M			127.00	278.64			0.53	E0650-069-5000S			0.44	E0650-069-5000X	208.40			0.44
E0750-049-2000M			50.80	117.86			0.40	E0750-049-2000S			0.34	E0750-049-2000X	83.69			0.34
E0750-049-2250M			57.15	156.46			0.26	E0750-049-2250S			0.22	E0750-049-2250X	107.58			0.22
E0750-049-2500M			63.50	195.33			0.21	E0750-049-2500S			0.18	E0750-049-2500X	126.53			0.18
E0750-049-2750M	1.24		69.85	233.93	29.40	2.62	0.16	E0750-049-2750S	24.49	2.18	0.13	E0750-049-2750X	153.90	13.22	2.19	0.13
E0750-049-3000M			76.20	272.80			0.14	E0750-049-3000S			0.12	E0750-049-3000X	170.75			0.12
E0750-049-3250M			82.55	311.40			0.12	E0750-049-3250S			0.10	E0750-049-3250X	190.61			0.10
E0750-049-3500M			88.90	350.27			0.11	E0750-049-3500S			0.09	E0750-049-3500X	214.97			0.09
E0750-055-2000M			50.80	110.74			0.58	E0750-055-2000S			0.48	E0750-055-2000X	83.82			0.48
E0750-055-2250M			57.15	139.70			0.42	E0750-055-2250S			0.35	E0750-055-2250X	102.55			0.35
E0750-055-2500M	1.40		63.50	168.66	39.14	3.56	0.33	E0750-055-2500S	32.60	2.97	0.28	E0750-055-2500X	120.85	18.86	2.96	0.28
E0750-055-2750M			69.85	197.36			0.26	E0750-055-2750S			0.22	E0750-055-2750X	142.50			0.22
E0750-055-3000M			76.20	226.31			0.23	E0750-055-3000S			0.19	E0750-055-3000X	160.02			0.19
E0750-055-3500M			88.90	286.51			0.18	E0750-055-3500S			0.15	E0750-055-3500X	197.87			0.15
E0750-063-2000M			50.80	95.76			1.14	E0750-063-2000S			0.95	E0750-063-2000X	75.44			0.95
E0750-063-2250M			57.15	118.62			0.84	E0750-063-2250S			0.70	E0750-063-2250X	90.52			0.70
E0750-063-2500M			63.50	141.22			0.65	E0750-063-2500S			0.54	E0750-063-2500X	106.79			0.54
E0750-063-2750M			69.85	159.77			0.56	E0750-063-2750S			0.47	E0750-063-2750X	119.90			0.47
E0750-063-3000M	1.60		76.20	186.69	56.94	5.34	0.46	E0750-063-3000S	47.43	4.45	0.38	E0750-063-3000X	137.80	27.81	4.45	0.38
E0750-063-3500M			88.90	229.87			0.35	E0750-063-3500S			0.29	E0750-063-3500X	168.98			0.29
E0750-063-4000M			101.60	275.34			0.30	E0750-063-4000S			0.25	E0750-063-4000X	195.81			0.25
E0750-063-4500M			114.30	320.80			0.25	E0750-063-4500S			0.20	E0750-063-4500X	228.70			0.20
E0750-063-5000M			127.00	366.27			0.21	E0750-063-5000S			0.18	E0750-063-5000X	260.47			0.18
E0750-063-5500M			139.70	425.45			0.19	E0750-063-5500S			0.16	E0750-063-5500X	285.30			0.16
E0750-069-2000M			50.80	83.57			2.14	E0750-069-2000S			1.78	E0750-069-2000X	68.02			1.78
E0750-069-2250M			57.15	104.14			1.49	E0750-069-2250S			1.24	E0750-069-2250X	81.87			1.24
E0750-069-2500M			63.50	124.21			1.16	E0750-069-2500S			0.96	E0750-069-2500X	95.33			0.96
E0750-069-2750M			69.85	144.53			0.93	E0750-069-2750S			0.77	E0750-069-2750X	109.49			0.77
E0750-069-3000M	1.75		76.20	165.10	76.78	6.89	0.79	E0750-069-3000S	63.96	5.74	0.66	E0750-069-3000X	122.89	36.39	5.74	0.66
E0750-069-3500M	19.05		88.90	205.74			0.60	E0750-069-3500S			0.50	E0750-069-3500X	150.69			0.50
E0750-069-4000M			101.60	246.38			0.49	E0750-069-4000S			0.41	E0750-069-4000X	176.63			0.41
E0750-069-4500M			114.30	287.27			0.40	E0750-069-4500S			0.34	E0750-069-4500X	205.64			0.34
E0750-069-5000M			127.00	327.91			0.35	E0750-069-5000S			0.29	E0750-069-5000X	232.05			0.29
E0750-075-2000M			50.80	80.26			2.84	E0750-075-2000S			2.37	E0750-075-2000X	67.49			2.36
E0750-075-2250M			57.15	97.28			2.07	E0750-075-2250S			1.72	E0750-075-2250X	80.07			1.72
E0750-075-2500M			63.50	114.55			1.63	E0750-075-2500S			1.36	E0750-075-2500X	92.58			1.36
E0750-075-2750M			69.85	130.30			1.38	E0750-075-2750S			1.15	E0750-075-2750X	104.08			1.15
E0750-075-3000M	1.91		76.20	147.32	92.08	8.45	1.17	E0750-075-3000S	76.70	7.04	0.98	E0750-075-3000X	116.56	46.49	7.04	0.98
E0750-075-3500M			88.90	180.09			0.91	E0750-075-3500S			0.76	E0750-075-3500X	140.91			0.76
E0750-075-4000M			101.60	214.63			0.74	E0750-075-4000S			0.61	E0750-075-4000X	165.99			0.61
E0750-075-4500M			114.30	247.40			0.61	E0750-075-4500S			0.51	E0750-075-4500X	191.57			0.51
E0750-075-5000M			127.00	280.16			0.54	E0750-075-5000S			0.45	E0750-075-5000X	214.24			0.45
E0750-075-5500M			139.70	325.88			0.47	E0750-075-5500S			0.39	E0750-075-5500X	239.86			0.39
E0750-075-6000M			152.40	361.44			0.42	E0750-075-6000S			0.35	E0750-075-6000X	265.08			0.35
E0750-085-2000M			50.80	71.88			5.94	E0750-085-2000S			4.95	E0750-085-2000X	62.32			4.95
E0750-085-2250M			57.15	86.36			4.27	E0750-085-2250S			3.56	E0750-085-2250X	73.16			3.56
E0750-085-2500M			63.50	100.84			3.33	E0750-085-2500S			2.77	E0750-085-2500X	84.06			2.77
E0750-085-2750M			69.85	115.57			2.73	E0750-085-2750S			2.27	E0750-085-2750X	94.89			2.28
E0750-085-3000M	2.16		76.20	130.05	137.09	12.32	2.31	E0750-085-3000S	114.20	10.26	1.92	E0750-085-3000X	105.79	67.24	10.26	1.93
E0750-085-3500M			88.90	159.26			1.77	E0750-085-3500S			1.47	E0750-085-3500X	127.57			1.47
E0750-085-4000M			101.60	188.21			1.44	E0750-085-4000S			1.20	E0750-085-4000X	149.23			1.20
E0750-085-4500M			114.30	217.42			1.21	E0750-085-4500S			1.01	E0750-085-4500X	170.91			1.01
E0750-085-5000M			127.00	246.63			1.05	E0750-085-5000S			0.88	E0750-085-5000X	192.10			0.88
E0750-095-2000M			50.80	66.80			10.42	E0750-095-2000S			8.68	E0750-095-2000X	59.95			8.68
E0750-095-2250M			57.15	78.74			7.69	E0750-095-2250S			6.41	E0750-095-2250X	69.55			6.40
E0750-095-2500M	2.41		63.50	91.95	183.3											

EXTENSION SPRINGS				302 STAINLESS STEEL / INOX						316 STAINLESS STEEL / INOX						
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)
E0750-095-4000M	2.41	127.00	101.60	165.61			2.61	E0750-095-4000S			2.17	E0750-095-4000X	138.15			2.17
E0750-095-4500M			114.30	190.75			2.17	E0750-095-4500S			1.81	E0750-095-4500X	158.21			1.81
E0750-095-5000M			127.00	214.88	183.30	16.50	1.89	E0750-095-5000S	152.69	13.74	1.58	E0750-095-5000X	177.42	93.18	13.75	1.58
E0750-095-5500M			139.70	240.28			1.66	E0750-095-5500S			1.39	E0750-095-5500X	197.02			1.39
E0750-095-6000M			152.40	264.41			1.49	E0750-095-6000S			1.24	E0750-095-6000X	216.46			1.24
E0750-105-2000M	2.67	76.20	50.80	63.50			17.55	E0750-105-2000S			14.62	E0750-105-2000X	58.09			14.62
E0750-105-2250M			57.15	74.68			12.68	E0750-105-2250S			10.56	E0750-105-2250X	67.24			10.56
E0750-105-2500M			63.50	85.85			9.91	E0750-105-2500S			8.26	E0750-105-2500X	76.40			8.26
E0750-105-2750M			69.85	97.28			8.14	E0750-105-2750S			6.78	E0750-105-2750X	85.55			6.78
E0750-105-3000M			76.20	108.46	244.46	22.02	6.92	E0750-105-3000S	203.64	18.34	5.76	E0750-105-3000X	94.69	124.86	18.34	5.76
E0750-105-3500M	19.05	76.20	88.90	129.90			5.43	E0750-105-3500S			4.52	E0750-105-3500X	112.46			4.52
E0750-105-4000M			101.60	152.40			4.38	E0750-105-4000S			3.65	E0750-105-4000X	130.81			3.65
E0750-105-4500M			114.30	173.74			3.73	E0750-105-4500S			3.11	E0750-105-4500X	148.58			3.11
E0750-105-5000M			127.00	196.34			3.20	E0750-105-5000S			2.67	E0750-105-5000X	166.90			2.67
E0750-115-2000M			50.80	61.47			26.46	E0750-115-2000S			22.04	E0750-115-2000X	57.14			22.04
E0750-115-2250M	2.92	76.20	57.15	71.12			20.22	E0750-115-2250S			16.84	E0750-115-2250X	65.44			16.85
E0750-115-2500M			63.50	81.53			15.64	E0750-115-2500S			13.03	E0750-115-2500X	74.23			13.03
E0750-115-2750M			69.85	91.19			13.22	E0750-115-2750S			11.01	E0750-115-2750X	82.54			11.01
E0750-115-3000M			100.84	309.98	27.89	11.47	E0750-115-3000S	258.21	23.23	9.56	E0750-115-3000X	90.83	162.98	23.23	9.56	
E0750-115-3500M			88.90	120.90			8.83	E0750-115-3500S			7.36	E0750-115-3500X	107.91			7.35
E0750-115-4000M	3.18	76.20	101.60	140.97			7.16	E0750-115-4000S			5.96	E0750-115-4000X	125.02			5.97
E0750-115-4500M			114.30	160.27			6.15	E0750-115-4500S			5.12	E0750-115-4500X	141.59			5.12
E0750-115-5000M			127.00	180.34			5.29	E0750-115-5000S			4.41	E0750-115-5000X	158.72			4.41
E0750-115-5500M			139.70	200.41			4.64	E0750-115-5500S			3.87	E0750-115-5500X	175.85			3.87
E0750-115-6000M			152.40	219.71			4.19	E0750-115-6000S			3.49	E0750-115-6000X	192.48			3.49
E0750-125-2000M	3.18	76.20	50.80	59.18			41.95	E0750-125-2000S			34.94	E0750-125-2000X	55.91			34.95
E0750-125-2250M			57.15	68.58			31.47	E0750-125-2250S			26.22	E0750-125-2250X	63.96			26.21
E0750-125-2500M			63.50	77.72			25.18	E0750-125-2500S			20.98	E0750-125-2500X	72.01			20.98
E0750-125-2750M			69.85	86.87			20.98	E0750-125-2750S			17.48	E0750-125-2750X	80.06			17.48
E0750-125-3000M			96.01	391.16	35.18	17.98	E0750-125-3000S	325.84	29.30	14.98	E0750-125-3000X	88.11	207.75	29.31	14.98	
E0750-125-3500M	21.59	101.60	88.90	114.30			13.99	E0750-125-3500S			11.65	E0750-125-3500X	104.21			11.66
E0750-125-4000M			101.60	132.59			11.43	E0750-125-4000S			9.52	E0750-125-4000X	120.33			9.53
E0750-125-4500M			114.30	151.13			9.68	E0750-125-4500S			8.06	E0750-125-4500X	136.42			8.07
E0750-125-5000M			127.00	169.42			8.39	E0750-125-5000S			6.99	E0750-125-5000X	152.54			6.99
E0850-055-2000M	1.40	76.20	50.80	107.19			0.56	E0850-055-2000S			0.47	E0850-055-2000X	80.08			0.47
E0850-055-2250M			57.15	143.51	34.70	3.11	0.37	E0850-055-2250S	28.91	2.59	0.31	E0850-055-2250X	101.76	16.26	2.59	0.31
E0850-055-2500M			63.50	179.58			0.28	E0850-055-2500S			0.23	E0850-055-2500X	122.05			0.23
E0850-055-2750M			69.85	215.90			0.21	E0850-055-2750S			0.18	E0850-055-2750X	147.92			0.18
E0850-063-2250M	1.60	69.85	57.15	123.95			0.68	E0850-063-2250S			0.57	E0850-063-2250X	94.04			0.57
E0850-063-2500M			63.50	153.42			0.51	E0850-063-2500S			0.42	E0850-063-2500X	113.11			0.42
E0850-063-2750M			69.85	183.13	50.26	4.45	0.40	E0850-063-2750S	41.87	3.71	0.34	E0850-063-2750X	132.40	24.69	3.71	0.34
E0850-063-3000M			76.20	212.60			0.33	E0850-063-3000S			0.28	E0850-063-3000X	151.91			0.28
E0850-063-3500M			88.90	271.78			0.25	E0850-063-3500S			0.20	E0850-063-3500X	191.65			0.20
E0850-075-2250M	1.91	76.20	57.15	100.84			1.70	E0850-075-2250S			1.42	E0850-075-2250X	81.31			1.42
E0850-075-2500M			63.50	119.63			1.31	E0850-075-2500S			1.09	E0850-075-2500X	94.75			1.09
E0850-075-2750M			69.85	140.72			1.05	E0850-075-2750S			0.88	E0850-075-2750X	108.91			0.88
E0850-075-3000M			76.20	161.54	81.85	7.56	0.88	E0850-075-3000S	68.18	6.30	0.73	E0850-075-3000X	123.08	40.49	6.30	0.73
E0850-075-3500M			88.90	201.42			0.67	E0850-075-3500S			0.55	E0850-075-3500X	150.58			0.55
E0850-075-4000M	21.59	101.60	101.60	241.05			0.53	E0850-075-4000S			0.44	E0850-075-4000X	179.73			0.44
E0850-075-4500M			114.30	282.96			0.44	E0850-075-4500S			0.37	E0850-075-4500X	208.06			0.37
E0850-075-5000M			127.00	322.83			0.39	E0850-075-5000S			0.32	E0850-075-5000X	233.54			0.32
E0850-085-2000M	2.16	76.20	50.80	69.34			5.95	E0850-085-2000S			4.96	E0850-085-2000X	60.79			4.96
E0850-085-2250M			57.15	89.41			3.36	E0850-085-2250S			2.80	E0850-085-2250X	74.84			2.80
E0850-085-2500M			63.50	106.17			2.45	E0850-085-2500S			2.04	E0850-085-2500X	87.77			2.04
E0850-085-2750M			69.85	122.68			1.98	E0850-085-2750S			1.65	E0850-085-2750X	99.91			1.65
E0850-085-3000M			76.20	139.45			1.66	E0850-085-3000S			1.39	E0850-085-3000X	111.96			1.39
E0850-085-3500M	2.16	88.90	88.90	170.94	115.21	10.68	1.28	E0850-085-3500S	95.97	8.90	1.07	E0850-085-3500X	135.44	58.45	8.89	1.07
E0850-085-4000M			101.60	203.96			1.02	E0850-085-4000S			0.85	E0850-085-4000X	160.17			0.85
E0850-085-4500M			114.30	237.24			0.86	E0850-085-4500S			0.72	E0850-085-4500X	183.63			0.72
E0850-085-4750M			120.65	253.75			0.79	E0850-085-4750S			0.66	E0850-085-4750X	196.15			0.66
E0850-085-5000M			127.00	270.26			0.74	E0850-085-5000S			0.61	E0850-085-5000X	207.89			0.61
E0850-085-5500M	2.16	152.40	139.70	313.9												

## EXTENSION SPRINGS

## 302 STAINLESS STEEL / INOX

## 316 STAINLESS STEEL / INOX

Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L1 (mm)	P (N)	T (N)	R (N/mm)
E1000-075-4000M			101.60	280.42			0.35	E1000-075-4000S			0.29	E1000-075-4000X	200.09			0.29
E1000-075-4500M		1.91	114.30	335.53	69.84	6.23	0.30	E1000-075-4500S	58.18	5.19	0.25	E1000-075-4500X	230.16	33.92	5.19	0.25
E1000-075-5000M			127.00	387.60			0.25	E1000-075-5000S			0.20	E1000-075-5000X	267.69			0.20
E1000-085-2500M			63.50	101.85			2.47	E1000-085-2500S			2.06	E1000-085-2500X	83.66			2.06
E1000-085-2750M			69.85	130.05			1.49	E1000-085-2750S			1.24	E1000-085-2750X	103.29			1.24
E1000-085-3000M			76.20	151.38			1.19	E1000-085-3000S			0.99	E1000-085-3000X	118.00			0.99
E1000-085-3500M	2.16		88.90	191.77	98.75	8.90	0.88	E1000-085-3500S	82.26	7.41	0.73	E1000-085-3500X	145.74	48.87	7.41	0.73
E1000-085-4000M			101.60	234.44			0.68	E1000-085-4000S			0.57	E1000-085-4000X	174.48			0.57
E1000-085-4500M			114.30	277.37			0.56	E1000-085-4500S			0.47	E1000-085-4500X	203.12			0.47
E1000-085-5000M			127.00	320.04			0.47	E1000-085-5000S			0.39	E1000-085-5000X	232.27			0.39
E1000-095-2500M			63.50	94.23			4.22	E1000-095-2500S			3.52	E1000-095-2500X	79.84			3.52
E1000-095-2750M			69.85	116.08			2.63	E1000-095-2750S			2.19	E1000-095-2750X	96.10			2.19
E1000-095-3000M			76.20	133.10			2.14	E1000-095-3000S			1.78	E1000-095-3000X	108.47			1.78
E1000-095-3500M			88.90	168.91			1.52	E1000-095-3500S			1.27	E1000-095-3500X	134.16			1.27
E1000-095-4000M			101.60	202.69			1.21	E1000-095-4000S			1.01	E1000-095-4000X	158.66			1.01
E1000-095-4500M			114.30	238.51			0.98	E1000-095-4500S			0.82	E1000-095-4500X	184.61			0.82
E1000-095-5000M	2.41		127.00	272.29	133.45	12.01	0.84	E1000-095-5000S	111.16	10.00	0.70	E1000-095-5000X	209.03	67.44	10.00	0.70
E1000-095-5500M			139.70	318.26			0.72	E1000-095-5500S			0.60	E1000-095-5500X	235.73			0.60
E1000-095-6000M			152.40	355.60			0.63	E1000-095-6000S			0.53	E1000-095-6000X	261.77			0.53
E1000-095-6500M			165.10	377.95			0.58	E1000-095-6500S			0.48	E1000-095-6500X	284.41			0.48
E1000-095-7000M			177.80	414.78			0.51	E1000-095-7000S			0.42	E1000-095-7000X	313.57			0.42
E1000-095-8000M			203.20	486.41			0.42	E1000-095-8000S			0.35	E1000-095-8000X	367.26			0.35
E1000-095-9000M			228.60	557.78			0.37	E1000-095-9000S			0.31	E1000-095-9000X	416.09			0.31
E1000-105-2500M			63.50	88.65			6.83	E1000-105-2500S			5.69	E1000-105-2500X	76.84			5.69
E1000-105-2750M			69.85	104.39			4.94	E1000-105-2750S			4.12	E1000-105-2750X	88.30			4.11
E1000-105-3000M			76.20	120.40			3.87	E1000-105-3000S			3.22	E1000-105-3000X	99.74			3.22
E1000-105-3500M			88.90	152.15			2.70	E1000-105-3500S			2.25	E1000-105-3500X	122.69			2.25
E1000-105-4000M			101.60	183.90			2.08	E1000-105-4000S			1.73	E1000-105-4000X	145.32			1.74
E1000-105-4500M			114.30	215.65			1.68	E1000-105-4500S			1.40	E1000-105-4500X	168.50			1.40
E1000-105-5000M	2.67		127.00	247.40	187.94	16.90	1.42	E1000-105-5000S	156.55	14.08	1.18	E1000-105-5000X	191.24	89.98	14.08	1.18
E1000-105-5500M			139.70	279.15			1.23	E1000-105-5500S			1.02	E1000-105-5500X	214.03			1.02
E1000-105-6000M			152.40	311.15			1.09	E1000-105-6000S			0.91	E1000-105-6000X	236.32			0.90
E1000-105-6500M			165.10	343.41			0.96	E1000-105-6500S			0.80	E1000-105-6500X	259.70			0.80
E1000-105-7000M			177.80	374.14			0.88	E1000-105-7000S			0.73	E1000-105-7000X	281.86			0.73
E1000-105-8000M	25.40		203.20	437.64			0.74	E1000-105-8000S			0.61	E1000-105-8000X	327.08			0.61
E1000-105-9000M			228.60	501.14			0.63	E1000-105-9000S			0.53	E1000-105-9000X	373.13			0.53
E1000-115-2500M			63.50	84.33			10.58	E1000-115-2500S			8.81	E1000-115-2500X	74.71			8.81
E1000-115-2750M			69.85	98.30			7.76	E1000-115-2750S			6.46	E1000-115-2750X	85.14			6.46
E1000-115-3000M			76.20	112.01			6.13	E1000-115-3000S			5.11	E1000-115-3000X	95.55			5.11
E1000-115-3500M			88.90	139.70			4.33	E1000-115-3500S			3.61	E1000-115-3500X	116.32			3.60
E1000-115-4000M			101.60	167.64			3.33	E1000-115-4000S			2.77	E1000-115-4000X	137.24			2.77
E1000-115-4500M			114.30	195.33			2.71	E1000-115-4500S			2.26	E1000-115-4500X	157.99			2.26
E1000-115-5000M	2.92		127.00	223.01	241.54	21.80	2.29	E1000-115-5000S	201.20	18.16	1.91	E1000-115-5000X	178.69	116.94	18.16	1.91
E1000-115-5500M			139.70	250.70			1.98	E1000-115-5500S			1.65	E1000-115-5500X	199.63			1.65
E1000-115-6000M			152.40	278.64			1.75	E1000-115-6000S			1.46	E1000-115-6000X	220.12			1.46
E1000-115-6500M			165.10	306.83			1.54	E1000-115-6500S			1.28	E1000-115-6500X	242.05			1.28
E1000-115-7000M			177.80	333.50			1.42	E1000-115-7000S			1.18	E1000-115-7000X	261.40			1.18
E1000-115-8000M			203.20	389.89			1.17	E1000-115-8000S			0.98	E1000-115-8000X	304.27			0.98
E1000-115-9000M			228.60	444.75			1.02	E1000-115-9000S			0.85	E1000-115-9000X	345.36			0.85
E1000-125-2500M			63.50	81.53			15.29	E1000-125-2500S			12.74	E1000-125-2500X	73.37			12.74
E1000-125-2750M			69.85	93.73			11.47	E1000-125-2750S			9.56	E1000-125-2750X	83.01			9.56
E1000-125-3000M			76.20	106.17			9.18	E1000-125-3000S			7.65	E1000-125-3000X	92.65			7.64
E1000-125-3500M			88.90	130.81			6.55	E1000-125-3500S			5.46	E1000-125-3500X	111.95			5.46
E1000-125-4000M			101.60	155.45			5.10	E1000-125-4000S			4.25	E1000-125-4000X	131.22			4.25
E1000-125-4500M			114.30	180.09			4.17	E1000-125-4500S			3.47	E1000-125-4500X	150.52			3.47
E1000-125-5000M	3.18		127.00	204.98	301.89	27.18	3.52	E1000-125-5000S	251.47	22.64	2.93	E1000-125-5000X	169.89	148.39	22.64	2.93
E1000-125-5500M			139.70	229.62			3.06	E1000-125-5500S			2.55	E1000-125-5500X	188.96			2.55
E1000-125-6000M			152.40	254.25			2.70	E1000-125-6000S			2.25	E1000-125-6000X	208.38			2.25
E1000-125-6500M			165.10	278.89			2.42	E1000-125-6500S			2.02	E1000-125-6500X	227.57			2.01
E1000-125-7000M			177.80	303.53			2.19	E1000-125-7000S			1.82	E1000-125-7000X	246.76			1.82
E1000-125-8000M			203.20	352.81			1.84	E1000-125-8000S			1.53	E1000-125-8000X	285.30			1.53
E1000-125-9000M			228.60	402.34			1.58	E1000-125-9000S			1.31	E1000-125-9000X	324.38			1.31
E1000-135-2500M			63.50	77.98			23.48	E1000-135-2500S			19.56	E1000-135-2500X	71.51			19.56
E1000-135-2750M			69.85	89.66			17.23	E1000-135-2750S			14.35	E1000-135-2750X	80.77			14.35
E1000-135-3000M			76.20	101.09			13.61	E1000-135-3000S			11.34	E1000-135-3000X	90.03			11.33
E1000-135-3500M			88.90	123.19			9.93	E1000-135-3500S			8.27	E1000-135-3500X	107.85			8.27
E1000-135-4000M	3.43		101.60	145.03	373.54	33.63	7.83	E1000-135-4000S	311.16	28.01	6.52	E1000-135-4000X	125.64	184.76	28.01	6.52
E1000-135-4500M			114.30	168.15												

EXTENSION SPRINGS						302 STAINLESS STEEL / INOX				316 STAINLESS STEEL / INOX						
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)
E1000-135-6500M			165.10	258.57			3.64	E1000-135-6500S			3.03	E1000-135-6500X	216.76			3.03
E1000-135-7000M		3.43	177.80	280.42	373.54	33.63	3.31	E1000-135-7000S	311.16	28.01	2.76	E1000-135-7000X	234.65	184.76	28.01	2.76
E1000-135-8000M			203.20	325.63			2.78	E1000-135-8000S			2.32	E1000-135-8000X	270.78			2.32
E1000-135-9000M			228.60	370.59			2.40	E1000-135-9000S			2.00	E1000-135-9000X	307.03			2.00
E1000-148-2500M			63.50	75.69			35.51	E1000-148-2500S			29.58	E1000-148-2500X	70.39			29.58
E1000-148-2750M			69.85	85.34			27.89	E1000-148-2750S			23.23	E1000-148-2750X	78.62			23.24
E1000-148-3000M			76.20	96.27			21.70	E1000-148-3000S			18.08	E1000-148-3000X	87.47			18.07
E1000-148-3500M	25.40		88.90	115.57			16.27	E1000-148-3500S			13.55	E1000-148-3500X	103.94			13.55
E1000-148-4000M			101.60	136.14			12.59	E1000-148-4000S			10.49	E1000-148-4000X	121.03			10.49
E1000-148-4500M			114.30	156.72			10.28	E1000-148-4500S			8.56	E1000-148-4500X	138.10			8.56
E1000-148-5000M		3.76	127.00	177.29	478.47	43.06	8.69	E1000-148-5000S	398.57	35.87	7.24	E1000-148-5000X	155.16	239.64	35.87	7.24
E1000-148-5500M			139.70	196.60			7.65	E1000-148-5500S			6.37	E1000-148-5500X	171.67			6.38
E1000-148-6000M			152.40	217.17			6.74	E1000-148-6000S			5.61	E1000-148-6000X	188.68			5.62
E1000-148-6500M			165.10	237.49			6.01	E1000-148-6500S			5.01	E1000-148-6500X	205.83			5.00
E1000-148-7000M			177.80	258.06			5.43	E1000-148-7000S			4.52	E1000-148-7000X	222.86			4.52
E1000-148-8000M			203.20	297.94			4.59	E1000-148-8000S			3.82	E1000-148-8000X	256.52			3.82
E1000-148-9000M			228.60	339.09			3.94	E1000-148-9000S			3.28	E1000-148-9000X	290.69			3.28
E1125-085-3000M			76.20	145.80			1.23	E1125-085-3000S			1.02	E1125-085-3000X	111.44			1.02
E1125-085-3500M			88.90	201.17			0.75	E1125-085-3500S			0.63	E1125-085-3500X	146.27			0.63
E1125-085-4000M			101.60	256.79			0.54	E1125-085-4000S			0.45	E1125-085-4000X	181.18			0.45
E1125-085-4500M			114.30	312.17			0.44	E1125-085-4500S			0.37	E1125-085-4500X	212.98			0.37
E1125-085-5000M	2.16	127.00	367.54	93.28	8.41	0.35	E1125-085-5000S	77.70	7.01	0.29	E1125-085-5000X	250.35	42.99	7.00	0.29	
E1125-085-5500M			139.70	422.91			0.30	E1125-085-5500S			0.25	E1125-085-5500X	284.82			0.25
E1125-085-6000M			152.40	478.54			0.26	E1125-085-6000S			0.22	E1125-085-6000X	316.87			0.22
E1125-085-6500M			165.10	533.91			0.23	E1125-085-6500S			0.19	E1125-085-6500X	354.87			0.19
E1125-085-7000M			177.80	589.28			0.21	E1125-085-7000S			0.18	E1125-085-7000X	383.38			0.18
E1125-105-3000M			76.20	120.65			3.43	E1125-105-3000S			2.86	E1125-105-3000X	99.41			2.86
E1125-105-3500M			88.90	158.75			2.19	E1125-105-3500S			1.82	E1125-105-3500X	125.29			1.82
E1125-105-4000M			101.60	196.60			1.61	E1125-105-4000S			1.34	E1125-105-4000X	151.04			1.34
E1125-105-4500M			114.30	234.70			1.28	E1125-105-4500S			1.07	E1125-105-4500X	176.61			1.07
E1125-105-5000M	28.58	2.67	127.00	272.54	168.14	15.12	1.05	E1125-105-5000S	140.06	12.59	0.88	E1125-105-5000X	202.81	78.95	12.60	0.88
E1125-105-5500M			139.70	310.64			0.89	E1125-105-5500S			0.74	E1125-105-5500X	228.89			0.74
E1125-105-6000M			152.40	348.49			0.79	E1125-105-6000S			0.66	E1125-105-6000X	253.48			0.66
E1125-105-6500M			165.10	386.59			0.68	E1125-105-6500S			0.57	E1125-105-6500X	281.73			0.57
E1125-105-7000M			177.80	424.43			0.61	E1125-105-7000S			0.51	E1125-105-7000X	307.76			0.51
E1125-125-3000M			76.20	106.93			8.09	E1125-125-3000S			6.74	E1125-125-3000X	92.44			6.74
E1125-125-3500M			88.90	135.64			5.31	E1125-125-3500S			4.42	E1125-125-3500X	113.66			4.42
E1125-125-4000M			101.60	164.59			3.94	E1125-125-4000S			3.28	E1125-125-4000X	134.94			3.28
E1125-125-4500M			114.30	193.29			3.13	E1125-125-4500S			2.61	E1125-125-4500X	156.21			2.61
E1125-125-5000M	3.18	127.00	222.25	272.45	24.51	2.61	E1125-125-5000S	226.95	20.42	2.17	E1125-125-5000X	177.34	129.84	20.42	2.17	
E1125-125-5500M			139.70	250.95			2.22	E1125-125-5500S			1.85	E1125-125-5500X	198.77			1.85
E1125-125-6000M			152.40	279.91			1.94	E1125-125-6000S			1.62	E1125-125-6000X	219.98			1.62
E1125-125-6500M			165.10	308.61			1.73	E1125-125-6500S			1.44	E1125-125-6500X	240.87			1.44
E1125-125-7000M			177.80	337.57			1.56	E1125-125-7000S			1.30	E1125-125-7000X	262.08			1.30
E1250-095-3500M			88.90	177.80			1.17	E1250-095-3500S			0.98	E1250-095-3500X	134.13			0.98
E1250-095-4000M			101.60	231.90			0.81	E1250-095-4000S			0.67	E1250-095-4000X	167.48			0.67
E1250-095-4500M			114.30	286.00			0.61	E1250-095-4500S			0.51	E1250-095-4500X	200.89			0.51
E1250-095-5000M	2.41	127.00	340.11	115.03	10.36	0.49	E1250-095-5000S	95.82	8.63	0.41	E1250-095-5000X	235.23	52.84	8.63	0.41	
E1250-095-5500M			139.70	394.21			0.40	E1250-095-5500S			0.34	E1250-095-5500X	271.46			0.34
E1250-095-6000M			152.40	448.31			0.35	E1250-095-6000S			0.29	E1250-095-6000X	303.92			0.29
E1250-095-6500M			165.10	502.41			0.32	E1250-095-6500S			0.26	E1250-095-6500X	333.46			0.26
E1250-095-7500M			190.50	610.62			0.25	E1250-095-7500S			0.20	E1250-095-7500X	406.96			0.20
E1250-115-3500M			88.90	147.57			3.03	E1250-115-3500S			2.52	E1250-115-3500X	119.22			2.52
E1250-115-4000M			101.60	185.93			2.12	E1250-115-4000S			1.77	E1250-115-4000X	144.95			1.77
E1250-115-4500M			114.30	224.54			1.61	E1250-115-4500S			1.34	E1250-115-4500X	171.31			1.34
E1250-115-5000M			127.00	262.89			1.31	E1250-115-5000S			1.09	E1250-115-5000X	196.93			1.09
E1250-115-5500M	31.75	2.92	139.70	301.24	195.86	17.61	1.10	E1250-115-5500S	163.15	14.67	0.92	E1250-115-5500X	222.95	91.18	14.67	0.92
E1250-115-6000M			152.40	339.85			0.95	E1250-115-6000S			0.79	E1250-115-6000X	249.53			0.79
E1250-115-6500M			165.10	378.21			0.84	E1250-115-6500S			0.70	E1250-115-6500X	274.37			0.70
E1250-115-7000M			177.80	416.56			0.75	E1250-115-7000S			0.63	E1250-115-7000X	299.77			0.63
E1250-115-7500M			190.50	455.17			0.67	E1250-115-7500S			0.55	E1250-115-7500X	328.52			0.55
E1250-135-3500M			88.90	130.05			6.74	E1250-135-3500S			5.61	E1250-135-3500X	110.35			5.62
E1250-135-4000M			101.60	160.02			4.76	E1250-135-4000S			3.97	E1250-135-4000X	131.96			3.97
E1250-135-4500M			114.30	189.74			3.70	E1250-135-4500S			3.08	E1250-135-4500X	153.43			3.08
E1250-135-5000M			127.00	219.46			3.01	E1250-135-5000S			2.51	E1250-135-5000X	175.00			2.51
E1250-135-5500M	3.43	139.70	249.17	305.24	27.49	2.54	E1250-135-5500S	254.26	22.90	2.12	E1250-135-5500X	196.64	143.34	22.90	2.12	
E1250-135-6000																

EXTENSION SPRINGS							302 STAINLESS STEEL / INOX				316 STAINLESS STEEL / INOX					
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L1 (mm)	P (N)	T (N)	R (N/mm)
E1250-148-4000M	31.75	3.76	101.60	148.59			7.62	E1250-148-4000S			6.35	E1250-148-4000X	126.16			6.35
E1250-148-4500M			114.30	174.75			5.94	E1250-148-4500S			4.95	E1250-148-4500X	145.81			4.95
E1250-148-5000M			127.00	200.66			4.85	E1250-148-5000S			4.04	E1250-148-5000X	165.56			4.04
E1250-148-5500M			139.70	226.82	393.13	35.36	4.10	E1250-148-5500S	327.48	29.45	3.42	E1250-148-5500X	185.35	185.28	29.46	3.41
E1250-148-6000M			152.40	252.98			3.56	E1250-148-6000S			2.97	E1250-148-6000X	205.02			2.96
E1250-148-6500M			165.10	279.15			3.13	E1250-148-6500S			2.61	E1250-148-6500X	224.78			2.61
E1250-148-7000M			177.80	305.05			2.80	E1250-148-7000S			2.33	E1250-148-7000X	244.56			2.33
E1250-148-7500M			190.50	331.22			2.54	E1250-148-7500S			2.12	E1250-148-7500X	264.17			2.12
E1500-125-4500M	3.18	3.76	114.30	218.19			1.82	E1500-125-4500S			1.52	E1500-125-4500X	166.29			1.52
E1500-125-5000M			127.00	262.64			1.38	E1500-125-5000S			1.15	E1500-125-5000X	195.44			1.15
E1500-125-5500M			139.70	307.34			1.12	E1500-125-5500S			0.93	E1500-125-5500X	224.18			0.93
E1500-125-6000M			152.40	352.04	207.47	18.68	0.95	E1500-125-6000S	172.82	15.56	0.79	E1500-125-6000X	252.52	94.43	15.56	0.79
E1500-125-6500M			165.10	396.75			0.82	E1500-125-6500S			0.69	E1500-125-6500X	280.13			0.69
E1500-125-7000M			177.80	441.20			0.72	E1500-125-7000S			0.60	E1500-125-7000X	309.67			0.60
E1500-125-7500M			190.50	485.90			0.63	E1500-125-7500S			0.53	E1500-125-7500X	340.68			0.53
E1500-125-8000M			203.20	530.61			0.58	E1500-125-8000S			0.48	E1500-125-8000X	367.04			0.48
E1500-148-4500M	38.10	3.76	114.30	185.42			4.26	E1500-148-4500S			3.55	E1500-148-4500X	149.90			3.55
E1500-148-5000M			127.00	218.95			3.27	E1500-148-5000S			2.72	E1500-148-5000X	173.26			2.73
E1500-148-5500M			139.70	252.48			2.68	E1500-148-5500S			2.23	E1500-148-5500X	196.24			2.23
E1500-148-6000M			152.40	286.00	331.35	29.80	2.26	E1500-148-6000S	276.01	24.82	1.88	E1500-148-6000X	219.46	151.02	24.82	1.88
E1500-148-6500M			165.10	319.53			1.96	E1500-148-6500S			1.63	E1500-148-6500X	242.34			1.63
E1500-148-7000M			177.80	353.06			1.72	E1500-148-7000S			1.43	E1500-148-7000X	266.08			1.43
E1500-148-7500M			190.50	386.59			1.54	E1500-148-7500S			1.28	E1500-148-7500X	288.81			1.28
E1500-148-8000M			203.20	420.12			1.38	E1500-148-8000S			1.15	E1500-148-8000X	312.71			1.15
E1500-177-4500M	4.50	3.76	114.30	161.29			10.49	E1500-177-4500S			8.74	E1500-177-4500X	137.84			8.74
E1500-177-5000M			127.00	187.20			8.21	E1500-177-5000S			6.84	E1500-177-5000X	157.07			6.84
E1500-177-5500M			139.70	212.85			6.74	E1500-177-5500S			5.61	E1500-177-5500X	176.33			5.62
E1500-177-6000M			152.40	238.76	542.24	48.79	5.73	E1500-177-6000S	451.69	40.64	4.77	E1500-177-6000X	195.53	246.36	40.65	4.77
E1500-177-6500M			165.10	264.41			4.97	E1500-177-6500S			4.14	E1500-177-6500X	214.76			4.14
E1500-177-7000M			177.80	290.07			4.40	E1500-177-7000S			3.67	E1500-177-7000X	233.98			3.66
E1500-177-7500M			190.50	315.98			3.94	E1500-177-7500S			3.28	E1500-177-7500X	253.18			3.28
E1500-177-8000M			203.20	341.63			3.56	E1500-177-8000S			2.97	E1500-177-8000X	272.67			2.96
E1750-148-5000M	3.76	3.76	127.00	226.06			2.63	E1750-148-5000S			2.19	E1750-148-5000X	175.44			2.19
E1750-148-5500M			139.70	268.73			2.01	E1750-148-5500S			1.67	E1750-148-5500X	202.89			1.68
E1750-148-6000M			152.40	311.40			1.65	E1750-148-6000S			1.37	E1750-148-6000X	229.70			1.37
E1750-148-6500M			165.10	353.82	286.15	25.75	1.38	E1750-148-6500S	238.36	21.45	1.15	E1750-148-6500X	257.08	127.45	21.45	1.15
E1750-148-7000M			177.80	396.49			1.19	E1750-148-7000S			0.99	E1750-148-7000X	284.66			0.99
E1750-148-7500M			190.50	439.17			1.05	E1750-148-7500S			0.88	E1750-148-7500X	311.61			0.88
E1750-148-8000M			203.20	481.84			0.93	E1750-148-8000S			0.77	E1750-148-8000X	340.30			0.77
E1750-148-9000M			228.60	567.18			0.77	E1750-148-9000S			0.64	E1750-148-9000X	393.74			0.64
E1750-177-5000M	4.50	4.50	127.00	193.55			6.41	E1750-177-5000S			5.34	E1750-177-5000X	159.22			5.34
E1750-177-5500M			139.70	225.30			4.99	E1750-177-5500S			4.16	E1750-177-5500X	181.07			4.16
E1750-177-6000M			152.40	257.05			4.08	E1750-177-6000S			3.40	E1750-177-6000X	203.01			3.40
E1750-177-6500M			165.10	288.80	469.33	42.26	3.45	E1750-177-6500S	390.95	35.20	2.87	E1750-177-6500X	224.95	207.20	35.20	2.87
E1750-177-7000M			177.80	320.29			2.99	E1750-177-7000S			2.49	E1750-177-7000X	246.75			2.49
E1750-177-7500M			190.50	352.04			2.64	E1750-177-7500S			2.20	E1750-177-7500X	268.59			2.20
E1750-177-8000M			203.20	383.79			2.36	E1750-177-8000S			1.97	E1750-177-8000X	290.54			1.97
E1750-177-9000M			228.60	447.29			1.96	E1750-177-9000S			1.63	E1750-177-9000X	333.88			1.63
E1750-207-5000M	5.26	5.26	127.00	173.74			14.05	E1750-207-5000S			11.70	E1750-207-5000X	149.22			11.70
E1750-207-5500M			139.70	199.14			11.07	E1750-207-5500S			9.22	E1750-207-5500X	167.89			9.22
E1750-207-6000M			152.40	224.28			9.12	E1750-207-6000S			7.60	E1750-207-6000X	186.60			7.60
E1750-207-6500M			165.10	249.68	721.37	64.90	7.76	E1750-207-6500S	600.90	54.06	6.46	E1750-207-6500X	205.32	313.99	54.06	6.46
E1750-207-7000M			177.80	274.83			6.76	E1750-207-7000S			5.63	E1750-207-7000X	223.96			5.63
E1750-207-7500M			190.50	300.23			5.99	E1750-207-7500S			4.99	E1750-207-7500X	242.60			4.99
E1750-207-8000M			203.20	325.63			5.36	E1750-207-8000S			4.47	E1750-207-8000X	261.43			4.46
E1750-207-9000M			228.60	376.17			4.45	E1750-207-9000S			3.71	E1750-207-9000X	298.75			3.71
E2000-177-5500M	5.26	5.26	139.70	228.35			4.24	E2000-177-5500S			3.53	E2000-177-5500X	181.56			3.53
E2000-177-6000M			152.40	267.21			3.27	E2000-177-6000S			2.72	E2000-177-6000X	206.57			2.73
E2000-177-6500M			165.10	305.82			2.68	E2000-177-6500S			2.23	E2000-177-6500X	231.31			2.23
E2000-177-7000M			177.80	344.68	413.46	37.23	2.26	E2000-177-7000S	344.41	31.01	1.88	E2000-177-7000X	256.33	178.79	31.01	1.88
E2000-177-7500M			190.50	383.54			1.94	E2000-177-7500S			1.62	E2000-177-7500X	281.77			1.62
E2000-177-8000M			203.20	422.15			1.72	E2000-177-8000S			1.43	E2000-177-8000X	306.57</td			

EXTENSION SPRINGS							302 STAINLESS STEEL / INOX				316 STAINLESS STEEL / INOX					
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)	Part Number	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)
E2000-207-10000M	50.80	5.26	254.00	473.96	636.63	57.29	2.63	E2000-207-10000S	530.31	47.72	2.19	E2000-207-10000X	355.68	270.21	47.72	2.19

EXTENSION SPRINGS							302 STAINLESS STEEL / INOX						
Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)		
T30800			7.90	9.61			7.98	T40800			6.65		
T30810		2.50	10.90	13.64		16.10	2.45	T40810		13.41	2.04	4.15	
T30820			15.40	19.68			3.19	T40820			2.66		
T30830			9.50	13.82			2.35	T40830			1.96		
T30840			12.50	19.41			1.47	T40840			1.23		
T30850		3.50	17.00	27.80	12.00	1.77	0.94	T40850		10.00	1.47	0.78	
T30860			24.50	41.80			0.59	T40860			0.49		
T30870			290.00	500.00			0.05	T40870			0.04		
T30880			12.70	25.80			0.51	T40880			0.43		
T30890			15.70	36.60			0.31	T40890			0.26		
T30900		5.50	20.20	52.90	7.80	1.02	0.21	T40900		6.50	0.85	0.18	
T30910			27.70	80.00			0.13	T40910			0.11		
T30920			37.70	116.10			0.09	T40920			0.08		
T30930			8.80	10.78			8.18	T40930			6.81		
T30940		2.80	12.10	15.27	19.00	2.79	5.11	T40940		15.83	2.33	4.26	
T30950			17.00	21.96			3.27	T40950			2.72		
T30960			9.90	13.58			3.63	T40960			3.02		
T30970		3.50	13.20	19.09		2.38	2.27	T40970		13.08	1.98	1.89	
T30980			18.10	27.30			1.45	T40980			1.21		
T30990			26.40	41.10			0.90	T40990			0.75		
T31000			13.90	28.00	9.50	1.09	0.58	T41000		7.91	0.91	0.48	
T31010			17.20	39.70			0.36	T41010			0.30		
T31020		6.00	22.10	57.20			0.23	T41020			0.19		
T31030			30.40	86.60	85.30	12.63	0.15	T41030		71.05	10.52	0.13	
T31040			41.40	125.70			0.11	T41040			0.09		
T31050			9.70	11.55			12.10	T41050			10.08		
T31060		3.00	13.50	16.46	26.20	3.92	7.51	T41060		21.82	3.27	6.26	
T31070			19.20	23.82			4.81	T41070			4.01		
T31080			12.10	17.75			2.77	T41080			2.31		
T31090		4.50	15.90	24.94	18.30	2.61	1.73	T41090		15.24	2.17	1.44	
T31100			21.60	35.70			1.11	T41100			0.93		
T31110			31.00	53.60			0.70	T41110			0.58		
T31120			16.10	32.70			0.62	T41120			0.52		
T31130			19.90	46.50			0.39	T41130			0.33		
T31140		7.00	25.60	67.20	12.20	1.67	0.25	T41140		10.16	1.39	0.21	
T31150			35.00	101.50			0.16	T41150			0.13		
T31160			47.60	147.30			0.11	T41160			0.09		
T31170			11.10	13.46			11.10	T41170			9.25		
T31180		3.50	15.30	19.08	30.70	4.48	6.95	T41180		25.57	3.73	5.79	
T31190			21.60	27.50			4.44	T41190			3.70		
T31200			13.50	19.75			3.07	T41200			2.56		
T31210		5.00	17.70	27.70	22.60	3.39	1.92	T41210		18.83	2.83	1.60	
T31220			24.00	39.60			1.23	T41220			1.03		
T31230			34.50	59.50			0.77	T41230			0.64		
T31240			17.50	34.40			0.78	T41240			0.65		
T31250			21.70	48.70			0.49	T41250			0.41		
T31260		7.50	28.00	70.20	15.40	2.18	0.31	T41260		12.83	1.81	0.26	
T31270			38.50	106.00			0.20	T41270			0.17		
T31280			52.50	153.50			0.13	T41280			0.11		
T31290			12.60	15.26			12.70	T41290			10.58		
T31300		4.00	17.40	21.66	39.90	5.96	8.00	T41300		33.24	4.96	6.66	
T31310			24.60	31.26			5.10	T41310			4.25		
T31320			15.00	21.40			4.00	T41320			3.33		
T31330			19.80	30.00			2.50	T41330			2.08		
T31340		5.50	27.00	43.00	30.20	4.79	1.60	T41340		25.16	3.99	1.33	
T31350			39.00	64.60			1.00	T41350			0.83		
T31360			290.00	515.00			0.11	T41360			0.09		
T31370			20.60	42.00			0.76	T41370			0.63		
T31380			25.40	59.70			0.47	T41380			0.39		
T31390		9.00	32.60	86.10	19.00	2.72	0.30	T41390		15.83	2.27	0.25	
T31400			44.60	130.20			0.19	T41400			0.16		
T31410			60.60	188.60			0.13	T41410			0.11		
T31420		4.50	0.90	14.20	17.15	49.70	7.45	T41420		41.40	6.20	11.91	



## EXTENSION SPRINGS

## 302 STAINLESS STEEL / INOX

Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)
T31430	4.50		19.60	24.32	49.70	7.45	8.96	T41430	41.40	6.20	7.46
T31440			27.70	35.08			5.73	T41440			4.77
T31450			17.10	24.53			4.23	T41450			3.52
T31460	6.30	0.90	22.50	34.40	37.10	5.58	2.65	T41460	30.90	4.65	2.21
T31470			30.60	49.20			1.70	T41470			1.42
T31480			44.10	73.80			1.06	T41480			0.88
T31490	10.00		23.00	46.10			0.88	T41490			0.73
T31500			28.40	65.30			0.55	T41500			0.46
T31510			36.50	94.10	24.00	3.46	0.35	T41510	19.99	2.88	0.29
T31520	10.00	0.90	50.00	142.20			0.23	T41520			0.19
T31530			68.00	206.00			0.15	T41530			0.13
T31540			15.80	19.05			15.90	T41540			13.25
T31550	5.00		21.80	27.00	60.80	9.17	9.90	T41550	50.65	7.64	8.25
T31560			30.80	38.92			6.37	T41560			5.31
T31570			19.00	27.17			4.71	T41570			3.92
T31580			25.00	38.10			2.94	T41580			2.45
T31590	7.00	1.00	34.00	54.40	45.30	6.78	1.83	T41590	37.73	5.66	1.52
T31600			49.00	81.70			1.18	T41600			0.98
T31610			290.00	510.00			0.18	T41610			0.15
T31620			25.40	50.20			1.02	T41620			0.85
T31630			31.40	71.00			0.64	T41630			0.53
T31640	11.00		40.40	102.30	29.60	4.18	0.41	T41640	24.66	3.48	0.34
T31650			55.40	154.40			0.26	T41650			0.22
T31660			75.40	224.40			0.17	T41660			0.14
T31670			17.40	20.94			17.50	T41670			14.58
T31680	5.50		24.00	29.66	72.80	10.77	11.00	T41680	60.64	8.97	9.16
T31690			33.90	42.74			7.00	T41690			5.83
T31700			20.60	28.90			5.69	T41700			4.74
T31710	7.50		27.20	40.50	55.50	8.25	3.55	T41710	46.23	6.87	2.96
T31720			37.10	57.90			2.28	T41720			1.90
T31730			53.60	86.80			1.42	T41730			1.18
T31740			27.80	54.20			1.15	T41740			0.96
T31750			34.40	76.70			0.72	T41750			0.60
T31760	12.00		44.30	110.40	35.80	5.26	0.46	T41760	29.82	4.38	0.38
T31770			60.80	166.80			0.28	T41770			0.23
T31780			82.80	241.80			0.20	T41780			0.17
T31790			19.00	22.80			19.10	T41790			15.91
T31800	6.00		26.20	32.28	85.30	12.63	12.00	T41800	71.05	10.52	10.00
T31810			37.00	46.50			7.63	T41810			6.36
T31820			23.00	32.85			5.43	T41820			4.52
T31830			30.20	46.00			3.39	T41830			2.82
T31840	8.50		41.00	65.60	62.80	9.22	2.17	T41840	52.31	7.68	1.81
T31850		1.20	59.00	98.60			1.35	T41850			1.13
T31860			290.00	515.00			0.24	T41860			0.20
T31870			30.20	58.10			1.28	T41870			1.07
T31880			37.40	82.10			0.80	T41880			0.67
T31890	13.00		48.20	118.00	42.20	6.56	0.51	T41890	35.15	5.47	0.43
T31900			66.20	178.20			0.32	T41900			0.27
T31910			90.20	258.20			0.21	T41910			0.18
T31920			22.10	26.46			22.30	T41920			18.58
T31930	7.00		30.50	37.48	114.00	16.88	13.90	T41930	94.96	14.06	11.58
T31940			43.10	54.00			8.91	T41940			7.42
T31950			26.90	38.50			6.14	T41950			5.12
T31960			35.30	53.80			3.83	T41960			3.19
T31970	10.00		47.90	76.80	83.60	12.66	2.46	T41970	69.64	10.54	2.05
T31980		1.40	68.90	115.10			1.54	T41980			1.28
T31990			290.00	510.00			0.32	T41990			0.27
T32000			34.90	66.10			1.55	T42000			1.29
T32010			43.30	93.30			0.97	T42010			0.81
T32020	15.00		55.90	134.00	57.10	8.57	0.62	T42020	47.56	7.14	0.52
T32030			76.90	201.90			0.39	T42030			0.33
T32040			105.00	292.00			0.26	T42040			0.22
T32050			25.30	30.18			25.40	T42050			21.16
T32060	8.00		34.90	42.71	146.00	21.81	15.90	T42060	121.62	18.17	13.25
T32070			49.30	61.50			10.20	T42070			8.50
T32080			30.10	41.80			8.04	T42080			6.70
T32090	11.00	1.60	39.70	58.40	111.00	16.91	5.02	T42090	92.46	14.09	4.18
T32100			54.10	83.40			3.22	T42100			2.68
T32110			78.10	124.90			2.01	T42110			1.67
T32120	17.00		39.70	74.00	74.00	11.62	1.82	T42120	61.64	9.68	1.52
T32130			49.30	104.10			1.14	T42130			0.95



## EXTENSION SPRINGS

## 302 STAINLESS STEEL / INOX

Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)
T32140			63.70	149.30			0.73	T42140			0.61
T32150	17.00	1.60	87.70	224.70	74.00	11.62	0.46	T42150	61.64	9.68	0.38
T32160			120.00	325.00			0.30	T42160			0.25
T32170			28.40	33.77			28.60	T42170			23.82
T32180	9.00		39.20	47.79	180.00	26.47	17.80	T42180	149.94	22.05	14.83
T32190			55.40	68.80			11.50	T42190			9.58
T32200			33.20	45.10			10.10	T42200			8.41
T32210		1.80	44.00	63.00			6.28	T42210			5.23
T32220	12.00		60.20	89.90	141.00	21.43	4.02	T42220	117.45	17.85	3.35
T32230			87.20	134.80			2.52	T42230			2.10
T32240			290.00	465.00			0.68	T42240			0.57
T32250			46.00	87.90			1.78	T42250			1.48
T32260			56.80	123.80			1.11	T42260			0.93
T32270	20.00	1.80	73.00	178.00	87.00	13.05	0.71	T42270	72.47	10.87	0.59
T32280			100.00	267.00			0.44	T42280			0.37
T32290			136.00	387.00			0.29	T42290			0.24
T32300			31.60	37.46			31.80	T42300			26.49
T32310	10.00		43.60	52.98	220.00	32.94	19.90	T42310	183.26	27.44	16.58
T32320			61.60	76.30			12.80	T42320			10.66
T32330			38.00	52.70			9.42	T42330			7.85
T32340	14.00		50.00	73.60	164.00	25.25	5.88	T42340	136.61	21.03	4.90
T32350		2.00	68.00	104.90			3.77	T42350			3.14
T32360			98.00	157.00			2.35	T42360			1.96
T32370			50.80	95.50			2.03	T42370			1.69
T32380			62.80	134.30			1.27	T42380			1.06
T32390	22.00		80.80	192.80	107.00	16.07	0.81	T42390	89.13	13.38	0.68
T32400			111.00	290.00			0.51	T42400			0.43
T32410			151.00	419.00			0.34	T42410			0.28
T32420			34.80	41.10			35.00	T42420			29.16
T32430	11.00		48.00	58.10	259.00	38.04	21.90	T42430	215.75	31.69	18.24
T32440			67.80	83.60			14.00	T42440			11.66
T32450			41.20	56.00			11.40	T42450			9.50
T32460	15.00		54.40	78.10	198.00	29.63	7.10	T42460	164.93	24.68	5.91
T32470		2.20	74.20	111.20			4.55	T42470			3.79
T32480			107.00	166.20			2.84	T42480			2.37
T32490			55.60	102.70			2.31	T42490			1.92
T32500			68.80	144.10			1.44	T42500			1.20
T32510	24.00		88.60	206.60	127.00	18.60	0.92	T42510	105.79	15.50	0.77
T32520			122.00	310.00			0.58	T42520			0.48
T32530			166.00	448.00			0.38	T42530			0.32
T32540	13.00		40.30	48.14			34.30	T42540			28.57
T32550			55.30	67.80	317.00	48.27	21.50	T42550	264.06	40.21	17.91
T32560			77.80	97.40			13.70	T42560			11.41
T32570			48.30	67.20			10.70	T42570			8.91
T32580	18.00		63.30	93.60	237.00	34.90	6.67	T42580	197.42	29.07	5.56
T32590		2.50	85.80	133.10			4.27	T42590			3.56
T32600			123.00	198.70			2.67	T42600			2.22
T32610			64.30	119.90			2.39	T42610			1.99
T32620			79.30	168.20			1.50	T42620			1.25
T32630	28.00		102.00	241.00	157.00	23.79	0.96	T42630	130.78	19.81	0.80
T32640			139.00	361.00			0.60	T42640			0.50
T32650			189.00	522.00			0.40	T42650			0.33
T32660			44.20	51.85			44.60	T42660			37.15
T32670	14.00		61.00	73.20	400.00	58.85	27.90	T42670	333.20	49.02	23.24
T32680			86.20	105.30			17.90	T42680			14.91
T32690			53.80	74.10			12.30	T42690			10.25
T32700	20.00		70.60	103.00	293.00	44.09	7.68	T42700	244.07	36.73	6.40
T32710		2.80	95.80	146.40			4.91	T42710			4.09
T32720			138.00	219.00			3.07	T42720			2.56
T32730			69.80	124.50			3.11	T42730			2.59
T32740	30.00		86.60	174.20	200.00	29.47	1.94	T42740	166.60	25.55	1.62
T32750			112.00	249.00			1.25	T42750			1.04
T32760			154.00	373.00			0.78	T42760			0.65
T32780			50.60	59.12			50.90	T42780			42.40
T32790	16.00		69.80	83.40	510.00	76.44	31.80	T42790	424.83	63.68	26.49
T32800			98.60	119.90			20.40	T42800			16.99
T32810		3.20	60.20	80.70			16.10	T42810			13.41
T32820	22.00		79.40	112.10	386.00	56.75	10.00	T42820	321.54	47.27	8.33
T32830			108.00	159.10			6.48	T42830			5.40
T32840			156.00	237.80			4.02	T42840			3.35
T32850	36.00		82.60	151.00	243.00	36.45	3.02	T42850	202.42	30.37	2.52



## EXTENSION SPRINGS

## 302 STAINLESS STEEL / INOX

Part Number	Do (mm)	d (mm)	Lo (mm)	L <sub>1</sub> (mm)	P (N)	T (N)	R (N/mm)	Part Number	P (N)	T (N)	R (N/mm)
T32860			102.00	211.00			1.89	T42860			1.57
T32870	36.00	3.20	131.00	302.00	243.00	36.45	1.21	T42870	202.42	30.37	1.01
T32880			179.00	453.00			0.76	T42880			0.63
T32890			243.00	653.00			0.50	T42890			0.42
T32900			56.90	66.25			57.20	T42900			47.65
T32910	18.00		78.50	93.50	630.00	94.11	35.80	T42910	524.79	78.39	29.82
T32920			111.00	134.40			22.90	T42920			19.08
T32930			68.10	91.10			17.50	T42930			14.58
T32940	25.00		89.70	126.50	473.00	70.96	10.90	T42940	394.01	59.11	9.08
T32950		3.60	122.00	179.60			6.98	T42950			5.81
T32960			176.00	268.10			4.37	T42960			3.64
T32970			92.10	165.00			3.54	T42970			2.95
T32980			114.00	231.00			2.22	T42980			1.85
T32990	40.00		146.00	328.00	304.00	45.79	1.42	T42990	253.23	38.15	1.18
T33000			200.00	492.00			0.88	T43000			0.73
T33010			272.00	709.00			0.59	T43010			0.49
T33020			63.20	73.30			63.60	T43020			52.98
T33030	20.00		87.20	103.40	757.00	114.29	39.70	T43030	630.58	95.21	33.07
T33040			123.00	148.30			25.40	T43040			21.16
T33050			76.00	101.40			18.80	T43050			15.66
T33060	28.00		100.00	140.70	564.00	84.56	11.80	T43060	469.81	70.44	9.83
T33070		4.00	136.00	199.60			7.54	T43070			6.28
T33080			196.00	298.00			4.71	T43080			3.92
T33090			103.00	184.20			3.78	T43090			3.15
T33100			127.00	257.00			2.36	T43100			1.97
T33110	45.00		163.00	366.00	361.00	54.49	1.51	T43110	300.71	45.39	1.26
T33120			223.00	548.00			0.94	T43120			0.78
T33130			303.00	790.00			0.63	T43130			0.53
T33140			70.30	80.70			77.90	T43140			64.89
T33150	22.00		97.30	113.90	951.00	142.11	48.70	T43150	792.18	118.38	40.57
T33160			138.00	163.90			31.20	T43160			25.99
T33170			86.30	115.30			20.10	T43170			16.74
T33180	32.00		113.00	159.40	685.00	102.08	12.60	T43180	570.61	85.03	10.50
T33190		4.50	154.00	226.60			8.03	T43190			6.69
T33200			221.00	337.00			5.01	T43200			4.17
T33210			115.00	201.40			4.43	T43210			3.69
T33220			142.00	280.00			2.77	T43220			2.31
T33230	50.00		183.00	399.00	451.00	67.63	1.78	T43230	375.68	56.33	1.48
T33240			250.00	596.00			1.11	T43240			0.93
T33250			340.00	858.00			0.74	T43250			0.62
T33260			79.00	90.90			79.50	T43260			66.22
T33270	25.00		109.00	128.00	1110.00	165.06	49.70	T43270	924.63	137.50	41.40
T33280			154.00	183.70			31.80	T43280			26.49
T33290			96.60	128.80			21.40	T43290			17.83
T33300	36.00		127.00	178.50	808.00	120.62	13.30	T43300	673.06	100.48	11.08
T33310		5.00	172.00	252.40			8.54	T43310			7.11
T33320			247.00	376.00			5.34	T43320			4.45
T33330			127.00	217.60			5.09	T43330			4.24
T33340			157.00	302.00			3.18	T43340			2.65
T33350	55.00		202.00	428.00	543.00	82.28	2.04	T43350	452.32	68.54	1.70
T33360			277.00	589.00			1.28	T43360			1.07
T33370			377.00	921.00			0.84	T43370			0.70



NOTES



## CONTINUOUS LENGTH SPRINGS

SPEC meter lengths can be used as a stock item or cut to length, where length requirement of spring can vary.



### MATERIALS

Music wire to DIN 17223 Class C. No 1,1200  
Stainless steel wire to DIN 17224 No. 1,4310

### KEY TO MEASUREMENTS

Do = Outside diameter  
d = Wire diameter  
Lo = Free Length  
S = Pitch (+/-10%)

When enquiring or ordering, use letter 'M' or 'S' as suffix on catalogue numbers to designate music wire or stainless steel wire respectively. If not specified we will supply music wire.

## COMPRESSION / TRACTION AU METRE

Les ressorts à couper SPEC, en longueur d'un mètre, peuvent être gardés en stock et coupés à la demande.

### MATERIAUX

Corde à piano conforme à la norme DIN 17223 Classe C. No. 1 1200.  
Fil en acier inoxydable conforme à la norme DIN 17224 No. 1 4310.

### INDEX DES MESURES

Do = Diamètre extérieur  
d = Diamètre du fil  
Lo = Longueur à vide  
S =

Pour se renseigner ou commander, utiliser la lettre 'M' pour la corde à piano ou 'S' pour le fil en acier inoxydable (comme suffixes aux numéros du catalogue), en l'absence de précision, nous fournirons la corde à piano.

## COMPRESION / TRACCION AL METRO

Los muelles/resortes de SPEC, suministrados en longitudes de un metro, se pueden utilizar como artículo de stock y cortarlos a medida en el caso de variaciones de longitud.

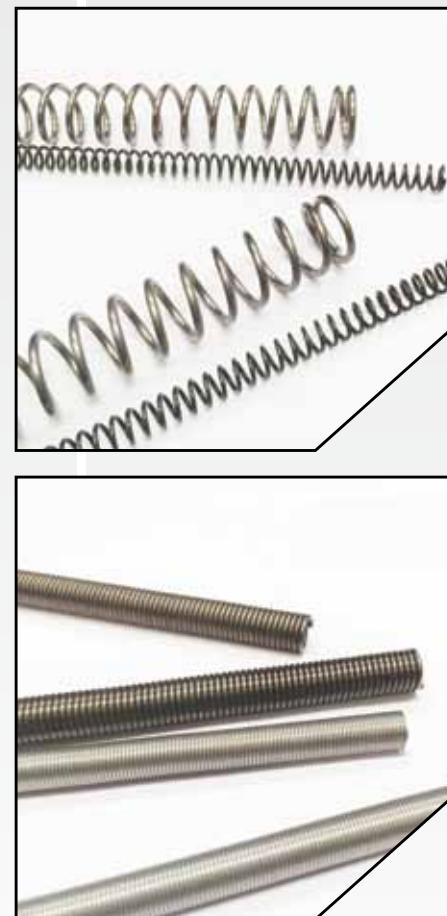
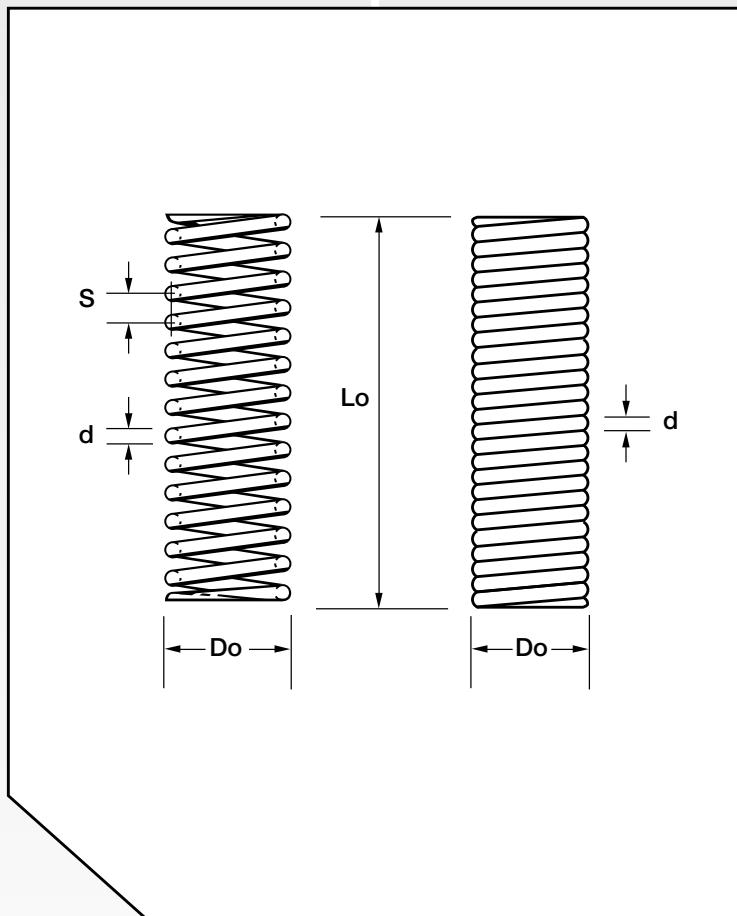
### MATERIAL

Alambre de piano según DIN 17223 Clase C. No. 1, 1200.  
Alambre de acero inoxidable según DIN 17224 No. 1,4310.

### CLAVES DE CARACTERÍSTICAS

Do = Diámetro exterior  
d = Diámetro del alambre  
Lo = Longitud libre  
S = Paso (+/-10%)

Al hacer una consulta o un pedido, utilice la letra "M" o "S" como sufijo en los números de catálogo para designar alambre de piano o alambre de acero inoxidable, respectivamente. Por defecto, suministramos en alambre de piano.



### United Kingdom

**Tel:** (44) 1386 443366  
**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363  
**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542  
**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04  
**E-mail:** info@asraymond.de

## METERLANGE FEDERN

SPEC Federn mit Meterlänge werden zur gewünschte Länge abgeschnitten, wo Längebedürfnisse ändern.

### WERKSTOFFE

Federstahldraht nach DIN 17223 Sorte C No 1,1200

Nichtrostender Federstahldraht nach DIN 17224 No 1,4310

### KENNZEICHNEN DER ABMESSUNGEN

Do = Äußerer Windungsdurchmesser  
d = Drahtdurchmesser  
Lo = Länge der unbelasteten Feder  
S = Steigung (+/-10%)

Bei Anfragen oder Bestellungen, fügen Sie "M" für Federstahldraht oder "S" für nichtrostender Federstahldraht Nachbuchstabe am Ende der Katalog-Bestell-Nummer zu. Falls keine zugefügt wird, werden wir Federstahldraht ausliefern.

## MOLLE A COMPRESSIONE/TRAZIONE

Le molle SPEC vengono fornite anche con lunghezza libera di 1 metro e possono venire utilizzate come scorta a magazzino e venire tagliate con diverse lunghezze secondo le necessità.

### MATERIALE

Filo armonico secondo DIN 17223 Classe C. No. 1. 1200.

Filo in acciaio inossidabile secondo DIN 17224 No. 1.4310

### LEGENDA

Do = Diametro esterno  
d = Diametro filo  
Lo = Lunghezza libera  
S = Passo (+/-10%)

Nelle vostre richieste od ordini specificate sempre il prefisso 'M' o 'S' rispettivamente per designare il filo armonico o l'acciaio inossidabile (se non specificato verrà fornito il filo armonico).

## COMPRESSÃO / TRACÇÃO

As molas SPEC, fornecidas em comprimentos de um metro, podem utilizar-se como artigo de stock, podendo ser cortadas para suprir diferentes requisitos de comprimento.

### MATERIAL

Arame de aço conforme à especificação DIN 17223 Classe C.

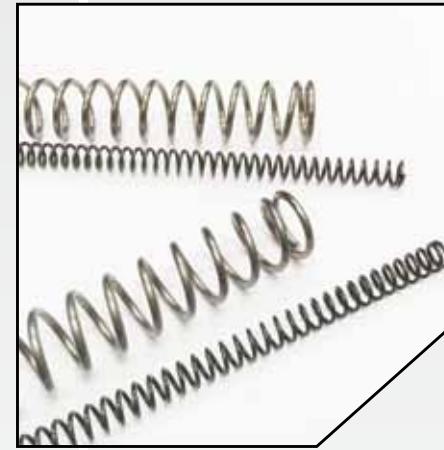
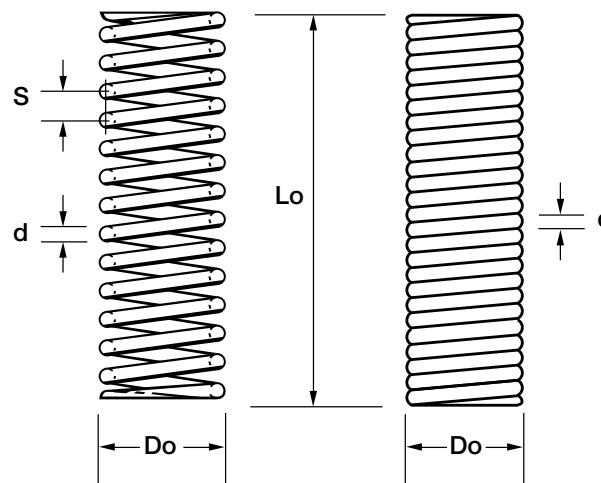
No. 1, 1200 Arame de aço inoxidável conforme à especificação DIN 17554 No. 1,4310.



### TABELA DE MEDIDAS

Do = Diâmetro exterior  
d = Diâmetro do arame  
Lo = Comprimento livre  
S = Passo (+/- 10mm)

Ao efectuar uma consulta ou um pedido, utilize a letra "M" ou "S" como sufixo nos números de catálogo, para designar arame de aço ou arame em aço inoxidável (caso não especifique, forneceremos arame de aço).



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



**COMPRESSION (1 metre length)**

Part Number	Do (mm)	d (mm)	Lo (mm)	S
D19000	2.4	0.4	1000	0.90
D19010	3.6		1000	1.30
D19020	3.7	0.5	1000	1.40
D19030	4.5		1000	1.80
D19040	4.63	0.63	1000	1.70
D19050	5.63		1000	2.20
D19060	5.8	0.8	1000	2.20
D19070	7.1		1000	2.80
D19080	7.3	1	1000	2.30
D19090	9		1000	3.30
D19100	9.25	1.25	1000	3.90
D19110	11.25		1000	5.30
D19120	11.6	1.6	1000	4.80
D19130	14.1		1000	6.25
D19140	14.5	2	1000	5.50
D19150	18		1000	8.00
D19160	15	2.2	1000	5.00
D19170	24		1000	10.60
D19180	18.5	2.5	1000	7.00
D19190	22.5		1000	9.50
D19200	20	2.8	1000	9.00
D19210	30		1000	12.50
D19220	28.2	3.2	1000	11.00
D19230	35.2		1000	15.00

**EXTENSION (1 metre length)**

Part Number	Do (mm)	d (mm)	Lo (mm)
T39000	2.4	0.4	1000
T39010	3.4		1000
T39020	3.5	0.5	1000
T39030	5.5		1000
T39040	4.5	0.63	1000
T39050	7		1000
T39060	5.5	0.8	1000
T39070	9		1000
T39080	7	1	1000
T39090	11		1000
T39100	8.5	1.2	1000
T39110	13		1000
T39120	11	1.6	1000
T39130	17		1000
T39140	14	2	1000
T39150	22		1000
T39160	15	2.2	1000
T39170	24		1000
T39180	18	2.5	1000
T39190	28		1000
T39200	20	2.8	1000
T39210	30		1000
T39220	22	3.2	1000
T39230	36		1000





**Barnes**  
GROUP INC

ENGINEERED COMPONENTS

**Associated Spring** 

 A business of BARNES GROUP INC

Pioneering Leader in  
Engineered Spring and  
Stamping Solutions

[www.asbg.com](http://www.asbg.com)

**Associated Spring RAYMOND** 

 A business of BARNES GROUP INC

Leading Supplier of  
Ready-to-Ship Standard  
Struts, Springs & Spring  
Washers as well as Custom  
Solutions/Assemblies

[www.asraymond.com](http://www.asraymond.com)

**Hänggi**

 A business of BARNES GROUP INC

Industry Pioneer in  
Microstamping, Fineblanking  
and Micro Cold Formed  
Solutions

[www.hanggi.com](http://www.hanggi.com)

Precision Engineered Solutions

Innovation and Technology

Expansive Global Footprint

One Team. One Company.

**SEEGER** 

 A business of BARNES GROUP INC

Inventor and Leader in  
Engineered Retaining and  
Snap Rings for both traditional  
and Electric/Hybrid vehicles

[www.seeger-orbis.com](http://www.seeger-orbis.com)

LOCATIONS  
● = MANUFACTURING  
● = NON-MANUFACTURING



## CONICAL SPRINGS

Spec conical springs are cone shaped compression springs designed to provide a near constant spring rate and a solid height lower than a normal spring. Each spring features a variable pitch to achieve the constant spring rate and coils which nest during deflection to provide a solid height of approximately equal to two wire diameters.

All springs are manufactured from stainless steel for use in a multitude of environments.



### MATERIALS

Stainless steel: Type 302 as per ASTM A313 or AMS 5688 spring temper

### FINISH

Standard finish is passivated to ASTM A967.

### DIRECTION OF HELIX

Right hand.

### ENDS

Squared ends not ground.

### SPRING RATE

The spring rate is linear due to the variable pitch.

### SOLID HEIGHT

Due to coil nesting, the solid height is approximately equal to two wire diameters.

### KEY TO MEASUREMENTS

Do (S) = Outside diameter (small end)  
 Do (L) = Outside diameter (large end)  
 d = Wire diameter  
 Lo = Free Length  
 P<sub>1</sub> = Load at 50% load  
 P<sub>2</sub> = Load at solid height  
 R = Rate

## RESSORTS DE COMPRESSION CONIQUES

Les ressorts coniques SPEC sont des ressorts de compression destinés à offrir une élasticité constante et une hauteur emboîtée plus basse que celles d'une raideur constante. Chaque ressort a un pas variable qui permet d'obtenir le taux d'élasticité constant et des spires qui s'emboîtent pendant la flexion pour donner une hauteur emboîtée à peu près égale à deux diamètres de fil.

Tous les ressorts sont fabriqués en acier inoxydable pour être utilisés dans une multitude d'environnements.

### MATÉRIAUX

Acier Inoxydable. Trempe de ressort type 302 par ASTM A313 ou AMS5688. (Chimique et physique seulement).

### FINITION

Finition standard passivée selon ASTM A967

### ENROULEMENT

A droite.

### EXTRÉMITÉS

Equarries et non meulées.

### RAIDEUR

La raideur est linéaire en raison du pas variable.

### HAUTEUR A SPIRES JOINTIVES

En raison de l'emboîtement des spires, la hauteur à spires jointives est à peu près égale à deux diamètres de fil.

### INDEX DES MESURES

Do (S) = Diamètre Ext. (petite extrémité)  
 Do (L) = Diamètre Ext. (grande extrémité)  
 d = Diamètre du fil  
 Lo = Longueur Libre  
 P<sub>1</sub> = Charge à 50% de la course  
 P<sub>2</sub> = Charge à bloc  
 R = Raideur

## MUELLES/RESORTES DE COMPRESIÓN CONICOS

Los muelles/resortes cónicos de SPEC son muelles/resortes de compresión con forma cónica diseñados para suministrar una casi constante tasa de compresión y una altura sólida menor que la de un muelle/resorte normal. Cada muelle genera un paso variable para obtener la tasa de compresión constante y unas espiras que se comprimen durante la deflexión para obtener una altura sólida aproximadamente igual a dos diámetros del hilo.

Todos los muelles/resortes se fabrican en acero inoxidable para ser usados en multitud de ambientes diferentes.

### MATERIAL

Acero inoxidable tipo 302 según ASTM A313 ó muelle/resorte templado según AMS 5688.

### ACABADO

Acabado estándar según la norma ASTM A967

### DIRECCIÓN DE LA ESPIRA

A derechas.

### EXTREMOS

Extremos reperfilados sin rectificar

### RATIO DE COMPRESIÓN

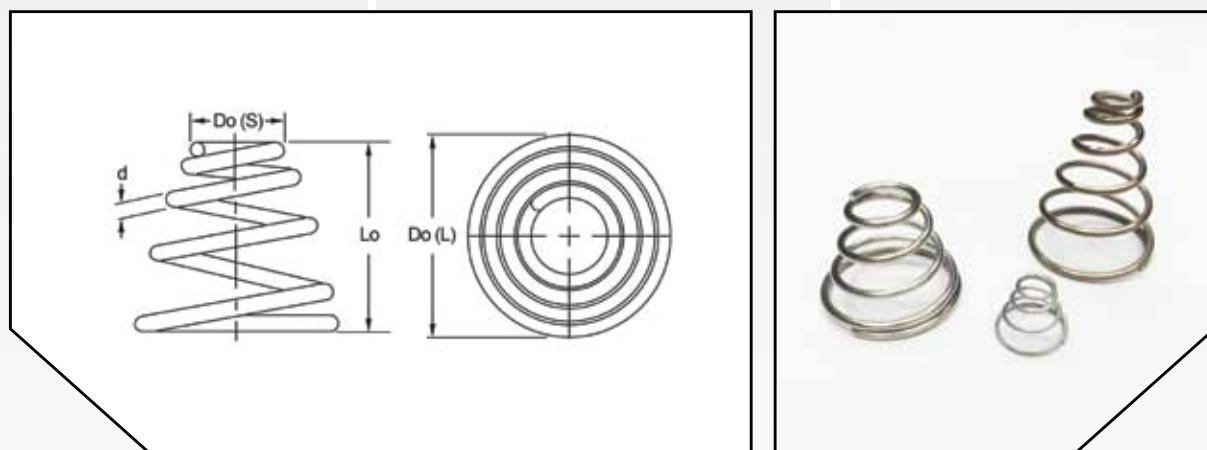
El ratio de compresión es lineal debido al paso variable.

### ALTURA A BLOQUE

Debido a la compresión de las espiras, la altura a bloque es aproximadamente igual a dos veces el diámetro del hilo.

### CLAVES DE CARACTERÍSTICAS

Do (S) = Diámetro exterior (extremo grande)  
 Do (L) = Diámetro exterior (extremo pequeño)  
 d = Diámetro del alambre  
 Lo = Longitud libre  
 P<sub>1</sub> = Carga al 50%  
 P<sub>2</sub> = Carga a altura bloque  
 R = Ratio



### United Kingdom

**Tel:** (44) 1386 443366  
**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363  
**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542  
**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04  
**E-mail:** info@asraymond.de

## KEGELFEDERN

Die lagermäßig vorrätigen Kegelfedern sind so ausgelegt, dass eine nahezu konstante Federrate erreicht wird. Die Blocklängen ist wesentlich kleiner als bei Druckfedern. Jede Kegelfeder hat eine sich verändernde Steigung aus der sich eine konstante Federrate ergibt. Bei Einfederung legt sich Windung in Windung bis maximal 2 Drahtdurchmesser an Blocklänge erreicht werden.

Alle Federn sind aus rostfreier Federstahldraht für Anwendung bei Viezahl von Umgebungen.

### WERKSTOFFE

Rostfreier Federstahldraht: 302 nach ASTM A313 oder AMS 5688 gehärtete Feder

### OBERFLÄCHE

Standard-Finish ist nach ASTM A967 passiviert.

### WINDUNGSRICHTUNG

Rechtsgewickelt.

### ENDWINDUNGEN

Nur angelegt.

### FEDERRATE

Konstante Federrate wegen der Variabilität der Steigung.

### BLOCKLÄNGE

Bei Einfederung legt sich Windung in Windung bis maximal 2 Drahtdurchmesser.

### KENNZEICHNEN DER ABMESSUNGEN

Do (S) = Äußerer Windungsdurchmesser  
Do (L) = Äußerer Windungsdurchmesser  
d = Drahtdurchmesser  
Lo = Länge der unbelasteten Feder  
P<sub>1</sub> = Federkraft bei 50% Federlänge  
P<sub>2</sub> = Federkraft bei Blocklänge  
R = Rate

## MOLLE A COMPRESSIONE CONICHE

Le molle coniche SPEC sono molle a compressione destinate a offrire una elasticità costante e un'altezza a blocco più bassa di quelle di una molla normale. Ogni molla ha un passo variabile che permette d'ottenere tassi d'elasticità costanti e delle spire che si avvicinano durante la flessione per determinare un'altezza a blocco pressoché uguale a due diametri di filo.

Tutte le molle vengono fabbricate in acciaio inox per essere utilizzate in una grande varietà di ambienti operativi

### MATERIALE

Acciaio inox tipo 302 da ASTM A313 o AMS 5688.

### FINITURA

La finitura standard è passivato a ASTM A967

### AVVITAMENTO DELL'ELICA

A destra

### ESTREMITÀ'

Squadrate e non rettificate.

### RIGIDITÀ'

Lineare a causa del passo variabile

### SPIRE , ALTEZZA A BLOCCO

Le molle sono concepite per permettere alle spire attive di avvicinarsi le une dentro le altre. Ciò determina un'altezza a blocco uguale a circa due diametri del filo.

### LEGENDA

Do (S) = Diametro esterno (piccolo)  
Do (L) = Diametro esterno (lungo)  
d = Diametro filo  
Lo = Lunghezza Libera  
P<sub>1</sub> = Carico al 50%  
P<sub>2</sub> = Carico a pacco  
R = Carico flessionale unitario

## MOLAS DE COMPRESSÃO CÓNICAS

As molas cónicas SPEC, tratam-se de molas de compressão de formato cônico, concebidas para disponibilizar uma força de compressão quase constante e uma altura sólida inferior à de uma mola normal. Cada mola gera um passo variável disponibilizando força de compressão constante e espiras que se comprimem durante a flexão, para se obter uma altura sólida aproximadamente igual a dois diâmetros do fio.

Todas as molas são fabricadas em aço inoxidável para utilização em muitas aplicações diferentes.

### MATERIAL

Aço inoxidável tipo 302 conforme à especificação ASTM A313, ou mola temperada conforme à especificação MAS 5688.

### ACABAMENTO

Acabamento padrão é passível à ASTM A967

### DIREÇÃO DO CONE

Para a direita

### EXTREMIDADES

Extremidades quadradas sem rectificação

### FORÇA DE COMPRESSÃO

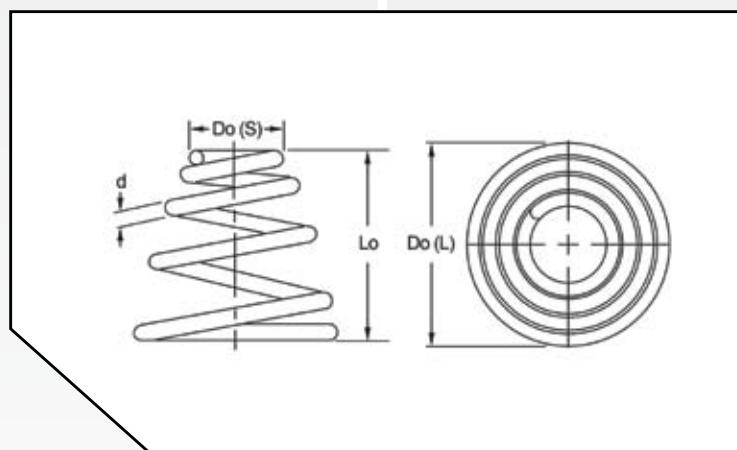
A força de compressão é linear dado o passo variável

### ALTURA SÓLIDA

Com a compressão das espiras, a altura sólida corresponde aproximadamente ao dobro do diâmetro do fio.

### MEDIDAS PADRÃO

Do (S) = Diâmetro Externo (Extremidade Menor)  
Do (L) = Diâmetro Interno (Extremidade Maior)  
d = Diâmetro do arame  
Lo = Comprimento Livre  
P<sub>1</sub> = Carga a 50%  
P<sub>2</sub> = Carga em Bloco  
R = Constante



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



**STOCK CONICAL COMPRESSION SPRINGS**

Part Number	Do (L) (mm)	Do (S) (mm)	d (mm)	Lo (mm)	P <sub>1</sub> (N)	P <sub>2</sub> (N)	R (N/mm)
A0360-029-0250-S	9.14	3.18	0.74	6.35	15.35	23.53	4.83
A0420-029-0250-S		5.54	0.74	6.35	9.07	13.97	2.87
A0420-029-0312-S		4.75	0.74	7.92	10.05	16.37	2.54
A0420-029-0375-S	10.67	3.96	0.74	9.53	11.12	18.82	2.34
A0420-032-0250-S		4.75	0.81	6.35	14.19	21.08	4.46
A0420-032-0312-S		3.96	0.81	7.92	16.15	25.66	4.07
A0420-035-0250-S		4.75	0.89	6.35	22.64	32.60	7.14
A0480-029-0312-S		7.14	0.74	7.92	6.81	11.08	1.71
A0480-029-0375-S		6.35	0.74	9.53	7.07	12.01	1.49
A0480-029-0500-S		5.54	0.74	12.70	8.58	15.12	1.35
A0480-029-0625-S		4.75	0.74	15.88	9.56	17.35	1.20
A0480-032-0312-S		6.35	0.81	7.92	10.54	16.81	2.66
A0480-032-0375-S	12.19	5.54	0.81	9.53	11.39	18.86	2.39
A0480-032-0500-S		4.75	0.81	12.70	12.81	22.33	2.02
A0480-032-0625-S		3.96	0.81	15.88	15.21	27.27	1.91
A0480-035-0312-S		5.54	0.89	7.92	15.48	23.97	3.90
A0480-035-0375-S		4.75	0.89	9.53	17.44	28.33	3.66
A0480-038-0250-S		5.54	0.97	6.35	21.13	29.40	6.66
A0480-038-0312-S		4.75	0.97	7.92	22.33	33.80	5.63
A0600-026-0750-S		9.53	0.66	19.05	3.25	6.05	0.34
A0600-026-1000-S		8.71	0.66	25.40	3.74	7.03	0.29
A0600-026-1250-S		7.92	0.66	31.75	4.45	8.54	0.28
A0600-029-0625-S		9.53	0.74	15.88	4.98	9.03	0.63
A0600-029-0750-S		8.71	0.74	19.05	5.25	9.74	0.55
A0600-029-1000-S		7.14	0.74	25.40	6.18	11.61	0.49
A0600-029-1250-S		6.35	0.74	31.75	6.94	13.21	0.44
A0600-032-0500-S		9.53	0.81	12.70	6.81	11.88	1.07
A0600-032-0625-S		8.71	0.81	15.88	7.29	13.12	0.92
A0600-032-0750-S	15.24	7.14	0.81	19.05	8.01	14.68	0.84
A0600-035-0500-S		7.92	0.89	12.70	9.61	16.55	1.51
A0600-035-0625-S		7.14	0.89	15.88	10.72	19.04	1.35
A0600-035-0750-S		5.54	0.89	19.05	12.10	21.93	1.27
A0600-038-0375-S		7.92	0.97	9.53	11.65	18.59	2.45
A0600-038-0500-S		7.14	0.97	12.70	14.32	24.24	2.26
A0600-038-0625-S		6.35	0.97	15.88	15.88	27.89	2.00
A0600-040-0375-S		7.92	1.02	9.53	15.83	24.95	3.32
A0600-040-0500-S		6.35	1.02	12.70	18.10	30.38	2.85
A0600-040-0625-S		5.54	1.02	15.88	20.28	35.36	2.55
A0600-042-0375-S		7.14	1.07	9.53	19.35	30.02	4.06
A0600-042-0500-S		5.54	1.07	12.70	22.82	37.94	3.59
A0600-045-0375-S		6.35	1.14	9.53	27.09	41.14	5.69
A0720-035-0750-S		11.13	0.89	19.05	7.21	13.08	0.76
A0720-035-1000-S		9.53	0.89	25.40	8.01	14.86	0.63
A0720-035-1250-S		8.71	0.89	31.75	9.07	17.17	0.57
A0720-038-0625-S		11.13	0.97	15.88	9.34	16.41	1.18
A0720-038-0750-S		9.53	0.97	19.05	9.74	17.53	1.02
A0720-038-1000-S		8.71	0.97	25.40	11.74	21.71	0.93
A0720-038-1250-S		7.14	0.97	31.75	13.30	24.95	0.84
A0720-040-0500-S		11.13	1.02	12.70	10.54	17.70	1.66
A0720-040-0625-S		9.53	1.02	15.88	10.90	18.99	1.37
A0720-040-0750-S	18.29	8.71	1.02	19.05	12.28	21.88	1.29
A0720-040-1000-S		7.14	1.02	25.40	14.72	27.04	1.16
A0720-042-0625-S		9.53	1.07	15.88	14.46	25.00	1.82
A0720-042-0750-S		8.71	1.07	19.05	15.30	27.18	1.61
A0720-042-1000-S		7.14	1.07	25.40	18.64	34.12	1.47
A0720-045-0500-S		9.53	1.14	12.70	17.30	28.33	2.72
A0720-045-0625-S		8.71	1.14	15.88	19.35	33.09	2.44
A0720-045-0750-S		7.14	1.14	19.05	21.48	37.76	2.25
A0720-049-0375-S		9.53	1.24	9.53	21.53	31.80	4.52
A0720-049-0500-S		8.71	1.24	12.70	25.49	40.97	4.01
A0720-049-0625-S		7.14	1.24	15.88	28.73	48.48	3.62
A0720-055-0375-S		7.92	1.40	9.53	37.10	52.40	7.79
A0720-055-0500-S		7.14	1.40	12.70	45.01	70.19	7.09
A0850-042-0750-S		14.22	1.07	19.05	10.50	18.64	1.10
A0850-042-1000-S		11.13	1.07	25.40	10.45	19.17	0.82
A0850-042-1250-S		9.53	1.07	31.75	12.01	22.42	0.76
A0850-042-1500-S	21.59	8.71	1.07	38.10	13.70	25.89	0.72
A0850-045-0750-S		12.70	1.14	19.05	13.34	23.44	1.40
A0850-045-1000-S		11.13	1.14	25.40	14.59	26.55	1.15
A0850-045-1250-S		9.53	1.14	31.75	16.68	30.96	1.05
A0850-045-1500-S		8.71	1.14	38.10	18.64	35.05	0.98

**STOCK CONICAL COMPRESSION SPRINGS**

<b>Part Number</b>	<b>Do (L) (mm)</b>	<b>Do (S) (mm)</b>	<b>d (mm)</b>	<b>Lo (mm)</b>	<b>P<sub>1</sub> (N)</b>	<b>P<sub>2</sub> (N)</b>	<b>R (N/mm)</b>
A0850-049-0625-S	21.59	12.70	1.24	15.88	17.97	30.34	2.26
A0850-049-0750-S		11.13	1.24	19.05	18.95	32.92	1.99
A0850-049-1250-S		7.92	1.24	31.75	25.26	46.57	1.59
A0850-055-0625-S		11.13	1.40	15.88	29.27	48.22	3.69
A0850-055-0750-S		8.71	1.40	19.05	31.94	54.49	3.35
A0850-055-1000-S		7.14	1.40	25.40	37.81	67.34	2.98
A0850-059-0625-S		9.53	1.50	15.88	39.41	63.92	4.97
A0850-059-0750-S		7.92	1.50	19.05	44.48	74.95	4.67
A0850-063-0500-S		9.53	1.60	12.70	49.33	73.84	7.76
A0850-063-0625-S		7.92	1.60	15.88	54.35	86.78	6.84
A0850-067-0500-S		9.53	1.70	12.70	66.05	96.70	10.41
A0975-049-0750-S	24.77	15.88	1.24	19.05	13.03	22.64	1.37
A0975-049-1000-S		14.22	1.24	25.40	14.63	26.38	1.15
A0975-049-1250-S		12.70	1.24	31.75	15.83	29.18	1.00
A0975-049-1500-S		11.13	1.24	38.10	17.26	32.29	0.91
A0975-055-0750-S		14.22	1.40	19.05	21.48	36.65	2.25
A0975-055-1000-S		12.70	1.40	25.40	24.02	42.75	1.89
A0975-055-1250-S		11.13	1.40	31.75	27.09	49.37	1.71
A0975-055-1500-S		9.53	1.40	38.10	30.60	56.76	1.61
A0975-059-0750-S		12.70	1.50	19.05	28.65	48.26	3.01
A0975-059-1000-S		11.13	1.50	25.40	32.92	58.09	2.59
A0975-059-1250-S		8.71	1.50	31.75	37.67	68.23	2.37
A0975-063-0750-S		11.13	1.60	19.05	38.21	63.56	4.01
A0975-063-1000-S		8.71	1.60	25.40	44.57	77.88	3.51
A0975-067-0625-S		11.13	1.70	15.88	45.68	71.79	5.75
A0975-067-0750-S		9.53	1.70	19.05	50.89	83.53	5.34
A0975-072-0625-S		11.13	1.83	15.88	66.05	101.64	8.32
A0975-072-0750-S		9.53	1.83	19.05	71.66	115.78	7.53
A0975-074-0625-S		11.13	1.88	15.88	74.95	114.36	9.44



## TORSION SPRINGS

SPEC torsion springs are widely useful to store and release energy of rotation or to maintain pressure over a short distance. Our stock selection includes stainless steel torsion springs with four end positions, and music wire springs with three end positions as shown in the drawings.

### MATERIALS

Stainless steel: Type 302 as per ASTM A313 or AMS 5688; Spring temper; Type 316 as per ASTM A313.

Music wire: ASTM-A228 or AMS 5112.

### DIRECTION OF HELIX

Must be specified by adding a suffix to the catalogue number. Use L for left-hand wound or R for right-hand wound. See illustration for example.



L



R

### TOLERANCES

Outer diameter       $\pm 5\%$  stainless steel  
 $\pm 2\%$  music wire

### KEY TO MEASUREMENTS

Do = Outside diameter  
d = Wire diameter  
R = Loaded position  
T = Torque Nmm  
M = Recommended mandrel size  
E = Leg length (from centreline)  
A = Minimum axial length  
Fig = Position of legs  
Deg° = Degrees deflection  
INOX = Stainless Steel  
MW = Music Wire

## RESSORTS DE TORSION

Les ressorts de torsion SPEC sont souvent utiles pour amasser et libérer l'énergie de rotation ou pour maintenir une pression sur une courte distance. Notre sélection sur stock comprend des ressorts Inox avec quatre différentes positions relatives des extrémités et des ressorts Acier avec trois positions, comme indiqué dans les dessins.

### MATERIAUX

Acier inoxydable commercial Type 302 / AMS 5688;  
Acier Inoxydable type 316 L suivant ASTM A313.

Corde à Piano : ASTM-A228 ou AMS 5112.

### SENS D'ENROULEMENT

La direction d'enroulement doit être précisée par un suffixe au numéro de référence du catalogue.  
Utilisez 'L' pour l'enroulement à gauche et 'R' pour l'enroulement à droite. (Voir l'illustration)



L



R

### TOLERANCES

Diamètre extérieur       $\pm 5\%$  pour l'Inox  
 $\pm 2\%$  pour l'Acier

### INDEX DES MESURES

Do = Diamètre extérieur  
d = Diamètre du fil  
R = Position de la charge  
T = Couple Nmm  
M = Taille de mandrin recommandée  
E = Longueur du pied (de l'axe)  
A = Longueur d'arbre minimum  
Fig = Position des pieds  
Deg° = Déflexion en degrés  
INOX = Acier inoxydable  
MW = Corde à Piano

## MUELLES/RESORTES DE TORSIÓN

Los muelles/resortes de torsión de SPEC se utilizan extensamente para almacenar y liberar la energía de rotación o para mantener una presión sobre un recorrido corto. En nuestro surtido de stock se incluyen muelles/resortes de torsión con cuatro posiciones de extremo, tal como se muestra en los dibujos.

### MATERIAL

Acero inoxidable : Tipo 302 según ASTM A313 ó templado de resorte AMS 5688; En AISI 316 según ASTM A313.

Alambre de piano: ASTM A228 ó AMS 5112.

### DIRECCIÓN DE LA ESPIRA

Se debe especificar el sentido de hélice añadiendo un sufijo al número de catálogo. Utilice L para muelles/resortes enrollados a izquierdas, R para muelles/resortes enrollados a derechas.



L



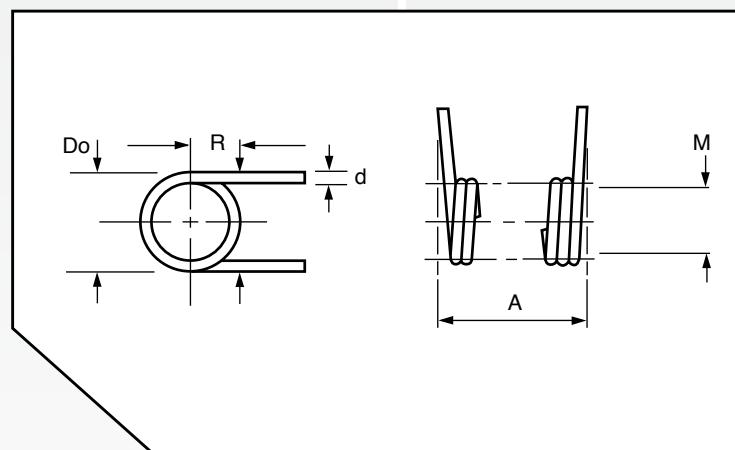
R

### TOLERANCIAS

Diámetro externo       $\pm 5\%$  acero inoxidable  
 $\pm 2\%$  alambre de piano

### CLAVES DE CARACTERÍSTICAS

Do = Diámetro exterior  
d = Diámetro del alambre  
R = Posición de carga  
T = Par Nmm  
M = Tamaño eje recomendado  
E = Longitud pata (desde centro)  
A = Longitud de eje mínima  
Fig = Posición patas  
Deg° = Grados deflexión  
INOX = Acero inoxidable  
MW = Alambre de piano



### United Kingdom

**Tel:** (44) 1386 443366  
**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363  
**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542  
**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04  
**E-mail:** info@asraymond.de

## TORSIONSFEDERN

Torsionsfedern aus rostfreiem Federstahl-Lagerprogramm  
Unsere Torsionsfedern werden zur Aufnahme und Abgabe von Kräften eingesetzt. Unser Lagerprogramm besteht aus 4 Schenkelstellungen für rostfreien Federstahldraht und aus 3 Schenkelstellungen für gezogenen Federstahldraht die in der Zeichnung dargestellt sind.

### WERKSTOFFE

Rostfreier Federstahldraht: 302 nach ASTM A313 oder AMS 5688 gehärtete Feder; Typ 316 gemäß ASTM A313.

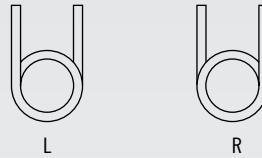
Federstahldraht: ASTM A228 oder AMS 5112

### WINDUNGSRICHTUNG

Fügen Sie eine Nachbuchstabe am Ende der Katalog-Bestell-Nummer zu.

Nachbuchstabe der Bestellnummer „R“ gilt für rechts-, Nachbuchstabe „L“ für linksgewickelt.

Zieh Zeichnung für Beispiel.



### TOLERANZEN

Außendurchmesser  $\pm 5\%$  für rostfreien Federstahldraht  
 $\pm 2\%$  für gezogenen Federstahldraht

### KENNZEICHNEN DER ABMESSUNGEN

Do = Außendurchmesser  
d = Drahtdurchmesser  
R = Belastete Stellung  
T = Drehmoment Nmm  
M = Dorndurchmesser  
E = Schenkellänge vom Mittelpunkt an  
A = Minimale Länge der Feder  
Fig = Schenkelstellung  
Deg<sup>o</sup> = Schenkelwinkel  
INOX = Rostfreier Federstahldraht  
MW = Gezogener Federstahldraht

## MOLLE A TORSIONE

Le molle a torsione SPEC vengono ampiamente utilizzate per immagazzinare e rilasciare energia di rotazione o per mantenere una pressione su breve distanza. La nostra selezione a magazzino prevede molle di torsione con quattro tipi di estremità, come illustrato nei disegni a lato.

### MATERIALE

Acciaio inossidabile: Tipo 302 AMS 5688

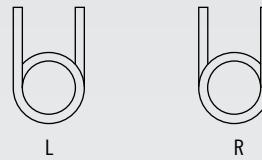
Certificati di conformità disponibili a richiesta;

Type 316 secondo ASTM A313.

Filo Armonico: DIN 17223 o JIS G4314 A313 SWP-A/B o AMS 5112

### SENSO DI AVVOLGIMENTO

L'orientamento dell'ellisse deve essere specificato aggiungendo un prefisso al numero di particolare a catalogo. L per avvolgimento sinistro, R per avvolgimento destro.



### TOLLERANZE

Diametro esterno  $\pm 5\%$  acciaio inox  
 $\pm 2\%$  filo armonico

### LEGENDA

Do = Diametro esterno  
d = Diametro filo  
R = Posizione in carico (tutte le parti)  
T = Torsione Nmm  
M = Dimensione mandrino consigliata  
E = Lunghezza estremità di torsione  
(dall'asse centrale)  
A = Lunghezza minima asse  
Fig = Posizione estremità  
Deg<sup>o</sup> = Gradi deflessione  
INOX = Acciaio inossidabile  
MW = Filo Armonico

## MOLAS DE TORÇÃO

As molas de torção da SPEC servem principalmente para armazenar e libertar a energia de rotação, ou para manter pressão num curso reduzido. O nosso sortido de stock compreende molas de torção com quatro posições finais, como se indica nos desenhos.

### MATERIAL

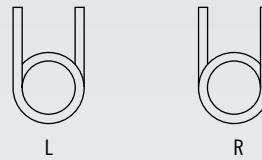
Aço inoxidável tipo comercial 302 ams 5688;

AISI 316 conforme à norma ASTM A313.

Fio de corda de piano: Din 17223 ou JIS G4314 A313 SWP-A/B AMS 5112

### SENTIDO DA ESPIRA

Deverá ser especificada adicionando o sufixo "R" (direito) e "L" (esquerdo). Veja a ilustração como exemplo.



### TOLERANCIAS

Binário de torção  $\pm 10\%$   
 $\emptyset$  ext.  $\pm 5\%$

### LEGENDA

Do = Diametro Externo  
d = Diametro do fio  
R = Posição de carga  
T = Torque Nmm  
M = Tamanho Mandril  
E = Tam braço desde o centro  
A = Mínimo comprimim. axial  
Fig = Posição dos braços  
Deg<sup>o</sup> = Graus de deflexão  
INOX = Aço inoxidável  
MW = Fio de corda de piano

### INOX

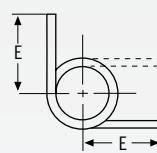


Fig 1. 90°

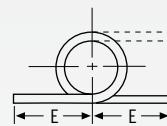


Fig 2. 180°

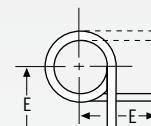


Fig 3. 270°

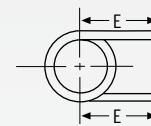


Fig 4. 360°

### MW

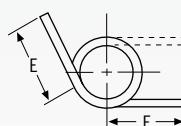


Fig 5. 120°

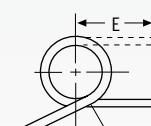


Fig 6. 210°

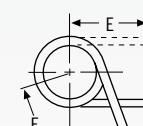


Fig 7. 300°

### United Kingdom

Tel: (44) 1386 443366

E-mail: sales@assocspring.co.uk

### France

Tel: (33) 01 30 68 6363

E-mail: info@ressortsspec.com

### Spain

Tel: (34) 945 147542

E-mail: ventas@bgespana.com

### Germany

Tel: (49) 6251 93-3252-04

E-mail: info@asraymond.de



**ADDITIONAL TECHNICAL DATA****TORSION SPRINGS**

SPEC torsion springs are normally used over a supporting mandrel or arbor. Suggested mandrel sizes allow about 10% clearance at the deflections listed. If greater deflections are used, the arbor size should be reduced. Sufficient room (minimum axial space) must be provided in the assembly for the spring to function properly.

Spec torsion springs should be used in the direction that winds the coils. In the unwinding direction the maximum load is lower because of residual stresses.

Torque values listed are suitable for average conditions. These values can be increased about 20% for static conditions with only slight setting.

To determine the load at any working length use rate proposed deflection.

**ENDS**

Straight torsion ends are standard.

**FINISH**

Plain finish is standard. Allow additional time for special finishes.

For inspection purposes, the load should be applied at  $\frac{1}{2}$  leg length (E). Using other lengths appreciably alters the active length of wire and affects the test results.

The reference torque values listed can be translated to the approximate direct load by use of the formula  $P=T/E_n$  where P is the load applied at the new length En.

Torque values at intermediate deflections can be calculated proportionally.

**DONNEES TECHNIQUES ADDITIONNELLES****RESSORTS DE TORSION**

Les ressorts de torsion SPEC sont normalement utilisés sur un mandrin ou un arbre de support. Les dimensions de mandrin recommandées permettent environ 1% de jeu aux déflexions listées. Si on utilise des déflexions plus importantes, le diamètre du mandrin doit être réduit. Suffisamment de place (jeu minimum axial) doit être prévue dans un assemblage pour que le ressort fonctionne correctement.

Les ressorts de torsion SPEC doivent être utilisés dans la direction qui enroule les spires. Dans la direction de déroulement la charge maximum est plus basse en raison des tensions résiduelles.

Les valeurs de couple listées sont compatibles avec des conditions moyennes. Ces valeurs peuvent être augmentées de 20% pour des conditions statiques avec seulement une déflexion permanente mineure. Une longévité infinie peut être obtenue si les conditions de montage sont bonnes, en utilisant des valeurs de couple d'environ 20% inférieures à celles à 50% de la plage de tension.

**EXTRÉMITÉS**

Les extrémités droites des torsion sont standard.

**FINITION**

Une finition naturelle est standard. Prévoyez du temps de livraison supplémentaire pour des finitions spéciales.

Pour contrôler, la force doit être appliquée à la moitié de la longueur du pied (E). Utiliser d'autres longueurs altère la partie active du fil et affecte les résultats du test.

Les valeurs de couple indiquées pour référence peuvent être converties en valeurs approximatives de charges correspondantes en utilisant la formule  $P=T/E_n$  où P est la charge à la nouvelle longueur de pied En.

Les valeurs de couple intermédiaire peuvent être calculées proportionnellement à la défexion totale.

**INFORMACIÓN TÉCNICA ADICIONAL****MUELLES/RESORTES DE TORSIÓN**

Los muelles/resortes de torsión de SPEC se utilizan generalmente sobre un mandril o eje. Los tamaños de eje sugeridos permiten una holgura del 10% aproximadamente en las deflexiones indicadas. En caso de que se utilicen deflexiones mayores, se debería reducir el diámetro del eje. Se debe dejar suficiente espacio (espacio axial mínimo) en el montaje de forma que el muelle pueda funcionar correctamente.

Los muelles/resortes de torsión de SPEC deberían utilizarse en el sentido que se enrollen las bobinas. En el sentido de desenrollar la carga máxima es menor debido a las tensiones residuales.

Los valores de torsión son adecuados para condiciones medias. Dichos valores pueden ser aumentados en un 20% para condiciones estáticas, con una ligera flecha solamente.

**EXTREMOS**

Los extremos rectos de torsión son estándar.

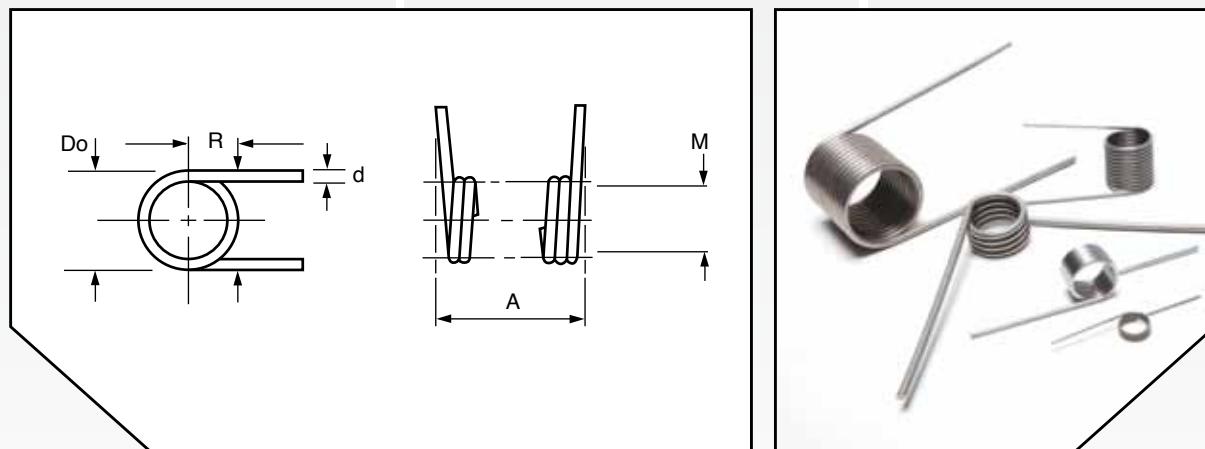
**ACABADO**

El acabado simple es estándar. Dejen un tiempo adicional para acabados especiales.

A la hora de realizar comprobaciones, la carga debe medirse a  $\frac{1}{2}$  de la longitud de la pata (E). La utilización de otras longitudes afecta significativamente a la longitud activa y a los resultados de la prueba.

El par torsor de referencia indicado puede traducirse a una carga directa mediante  $P=T/E_n$ , donde P es la carga aplicada en la nueva longitud En.

El par torsor en deflexiones intermedias puede calcularse mediante un prorrateo.



## ZUSÄTZLICHE TECHNISCHE ANGABEN

### TORSIONSFEDERN

Torsionsfedern werden normalerweise über einem Dom geführt. Der angegebene Dorn M ergibt 10% Spiel zur gespannten Feder. Bei größerer Spannung der Feder muß der Dorndurchmesser verkleinert werden. Auch sollte axiales Spiel beim Einbau berücksichtigt werden um eine einwandfreie Funktion der Feder zu gewährleisten.

Verwenden Sie die Feder in Richtung der Windung. Bei Verwendung entgegen der Windungsrichtung können Sie die Feder nicht optimal nutzen.

Die angegebenen Drehmomente sind für Standardanwendungen vorgesehen. Diese Werte können um 20% überschritten werden, wenn statische Lasten vorhanden sind; dabei tritt nur eine leicht Setzung ein.

### SCHENKELFORM

Geraide Schenkeln sind Standard.

### oberfläche

Gewöhnlich Oberfläche ist Standard. Sondern Oberfläche verlangen längere Lieferzeiten.

Aus Gründen der Übersichtlichkeit, haben wir das Drehmoment in der  $\frac{1}{2}$  Schenkellänge E angegeben (Halblänge des Schenkels). Bei anderen Längen wird das Drehmoment erheblich ändern.

Die Federkraft bei dem angegebenen Drehmomentwert dürfen Sie mittels der Formel  $P = T/En$  wo P ist die Federkraft bei neuem Hebelarm En berechnen.

Die erreichbare Kraft bei einem bestimmten Winkel dürfen Sie mittels direkter Zuteilung kalkulieren.

## ULTERIORI INFORMAZIONI TECNICHE

### MOLLE A TORSIONE

Le molle di torsione SPEC vengono normalmente montate su di un perno di supporto. Le dimensioni di perno consigliate permettono circa il 10% di gioco alle deflessioni indicate. Se vengono adottate deflessioni maggiori, la dimensione del perno deve essere ridotta. Sufficiente spazio (spazio assiale minimo) deve essere previsto durante il montaggio, affinché la molla possa funzionare correttamente.

Le molle di torsione SPEC dovrebbero essere utilizzate secondo la direzione di avvolgimento delle spire in direzione contraria il carico massimo è minore a causa degli stress residui.

I valori di torsione indicati fanno riferimento a condizioni di impiego medie. Questi valori possono essere aumentati del 40% circa in condizioni statiche, con leggere deformazioni. Ci si può attendere un ciclo di vita praticamente infinito se le condizioni di montaggio sono ottimali e ci si tiene al di sotto del 20% dei valori di torsione indicati.

### ESTREMITÀ

Le estremità di torsione sono diritte.

### FINITURA

Finitura standard liscia.

Su richiesta è possibile fornire finiture speciali.

Per controllo, la forza deve essere applicata a metà della lunghezza dei gambi (E). Utilizzando altre lunghezze si altera la lunghezza attiva del filo modificando il risultato del test.

Il valore di torsione indicato può essere convertito in valori approssimativi di carico utilizzando la formula  $P = T/En$  dove P è il carico applicato alla nuova lunghezza En.

I valori di torsione a deflessioni intermedie possono essere calcolati proporzionalmente.

## INFORMAÇÕES TÉCNICAS ADICIONAIS

### MOLAS DE TORÇÃO

As molas de torção SPEC utilizam-se de um modo geral com um mandril ou eixo de apoio. As dimensões de mandril sugeridas permitem cerca de 10% de folga nas deflexões indicadas. Em caso de utilização de deflexões maiores, deve reduzir-se a dimensão do eixo de apoio. Deve deixar-se espaço suficiente (espaço axial mínimo) durante a montagem para que a mola possa operar correctamente.

As molas de torção SPEC devem utilizar-se no sentido de enrolamento das bobinas. Em sentido contrário, a carga máxima é menor dada a presença de esforços residuais.

Os valores de torção são adequados a condições médias. Em condições estáticas, os referidos valores podem ser aumentados sem cerca de 40%, apenas com uma ligeira flecha. Em boas condições de montagem, é possível esperar uma resistência infinita à fadiga, recorrendo a valores de torção 20% inferiores aos indicados.



### EXTREMIDADES

As extremidades direitas de torção são de série.

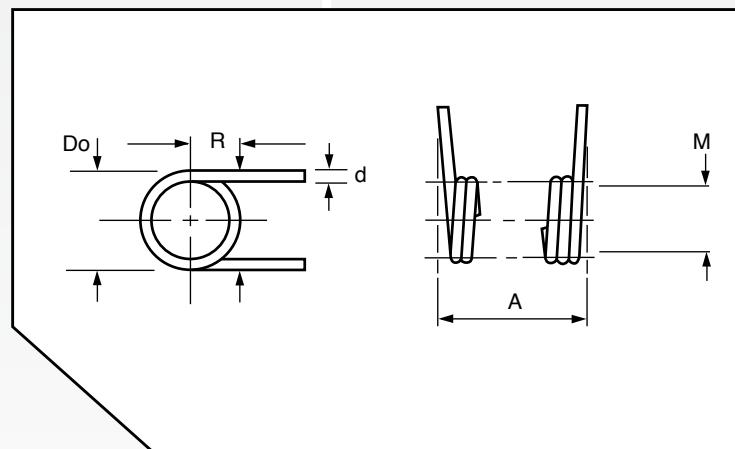
### ACABAMENTO

O acabamento simples é de série. Deve ter-se em conta um período adicional no caso de acabamentos especiais.

Para fins de inspeção, a carga deve ser aplicada na metade do comprimento (E). Se usar outros comprimentos ativos, isso afetará o fio e também os resultados finais.

Os valores de referencia de torque listados podem ser encontrados como carga direta usando a Formula  $P = T/En$ , onde P é a carga aplicada no novo comprimento En.

Os valores de torque intermediarios podem ser calculados proporcionalmente.



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



**TORSION SPRINGS - MUSIC WIRE**

Part Number	d (mm)	Do (mm)	Fig	Max Deg°	T (Nmm)	1/2 E (mm)	M (mm)	E (mm)	A (mm)	Coils
T016-120-125		4.83	5	120			3.18		2.31	3.17
T016-210-125	0.41	4.78	6	210	12.00	9.52	3.18	19.05	3.43	5.92
T016-300-125		4.78	7	300			3.18		4.55	8.67
T020-120-187		6.99	5	120			4.75		2.87	3.17
T020-210-187	0.51	6.96	6	210	20.00		4.75		4.27	5.92
T020-300-187		6.93	7	300			4.75		5.66	8.67
T024-120-250		9.19	5	120			6.35		3.45	3.17
T024-210-250	0.61	9.14	6	210	32.00		6.35		5.13	5.92
T024-300-250		9.12	7	300			6.35		6.81	8.67
T026-120-250		9.30	5	120	44.00		6.35		3.73	3.17
T026-210-250	0.66	9.25	6	210	43.00	12.70	6.35	25.40	5.56	5.92
T026-300-250		9.25	7	300			6.35		7.37	8.67
T029-120-250		9.27	5	120	53.00		6.35		4.90	4.17
T029-210-250	0.74	9.30	6	210	58.00		6.35		6.93	6.92
T029-300-250		9.32	7	300	60.00		6.35		8.97	9.67
T032-120-250		9.42	5	120	78.00		6.35		5.41	4.17
T032-210-250	0.81	9.37	6	210	75.00		6.35		8.46	7.92
T032-300-250		9.42	7	300	79.00		6.35		10.69	10.67
T035-120-250		9.58	5	120	108.00		6.35		5.92	4.17
T035-210-250	0.89	9.53	6	210	104.00		6.35		9.27	7.92
T035-300-250		9.58	7	300	112.00		6.35		11.71	10.67
T038-120-375		13.89	5	120	137.00		9.53		5.46	3.17
T038-210-312	0.97	11.71	6	210	134.00	15.88	7.92	31.75	9.09	6.92
T038-300-312		11.73	7	300	140.00		7.92		11.73	9.67
T040-120-375		14.02	5	120	167.00		9.53		5.77	3.17
T040-210-312	1.02	11.81	6	210	165.00		7.92		9.58	6.92
T040-300-312		11.76	7	300	155.00		7.92		13.39	10.67
T042-120-312		11.86	5	120	175.00		7.92		7.11	4.17
T042-210-312	1.07	11.81	6	210	170.00		7.92		11.13	7.92
T042-300-312		11.79	7	300	169.00		7.92		15.11	11.67
T045-120-312		12.04	5	120	229.00		7.92		7.62	4.17
T045-210-312	1.14	11.96	6	210	224.00		7.92		11.91	7.92
T045-300-312		11.94	7	300	221.00		7.92		16.21	11.67
T049-120-375		14.20	5	120	277.00		9.53		8.31	4.17
T049-210-375	1.24	14.12	6	210	266.00		9.53		12.98	7.92
T049-300-375		14.17	7	300	287.00		9.53		16.38	10.67
T055-120-375		14.33	5	120	357.00	25.40	9.53	50.80	10.72	5.17
T055-210-375	1.40	14.33	6	210	374.00		9.53		15.95	8.92
T055-300-375		14.33	7	300	382.00		9.53		21.18	12.67
T059-120-375		14.53	5	120	469.00		9.53		11.51	5.17
T059-210-375	1.50	14.45	6	210	444.00		9.53		18.62	9.92
T059-300-375		14.48	7	300	465.00		9.53		24.23	13.67
T063-120-375		14.61	5	120	513.00		9.53		13.87	6.17
T063-210-375	1.60	14.68	6	210	572.00		9.53		19.86	9.92
T063-300-375		14.66	7	300	561.00		9.53		27.48	14.67
T072-120-500		19.02	5	120	803.00		12.70		14.02	5.17
T072-210-500	1.83	19.05	6	210	835.00		12.70		20.88	8.92
T072-300-500		19.05	7	300	849.00		12.70		27.74	12.67
T081-120-500		19.33	5	120	1060.00		12.70		17.83	6.17
T081-210-500	2.06	19.41	6	210	1182.00		12.70		25.55	9.92
T081-300-500		19.38	7	300	1156.00	31.75	12.70	63.50	35.33	14.67
T085-120-625		23.52	5	120	1254.00		15.88		16.56	5.17
T085-210-625	2.16	23.55	6	210	1306.00		15.88		24.66	8.92
T085-300-625		23.55	7	300	1328.00		15.88		32.74	12.67
T092-120-625		23.88	5	120	1687.00		15.88		17.93	5.17
T092-210-625	2.34	23.77	6	210	1593.00		15.88		29.03	9.92
T092-300-625		23.83	7	300	1670.00	38.10	15.88	76.20	37.80	13.67
T096-120-625		24.10	5	120	1990.00		15.88		18.69	5.17
T096-210-625	2.44	23.98	6	210	1880.00		15.88		30.28	9.92
T096-300-625		23.95	7	300	1839.00		15.88		41.86	14.67
T105-120-750		28.37	5	120	2403.00		19.05		20.45	5.17
T105-210-750	2.67	28.40	6	210	2511.00	44.45	19.05	88.90	30.45	8.92
T105-300-750		28.30	7	300	2375.00		19.05		43.13	13.67
T112-120-750		28.75	5	120	3058.00		19.05		21.82	5.17
T112-210-750	2.84	28.60	6	210	2899.00		19.05		35.33	9.92
T112-300-750		28.65	7	300	3042.00		19.05		46.00	13.67
T125-120-750		29.16	5	120	3979.00	50.80	19.05	101.60	27.53	6.17
T125-210-750	3.18	29.16	6	210	4050.00		19.05		42.62	10.92
T125-300-750		29.08	7	300	3841.00		19.05		60.86	16.67
T135-120-750	3.43	29.51	5	120	4656.00		19.05		33.15	7.17
T135-210-750		29.46	6	210	4639.00		19.05		52.88	12.92

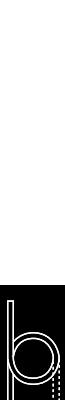
**TORSION SPRINGS - MUSIC WIRE**

Part Number	d (mm)	Do (mm)	Fig	Max Deg°	T (Nmm)	1/2 E (mm)	M (mm)	E (mm)	A (mm)	Coils
T135-300-750	3.43	29.51	7	300	4887.00	50.80	19.05	101.60	69.16	17.67



**TORSION SPRINGS - STAINLESS STEEL / INOX**

Part Number	d (mm)	D <sub>o</sub> (mm)	Fig	Max Deg°	T (Nmm)	1/2 E (mm)	M (mm)	E (mm)	A (mm)	Coils
T012-090-055	0.30	2.36	1	90	5.31	4.75	1.40	9.52	1.37	2.25
T012-180-067		2.77	2	180			1.70		2.29	5.00
T012-180-109		4.22	2	180		6.35	2.77	12.70	1.68	3.00
T012-270-062		2.59	3	270		4.75	1.57	9.52	3.53	8.75
T012-270-109		4.32	3	270			2.77		2.29	4.75
T012-360-109		4.42	4	360		6.35	2.77	12.70	2.90	6.50
T014-090-063	0.36	3.15	1	90	7.91		1.60		1.70	2.25
T014-180-078		3.38	2	180			1.98		2.67	5.00
T014-180-109		4.93	2	180		9.52	2.77	19.05	1.96	3.00
T014-270-063		3.15	3	270		6.35	1.60	12.70	4.09	8.75
T014-270-125		5.11	3	270		9.52	3.18	19.05	2.67	4.75
T014-360-125		5.18	4	360			3.18		3.38	6.50
T015-090-062	0.38	2.79	1	90	10.51	6.35	1.57	12.70	1.71	2.25
T015-180-078		3.30	2	180			1.98		2.86	5.00
T015-180-109		4.65	2	180		9.52	2.77	19.05	2.10	3.00
T015-270-078		3.15	3	270		6.35	1.98	12.70	4.39	8.75
T015-270-109		5.05	3	270		9.52	2.77	19.05	2.86	4.75
T015-360-109		5.26	4	360			2.77		3.62	6.50
T017-090-093	0.43	4.06	1	90	13.22	6.35	2.36	12.70	2.06	2.25
T017-180-093		4.37	2	180			2.36		3.24	5.00
T017-180-156		6.32	2	180		9.52	3.96	19.05	2.39	3.00
T017-270-093		4.06	3	270		6.35	2.36	12.70	4.97	8.75
T017-270-156		6.58	3	270		9.52	3.96	19.05	3.24	4.75
T017-360-140		5.97	4	360			3.56		4.32	7.50
T018-090-109	0.46	4.50	1	90	15.82	6.35	2.77	12.70	2.06	2.25
T018-180-109		4.17	2	180			2.77		3.89	6.00
T018-180-140		5.49	2	180		9.52	3.56	19.05	2.97	4.00
T018-270-109		4.06	3	270		6.35	2.77	12.70	5.79	9.75
T018-270-156		6.22	3	270			3.96		3.81	4.75
T018-360-156		5.92	4	360		9.52	3.96	19.05	5.33	8.50
T020-090-109	0.51	4.85	1	90	21.10		2.77		2.41	2.25
T020-180-109		4.55	2	180			2.77		4.32	6.00
T020-180-140		6.15	2	180		12.70	3.56	25.40	3.30	4.00
T020-270-093		4.45	3	270		9.52	2.36	19.05	6.35	9.75
T020-270-172		6.81	3	270		12.70	4.37	25.40	4.19	4.75
T020-360-156		6.45	4	360			3.96		6.35	8.50
T021-090-109	0.53	4.72	1	90	24.60	9.52	2.77	19.05	2.40	2.25
T021-180-109		4.70	2	180			2.77		4.53	6.00
T021-180-156		6.27	2	180		12.70	3.96	25.40	3.47	4.00
T021-270-109		4.67	3	270		9.52	2.77	19.05	6.76	9.75
T021-270-187		7.19	3	270		12.70	4.75	25.40	4.53	5.75
T021-360-187		6.88	4	360			4.75		6.15	8.50
T023-090-109	0.58	5.18	1	90	34.80	9.52	2.77	19.05	2.77	2.25
T023-180-109		4.85	2	180			2.77		4.98	6.00
T023-180-156		6.58	2	180		12.70	3.96	25.40	3.81	4.00
T023-270-109		4.75	3	270		9.52	2.77	19.05	7.30	9.75
T023-270-156		6.38	3	270		12.70	3.96	25.40	5.55	6.75
T023-360-172		6.88	4	360			4.37		6.72	8.50
T025-090-140	0.64	5.97	1	90	42.40	9.52	3.56	19.05	2.86	2.25
T025-180-140		5.69	2	180			3.56		5.40	6.00
T025-180-203		7.72	2	180		12.70	5.16	25.40	4.13	4.00
T025-270-140		5.56	3	270		9.52	3.56	19.05	8.03	9.75
T025-270-218		8.64	3	270			5.54		5.40	5.75
T025-360-218		8.23	4	360			5.54		7.32	8.50
T028-090-156	0.71	6.78	1	90	58.20		3.96		3.38	2.25
T028-180-140		6.32	2	180			3.56		6.05	6.00
T028-180-203		8.64	2	180			5.16		4.62	4.00
T028-270-140		6.22	3	270			3.56		8.89	9.75
T028-270-203		8.36	3	270			5.16		6.76	6.75
T028-360-218		9.02	4	360			5.54		8.89	9.50
T030-090-172	0.76	7.14	1	90	70.60	12.70	4.37	25.40	3.43	2.25
T030-180-172		6.91	2	180			4.37		6.48	6.00
T030-180-250		10.01	2	180			6.35		4.95	4.00
T030-270-172		6.86	3	270			4.37		9.65	9.75
T030-270-250		9.58	3	270			6.35		7.11	5.75
T030-360-250		10.41	4	360			6.35		8.79	8.50
T032-090-172	0.81	7.32	1	90	92.70		4.36		3.86	2.25
T032-180-156		6.86	2	180			3.96		6.91	6.00
T032-180-218		9.30	2	180			5.54		5.28	4.00
T032-270-156		6.71	3	270			3.96		10.97	10.75
T032-270-218		8.99	3	270			5.54		7.72	6.75



**TORSION SPRINGS - STAINLESS STEEL / INOX**

Part Number	d (mm)	Do (mm)	Fig	Max Deg°	T (Nmm)	1/2 E (mm)	M (mm)	E (mm)	A (mm)	Coils
T032-360-234	0.81	9.70	4	360	92.70	12.70	5.95	25.40	9.35	8.50
T035-090-187		8.00	1	90			4.75		4.00	2.25
T035-180-187		7.70	2	180			4.75		7.56	6.00
T035-180-281	0.89	11.43	2	180	113.00		7.14		5.78	4.00
T035-270-187		7.90	3	270			4.75		11.23	9.75
T035-270-281		11.05	3	270			7.14		8.45	6.75
T035-360-312		11.96	4	360			7.92		10.29	8.50
T038-090-234		9.80	1	90		15.88	5.94	31.75	4.57	2.25
T038-180-218		9.35	2	180			5.54		8.20	6.00
T038-180-312	0.97	12.37	2	180	134.50		8.08		6.27	4.00
T038-270-218		8.97	3	270			5.54		12.07	9.75
T038-270-312		12.12	3	270			7.92		9.17	6.75
T038-360-328		13.06	4	360			8.33		12.07	9.50
T040-090-187		7.85	1	90			4.75		5.59	3.25
T040-180-218		8.84	2	180			5.54		9.65	7.00
T040-180-343	1.02	13.16	2	180	155.40	25.40	8.71	50.80	6.60	4.00
T040-270-218		9.09	3	270		15.88	5.54	31.75	13.97	10.75
T040-270-343		12.98	3	270		25.40	8.71	50.80	9.65	6.47
T040-360-343		12.88	4	360			8.71		12.90	8.50
T045-090-203		9.07	1	90		15.88	5.16	31.75	6.58	3.25
T045-180-218		9.58	2	180			5.54		10.86	7.00
T045-180-359	1.14	14.61	2	180	226.00	25.40	9.12	50.80	7.44	4.00
T045-270-234		9.70	3	270		15.88	5.94	31.75	15.43	10.75
T045-270-359		14.12	3	270		25.40	9.12	50.80	10.86	6.75
T045-360-359		13.94	4	360			9.12		14.29	9.50
T048-090-218		9.53	1	90		15.88	5.54	31.75	6.71	3.25
T048-180-250		10.26	2	180			6.35		11.58	7.00
T048-180-406	1.22	15.70	2	180	282.00	25.40	10.31	50.80	7.92	4.00
T048-270-250		10.57	3	270		15.88	6.35	31.75	16.76	10.75
T048-270-406		15.24	3	270			10.31		11.58	6.75
T048-360-406		15.09	4	360			10.31		15.49	9.50
T051-090-234		10.36	1	90			5.94		7.44	2.25
T051-180-250		10.92	2	180			6.35		12.32	6.00
T051-180-344	1.30	14.12	2	180	328.00		8.74		9.72	5.00
T051-270-266		11.15	3	270			6.76		17.49	10.75
T051-270-359		14.50	3	270			9.12		13.60	7.75
T051-360-406		15.95	4	360			10.31		16.19	9.50
T054-090-296		12.29	1	90			7.52		7.87	2.25
T054-180-312		12.93	2	180			7.92		13.00	6.00
T054-180-421	1.37	16.61	2	180	370.00		10.69		10.29	4.00
T054-270-312		13.06	3	270			7.92		18.16	9.75
T054-270-437		16.87	3	270			11.10		14.40	7.75
T054-360-453		17.63	4	360			11.51		17.91	9.50
T059-090-296		12.67	1	90			7.52		8.64	3.25
T059-180-328		13.36	2	180			8.33		14.24	7.00
T059-180-437	1.50	17.30	2	180	475.00		11.10		11.30	5.00
T059-270-328		13.64	3	270			8.33		20.23	10.75
T059-270-453		17.75	3	270			11.51		15.74	7.75
T059-360-459		18.01	4	360		25.40	11.66	50.80	20.23	10.50
T063-090-343		14.22	1	90			8.71		9.19	2.25
T063-180-359		15.01	2	180			9.12		15.24	6.00
T063-180-500	1.60	19.48	2	180	582.00		12.70		12.07	5.00
T063-270-375		15.24	3	270			9.53		21.60	10.75
T063-270-516		19.91	3	270			13.11		16.80	7.75
T063-360-516		20.27	4	360			13.11		21.60	10.50
T070-090-359		15.06	1	90			9.12		10.16	3.25
T070-180-390		15.88	2	180			9.91		16.89	7.00
T070-180-515	1.78	20.57	2	180	791.00		13.08		13.34	5.00
T070-270-390		16.23	3	270			9.91		24.00	10.75
T070-270-531		20.98	3	270			13.49		18.67	7.75
T070-360-546		21.41	4	360			13.87		24.00	10.50
T075-090-375		16.13	1	90			9.53		10.92	3.25
T075-180-422		17.15	2	180			10.72		18.10	7.00
T075-180-484	1.91	19.69	2	180	989.00		12.29		16.26	6.00
T075-270-500		17.78	3	270			12.70		25.72	10.75
T075-270-531		20.96	3	270			13.49		21.91	8.75
T075-360-640		24.77	4	360			16.26		26.67	10.50
T078-090-406		17.22	1	90			10.31		11.43	3.25
T078-180-453		18.49	2	180			11.51		18.82	7.00
T078-180-500	1.98	20.40	2	180	1102.00		12.70		16.84	6.00
T078-270-453		18.49	3	270			11.51		26.16	10.75



**TORSION SPRINGS - STAINLESS STEEL / INOX**

Part Number	d (mm)	Do (mm)	Fig	Max Deg°	T (Nmm)	1/2 E (mm)	M (mm)	E (mm)	A (mm)	Coils
T078-270-546	1.98	21.67	3	270	1102.00	25.40	13.87	50.80	22.78	8.75
T078-360-578		22.94	4	360			14.68		28.73	11.50
T085-090-422		18.16	1	90			10.72		12.42	3.25
T085-180-469		19.30	2	180			11.91		20.52	7.00
T085-180-641	2.16	25.25	2	180	1356.00	31.75	16.28	63.50	16.21	5.00
T085-270-500		20.07	3	270			12.70		29.15	10.75
T085-270-672		26.42	3	270			17.07		22.67	7.75
T085-360-688		26.77	4	360			17.48		29.15	10.50
T095-090-453		19.71	1	90			11.51		13.87	3.25
T095-180-531		22.07	2	180			13.49		22.94	7.00
T095-180-734	2.41	28.73	2	180	1808.00	38.10	18.64	76.20	18.11	5.00
T095-270-578		23.50	3	270			14.68		32.58	10.75
T095-270-797		30.56	3	270			20.24		25.34	7.75
T095-360-813		31.12	4	360			20.65		32.58	10.50
T105-090-500		21.54	1	90			12.70		15.34	3.25
T105-180-609		24.94	2	180			15.47		25.35	7.00
T105-180-813	2.67	31.70	2	180	2373.00	44.45	20.65	88.90	20.02	5.00
T105-270-703		27.69	3	270			17.86		36.00	10.75
T105-270-891		34.09	3	270			22.63		28.00	7.75
T105-360-906		34.77	4	360			23.01		36.00	10.50
T115-090-594		24.84	1	90			15.09		16.79	3.25
T115-180-641		26.49	2	180			16.28		27.76	7.00
T115-180-859	2.92	34.21	2	180	3164.00		21.82		21.92	5.00
T115-270-688		27.58	3	270			17.48		39.43	10.75
T115-270-938		36.45	3	270			23.83		30.67	7.75
T115-360-969		37.21	4	360			24.61		39.43	10.50
T125-090-591		25.12	1	90			15.01		21.44	4.25
T125-180-666		27.48	2	180			16.92		36.53	9.00
T125-180-885	3.18	34.44	2	180	3616.00	50.80	22.48	101.60	30.18	7.00
T125-270-1013		38.51	3	270			25.73		39.69	12.75
T125-270-751		30.20	3	270			19.08		49.21	9.75
T125-360-1084		40.77	4	360			27.53		49.21	12.50
T135-090-666		27.99	1	90			16.92		23.14	4.25
T135-180-735		30.20	2	180			18.67		39.45	9.00
T135-180-977	3.43	37.87	2	180	4519.00		24.82		32.59	7.00
T135-270-1112		42.16	3	270			28.24		42.86	12.75
T135-270-825		33.05	3	270			20.96		53.15	9.75
T135-360-1188		44.58	4	360			30.18		53.15	12.50



**TORSION SPRINGS - 316 STAINLESS STEEL**

Part Number	d (mm)	Do (mm)	Fig	Max Deg°	T (Nmm)	1/2 E (mm)	M (mm)	E (mm)	A (mm)	Coils
T012-090-055-X		2.36	1	27	2.49	4.75	1.40	9.52	1.37	2.25
T012-180-067-X		2.77	2	73	2.54		1.70		2.29	5.00
T012-180-109-X	0.30	4.22	2	72	2.64	6.35	2.77	12.70	1.68	3.00
T012-270-062-X		2.59	3	118	2.52	4.75	1.57	9.52	3.53	8.75
T012-270-109-X		4.32	3	118	2.64		2.77		2.29	4.75
T012-360-109-X		4.42	4	165	2.65	6.35	2.77	12.70	2.90	6.50
T014-090-063-X		3.15	1	32	4.01		1.60		1.70	2.25
T014-180-078-X		3.38	2	77	4.04		1.98		2.67	5.00
T014-180-109-X	0.36	4.93	2	72	4.18	9.52	2.77	19.05	1.96	3.00
T014-270-063-X		3.15	3	124	4.01	6.35	1.60	12.70	4.09	8.75
T014-270-125-X		5.11	3	119	4.18	9.52	3.18	19.05	2.67	4.75
T014-360-125-X		5.18	4	165	4.19		3.18		3.38	6.50
T015-090-062-X		2.79	1	25	4.80	6.35	1.57	12.70	1.71	2.25
T015-180-078-X		3.30	2	69	4.91		1.98		2.86	5.00
T015-180-109-X	0.38	4.65	2	62	5.08	9.52	2.77	19.05	2.10	3.00
T015-270-078-X		3.15	3	113	4.88	6.35	1.98	12.70	4.39	8.75
T015-270-109-X		5.05	3	108	5.11	9.52	2.77	19.05	2.86	4.75
T015-360-109-X		5.26	4	155	5.12		2.77		3.62	6.50
T017-090-093-X		4.06	1	34	7.19	6.35	2.36	12.70	2.06	2.25
T017-180-093-X		4.37	2	83	7.24		2.36		3.24	5.00
T017-180-156-X	0.43	6.32	2	76	7.45	9.52	3.96	19.05	2.39	3.00
T017-270-093-X		4.06	3	132	7.19	6.35	2.36	12.70	4.97	8.75
T017-270-156-X		6.58	3	126	7.47	9.52	3.96	19.05	3.24	4.75
T017-360-140-X		5.97	4	179	7.43		3.56		4.32	7.50
T018-090-109-X		4.50	1	36	8.55	6.35	2.77	12.70	2.06	2.25
T018-180-109-X		4.17	2	87	8.48		2.77		3.89	6.00
T018-180-140-X	0.46	5.49	2	81	8.71	9.52	3.56	19.05	2.97	4.00
T018-270-109-X		4.06	3	137	8.46	6.35	2.77	12.70	5.79	9.75
T018-270-156-X		6.22	3	111	8.79		3.96		3.81	4.75
T018-360-156-X		5.92	4	187	8.76	9.52	3.96	19.05	5.33	8.50
T020-090-109-X		4.85	1	34	11.65		2.77		2.41	2.25
T020-180-109-X		4.55	2	85	11.57		2.77		4.32	6.00
T020-180-140-X	0.51	6.15	2	81	11.90	12.70	3.56	25.40	3.30	4.00
T020-270-093-X		4.45	3	134	11.53	9.52	2.36	19.05	6.35	9.75
T020-270-172-X		6.81	3	109	11.99	12.70	4.37	25.40	4.19	4.75
T020-360-156-X		6.45	4	183	11.95		3.96		6.35	8.50
T021-090-109-X		4.72	1	31	13.34	9.52	2.77	19.05	2.40	2.25
T021-180-109-X		4.70	2	83	13.34		2.77		4.53	6.00
T021-180-156-X	0.53	6.27	2	78	13.72	12.70	3.96	25.40	3.47	4.00
T021-270-109-X		4.67	3	134	13.33	9.52	2.77	19.05	6.76	9.75
T021-270-187-X		7.19	3	132	13.86	12.70	4.75	25.40	4.53	5.75
T021-360-187-X		6.88	4	186	13.82		4.75		6.15	8.50
T023-090-109-X		5.18	1	31	17.46	9.52	2.77	19.05	2.77	2.25
T023-180-109-X		4.85	2	77	17.32		2.77		4.98	6.00
T023-180-156-X	0.58	6.58	2	74	17.88	12.70	3.96	25.40	3.81	4.00
T023-270-109-X		4.75	3	121	17.27	9.52	2.77	19.05	7.30	9.75
T023-270-156-X		6.38	3	121	17.84	12.70	3.96	25.40	5.55	6.75
T023-360-172-X		6.88	4	166	17.95		4.37		6.72	8.50
T025-090-140-X		5.97	1	33	22.48	9.52	3.56	19.05	2.86	2.25
T025-180-140-X		5.69	2	84	22.35		3.56		5.40	6.00
T025-180-203-X	0.64	7.72	2	81	23.01	12.70	5.16	25.40	4.13	4.00
T025-270-140-X		5.56	3	133	22.30	9.52	3.56	19.05	8.03	9.75
T025-270-218-X		8.64	3	132	23.20		5.54		5.40	5.75
T025-360-218-X		8.23	4	185	23.12		5.54		7.32	8.50
T028-090-156-X		6.78	1	34	31.43		3.96		3.38	2.25
T028-180-140-X		6.32	2	83	31.18		3.56		6.05	6.00
T028-180-203-X	0.71	8.64	2	80	32.13		5.16		4.62	4.00
T028-270-140-X		6.22	3	132	31.12		3.56		8.89	9.75
T028-270-203-X		8.36	3	130	32.04		5.16		6.76	6.75
T028-360-218-X		9.02	4	200	32.23		5.54		8.89	9.50
T030-090-172-X		7.14	1	33	38.41		4.37		3.43	2.25
T030-180-172-X		6.91	2	84	38.27	12.70	4.37	25.40	6.48	6.00
T030-180-250-X	0.76	10.01	2	87	39.58		6.35		4.95	4.00
T030-270-172-X		6.86	3	136	38.24		4.37		9.65	9.75
T030-270-250-X		9.58	3	119	39.45		6.35		7.11	5.75
T030-360-250-X		10.41	4	194	39.68		6.35		8.79	8.50
T032-090-172-X		7.32	1	31	46.22		4.36		3.86	2.25
T032-180-156-X		6.86	2	77	45.86		3.96		6.91	6.00
T032-180-218-X	0.81	9.30	2	74	47.32		5.54		5.28	4.00
T032-270-156-X		6.71	3	134	45.73		3.96		10.97	10.75
T032-270-218-X		8.99	3	120	47.19		5.54		7.72	6.75



**TORSION SPRINGS - 316 STAINLESS STEEL / INOX**

Part Number	d (mm)	Do (mm)	Fig	Max Deg°	T (Nmm)	1/2 E (mm)	M (mm)	E (mm)	A (mm)	Coils
T032-360-234-X	0.81	9.70	4	166	47.49	12.70	5.95	25.40	9.35	8.50
T035-090-187-X		8.00	1	31	60.09		4.75		4.00	2.25
T035-180-187-X		7.70	2	79	59.81		4.75		7.56	6.00
T035-180-281-X	0.89	11.43	2	84	62.09		7.14		5.78	4.00
T035-270-187-X		7.90	3	132	60.00		4.75		11.23	9.75
T035-270-281-X		11.05	3	137	61.93		7.14		8.45	6.75
T035-360-312-X		11.96	4	189	62.29		7.92		10.29	8.50
T038-090-234-X		9.80	1	36	77.40	15.88	5.94	31.75	4.57	2.25
T038-180-218-X		9.35	2	90	77.03		5.54		8.20	6.00
T038-180-312-X	0.97	12.37	2	84	78.94		8.08		6.27	4.00
T038-270-218-X		8.97	3	139	76.68		5.54		12.07	9.75
T038-270-312-X		12.12	3	138	78.81		7.92		9.17	6.75
T038-360-328-X		13.06	4	211	79.24		8.33		12.07	9.50
T040-090-187-X		7.85	1	37	87.02		4.75		5.59	3.25
T040-180-218-X		8.84	2	91	88.39		5.54		9.65	7.00
T040-180-343-X	1.02	13.16	2	84	91.74	25.40	8.71	50.80	6.60	4.00
T040-270-218-X		9.09	3	146	88.68	15.88	5.54	31.75	13.97	10.75
T040-270-343-X		12.98	3	140	91.65	25.40	8.71	50.80	9.65	6.47
T040-360-343-X		12.88	4	175	91.60	25.40	8.71	50.80	12.90	8.50
T045-090-203-X		9.07	1	37	123.04	15.88	5.16	31.75	6.58	3.25
T045-180-218-X		9.58	2	86	123.93		5.54		10.86	7.00
T045-180-359-X	1.14	14.61	2	82	129.11	25.40	9.12	50.80	7.44	4.00
T045-270-234-X		9.70	3	135	124.13	15.88	5.94	31.75	15.43	10.75
T045-270-359-X		14.12	3	133	128.79	25.40	9.12	50.80	10.86	6.75
T045-360-359-X		13.94	4	185	128.66		9.12		14.29	9.50
T048-090-218-X		9.53	1	36	148.04	15.88	5.54	31.75	6.71	3.25
T048-180-250-X		10.26	2	86	149.52		6.35		11.58	7.00
T048-180-406-X	1.22	15.70	2	82	155.77	25.40	10.31	50.80	7.92	4.00
T048-270-250-X		10.57	3	137	150.06	15.88	6.35	31.75	16.76	10.75
T048-270-406-X		15.24	3	134	155.43		10.31		11.58	6.75
T048-360-406-X		15.09	4	187	155.31		10.31		15.49	9.50
T051-090-234-X		10.36	1	26	177.01		5.94		7.44	2.25
T051-180-250-X		10.92	2	74	178.23		6.35		12.32	6.00
T051-180-344-X	1.30	14.12	2	84	183.17		8.74		9.72	5.00
T051-270-266-X		11.15	3	135	178.69		6.76		17.49	10.75
T051-270-359-X		14.50	3	134	183.59		9.12		13.60	7.75
T051-360-406-X		15.95	4	184	185.02		10.31		16.19	9.50
T054-090-296-X		12.29	1	30	211.76		7.52		7.87	2.25
T054-180-312-X		12.93	2	84	212.95		7.92		13.00	6.00
T054-180-421-X	1.37	16.61	2	76	217.93		10.69		10.29	4.00
T054-270-312-X		13.06	3	138	213.18		7.92		18.16	9.75
T054-270-437-X		16.87	3	149	218.19		11.10		14.40	7.75
T054-360-453-X		17.63	4	192	218.91		11.51		17.91	9.50
T059-090-296-X		12.67	1	39	271.31		7.52		8.64	3.25
T059-180-328-X		13.36	2	91	273.04		8.33		14.24	7.00
T059-180-437-X	1.50	17.30	2	88	280.09		11.10		11.30	5.00
T059-270-328-X		13.64	3	143	273.69		8.33		20.23	10.75
T059-270-453-X		17.75	3	141	280.69	25.40	11.51	50.80	15.74	7.75
T059-360-459-X		18.01	4	195	281.01		11.66		20.23	10.50
T063-090-343-X		14.22	1	29	329.43		8.71		9.19	2.25
T063-180-359-X		15.01	2	82	331.44		9.12		15.24	6.00
T063-180-500-X	1.60	19.48	2	93	339.50		12.70		12.07	5.00
T063-270-375-X		15.24	3	150	331.98		9.53		21.60	10.75
T063-270-516-X		19.91	3	148	340.07		13.11		16.80	7.75
T063-360-516-X		20.27	4	205	340.52		13.11		21.60	10.50
T070-090-359-X		15.06	1	38	442.43		9.12		10.16	3.25
T070-180-390-X		15.88	2	89	445.25		9.91		16.89	7.00
T070-180-515-X	1.78	20.57	2	87	456.76		13.08		13.34	5.00
T070-270-390-X		16.23	3	140	446.38		9.91		24.00	10.75
T070-270-531-X		20.98	3	137	457.49		13.49		18.67	7.75
T070-360-546-X		21.41	4	190	458.23		13.87		24.00	10.50
T075-090-375-X		16.13	1	38	538.18		9.53		10.92	3.25
T075-180-422-X		17.15	2	88	542.15		10.72		18.10	7.00
T075-180-484-X	1.91	19.69	2	90	550.08		12.29		16.26	6.00
T075-270-500-X		17.78	3	142	544.37		12.70		25.72	10.75
T075-270-531-X		20.96	3	141	553.25		13.49		21.91	8.75
T075-360-640-X		24.77	4	206	560.65		16.26		26.67	10.50
T078-090-406-X		17.22	1	39	603.33		10.31		11.43	3.25
T078-180-453-X	1.98	18.49	2	92	608.29		11.51		18.82	7.00
T078-180-500-X		20.40	2	89	614.45		12.70		16.84	6.00
T078-270-453-X		18.49	3	141	608.29		11.51		26.16	10.75

**TORSION SPRINGS - 316 STAINLESS STEEL / INOX**

Part Number	d (mm)	Do (mm)	Fig	Max Deg°	T (Nmm)	1/2 E (mm)	M (mm)	E (mm)	A (mm)	Coils
T078-270-546-X	1.98	21.67	3	139	617.90	25.40	13.87	50.80	22.78	8.75
T078-360-578-X		22.94	4	196	620.92		14.68		28.73	11.50
T085-090-422-X		18.16	1	37	765.64		10.72		12.42	3.25
T085-180-469-X		19.30	2	86	771.33		11.91		20.52	7.00
T085-180-641-X	2.16	25.25	2	85	791.82	31.75	16.28	63.50	16.21	5.00
T085-270-500-X		20.07	3	138	774.71		12.70		29.15	10.75
T085-270-672-X		26.42	3	138	794.67		17.07		22.67	7.75
T085-360-688-X		26.77	4	191	795.48		17.48		29.15	10.50
T095-090-453-X		19.71	1	35	1041.32		11.51		13.87	3.25
T095-180-531-X		22.07	2	86	1055.79		13.49		22.94	7.00
T095-180-734-X	2.41	28.73	2	85	1082.58	38.10	18.64	76.20	18.11	5.00
T095-270-578-X		23.50	3	143	1062.93		14.68		32.58	10.75
T095-270-797-X		30.56	3	141	1087.72		20.24		25.34	7.75
T095-360-813-X		31.12	4	195	1089.16		20.65		32.58	10.50
T105-090-500-X		21.54	1	34	1372.54		12.70		15.34	3.25
T105-180-609-X		24.94	2	87	1397.15		15.47		25.35	7.00
T105-180-813-X	2.67	31.70	2	83	1428.89	44.45	20.65	88.90	20.02	5.00
T105-270-703-X		27.69	3	151	1412.10		17.86		36.00	10.75
T105-270-891-X		34.09	3	139	1436.85		22.63		28.00	7.75
T105-360-906-X		34.77	4	193	1438.92		23.01		36.00	10.50
T115-090-594-X		24.84	1	35	1774.44		15.09		16.79	3.25
T115-180-641-X		26.49	2	82	1788.09		16.28		27.76	7.00
T115-180-859-X	2.92	34.21	2	79	1832.83		21.82		21.92	5.00
T115-270-688-X		27.58	3	132	1796.12		17.48		39.43	10.75
T115-270-938-X		36.45	3	132	1841.94		23.83		30.67	7.75
T115-360-969-X		37.21	4	184	1844.78		24.61		39.43	10.50
T125-090-591-X		25.12	1	41	2206.00		15.01		21.44	4.25
T125-180-666-X		27.48	2	97	2231.83		16.92		36.53	9.00
T125-180-885-X	3.18	34.44	2	99	2285.21	50.80	22.48	101.60	30.18	7.00
T125-270-1013-X		38.51	3	157	2306.66		25.73		39.69	12.75
T125-270-751-X		30.20	3	154	2255.95		19.08		49.21	9.75
T125-360-1084-X		40.77	4	216	2316.59		27.53		49.21	12.50
T135-090-666-X		27.99	1	41	2726.69		16.92		23.14	4.25
T135-180-735-X		30.20	2	97	2752.74		18.67		39.45	9.00
T135-180-977-X	3.43	37.87	2	99	2817.22		24.82		32.59	7.00
T135-270-1112-X		42.16	3	156	2842.16		28.24		42.86	12.75
T135-270-825-X		33.05	3	153	2780.55		20.96		53.15	9.75
T135-360-1188-X		44.58	4	214	2853.90		30.18		53.15	12.50



## INTERLOCK GARTER SPRINGS

### Stock sizes in stainless steel

Garter springs are extension springs with the ends fastened together to form a ring. They are primarily used to maintain controlled pressure of a radial lip seal on a shaft and to compensate for lip wear, changes in volume or stiffness of the elastomer caused by the fluid, and the effect of temperature changes and time. Other uses include small motor belts and electrical connectors.

SPEC garter springs are engineered and manufactured to provide a consistent and reliable product. They feature high initial tension to provide constant load and a special tapered end to assure a strong connection and a continuous near uniform body diameter.



### Applications

- Oil Seals • Lip Seals • Small Motor Belts
- Electrical Connectors

### Lengths

SPEC garter springs are available in a variety of standard lengths which can be trimmed and assembled to meet your required inside diameter. Simply trim the non-tapered end to your needed length and assemble by screwing the tapered end into the non-tapered end as shown in figure G1.

### Material

Stainless steel – plain finish.  
Type 302 per ASTM A313 or AMS 5688 spring temper.  
(Chemical and physical only.) Certificate of chemical analysis available at additional charge.

### Tolerances

Body O.D.  $\pm 0.13$   
Load at 4.75mm extension  $\pm 10\%$

### Ends

Springs are sold in unassembled lengths with interlock ends.

### KEY TO MEASUREMENTS

D<sub>o</sub> = Outside diameter  
d = Wire diameter  
D<sub>1</sub> = Internal diameter when assembled  
L<sub>1</sub> = Approximate active length  
L<sub>2</sub> = Loaded length  
F<sub>1</sub> = Force at loaded length  
D<sub>2</sub> = Maximum expanded internal diameter

## GAINES À VISSEZ

### Dimensions standard en acier inoxydable

Les gaines à visser sont des ressorts de traction dont les extrémités sont réunies pour former un anneau. Elles sont principalement utilisées pour maintenir une pression contrôlée d'un joint à lèvres radial sur un arbre et pour compenser l'usure des lèvres, les changements de volume ou de raideur de l'élastomère causés par le fluide, et l'effet des changements de température et du temps. Les autres usages comprennent notamment les courroies de petits moteurs et les connecteurs électriques.

Les gaines à visser SPEC sont conçues et fabriquées pour fournir un produit uniforme et fiable. Elles présentent une forte tension initiale qui assure une charge constante et une extrémité conique spéciale qui assure une liaison solide et un diamètre de corps pratiquement uniforme.

### Applications

- Bagues d'étanchéité • Joints à lèvres
- Courroies de Petits moteurs • Connecteurs électriques

### Longueurs

Les gaines à visser SPEC existent en diverses longueurs standard qui peuvent être raccourcies et peuvent être assemblées en fonction du diamètre intérieur requis. Il suffit de raccourcir l'extrémité non conique à la longueur voulue et d'assembler le tout en vissant l'extrémité conique dans l'extrémité non conique comme dans la Fig. G1.

### Matériaux

Acier inoxydable - finition ordinaire  
Trempe de ressort type 302 par ASTM A313 ou AMS5688.  
(Chimique et physique seulement). Certificat d'analyse chimique disponible contre supplément.

### Tolérances

Corps diam. ext.  $\pm 0,13$   
Charge à 4,75 mm extension  $\pm 10\%$

### Extrémités

Les ressorts sont vendus par longueurs non montées avec des extrémités à verrouillage.

### INDEX DES MESURES

D<sub>o</sub> = Diamètre Extérieur  
d = Diamètre du fil  
D<sub>1</sub> = Diamètre intérieur assemblé  
L<sub>1</sub> = Longueur de corps active (approx.)  
L<sub>2</sub> = Longueur en charge  
F<sub>1</sub> = Charge en extension  
D<sub>2</sub> = Diamètre intérieur maxi en extension

## MUELLES/RESORTES VAINA ENTRELAZABLES

### Tamaños en stock en acero inoxidable

Los muelles/resortes vaina son muelles/resortes de extensión con los extremos unidos para formar un aro. Se usan sobre todo para mantener la presión controlada en un borde radial de un eje y compensar el desgaste del borde, cambios en el volumen o en la rigidez del elastómero causados por el fluido, y el efecto de los cambios de temperatura y el paso del tiempo. Otras aplicaciones incluyen correas en motores pequeños y conectores eléctricos.

Los muelles/resortes vaina de SPEC están diseñados y fabricados para generar un producto consistente y de confianza. Desarrollar una fuerte tensión inicial para suministrar una fuerza constante y un extremo ahulado para asegurar una conexión fuerte y un diámetro de cuerpo uniforme y constante.

### Aplicaciones

- Juntas de aceite • Juntas de bordes
- Correas de pequeños motores • Conectores eléctricos

### Longitudes

Los muelles/resortes vaina de SPEC están disponibles en una gran variedad de longitudes standard recortados y montados para cumplir con sus necesidades de diámetro interior. Simplemente recortar el extremo no ahulado según sus necesidades de longitud y montarlo roscando el extremo ahulado en el no ahulado como aparece en la figura G1.

### Material

Acer inoxidable – acabado plano  
Muelles templado tipo 302 según ASTM A313 o AMS 5688 (Químico y físico solamente). El certificado de composición química está disponible contra pago adicional.

### Tolerancias

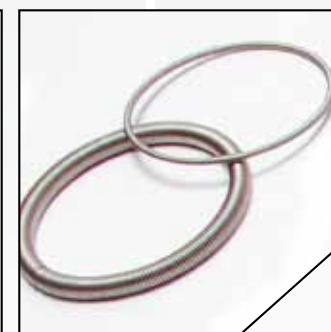
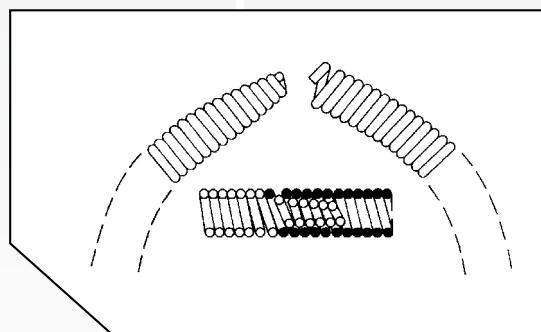
Cuerpo D.E.  $\pm 0,13$   
Fuerza a 4,75 mm. de extensión  $\pm 10\%$

### Extremos

Los muelles/resortes se venden en longitudes sin montar con extremos entrelazables.

### CLAVES DE DIMENSIONES

D<sub>o</sub> = Diámetro exterior (Max)  
d = Diámetro del alambre  
D<sub>1</sub> = Diámetro interior colocado  
L<sub>1</sub> = Altura libre aproximada  
L<sub>2</sub> = Longitud cargada  
F<sub>1</sub> = Fuerza en la altura de carga  
D<sub>2</sub> = Máximo diámetro interno expandido



### United Kingdom

**Tel:** (44) 1386 443366  
**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363  
**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542  
**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04  
**E-mail:** info@asraymond.de

## WURMFEDERN

### Größen in Edelstahl

Wurmfedern sind Zugfedern, deren Enden aneinander befestigt werden und einen Ring bilden. Sie werden hauptsächlich verwendet, um bei Radiallippendiftungen einen kontrollierten Druck auf die Welle aufrechtzuerhalten und den Dichtungsverschleiß sowie Veränderungen im Volumen oder der Steifigkeit des Elastomers auszugleichen, welche durch die Flüssigkeit und durch Temperaturveränderungen hervorgerufen werden können. Weitere Anwendungen sind kleine Motorriemen und elektrische Anschlüsse.

Bei der Entwicklung und Herstellung der SPEC Wurmfedern steht die Bereitstellung eines konsistenten und zuverlässigen Produkts im Mittelpunkt. Die Federn weisen eine hohe Vorspannung auf, um eine konstante Kraft zur Verfügung zu stellen, und haben ein besonderes verjüngtes Ende, um eine starke Verbindung und einen kontinuierlichen einheitlichen Durchmesser sicherzustellen.

### Anwendungen

- Öldichtungen • Lippendiftungen • Kleine Motorriemen • Elektrische Anschlüsse

### Längen

SPEC Wurmfedern sind in einer Vielzahl von Standardlängen erhältlich, welche je nach dem von Ihnen benötigten Innendurchmesser gekürzt und montiert werden können. Kürzen Sie das nicht verjüngte Ende einfach auf die benötigte Länge und montieren Sie die Feder, indem Sie das verjüngte Ende in das nicht verjüngte Ende schrauben (siehe Abbildung G1).

### Material

Edelstahl – einfaches Finish.

Typ 302 - ASTM A313 oder AMS 5688 Federhärte. (nur chemisch und physikalisch) Zertifikat zur chemischen Analyse auf Wunsch gegen besondere Berechnung erhältlich.

### Toleranzen

Körper O.D.  $\pm 0.13$

Kraft bei 4.75mm Dehnung  $\pm 10\%$

### Enden

Federn werden in unmontierten Längen mit Verriegelungsenden verkauft.

### KENNZEICHNEN DER ABMESSUNGEN

$D_o$  = Außendurchmesser  
 $d$  = Drahtdurchmesser  
 $D_1$  = Innendurchmesser nach Montage  
 $L_1$  = Ungefähr aktive Länge  
 $L_2$  = Gespannte Höhe  
 $F_1$  = Kraft bei gespannter Länge  
 $D_2$  = Maximaler erweiterter Innendurchmesser

## MOLLE GARTER

### Dimensioni standard in acciaio inox

Sono molle di trazione in cui le estremità sono riunite per formare unanello. Sono principalmente utilizzate per mantenere una pressione controllata in un giunto a labbri radiale su un albero e per compensare l'usura dei labbri, i cambi di volume o la rigidità dell'elastomero causati dal fluido, così come l'effetto dei cambiamenti di temperatura o atmosferici. Le altre utilizzazioni comprendono cinture per piccoli motorie i connettori elettrici.

Le molle garter SPEC sono concepite e fabbricate per fornire un prodotto uniforme e affidabile. Presentano una forte tensione iniziale che assicura un carico costante e un'estremità conica speciale che assicura una solida connessione e un diametro del corpo praticamente uniforme.

### Applicazioni

- Dispositivi di tenuta dell'olio • Giunti a labbri
- Cinture per piccoli motori • Connettori elettrici

### Lunghezze

Le molle garter SPEC esistono in diverse lunghezze standard che possono essere accorate ed essere assemblate in funzione del diametro interno richiesto. Basta accorciare fino alla lunghezza voluta l'estremità non conica e assemblare il tutto avvitando l'estremità conica dentro quella non conica come da fig. G1

### Materiale

Acciaio inox - finitura ordinaria.

Typ 302 da ASTM A313 o AMS5688. Il certificato d'analisi chimica è disponibile dietro supplemento.

### Tolleranze

Corpo diam est.  $\pm 0,13$

Carico a 4,75 mm estensione  $\pm 10\%$

### Estremità

Le molle vengono vendute per lunghezze non montate con le estremità a chiusura.

### LEGENDA

$D_o$  = Diametro esterno  
 $d$  = Diametro del filo  
 $D_1$  = Diametro interno assemblato  
 $L_1$  = Lunghezza libera approssimativa  
 $L_2$  = Lunghezza in carico  
 $F_1$  = Carico alla lunghezza in carico  
 $D_2$  = Massima espansione diametro interno

## MOLAS AUTOTRAVANTES GARTER

### Padronizadas em aço inox

As molas Garter são molas com as extremidades unidas para formar um anel. Essas peças são usadas para manter a pressão em uma aba selada para prevenir o desgaste do eixo. Também são usadas para manter os fluidos de um elastómero. Outros usos são em pequenas correias de motores e conectores elétricos.

As autotravantes SPEC são desenhadas para manter a pressão inicial uma constante em qualquer que seja seu uso.



### Aplicações

- Lacres de óleo • Lacres de abas
- Correias de pequenos motores • Conectores elétricos

### Comprimentos

São disponíveis em uma variedade de comprimentos padrão para ir de encontro ao seu diâmetro de uso. Simplesmente corte uma das extremidades a junte à outra, obtendo o diâmetro necessário, veja na figura G1.

### Material

Aço inox Acabamento Comum

Typ 302 ASTM A313 ou AMS 5688 tipo mola.

Certificado de análise química, disponível a custo extra.

### Tolerancias

Corpo (Diam.Externo)  $+ - 0.13$

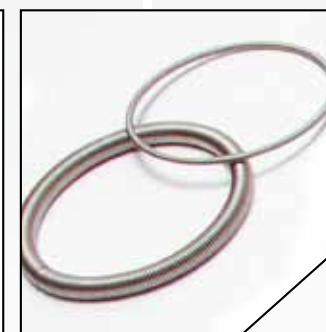
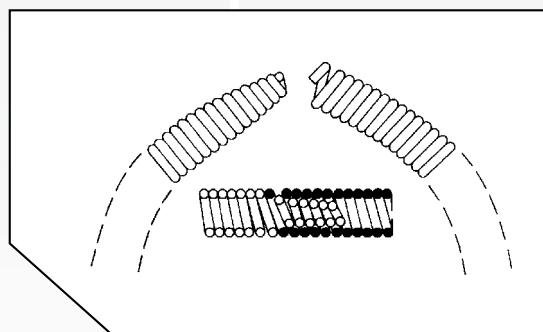
Carga a 4,75mm extensão  $+ - 10\%$

### Extremidades

As molas são fornecidas desmontadas com as travas nas extremidades.

### LEGENDA

$D_o$  = Diâmetro externo  
 $d$  = Diâmetro do arame  
 $D_1$  = Diâmetro interno quando montado  
 $L_1$  = Comprimento ativo aproximado  
 $L_2$  = Comprimento em Carga  
 $F_1$  = Carga em  $L_1$   
 $D_2$  = Diâmetro interno Máximo (montado)



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



**INTERLOCK GARTER SPRINGS**

<b>Part Number</b>	<b>D<sub>o</sub> (mm)</b>	<b>d (mm)</b>	<b>D<sub>1</sub> (mm)</b>	<b>L<sub>1</sub> (mm)</b>	<b>L<sub>2</sub> (mm)</b>	<b>F<sub>1</sub> (mm)</b>	<b>D<sub>2</sub> (mm)</b>
G040-008-0813-S	1.02	0.20	65.53	206.50	209.68	0.70	79.83
G050-009-0170-S		0.23	13.56	43.33	49.00	1.53	16.29
G050-009-0249-S			19.94	63.35	72.47	1.32	25.56
G050-010-0370-S	1.27	0.25	29.72	94.16	101.50	1.53	35.97
G050-010-0695-S			56.01	176.76	184.73	1.81	65.03
G050-011-0492-S		0.28	39.55	125.12	133.02	1.88	46.25
G062-008-0078-S		0.20	6.12	19.86	26.16	0.70	8.26
G062-010-0168-S			13.36	42.77	50.27	1.53	17.63
G062-010-0350-S		0.25	28.04	88.90	93.65	0.91	37.30
G062-010-0700-S			56.34	177.80	182.55	0.80	76.06
G062-010-1400-S			112.93	355.60	360.35	0.75	152.45
G062-011-0249-S			19.91	63.35	74.04	1.33	26.88
G062-011-0350-S	1.57	0.28	28.02	88.90	93.65	1.20	36.70
G062-011-0366-S			29.36	93.12	103.96	1.62	38.55
G062-011-0700-S			56.31	177.80	182.55	1.01	75.02
G062-011-1400-S			112.90	355.60	360.35	0.92	151.60
G062-012-0350-S			27.99	88.90	93.65	1.71	34.33
G062-012-0538-S			43.26	136.86	146.43	1.95	53.48
G062-012-0694-S		0.30	55.85	176.43	188.01	2.18	68.04
G062-012-0700-S			56.29	177.80	182.55	1.41	70.26
G062-012-1074-S			86.59	272.97	291.57	3.34	97.22
G062-012-1400-S			112.88	355.60	360.35	1.26	142.18
G062-013-0820-S		0.33	66.04	208.51	220.40	2.64	77.90
G062-013-0952-S			76.71	242.01	255.60	2.92	89.38
G062-015-1281-S		0.38	103.20	325.40	337.95	4.17	111.45
G078-010-0107-S		0.25	8.41	27.20	35.92	0.90	11.35
G078-011-0217-S		0.28	17.30	55.22	65.02	1.25	23.35
G078-012-0350-S			27.99	88.90	93.65	2.07	35.44
G078-012-0700-S		0.30	56.29	177.80	182.55	1.93	72.90
G078-012-1400-S			112.88	355.60	360.35	1.87	147.75
G078-013-0324-S	1.98	0.33	25.88	82.35	89.94	1.95	34.51
G078-014-0350-S			27.94	88.90	93.65	3.40	32.22
G078-014-0700-S		0.36	56.24	177.80	182.55	3.09	66.47
G078-014-0869-S			69.90	220.73	232.28	2.64	87.52
G078-014-1400-S			112.83	355.60	360.35	2.93	134.98
G078-015-0491-S			39.37	124.89	136.04	3.34	48.19
G078-015-0700-S		0.38	56.24	177.88	189.43	3.61	67.15
G078-015-1390-S			112.06	353.26	367.54	3.34	134.47
G080-016-1413-S	2.03	0.41	113.89	359.08	372.97	3.89	134.27
G080-016-1663-S			134.09	422.53	438.28	3.89	158.16
G094-014-0350-S			27.94	88.90	93.65	2.26	37.71
G094-014-0700-S		0.36	56.24	177.80	182.55	2.10	75.92
G094-014-1400-S			112.83	355.60	360.35	2.03	152.32
G094-016-0350-S		0.41	27.89	88.90	93.65	2.96	35.29
G094-016-0700-S	2.39		56.18	177.80	182.55	2.62	73.05
G094-016-1400-S			112.78	355.60	360.35	2.45	148.48
G094-017-1279-S		0.43	103.02	325.02	340.82	3.61	129.62
G094-017-1443-S			116.31	366.75	384.71	4.03	143.87
G094-018-1589-S		0.46	128.07	403.76	420.52	4.31	155.76
G094-018-2065-S			166.50	524.51	541.25	5.35	194.16
G109-016-0350-S			27.89	88.90	93.65	2.44	37.65
G109-016-0700-S		0.41	56.18	177.80	182.55	2.24	75.85
G109-016-1400-S	2.77		112.78	355.60	360.35	2.14	152.25
G109-018-0350-S			27.84	88.90	93.65	3.14	36.44
G109-018-0700-S		0.46	56.13	177.80	182.55	2.75	75.74
G109-018-1400-S			112.73	355.60	360.35	2.57	152.18
G125-020-0700-S			55.98	177.80	182.55	5.05	70.32
G125-020-1400-S			112.57	355.60	360.35	4.47	146.71
G125-020-1587-S	3.18	0.51	127.81	403.12	422.12	4.31	172.43
G125-020-1959-S			157.94	497.76	512.37	3.41	213.22
G125-020-2600-S			209.60	660.40	665.15	4.20	277.62
G125-024-2167-S			174.63	550.55	565.05	7.58	208.09
G188-024-0700-S			55.98	177.80	182.55	3.50	75.58
G188-024-1400-S	4.76		112.57	355.60	360.35	3.36	151.97
G188-024-2600-S		0.61	209.60	660.40	665.15	3.30	282.96
G250-024-0700-S			55.98	177.80	182.55	3.16	75.58
G250-024-1400-S	6.35		112.57	355.60	360.35	3.11	151.97
G250-024-2600-S			209.60	660.40	665.15	3.08	282.96

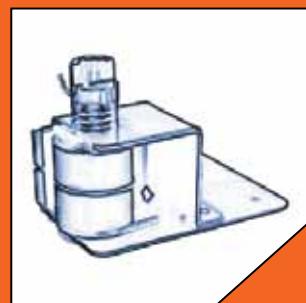


# Custom Engineered Solutions

Associated Spring RAYMOND's highly experienced engineering team has completed thousands of custom engineered spring designs. We have the know-how and the tools to meet the unique demands of any customer. Whether you need a single perfect spring design for a particular application, or designs for a complete spring system, we have the core technology & expertise to get the job done right.

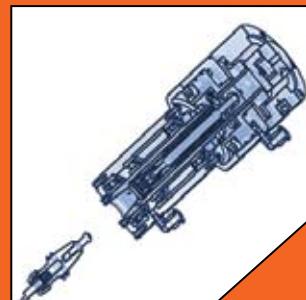
## Integrated Systems

You may not associate systems with Associated Spring RAYMOND, but we have been designing & manufacturing sub-systems for OEMs for some time. Our expertise is in systems that provide isolation, counter-balance, rotation, and translation. We combine the core component expertise into assembled custom systems that push, pull, centre, balance, dampen, absorb vibration, provide play, and provide adjustability. By working closely with our customers' engineers and sharing information, we achieve solutions that are packaged in a space that fits the application and mounts easily into the rest of the application.



## Applications

Designing the counter-balance or actuation components is not always easy, feasible, or allowed for in your resources. Associated Spring RAYMOND's engineering team is here to select the correct standard design for the application, or if necessary, design the custom part(s). Because Associated Spring RAYMOND has an expansive product breadth, we have multiple technologies, base designs, materials, & coating options to choose from to suit your application perfectly. Other companies might try and force a particular design into your application, simply because it is all they offer.



## Components

If you already know what would work in your application and are simply looking for a source, Associated Spring RAYMOND's engineering goes beyond looking at your print. We analyse the stresses & functionality of your design to offer improvement suggestions and caution when there is a problem with the design.



## Regulations & Compliance

Associated Spring RAYMOND takes regulations and compliance seriously. As part of Barnes Group Inc., a publicly held company, we are subject to regular third party audits. We can assist with ITAR, DFARs, RoHS, and applications with other regulatory requirements, as we already do this regularly.

## Software

We maintain a suite of engineering software, including common CAD packages, to interface with customers and their design information. We can work with a variety of 2D and 3D datasets / file formats.

- 2D: \*.dwg, \*.dxf, and many more
- 3D: \*.stp, \*.step, \*.iges, \*.stl, \*.x\_t (Parasolid) & many more

### Native Packages

- AutoCAD • Autodesk Inventor • CATIA • SolidWorks

Interested in Custom Engineered Solutions? Call us on

United Kingdom  
Tel: (44) 1386 443366

France  
Tel: (33) 01 30 68 6363

Spain  
Tel: (34) 945 147542

Germany  
Tel: (49) 6251 93-3252-04



## DISC SPRING WASHERS - DIN 2093

Manufactured under strict quality control to conform DIN2093, disc springs in the SPEC range are for arduous applications which require high resistance to fatigue. These washers have had the set removed during the manufacturing process.

In addition to the standard sizes held in stock, intermediate sizes and larger sizes are available on request.

### MATERIAL

Thickness less than 1.25mm: Carbon steel per C1074-1075 – CK67, Phosphate + oil finish.  
Thickness 1.25mm and up: Chrome Vanadium per SAE 6150 – 50CrV4, Phosphate + oil finish.



### TOLERANCES

**DIAMETER:** Di and Do shown are minimum and maximum dimensions, respectively.

**LOAD:** Values shown are for reference only. Loads shown are theoretical and approximate.

### KEY TO MEASUREMENTS

Do = Outside Diameter (max)  
Di = Inside Diameter (min)  
t = Thickness  
Lo = Free Height (ref only)  
L<sub>1</sub> = Loaded height  
P<sub>1</sub> = Load at deflection (N) (+/- 15%)  
F = Deflection Lo-L<sub>1</sub>

## RESSORTS DISQUE - DIN 2093

Fabriqués sous contrôles de qualité sévère pour assurer la conformité à la DIN2093, les ressorts disque SPEC sont prévus pour des applications extrêmes qui requièrent une haute résistance à la fatigue. Toute éventuelle perte de hauteur après mise à plat a été supprimée durant la fabrication.

En plus des dimensions standards du catalogue, d'autres tailles peuvent être obtenues sur demande.

### MATERIAU

Epaisseurs inférieures à 1.25mm : Acier au carbone type C1074-1075 – CK67, finition phosphatée et huilée.  
Epaisseurs 1.25mm et plus : Chrome vanadium SAE 6150 – 50CrV4, finition phosphatée et huilée.

### TOLERANCES

**DIAMETRES :** les diamètres intérieurs et extérieurs indiqués sont respectivement des dimensions minimum et maximum.

**CHARGES :** Les valeurs indiquées le sont pour référence uniquement. Les charges données sont théoriques et approximatives.

### INDEX DES MESURES

Do = Diamètre Extérieur (max)  
Di = Diamètre Intérieur (min)  
t = Epaisseur  
Lo = Hauteur libre (pour réf.)  
L<sub>1</sub> = Hauteur en charge  
P<sub>1</sub> = Charge à L<sub>1</sub> (N) (+/- 15%)  
F = Déflexion Lo-L<sub>1</sub>

## MUELLES DE PLATILLO DIN 2093

Para uso general. Estos muelles/resortes de disco se fabrican bajo los más estrictos controles de calidad para que las dimensiones indicadas en el catálogo coincidan con las reales.

Nuestros muelles/resortes de disco SPEC son la solución óptima para aquellas aplicaciones donde las tolerancias de carga no sean muy estrechas. Además, se les ha sometido a un proceso de liberación de tensiones para evitar la pérdida de altura después de comprimirlos.

### MATERIAL

Espesores de material menores de 1,25mm: Acero al carbono C1074-1075 Espesores de material iguales o mayores de 1,25mm: Acero al carbono C1074-1075 ó Cromo Vanadio según SAE 6150.

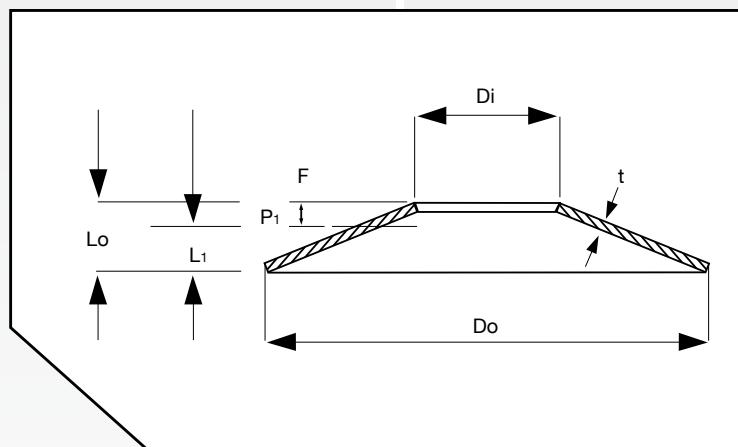
### TOLERANCIAS

**DIÁMETRO:** Los diámetros internos y externos muestran valores mínimos y máximos, respectivamente.

**CARGA:** Los valores deben tomarse como referencia exclusivamente. Las cargas son teóricas y aproximadas.

### CLAVES DE CARACTERÍSTICAS

Do = Diámetro externo (max)  
Di = Diámetro interno (min)  
t = Espesor  
Lo = Altura libre (referencia solo)  
L<sub>1</sub> = Altura cargada  
P<sub>1</sub> = Carga a deflexión (N) (+/- 15%)  
F = Deflexión Lo-L<sub>1</sub>



### United Kingdom

**Tel:** (44) 1386 443366  
**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363  
**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542  
**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04  
**E-mail:** info@asraymond.de

## TELLERFEDERN - DIN 2093

Sie werden in verschiedenen Anwendungsgebieten eingesetzt. Sie werden unter scharfen Qualitätskontrolle hergestellt um die Massen die in Katalog angegeben werden abzustimmen.

Unsere SPEC Tellerfedern passen am besten in Anwendungsgebieten wo engen Krafttoleranzen nicht erforderlich sind. Alle Tellerfedern wurden bei der Herstellung gesetzt.

### WERKSTOFF

Materialdicke bis 1,25mm: Kohlenstoffstahl C1074-1075  
Materialdicke >1,25mm: Kohlenstoffstahl C1074-1075 oder Chromvanadiumstahl SAE 6150.

### TOLERANZEN

Durchmesser: Innen und Aussendurchmesser sind minimale und, beziehungsweise, maximale Massangaben.

**KRAFT:** Angaben sollten nur als Information verwandt werden. Kräfte sind wie theoretisch und annähernden Werte zu betrachten.

### KENNZEICHNEN DER ABMESSUNGEN

Do = Äußerer Durchmesser (max.)  
Di = Innerer Durchmesser (min.)  
t = Materialdicke  
Lo = Länge der unbelasteten Tellerfeder  
L<sub>1</sub> = Länge der belasteten Tellerfeder  
P<sub>1</sub> = Federkraft bei Federlänge (N) (+/-15%)  
F = Federweg Lo-L<sub>1</sub>

## MOLLE A TAZZA - DIN 2093

Fabbricate sotto i più stretti controlli di qualità, le molle a tazza SPEC vengono utilizzate per applicazioni estreme che richiedono alta resistenza alla fatica e dove non è richiesta una elevata tolleranza sul carico della molla. Questi articoli sono stati assestati per minimizzare l'acorciamiento dopo il lavoro in compressione.

Oltre alle dimensioni standard a magazzino, sono fornibili dimensioni intermedie su richiesta.

### MATERIALE

Per spessori minori di 1,25 mm: acciaio al carbonio secondo C1074-1075  
Spessore da 1,25 mm in su: Acciaio al carbonio secondo C1074-1075 o Cromo Vanadio secondo SAE 6150

### TOLLERANZE

Diametri: diametro interno e diametro esterno sono rispettivamente la minima e la massima dimensione possibile.

Carico: I valori riportati sono solo per riferimento. I carichi indicati sono teorici e approssimativi.

### LEGENDA

Do = Diametro esterno (max)  
Di = Diametro interno (min)  
t = Spessore  
Lo = Altezza libera (solo rif)  
L<sub>1</sub> = Altezza in carico  
P<sub>1</sub> = Carico in deflessione (N) (+/-15%)  
F = Deflessione Lo-L<sub>1</sub>

## MOLAS DISCO - DIN 2093

Construídas para uso geral. Estes itens são construídos sob um rígido controle de qualidade, para satisfazer as dimensões físicas listadas nas tabelas abaixo. Nossas molas de disco SPEC, são ideais para uso quando uma tolerância apertada não é requerida. Essas peças tem sido usadas para minimizar perda de carga depois de comprimidas.

### MATERIAL

Espessura menor que 1,25mm : Aço Carbono C1074-1075  
Espessura maior que 1,25mm : Aço Carbono C1074-1075 ou Cromo vanádio SAE 6150.

### TOLERANCIAS

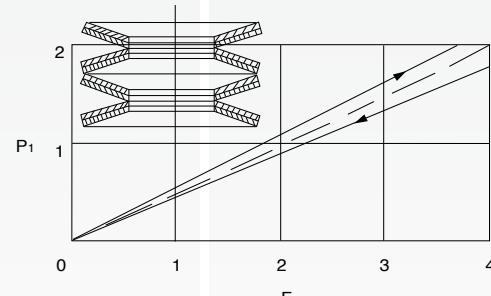
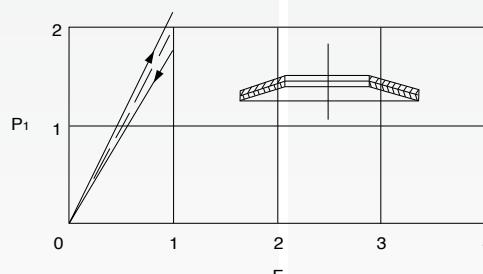
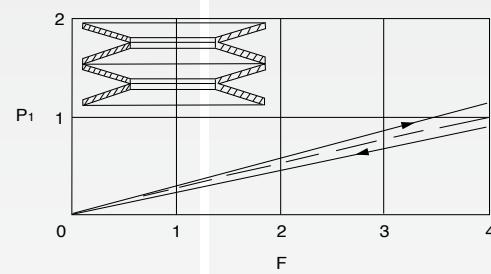
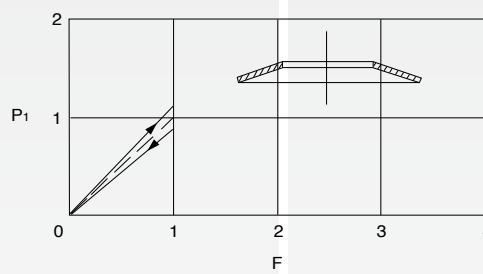
**DIAMETROS:** Di e Do mostrados são mínimos e máximos, respectivamente.

**CARGA:** Valores mostradas são referência somente. Cargas aparentam ser teóricas e aproximadas.



### LEGENDA

Do = Diam Externo  
Di = Diam Interno (max)  
t = Espessura  
Lo = Altura livre (Somente ref)  
L<sub>1</sub> = Carga em L<sub>1</sub>  
P<sub>1</sub> = Deflexão em carga (N) (+/- 15%)  
F = Deflexão Lo-L<sub>1</sub>



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



## DISC SPRINGS – DIN 2093

Part Number	Do (mm)	Di (mm)	t (mm)	Lo (mm)	L1 (N)	P1 (N)
S4201	6		0.30	0.45	0.34	119
S4202			0.20	0.40	0.25	26
S4203		3.2	0.30	0.55	0.36	104
S4204			0.40	0.60	0.45	185
S4205	8		0.50	0.70	0.55	357
S4206			0.20	0.45	0.26	39
S4207		4.2	0.30	0.55	0.36	119
S4208			0.40	0.60	0.45	210
S4209			0.30	0.65	0.39	98
S4210		3.2	0.40	0.70	0.48	179
S4211			0.50	0.75	0.56	278
S4212			0.40	0.70	0.48	189
S4213	10	4.2	0.50	0.75	0.56	294
S4214			0.60	0.85	0.66	502
S4215			0.25	0.55	0.33	58
S4216		5.2	0.40	0.70	0.48	213
S4217			0.50	0.75	0.56	329
S4218			0.40	0.80	0.50	178
S4219		4.2	0.50	0.85	0.59	284
S4220			0.60	1.00	0.70	556
S4221	12	5.2	0.50	0.90	0.60	349
S4222			0.60	0.95	0.69	506
S4223		6.2	0.50	0.85	0.59	326
S4224			0.60	0.95	0.69	551
S4225		5.2	0.50	0.85	0.59	272
S4226	13		0.35	0.80	0.46	152
S4227		6.2	0.50	0.85	0.59	291
S4228			0.70	1.00	0.78	673
S4229			0.35	0.80	0.46	123
S4230	14	7.2	0.50	0.90	0.60	279
S4231			0.80	1.10	0.87	813
S4232			0.40	0.95	0.54	175
S4233		5.2	0.50	1.00	0.63	278
S4234			0.60	1.05	0.71	407
S4235			0.70	1.10	0.80	555
S4236	15		0.50	1.00	0.63	289
S4237		6.2	0.60	1.05	0.71	423
S4238			0.70	1.10	0.80	577
S4239			0.50	1.00	0.63	333
S4240			0.70	1.10	0.80	665
S4241			0.80	1.20	0.90	982
S4242		8.2	0.40	0.90	0.53	155
S4243			0.60	1.05	0.71	412
S4244	16		0.70	1.15	0.81	637
S4245			0.80	1.20	0.90	825
S4246			0.90	1.25	0.99	1000
S4247			0.40	1.00	0.55	139
S4248			0.50	1.10	0.65	245
S4249		6.2	0.60	1.20	0.75	400
S4250			0.70	1.25	0.84	552
S4251			0.80	1.30	0.92	725
S4252	18		0.50	1.10	0.65	265
S4253		8.2	0.70	1.25	0.84	596
S4254			0.80	1.30	0.92	582
S4255			1.00	1.40	1.10	1181
S4256			0.45	1.05	0.60	214
S4257		9.2	0.70	1.20	0.83	572
S4258			1.00	1.40	1.10	1250
S4259			0.60	1.30	0.77	412
S4260			0.70	1.35	0.86	568
S4261		8.2	0.80	1.40	0.95	751
S4262			0.90	1.45	1.04	953
S4263			1.00	1.55	1.14	1294
S4264	20		0.50	1.15	0.66	254
S4265			0.80	1.35	0.94	745
S4266			0.90	1.45	1.04	1049
S4267		10.2	1.00	1.55	1.14	1424
S4268			1.10	1.55	1.21	1530
S4269			1.25	1.75	1.38	2475
S4270			1.50	1.80	1.58	2520
S4271	23	11.2	0.60	1.40	0.80	426

## DISC SPRINGS – DIN 2093

Part Number	Do (mm)	Di (mm)	t (mm)	Lo (mm)	L1 (N)	P1 (N)
S4272	23	11.2	0.80	1.45	0.96	710
S4273			1.25	1.75	1.38	1950
S4274			0.70	1.50	0.90	543
S4275			8.2	0.80	1.55	0.99
S4276			0.90	1.60	1.07	918
S4277		10.2	1.00	1.70	1.17	1239
S4278			0.90	1.65	1.09	1057
S4279			1.00	1.70	1.17	1315
S4280			1.25	1.90	1.41	2038
S4281			12.2	1.25	1.85	1.40
S4282		12.2	1.50	2.00	1.63	3295
S4283			1.00	1.75	1.19	1171
S4284			0.70	1.60	0.92	601
S4285			0.90	1.60	1.07	868
S4286			1.00	1.80	1.20	1358
S4287		12.2	1.25	1.95	1.42	2213
S4288			1.50	2.05	1.64	2910
S4289			0.80	1.75	1.04	661
S4290			1.00	1.90	1.23	1129
S4291			1.25	2.05	1.45	1852
S4292		12.2	1.50	2.25	1.67	2721
S4293			1.00	1.95	1.24	1267
S4294			1.25	2.10	1.46	2081
S4295			1.50	2.25	1.69	3075
S4296			0.80	1.80	1.05	801
S4297		14.2	1.00	1.80	1.20	1102
S4298			1.25	2.10	1.46	2238
S4299			1.50	2.15	1.66	2850
S4300		12.2	1.50	2.35	1.71	2686
S4301			0.80	1.85	1.06	687
S4302		32	1.25	2.15	1.48	1912
S4303			1.50	2.40	1.73	3228
S4304			1.75	2.45	1.92	3900
S4305		16.3	2.00	2.75	2.19	6170
S4306			1.00	2.25	1.31	1172
S4307			12.2	1.25	1.53	1814
S4308			1.50	2.50	1.75	2719
S4309		34	1.25	2.40	1.54	1988
S4310			1.50	2.55	1.76	2982
S4311			16.3	1.50	1.76	3153
S4312			2.00	2.85	2.21	5779
S4313		18.3	0.90	2.05	1.19	831
S4314			1.25	2.25	1.50	1700
S4315			2.00	2.80	2.20	5190
S4316			1.25	2.65	1.60	1779
S4317			14.2	1.50	1.81	2544
S4318		40	2.00	3.05	2.26	4766
S4319			16.3	1.50	1.83	2748
S4320			2.00	3.10	2.28	5166
S4321			18.3	2.00	2.29	5653
S4322			1.00	2.30	1.33	1016
S4323		20.4	1.50	2.65	1.79	2620
S4324			2.00	3.10	2.28	5698
S4325			2.25	3.15	2.48	6497
S4326			2.50	3.45	2.74	9384
S4327			1.25	2.85	1.65	1890
S4328		45	1.75	3.05	2.08	3644
S4329			2.50	3.50	2.75	7720
S4330			1.50	3.30	1.95	2602
S4331		50	2.00	3.50	2.38	4564
S4332			2.50	4.10	2.90	9300
S4333			3.00	4.40	3.35	13666
S4334			20.4	2.00	2.38	4685
S4335			2.50	3.85	2.84	7915
S4336		22.4	2.00	3.60	2.40	5219
S4337			2.50	3.90	2.85	8505
S4338			1.25	2.85	1.65	1550
S4339		25.4	2.00	3.40	2.35	4760
S4340			2.50	3.90	2.85	9058
S4341			3.00	4.10	3.28	11970
S4342	56	28.5	1.50	3.45	1.99	2620



**DISC SPRINGS – DIN 2093**

Part Number	Do (mm)	Di (mm)	t (mm)	Lo (mm)	L1 (N)	P1 (N)
S4343	56	28.5	2.00	3.60	2.40	4440
S4344			3.00	4.30	3.33	11382
S4345			2.00	4.10	2.52	4724
S4346		20.5	2.50	4.30	2.95	7293
S4347			3.00	4.70	3.42	11563
S4348	60	25.5	2.50	4.65	2.97	8159
S4349			3.00	4.65	3.41	11762
S4350			2.50	4.30	2.95	8337
S4351		30.5	3.00	4.70	3.42	13219
S4352			3.50	5.00	3.88	18143
S4353			1.80	4.15	2.39	4240
S4354	63	31.0	2.50	4.25	2.94	7180
S4355			3.00	4.80	3.45	12530
S4356			3.50	4.90	3.85	15000
S4357		25.5	2.00	4.50	2.63	4435
S4358		30.5	2.50	4.90	3.10	8026
S4359			3.00	5.10	3.52	11420
S4360	70	35.5	3.00	5.10	3.52	12281
S4361			4.00	5.80	4.45	23910
S4362		40.5	4.00	5.60	4.40	23338
S4363			5.00	6.20	5.30	33653
S4364			2.00	4.60	2.65	5140
S4365	71	36.0	2.50	4.50	3.00	6730
S4366			4.00	5.60	4.40	20500
S4367			2.50	5.30	3.20	7235
S4368		31.0	3.00	5.50	3.63	10346
S4369			4.00	6.10	4.52	19384
S4370		36.0	3.00	5.70	3.67	11912
S4371	80		4.00	6.20	4.55	21388
S4372			2.25	5.20	2.99	6610
S4373		41.0	3.00	5.30	3.58	10500
S4374			4.00	6.20	4.55	22861
S4375			5.00	6.70	5.42	33700
S4376			2.50	5.70	3.30	7680
S4377	90	46.0	3.50	6.00	4.13	14200
S4378			5.00	7.00	5.50	31400
S4379		41.0	4.00	7.20	4.80	20240
S4380			5.00	7.75	5.69	32344
S4381			2.70	6.20	3.58	8610
S4382	100		3.50	6.30	4.20	13100
S4383		51.0	4.00	7.00	4.75	20662
S4384			5.00	7.80	5.70	36319
S4385			6.00	8.20	6.55	48000
S4386			3.00	6.90	3.97	10483
S4387	112	57.0	4.00	7.20	4.87	17743
S4388			6.00	8.50	6.63	43683
S4389		41.0	4.00	8.20	5.05	17336
S4390			4.00	8.50	5.13	19806
S4391		51.0	5.00	8.90	5.97	30652
S4392			6.00	9.40	6.85	44283
S4393			5.00	9.00	6.00	33947
S4394	125	61.0	6.00	9.60	6.90	50694
S4395			7.50	10.90	8.72	93526
S4396			3.50	8.00	4.63	15407
S4397		64.0	5.00	8.50	5.88	29892
S4398			7.50	10.60	8.65	85879
S4399			6.00	9.30	6.88	51189
S4400		71.0	7.50	10.40	8.60	85447
S4401			9.30	11.80	10.45	124056
S4402			3.80	8.38	5.02	17186
S4403	140	72.0	5.00	9.00	6.00	27905
S4404			7.50	11.20	8.80	85204
S4405		61.0	5.00	10.30	6.88	31024
S4406			6.00	10.80	7.20	45481
S4407	150	71.0	6.00	10.80	7.20	48129
S4408			7.50	12.00	9.00	89802
S4409		81.0	7.50	11.70	8.92	89483
S4410			9.40	13.00	10.75	139051
S4411			4.30	9.90	5.70	21831
S4412	160	82.0	6.00	10.50	7.13	40985
S4413			9.40	13.50	10.88	138255

**DISC SPRINGS – DIN 2093**

Part Number	Do (mm)	Di (mm)	t (mm)	Lo (mm)	L1 (N)	P1 (N)
S4414	180	92.0	4.80	11.00	6.35	26468
S4415			6.00	11.10	7.27	37481
S4416			9.40	14.00	11.00	125349
S4417		82.0	7.60	14.20	9.55	77992
S4418			9.60	15.50	11.38	129374
S4419			11.50	16.60	13.15	182637
S4420		92.0	9.50	15.60	11.40	137612
S4421			11.40	16.80	13.20	199160
S4422			13.20	18.10	15.02	267081
S4423	200	102.0	6.00	12.50	7.25	36092
S4424			7.50	13.60	9.40	76336
S4425			9.50	15.60	11.40	145277
S4426		112.0	11.40	16.19	13.05	182920
S4427			13.10	18.20	15.05	289023
S4428			11.40	16.20	13.05	195723
S4429		127.0	13.10	17.50	14.88	256618
S4430			14.70	18.80	16.70	304934
S4431	225	102.0	6.20	13.60	8.27	44556
S4432			7.50	14.50	9.63	70710
S4433			11.30	17.00	13.25	170923
S4434		127.0	9.70	18.00	12.00	126318
S4435			11.30	19.00	13.75	182862
S4436			6.50	14.80	8.95	50438
S4437	250	127.0	9.40	17.00	11.75	118988
S4438			11.30	19.30	13.82	210691
S4439		127.0	13.10	19.60	15.40	248692
S4440			15.10	21.80	17.45	382807



**LOOKING FOR A SPECIAL FINISH FOR YOUR SPRINGS OR WASHERS?**

See page 127 for more details

**VOUS RECHERCHEZ UNE FINITION SPÉCIALE POUR VOS RESSORTS OU RONDELLES ?**

Voir page 127 pour plus de détails

**¿BUSCA UN ACABADO ESPECIAL PARA SUS ARANDELAS O MUELLES?**

Diríjase a la página 127 para obtener más información

**SUCHEN SIE EINE BESONDERE OBERFLÄCHE FÜR IHRE FEDERN UND UNTERLEGSCHEIBEN?**

Weitere Informationen hierzu finden Sie auf Seite 127

**STATE CERCANDO UNA FINITURA SPECIALE PER MOLLE O RONDELLE?**

Vedere a pagina 127 per ulteriori dettagli

**PROCURA UM ACABAMENTO ESPECIAL PARA AS SUAS MOLAS OU ANILHAS?**

Consulte a página 127 para obter mais detalhes

**United Kingdom**

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

**France**

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

**Spain**

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

**Germany**

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



**UK**

## DISC SPRING WASHERS - STAINLESS STEEL

Manufactured to Metric dimensions; these washers are designed for both dynamic and static application and are supplied without pre-setting.

Washers may be stacked in parallel or series to provide variation in load and deflection characteristics.

Optimal deflection should not exceed 75% of maximum.

**Material**

Outer Diameter of <35.5mm: 301 (1.4310), 302  
Outer Diameter of >35.5mm: 17-7ph (1.4568)

**Tolerances**

Operational load (P1) @ L1 = +/-20%

Dimensional data available on request  
Note: Overall height (L0) may change in order to compensate for material availability.

**KEY TO DIMENSIONS**

Do	= Outside Diameter
Di	= Free Length
t	= Thickness
Lo	= Free Height (ref only)
L1	= Loaded height
P1	= Load at deflection (N) (+/- 15%)

**F**

## RESSORTS DISQUE - ACIER INOXYDABLE

Ces rondelles aux dimensions métriques sont conçues pour des applications à la fois dynamiques et statiques et sont fournies sans préréglage.

Les rondelles peuvent être empilées en parallèle ou en série pour permettre une variation des caractéristiques de charge et de déflexion.

La déflexion optimale ne doit pas dépasser 75 % du maximum indiqué.

**Matériaux**

Diamètre extérieur < 35,5 mm : 301 (1.4310), 302  
Diamètre extérieur > 35,5 mm : 17-7ph (1.4568)

**Tolérances**

Charge opérationnelle (P1) @ L1 = +/- 20 %

Données dimensionnelles disponibles sur demande  
Remarque : La hauteur totale (L0) peut varier afin de compenser la disponibilité des matériaux.

**INDEX DES DIMENSIONS**

Do	= Diamètre Extérieur
Di	= Diamètre Intérieur
t	= Épaisseur
Lo	= Hauteur libre (pour réf.)
L1	= Hauteur en charge
P1	= Charge à L1 (N) (+/- 15 %)

**E**

## MUELLES DE PLATILLO - ACERO INOXIDABLE

Diseñadas para dimensiones métricas. Estas arandelas están diseñadas tanto para la aplicación dinámica como estática y se suministran sin prefijación.

Las arandelas pueden apilarse en paralelo o en serie para conseguir una variación en las características de carga y deflexión.

La deflexión óptima no debe exceder el 75 % del máximo.

**Material**

Diámetro externo <35,5 mm: 301(1.4310), 302  
Diámetro externo >35,5 mm: 17-7ph (1.4568)

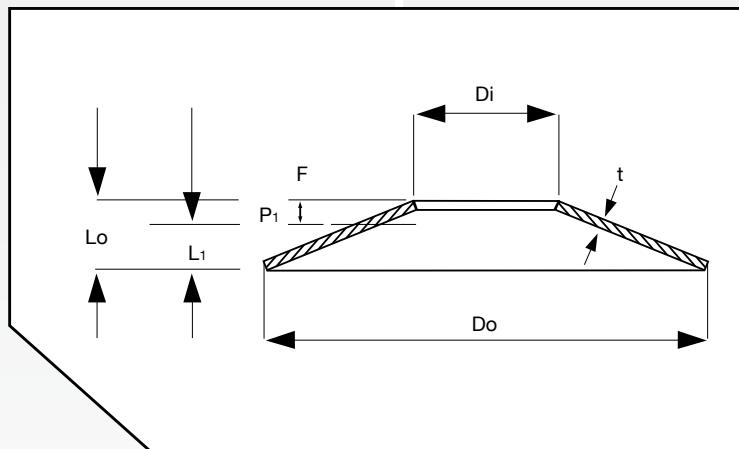
**Tolerancias**

Carga de servicio (P1) @ L1 = +/- 20 %

Datos de dimensiones disponibles previa solicitud  
Nota: La altura total (L0) puede variar para compensar la disponibilidad de materiales.

**CLAVES DE DIMENSIONES**

Do	= Diámetro externo
Di	= Diámetro interno
t	= Espesor
Lo	= Altura libre (solo ref.)
L1	= Altura cargada
P1	= Carga a deflexión (N) (+/- 15 %)



LOOKING FOR A SPECIAL FINISH FOR YOUR SPRINGS OR WASHERS?

See page 127 for more details

VOUS RECHERCHEZ UNE FINITION SPÉCIALE POUR VOS RESSORTS OU RONDELLES ?

Voir page 127 pour plus de détails

¿BUSCA UN ACABADO ESPECIAL PARA SUS ARANDELAS O MUELLES?

Diríjase a la página 127 para obtener más información

**United Kingdom**

**Tel:** (44) 1386 443366  
**E-mail:** sales@assocspring.co.uk

**France**

**Tel:** (33) 01 30 68 6363  
**E-mail:** info@ressortsspec.com

**Spain**

**Tel:** (34) 945 147542  
**E-mail:** ventas@bgespana.com

**Germany**

**Tel:** (49) 6251 93-3252-04  
**E-mail:** info@asraymond.de

## TELLERFEDERN AUS ROSTFREIEN STAHL

Diese Unterlegscheiben entsprechen metrischen Größen und sind sowohl für dynamische als auch für statische Anwendungen geeignet und werden ohne Voreinstellung geliefert.

Die Unterlegscheiben können parallel oder hintereinander gestapelt und so Last- und Defektionseigenschaften angepasst werden.

Die optimale Defektion sollte 75 % des Maximums nicht überschreiten.

### Material

Außendurchmesser von < 35,5mm: 301(1.4310), 302  
Außendurchmesser von > 35,5mm: 17-7ph (1.4568)

### Toleranzen

Betriebslast (P1) @ L1 = +/- 20 %

Abmessungsdaten auf Anfrage erhältlich  
Hinweis: Die Gesamthöhe (L0) variiert je nach Materialverfügbarkeit.

### ABKÜRZUNGEN – ABMESSUNGEN

Do = Drahtdurchmesser

Di = Freie Länge

t = Dicke

Lo = Freie Höhe (nur Referenz)

L1 = Höhe unter Last

P1 = Last bei Defektion (N) (+/- 15 %)

## RONDELLE PER MOLLE A DISCO - ACCIAIO INOSSIDABILE

Fabbricate in dimensioni metriche, queste rondelle sono progettate per applicazioni dinamiche e statiche e sono fornite senza pre-impostazione.

Le rondelle possono essere impilate in parallelo o in serie per fornire una variazione nel carico e nelle caratteristiche di deflessione.

La deflessione ottimale non deve superare il 75% del massimo.

### Materiale

Diametro esterno <35,5mm: 301 (1.4310), 302  
diametro esterno >35,5 mm: 17-7f (1.4568)

### Tolleranze

Carico di esercizio (P1) a L1 = +/- 20%

Dati dimensionali disponibili su richiesta

Nota: l'altezza complessiva (L0) può cambiare per compensare la disponibilità del materiale.

### LEGENDA DIMENSIONI

Do = Diametro del filo

Di = Lunghezza libera

t = Spessore

Lo = Altezza libera (solo per riferimento)

L1 = Altezza caricata

P1 = carico a deflessione (N) (+/- 15%)

## ANILHAS DE MOLA DE DISCO - AÇO INOXIDÁVEL

Fabricadas segundo as dimensões métricas, estas anilhas foram concebidas para aplicação dinâmica e estática e são fornecidas sem pré-configuração.

As anilhas podem ser empilhadas em paralelo ou em série para fornecer variação na carga e características de flexão.

A deflexão ideal não deve exceder 75% do máximo.

### Material

Diâmetro Externo de <35,5 mm: 301 (1.4310), 302  
Diâmetro Externo de >35,5 mm: 17-7ph (1.4568)

### Tolerâncias

Carga operacional (P1) @ L1 = +/- 20%

Dados dimensionais disponíveis mediante pedido

Nota: A altura global (L0) poderá mudar com vista a compensar a disponibilidade de material.

### LEGENDA DAS DIMENSÕES

Do = Diâmetro do Arame

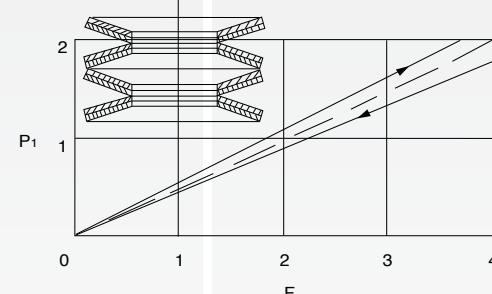
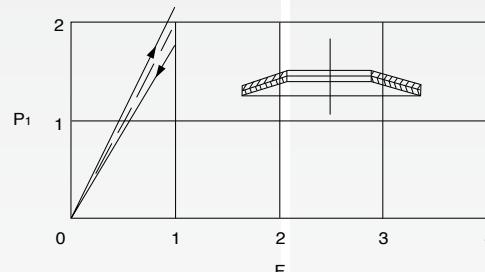
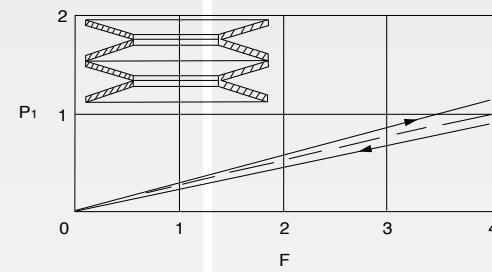
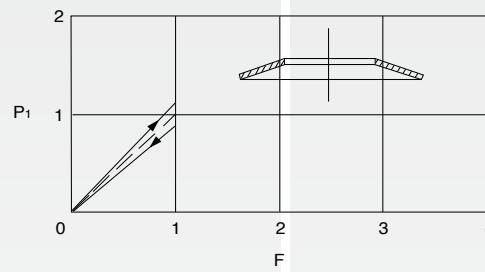
Di = Comprimento Livre

t = Espessura

Lo = Altura Livre (apenas ref.<sup>a</sup>)

L1 = Altura em carga

P1 = Carga em deflexão (N) (+/- 15%)



SUCHEN SIE IN BESTIMMTES FINISH FÜR IHRE FEDERN ODER UNTERLEGSCHIEBEN?

Weitere Informationen hierzu finden Sie auf Seite 127

STATE CERCANDO UNA FINITURA SPECIALE PER MOLLE O RONDELLE?

Vedere a pagina 127 per ulteriori dettagli

PROCURA UM ACABAMENTO ESPECIAL PARA AS SUAS MOLAS OU ANILHAS?

Consulte a página 127 para obter mais detalhes

### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



**DISC SPRINGS – STAINLESS STEEL / INOX**

Part Number	Material	Do (mm)	Di (mm)	t (mm)	Lo (mm)	L1 (N)	P1 (N)
S4201S	301 SS	6		0.3	0.45	0.34	139
S4203S	17/7 SS		3.2	0.2	0.40	0.25	121
S4204S	17/7 SS			0.3	0.55	0.36	221
S4206S	17/7 SS	8		0.4	0.60	0.45	44
S4207S	17/7 SS		4.2	0.3	0.55	0.36	137
S4208S	17/7 SS			0.4	0.60	0.45	249
S4215S	301 SS			0.25	0.55	0.33	65
S4216S	17/7 SS	10	5.2	0.4	0.70	0.48	239
S4217S	17/7 SS			0.5	0.75	0.56	388
S4222S	17/7 SS	12		0.6	0.95	0.69	653
S4223S	17/7 SS			0.5	0.85	0.59	414
S4226S	17/7 SS		6.2	0.35	0.80	0.46	171
S4227S	17/7 SS	13		0.5	0.85	0.59	414
S4228S	17/7 SS			0.7	1.00	0.78	692
S4229S	301 SS			0.35	0.80	0.46	138
S4230S	17/7 SS	14	7.2	0.5	0.90	0.6	292
S4231S	17/7 SS			0.8	1.10	0.87	874
S4232S	17/7 SS			0.4	0.95	0.54	185
S4233S	17/7 SS		5.2	0.5	1.00	0.63	293
S4235S	17/7 SS			0.7	1.10	0.8	601
S4236S	17/7 SS	15	6.2	0.5	1.00	0.63	303
S4238S	301 SS			0.7	1.10	0.8	623
S4240S	17/7 SS			0.7	1.10	0.8	718
S4241S	17/7 SS			0.8	1.20	0.9	1070
S4242S	17/7 SS			0.4	0.90	0.53	160
S4243S	17/7 SS		7.2	0.6	1.05	0.71	439
S4244S	17/7 SS	16		0.7	1.15	0.81	694
S4245S	17/7 SS			0.8	1.20	0.9	894
S4246S	17/7 SS			0.9	1.25	0.99	1020
S4249S	17/7 SS			0.6	1.20	0.75	431
S4250S	17/7 SS		5.2	0.7	1.25	0.84	598
S4251S	17/7 SS			0.8	1.30	0.92	800
S4252S	17/7 SS	18	8.2	0.5	1.10	0.65	280
S4254S	17/7 SS			0.8	1.30	0.92	860
S4256S	17/7 SS			0.45	1.05	0.6	239
S4257S	17/7 SS		9.2	0.7	1.20	0.83	604
S4258S	17/7 SS			1	1.40	1.1	1297
S4259S	17/7 SS			0.6	1.30	0.77	445
S4262S	17/7 SS		8.2	0.9	1.45	1.04	978
S4263S	17/7 SS			1	1.55	1.14	1350
S4264S	17/7 SS			0.5	1.15	0.66	269
S4265S	17/7 SS	20		0.8	1.35	0.94	809
S4266S	17/7 SS			0.9	1.45	1.04	1105
S4267S	17/7 SS		10.2	1	1.55	1.14	1487
S4268S	17/7 SS			1.1	1.55	1.21	1606
S4269S	17/7 SS			1.25	1.75	1.38	2639
S4270S	17/7 SS			1.5	1.80	1.58	2708
S4271S	17/7 SS			0.6	1.40	0.8	430
S4272S	17/7 SS		11.2	0.8	1.45	0.96	726
S4273S	17/7 SS			1.25	1.75	1.38	1911
S4274S	17/7 SS		8.2	0.7	1.50	0.9	591
S4275S	17/7 SS	23		0.8	1.55	0.99	782
S4279S	17/7 SS		10.2	1	1.70	1.17	1387
S4280S	17/7 SS			1.25	1.90	1.41	2490
S4281S	17/7 SS		12.2	1.25	1.85	1.4	2494
S4282S	17/7 SS			1.5	2.00	1.63	3569
S4284S	17/7 SS			0.7	1.60	0.92	652
S4285S	17/7 SS			0.9	1.60	1.07	891
S4286S	17/7 SS	25	12.2	1	1.80	1.2	1358
S4287S	17/7 SS			1.25	1.95	1.42	2389
S4288S	17/7 SS			1.5	2.05	1.64	3179
S4289S	17/7 SS			0.8	1.75	1.04	722
S4290S	17/7 SS		10.2	1	1.90	1.23	1187
S4291S	17/7 SS			1.25	2.05	1.45	1991
S4293S	17/7 SS			1	1.95	1.24	1337
S4294S	17/7 SS	28	12.2	1.25	2.10	1.46	2245
S4295S	17/7 SS			1.5	2.25	1.69	3364
S4296S	17/7 SS			0.8	1.80	1.05	877
S4297S	17/7 SS		14.2	1	1.80	1.2	1159
S4298S	17/7 SS			1.25	2.10	1.46	2417
S4299S	17/7 SS			1.5	2.15	1.66	3119

**DISC SPRINGS – STAINLESS STEEL / INOX**

Part Number	Material	Do (mm)	Di (mm)	t (mm)	Lo (mm)	L1 (N)	P1 (N)
S4300S	17/7 SS	32	12.2	1.5	2.35	1.71	2931
S4301S	17/7 SS		0.8	1.85	1.06	744	
S4302S	17/7 SS		1.25	2.15	1.48	2024	
S4303S	17/7 SS		16.3	1.5	2.40	1.73	3497
S4304S	17/7 SS		1.75	2.45	1.92	4315	
S4305S	17/7 SS		2	2.75	2.19	6620	
S4306S	17/7 SS	34	12.2	1	2.25	1.31	1237
S4309S	17/7 SS		14.3	1.25	2.40	1.54	2120
S4310S	17/7 SS		1.5	2.55	1.76	3140	
S4311S	17/7 SS		16.3	1.5	2.55	1.76	3312
S4312S	17/7 SS	36	2	2.85	2.21	6228	
S4313S	17/7 SS		0.9	2.05	1.19	857	
S4314S	17/7 SS		18.3	1.25	2.25	1.5	1789
S4315S	17/7 SS		2	2.80	2.2	5513	
S4317S	17/7 SS		14.2	1.5	2.75	1.81	2697
S4318S	17/7 SS	40	2	3.05	2.26	5182	
S4319S	17/7 SS		16.3	1.5	2.80	1.83	2904
S4320S	17/7 SS		2	3.10	2.28	5408	
S4321S	17/7 SS		18.3	2	3.15	2.29	6187
S4322S	17/7 SS	45	1	2.30	1.33	1070	
S4323S	17/7 SS		1.5	2.65	1.79	2752	
S4324S	17/7 SS		20.4	2	3.10	2.28	6154
S4325S	17/7 SS		2.25	3.15	2.48	7053	
S4326S	17/7 SS		2.5	3.45	2.74	11257	
S4327S	17/7 SS		1.25	2.85	1.65	1970	
S4328S	17/7 SS		22.4	1.75	3.05	2.08	3861
S4329S	17/7 SS	50	2.5	3.50	2.75	8231	
S4330S	17/7 SS		1.5	3.30	1.95	2750	
S4331S	17/7 SS		18.3	2	3.50	2.38	4892
S4332S	17/7 SS		2.5	4.10	2.9	9800	
S4333S	17/7 SS		3.18	4.40	3.47	15241	
S4334S	17/7 SS		20.4	2	3.50	2.38	5008
S4335S	17/7 SS		2.5	3.85	2.84	8433	
S4336S	17/7 SS		22.4	2	3.60	2.4	5609
S4337S	17/7 SS		2.5	3.90	2.85	9089	
S4338S	17/7 SS		1.25	2.85	1.65	1597	
S4339S	17/7 SS	56	25.4	2	3.40	2.35	5083
S4340S	17/7 SS		2.5	3.90	2.85	9683	
S4341S	17/7 SS		3.18	4.10	3.4	12672	
S4342S	17/7 SS		1.5	3.45	1.99	2888	
S4343S	17/7 SS		28.5	2	3.60	2.4	4765
S4344S	17/7 SS		3.18	4.30	3.45	12468	
S4346S	17/7 SS		20.5	2.50	4.30	2.95	7675
S4347S	17/7 SS	60	3.18	4.70	3.55	13147	
S4348S	17/7 SS		25.5	2.50	4.65	2.97	8631
S4349S	17/7 SS		3.18	4.65	3.53	13327	
S4350S	17/7 SS		2.50	4.30	2.95	8744	
S4351S	17/7 SS		30.5	3.18	4.70	3.54	15046
S4352S	17/7 SS		3.5	5.00	3.88	19656	
S4354S	17/7 SS		2.5	4.25	2.94	7462	
S4355S	17/7 SS	63	31.0	3.18	4.80	3.57	14261
S4356S	17/7 SS		3.50	4.90	3.85	16164	
S4357S	17/7 SS		25.5	2.00	4.50	2.63	4681
S4358S	17/7 SS		30.5	2.50	4.90	3.10	8414
S4360S	17/7 SS		35.5	3.18	5.10	3.64	14072
S4361S	17/7 SS		4.00	5.80	4.45	26537	
S4362S	17/7 SS		40.5	4.00	5.60	4.40	25069
S4363S	17/7 SS	71	4.83	6.20	5.15	38132	
S4364S	17/7 SS		2.00	4.60	2.65	5427	
S4365S	17/7 SS		36.0	2.50	4.50	3.00	6966
S4366S	17/7 SS		4.00	5.60	4.40	21983	
S4369S	17/7 SS		31.0	4.00	6.10	4.52	24145
S4371S	17/7 SS		36.0	4.00	6.20	4.55	24145
S4372S	17/7 SS		2.25	5.20	2.99	7043	
S4373S	17/7 SS	80	41.0	3.18	5.30	3.69	12044
S4374S	17/7 SS		4.00	6.20	4.55	25365	
S4375S	17/7 SS		4.83	6.70	5.28	36511	
S4376S	17/7 SS		2.50	5.70	3.30	8006	
S4377S	17/7 SS		46.0	3.50	6.00	4.13	14968
S4378S	17/7 SS	90	4.83	7.00	5.35	33611	
S4382S	17/7 SS		51.0	3.50	6.30	4.20	13802



**DISC SPRINGS – STAINLESS STEEL / INOX**

Part Number	Material	Do (mm)	Di (mm)	t (mm)	Lo (mm)	L1 (N)	P1 (N)
S4383S	17/7 SS			4.83	7.00	4.78	22620
S4384S	17/7 SS	100	51.0	4.83	7.80	5.54	37840
S4385S	17/7 SS			6.00	8.20	6.55	51503
S4386S	17/7 SS			3.00	6.90	3.97	12220
S4387S	17/7 SS	112	57.0	4.06	7.20	4.83	19303
S4388S	17/7 SS			6.00	8.50	6.63	46566
S4391S	17/7 SS		51.0	5.00	8.90	5.97	32580
S4394S	17/7 SS	125	61.0	6.00	9.60	6.90	54096
S4395S	17/7 SS			7.50	10.90	8.72	90366
S4400S	17/7 SS		71.0	7.50	10.40	8.60	74807
S4411S	17/7 SS	160	82.0	4.30	9.90	5.70	22931



# CUSTOM-ENGINEERED PARTS AND SPECIAL ORDERS

If you are looking for a special spring, spring washer, assembly or engineered component and cannot find it in this catalogue, let us know, and we will design it for you, to your specifications. Our unique technical capabilities and resources allow us to provide custom-engineered parts and components to a multitude of industries and applications, ranging from aerospace to medical devices to food service.

Your Special Order is very important to us: when you deal with Associated Spring Raymond, you can be certain that we will assist you with high quality custom engineered parts, from design right into production – at the right price and to your delivery requirements. Give us a call and let our Expertise work for you.

Below is a snapshot of our various capabilities:

## **Compression Springs**

- Resists applied push forces
- Cylindrical, Conical, and Barrel shaped
- Outside Diameter: .004" to 3"
- Typical applications include transpiration and medical equipment

## **Extension Springs**

- Resists applied pull forces
- Various end types available
- Outside Diameter: .004" to .625"
- Typical applications include dental furniture, attic door hatches, and playground equipment

## **Torsion Springs**

- Resists applied torque
- Single or double wound
- Open or closed wound
- Various end types available
- Outside Diameter: .005" to .625"
- Typical applications include truck doors, ATM machines and printers

## **Die Springs**

- Resists applied compression forces
- Hole diameter: .375" to 4"
- Wire shapes: D, Square, Round, Rectangular
- Typical applications include stamping and molding dies

## **Constant Force Springs**

- Used as counterbalance
- Inside diameter mounted on drum – self-contained outer diameter
- Typical applications include window shades and display racks

## **Power Springs**

- Resists applied torque
- Contained by arbor and case
- Coils contact each other
- Typical applications include motors and retractor mechanisms

## **Spiral Torsion Springs**

- Resists applied torque
- Self contained
- Coils do not contact each other
- Typical applications include motors and timing mechanisms

## **Garter Springs**

- Garter springs are extension spring with ends connected
- Exerts Radial Forces
- Outside coil diameter: .039" to .250"
- Outside Diameter: .006" to .034"
- Primary application is oil seals

## **Belleville Washers**

- High forces in small deflections
- Also known as conical or disc washers
- OD up to 24"
- Linear and non-linear force/deflection curves
- Made to fit specified rod and/or hole fit
- Assembled in parallel or series to modify force and deflection
- Typical applications include stamping dies and clutches

## **Curved Washers**

- Exert light thrust loads
- Made to fit specified rod and/or hole fit
- Often used to absorb axial end play

## **Wave Washers**

- Exert moderate thrust loads
- Made to fit specified rod and/or hole fit
- Often used for bearing preload

## **Wire Forms**

- Non-traditional force applications
- Outside Diameter: .004" to .625"
- Typical applications include nozzles and clamps

## **Stampings**

- Per customer specification
- Material thickness: .010" to .375"

## **Materials:**

- Carbon steels: Music wire, hard drawn, oil tempered
- Pre plated music wire: Tin and Zinc
- Alloy steels: Chrome silicon – commercial and valve quality
- Stainless Steels: 302, 316, 17-7
- Exotic: Inconel® 600, 718, and X750, Hastelloy®, Beryllium Copper, titanium, etc.
- Round, rectangular, and square wire available

## **Special Processing (see more information on page 127):**

- Passivation
- Zinc, cadmium, nickel, tin plating and black oxide
- Dacromet®, Dacroseal, Geomet®, Dip and Spin.
- Enamel, epoxy and temperature-indicator paint
- Shot peening
- Liquid penetrant and magnetic particle inspection
- Special packaging available (including tacky board)
- Mechanical Zinc Plate\*

\* Standard finish for high carbon steel is plain finish. Stainless steel is supplied in plain finish. On special order, high carbon steel washers may be mechanically plated, a process which substantially reduces the possibility of hydrogen embrittlement. Recommendations for specific applications will be made on request. See page 127 for alternative finishes.



## CONICAL SPRING WASHERS - DIN 6796

DIN6796 disc springs are designed as heavy duty bolting spring washers. They are aligned with metric fasteners and ideal for bolt connections, where fasteners risk coming loose due to thermal expansion/contraction or vibration.

Associated Spring RAYMOND offers parts in a variety of material and finish options as standard parts. While based on the DIN6796 specification, disc springs from Associated Spring RAYMOND are manufactured according to our processes and quality control, producing superior solutions.

### Material

Stainless steel Type 302 to AMS-5906 or UNS30200 (chemistry only)

Stainless Steel Type 316 to AMS 5524 or UNS31600 (chemistry only)

Carbon steel to C1060/C1075

Additional performance requirements to be reviewed with Associated Spring Raymond Engineering prior to use.

### Finish

Black Phosphate on standard parts to ASTM-A684

Mechanical Zinc Chromate to ASTM B695 Type II

Class 8

### KEY TO DIMENSIONS

Do = Outside Diameter

t = Thickness

Lo = Free Height

Di = Inside Diameter

BNM\* = Carbon Steel

BNM\*S = Stainless Steel 302

BNM\*X = Stainless Steel 316

BNM\*Z = Mechanical Zinc Chromate

## RONDELLES RESSORTS CONIQUES - DIN 6796

Les ressorts disques DIN6796 sont conçus comme des rondelles-ressorts pour boulonnage à fort serrage. Ils sont prévus pour des filetages métriques et sont parfaits pour les applications où les attaches risquent de se desserrer en raison de la dilatation/ contraction thermique ou des vibrations.

Associated Spring RAYMOND offre des pièces standard dans une variété de matériaux et de finition. Bien que basés sur la spécification DIN6796, les ressorts disque d'Associated Spring RAYMOND sont fabriqués selon nos processus de contrôle de la qualité, produisant ainsi des solutions de qualité supérieure.

### Matériaux

Acier inoxydable Type 302 selon AMS-5906 ou UNS30200 (chimie uniquement)

Acier inoxydable Type 316 selon AMS5524 ou UNS31600 (chimie uniquement)

Acier au carbone selon C1060/C1075

Exigences de performances supplémentaires à étudier avec Associated Spring Raymond Engineering avant toute utilisation.

### Finition

Phosphate noir sur pièces standard selon ASTM-A684 chromate de zinc mécanique selon ASTM B695 Type II Classe 8

### INDEX DES DIMENSIONS

Do = Diamètre extérieur

t = Épaisseur

Lo = Hauteur libre

Di = Diamètre intérieur

BNM\* = Acier au carbone

BNM\*S = Acier inoxydable 302

BNM\*X = Acier inoxydable 316

BNM\*Z = Chromate de zinc mécanique

## ARANDELAS ELÁSTICAS DE COMPRESIÓN CÓNICA - DIN 6796

Las arandelas elásticas de disco DIN 6796 han sido diseñadas como arandelas elásticas de fijación con tornillos. Se alinean con elementos de sujeción métricos y son perfectos para uniones atornilladas, donde los elementos de sujeción se aflojan debido a la expansión/contracción térmica o la vibración.

Associated Spring RAYMOND ofrece piezas con una gran variedad de materiales y acabados como piezas normalizadas. Tomando como base la especificación DIN6796, las arandelas elásticas de disco de Associated Spring RAYMOND se fabrican de acuerdo con nuestros procesos y control de calidad, fabricando así soluciones superiores.

### Material

Acer inoxidable: tipo 302 según AMS-5906 o UNS30200 (solo química)

Acer inoxidable: tipo 316 según AMS5524 o UNS31600 (solo química)

Acer al carbono según C1060/C1075

Los requisitos de rendimiento adicionales serán revisados por Associated Spring Raymond Engineering antes de su uso.

### Acabado

Fosfato negro en piezas normalizadas según ASTM-684. Cromado de zinc mecánico según ASTM B695 tipo II Clase 8

### CLAVES DE DIMENSIONES

Do = Diámetro externo

t = Espesor

Lo = Altura libre

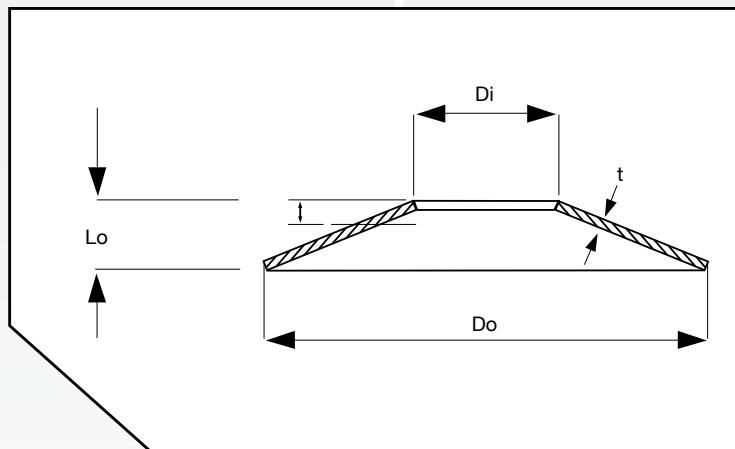
Di = Diámetro interno

BNM\* = Acer al carbón

BNM\*S = Acer inoxidable 302

BNM\*X = Acer inoxidable 316

BNM\*Z = Cromato de zinc mecánico



## SPANNSCHEIBEN NACH DIN 6796

Tellerfeder, die DIN 6796 entsprechen, können als Schwerlast-Bolzenfegerscheiben verwendet werden. Diese Federn sind auf metrische Befestigungselemente ausgerichtet und hervorragend für Bolzenverbindungen geeignet, bei denen sich die Befestigungselemente aufgrund von temperaturbedingter Materialausdehnung/-kontraktion oder Vibration lösen können.

Associated Spring RAYMOND bietet Ersatzteile aus verschiedenen Materialien und mit unterschiedlichen Lackierungsoptionen als Standard-Ersatzteile an. Die Tellerfedern von Associated Spring RAYMOND entsprechen DIN 6796 und wurden gemäß unseren Prozessen und unserer Qualitätskontrolle hergestellt, um eine überlegene Lösung zu bieten.

### Material

Edelstahl Typ 302 gemäß AMS-5906 oder UNS30200 (nur Chemie)  
Edelstahl Typ 316 gemäß AMS5524 oder UNS31600 (nur Chemie)  
Kohlenstoffstahl gemäß C1060/C1075

Weitere Leistungsanforderungen sind vor der Verwendung mit Associated Spring Raymond Engineering zu besprechen.

### Finish

Schwarzes Phosphat auf Standard-Ersatzteilen gemäß ASTM-A684 Mechanisches Zink-Chromat gemäß ASTM B695 Typ II Klasse 8

### ABKÜRZUNGEN – ABMESSUNGEN

Do = Außendurchmesser  
t = Dicke  
Lo = Freie Höhe  
Di = Innendurchmesser  
BNM\* = Kohlenstoffstahl  
BNM\*S = Edelstahl 302  
BNM\*X = Edelstahl 316  
BNM\*Z = Mechanisches Zink-Chromat

## RONDELLE PER MOLLE CONICHE - DIN 6796

Le molle a disco DIN6796 sono progettate come rondelle per molle per bullonatura per impieghi pesanti. Sono allineate con i dispositivi di fissaggio metrici e sono ideali per il fissaggio con bulloni, dove i dispositivi di fissaggio rischiano di allentarsi a causa di dilatazione/contrazione o vibrazione.

Associated Spring RAYMOND offre componenti in una varietà di materiali e opzioni di finitura come componenti standard. Sebbene basate sulla specifica della norma DIN6796, le molle a disco di Associated Spring RAYMOND sono fabbricate secondo i processi e il controllo di qualità interni, ottenendo di soluzioni di qualità superiore.

### Materiale

Acciaio inox tipo da 302 ad AMS-5906 o UNS30200 (solo per chimica)  
Acciaio inox tipo da 316 ad AMS-5906 o UNS31600 (solo per chimica)  
Acciaio al carbonio secondo C1060/C1075

Ulteriori requisiti di prestazioni da riesaminare con il servizio tecnico di Associated Spring Raymond Engineering prima dell'uso.

### Finitura

Fosfato nero su componenti standard secondo ASTM A684, zinco cromato meccanico secondo ASTM B695 Tipo II Classe 8

### LEGENDA DIMENSIONI

Do = Diametro esterno  
t = Spessore  
Lo = Altezza libera  
Di = Diametro interno  
BNM\* = Acciaio al carbonio  
BNM\*S = Acciaio inossidabile 302  
BNM\*X = Acciaio inossidabile 316  
BNM\*Z = Zinco cromato meccanico

## ANILHAS DE MOLA CÓNICAS - DIN 6796

As molas de disco DIN6796 foram concebidas como anilhas de mola de travamento do parafuso para carga intensiva. Estão alinhadas com elementos de fixação métrica e são ideais para ligações com parafusos, em que os elementos de fixação podem correr o risco de ficarem soltos devido a expansão/contracção térmica ou vibração.

A Associated Spring RAYMOND oferece peças numa variedade de opções de materiais e acabamentos como peças standard. Embora baseando-se na especificação DIN6796, as molas de disco da Associated Spring RAYMOND são fabricadas segundo os nossos processos e controlo da qualidade, produzindo soluções superiores.

### Material

Aço inoxidável do tipo 302 segundo a AMS-5906 ou a UNS30200 (apenas química)  
Aço inoxidável do tipo 316 segundo a AMS5524 ou a UNS31600 (apenas química)  
Aço carbono C1060/C1075

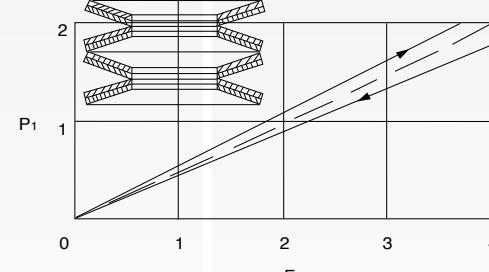
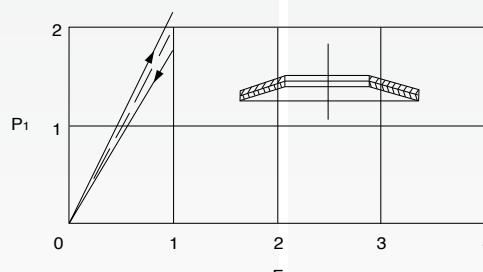
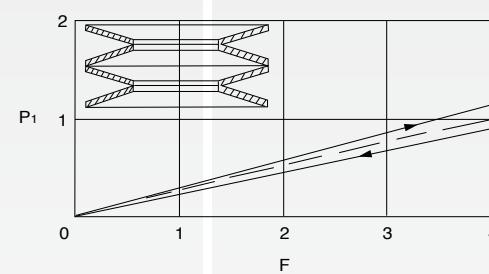
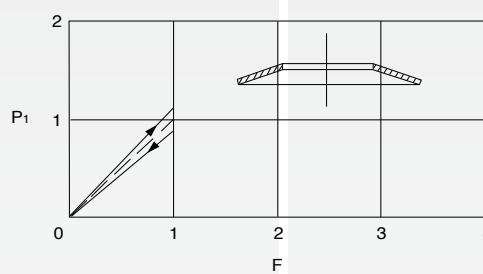
Os requisitos de desempenho adicional devem ser analisados com a equipa de engenharia da Associated Spring Raymond antes da utilização.

### Acabamento

Fosfato preto em peças standard segundo a ASTM-A684 Cromato de Zinco Mecânico segundo a ASTM B695 Tipo II Classe 8

### LEGENDA DAS DIMENSÕES

Do = Diâmetro Externo  
t = Espessura  
Lo = Altura Livre  
Di = Diâmetro Interno  
BNM\* = Aço Carbono  
BNM\*S = Aço Inoxidável 302  
BNM\*X = Aço Inoxidável 316  
BNM\*Z = Cromato de Zinco Mecânico



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



## DISC SPRINGS – DIN 6796

Part Number	Do (mm)	t (mm)	Lo (mm)	Di
BNM2	5	0.4	0.60	M2
BNM3	7	0.6	0.85	M3
BNM4	9	1.0	1.30	M4
BNM5	11	1.2	1.55	M5
BNM6	14	1.5	2.00	M6
BNM8	18	2.0	2.60	M8
BNM10	23	2.5	3.20	M10
BNM12	29	3.0	3.95	M12
BNM14	35	3.5	4.65	M14
BNM16	39	4.0	5.25	M16
BNM18	42	4.5	5.80	M18
BNM20	45	5.0	6.40	M20
BNM22	49	5.5	7.05	M22
BNM24	56	6.0	7.75	M24
BNM2S	5	0.4	0.60	M2
BNM3S	7	0.6	0.85	M3
BNM4S	9	1.0	1.30	M4
BNM5S	11	1.2	1.55	M5
BNM6S	14	1.5	2.00	M6
BNM8S	18	2.0	2.60	M8
BNM10S	23	2.5	3.20	M10
BNM12S	29	3.0	3.95	M12
BNM14S	35	3.5	4.65	M14
BNM16S	39	4.0	5.25	M16
BNM18S	42	4.5	5.80	M18
BNM20S	45	5.0	6.40	M20
BNM22S	49	5.5	7.05	M22
BNM24S	56	6.0	7.75	M24
BNM2X	5	0.4	0.60	M2
BNM3X	7	0.6	0.85	M3
BNM4X	9	1.0	1.30	M4
BNM5X	11	1.2	1.55	M5
BNM6X	14	1.5	2.00	M6
BNM8X	18	2.0	2.60	M8
BNM10X	23	2.5	3.20	M10
BNM12X	29	3.0	3.95	M12
BNM14X	35	3.5	4.65	M14
BNM16X	39	4.0	5.25	M16
BNM18X	42	4.5	5.80	M18
BNM20X	45	5.0	6.40	M20
BNM22X	49	5.5	7.05	M22
BNM24X	56	6.0	7.75	M24
BNM2Z	5	0.4	0.60	M2
BNM3Z	7	0.6	0.85	M3
BNM4Z	9	1.0	1.30	M4
BNM5Z	11	1.2	1.55	M5
BNM6Z	14	1.5	2.00	M6
BNM8Z	18	2.0	2.60	M8
BNM10Z	23	2.5	3.20	M10
BNM12Z	29	3.0	3.95	M12
BNM14Z	35	3.5	4.65	M14
BNM16Z	39	4.0	5.25	M16
BNM18Z	42	4.5	5.80	M18
BNM20Z	45	5.0	6.40	M20
BNM22Z	49	5.5	7.05	M22
BNM24Z	56	6.0	7.75	M24



Associated Spring Raymond - SPEC has the largest line of high-quality, precision-engineered stock springs and washers on the market today. They are all immediately available per the specifications indicated in these catalog pages. But our commitment to you does not stop here. We recognize that your application might include a special plating or even a secondary color coating – all available from Associated Spring Raymond SPEC as well. We offer a variety of specific processes and treatments, that we have summarized in the following tables.

Finish	Sub-Finish	Code	Notes
Electrodeposited Zinc	As Plated	01	Not recommended for: Heavy Duty Compression Springs, Belleville Spring Washers, Metric Disc Springs, Curved Spring Washers, Larger Wave Spring Washers (W3118-035 & up), MultiWave Washers, and Finger Washers
	w/ Clear Chromate	02	
	w/ Yellow Chromate	03	
Electrodeposited Cad	As Plated	04	Not recommended for: Heavy Duty Compression Springs, Belleville Spring Washers, Metric Disc Springs, Curved Spring Washers, Larger Wave Spring Washers (W3118-035 & up), MultiWave Washers, and Finger Washers
	w/ Clear Chromate	05	
	w/ Yellow Chromate	06	
Electrodeposited Nickel	As Plated	07	
Electroless Nickel	As Plated	08	
Electrodeposited Tin	As Plated	09	
Electrodeposited Zinc-Nickel	w/ Clear Chromate	10	Not recommended for: MultiWave Washers or Finger Washers
	w/ Yellow Chromate	11	
Mechanical Zinc	As Plated	12	
	w/ Clear Chromate	13	
	w/ Yellow Chromate	14	
Mechanical Tin	As Plated	15	Not recommended for: MultiWave Washers or Finger Washers
	w/ Yellow Chromate	16	
Mechanical Zinc-Nickel	As Plated	17	
Vacuum Cad	As Plated	18	
	w/ Yellow Chromate	19	
Zinc Phosphate and Oil	As Plated	20	Not recommended for: Belleville Spring Washers, Metric Disc Springs, Curved Spring Washers, and Stainless MultiWave Washers
Black Oxide and Oil	As Plated	21	
Dacromet 320°	As Plated	22	Not recommended for: MultiWave Washers
Passivation		23	Not recommended for: Steel Parts (of all types), and MultiWave Washers
Dacromet 320° with Plus Coating		25	Not recommended for: Continuous length extension springs, Fasteners, MultiWave Washers
Thermadep® Paint		26	Not recommended for: Continuous length extension springs, Fasteners
Painted Finish for Color Coating		27	
Electrodeposited Cadmium Plate	(QQ-P-416)	28	Not recommended for: Heavy Duty Compression Springs, Belleville Spring Washers, Metric Disc Springs, Curved Spring Washers, Larger Wave Spring Washers (W3118-035 & up), MultiWave Washers, and Finger Washers
	With Yellow Chromate, supplementary Coating (QQ-P-416)	29	
Tacky Board		30	Not recommended for: Heavy Duty Compression Springs, Continuous Springs, and Fasteners
RoHs Electrodeposited Zinc Plate	As Plated	31	Not recommended for: Heavy Duty Compression Springs, Belleville Spring Washers, Metric Disc Springs, Curved Spring Washers, Larger Wave Spring Washers (W3118-035 & up), MultiWave Washers, and Finger Washers
	With Clear Chromate Supplementary Coating	32	
	With Yellow Chromate Supplementary Coating	33	
RoHs Electrodeposited Nickel	As Plated	34	
RoHs Passivation		35	Not recommended for: Steel Parts (of all types)
Dip and Spin Painting		36	
Passivation	ASTM A967-Citicric	37	Not recommended for: Steel Parts (of all types)
RoHs Mechanical Zinc Plate	With Yellow Chromate Supplementary Coating	38	Not recommended for: Heavy Duty Compression Springs, MultiWave Washers, and Finger Washers
Geomet® Coating		39	Not recommended for: MultiWave Washers
RoHs Mechanical Zinc Plate	With Clear Chromate Supplementary Coating	40	Not recommended for: Heavy Duty Compression Springs, MultiWave Washers, and Finger Washers
Temperature Indicating Coating		41	Not recommended for: MultiWave Washers, and Retaining Rings
High Performance Teflon Coating		42	Not recommended for: Fasteners



## HIGH LOAD DISC WASHERS

### Stock sizes in carbon steel

SPEC high load disc washers provide loads which are substantially greater than our standard washers of similar diameters. These washers have not had their set removed during manufacturing since most applications are static applications. Set generally is removed during installation which results in a reduction of the free height.

### Material

Carbon spring steel C1070-C1075 or chrome vanadium based on availability at time of manufacture.

Certificate of chemical analysis available at extra cost.

Parts made from 17-7 are available as a special order.



### Loads

Maximum load is achieved at flat. Loads are calculated values.

### Stacked disc washers

Additional load or deflection can be obtained by the stacking of discs in series or parallel. See the standard line of disc spring washers for information on stacking of disc washers.

### KEY TO MEASUREMENTS

Dr = Free fit Bolt or Rod diameter

Di = Inside diameter (Min)

Do = Outside diameter (Max)

t = Thickness

Lo = Approx Free Height

L<sub>1</sub> = Loaded Height

Pf = Cal Load flat. Newton

F<sub>1</sub> = Deflection = Lo-L<sub>1</sub>

## RESSORTS DISQUE A CHARGE ELEVEE

### Dimensions standard en acier inoxydable

Les rondelles à disque à charge élevée SPEC assurent des charges considérablement plus élevées que nos rondelles standard de même diamètre. La déformation de ces rondelles n'a pas été éliminée lors de la fabrication car la plupart des applications sont statiques. La déformation est généralement éliminée durant l'installation, ce qui entraîne une réduction de la hauteur libre.

### Matériaux

Aacier pour ressorts au carbone C1070-C1075 ou chrome-vanadium selon la disponibilité au moment de la fabrication.

Certificat d'analyse chimique disponible contre supplément.

Les pièces fabriquées à partir de 17-7 sont disponibles sur commande spéciale.

### Charges

La charge maximale est obtenue à plat. Les charges sont des valeurs calculées.

### Ressorts disque empilé

Une charge ou une flexion supplémentaire peut être obtenue en empilant les disques en série ou en parallèle. Se reporter à la ligne standard de ressorts disque pour toute information concernant l'empilage.

### INDEX DES MESURES

Dr = Diamètre d'axe ou de filetage recommandé

Do = Diamètre extérieur (Min)

Di = Diamètre intérieur (Max)

t = Epaisseur

Lo = Hauteur libre approximative

L<sub>1</sub> = Huteur en charge

Pf = Charge à plat

F<sub>1</sub> = Déflexion = Lo-L<sub>1</sub>

## ARANDELAS DE DISCO DE ALTA FUERZA

### Medidas de stock en acero al carbono

Las arandelas de disco de alta fuerza suministran fuerzas que son sustancialmente mayores que las suministradas por nuestras arandelas estándar con diámetros similares. A estas arandelas no se les han eliminado las deformaciones durante la fabricación ya que muchas de sus aplicaciones son en estático. La deformación generalmente se elimina durante el proceso de instalación lo que provoca una reducción de la altura libre.

### Material

Acer al carbón de muelle C1070-C1075 ó cromo vanadio dependiendo de la disponibilidad en el momento de fabricación.

Disponible el certificado de composición química bajo coste extra.

Se pueden fabricar piezas en 17-7 bajo pedido especial.

### Fuerzas

La fuerza máxima se obtiene en la posición plana. Las fuerzas son los valores calculados.

### Arandelas de disco acumulables

pueden obtener fuerzas o deflexiones adicionales, acumulando discos ya sea en serie o en paralelo. Ver la línea estandar de arandelas muelle de disco para más información sobre acumulación de arandelas de disco.

### CLAVES DE DIMENSIONES

Dr = Juego del tornillo o del diámetro del vástago

Do = Diámetro Exterior (Max)

Di = Diámetro interior (Min)

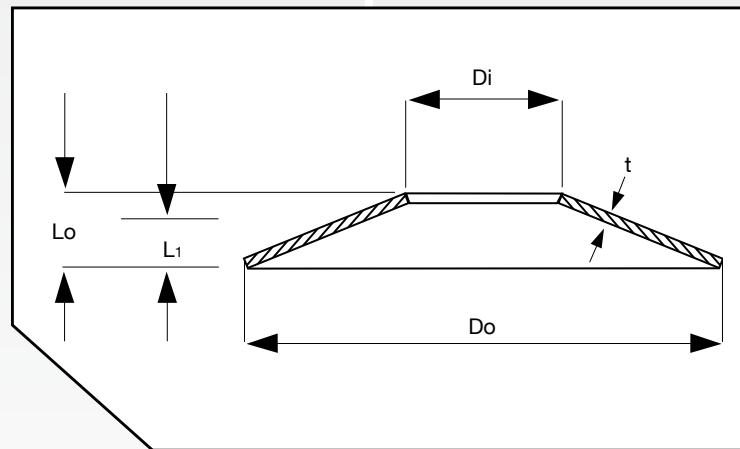
t = Grosor

Lo = Altura libre aproximada

L<sub>1</sub> = Altura con carga

Pf = Fuerza calculada en la posición plana (N)

F<sub>1</sub> = Deflexión = Lo-L<sub>1</sub>



## TELLERFEDERSCHEIBEN FÜR HOHE BELASTUNGEN

### Größen in Kohlenstoffstahl

SPEC Tellerfegerscheiben für hohe Belastungen stellen wesentlich höhere Kräfte zur Verfügung als unsere Standardscheiben mit ähnlichen Durchmessern. Bei diesen Scheiben wurde das Set nicht bei der Herstellung entfernt, da es sich bei den meisten Anwendungen um statische Anwendungen handelt (Set wird im Allgemeinen während der Installation entfernt, was zu einer Reduzierung der ungespannten Höhe führt).

### Material

Kohlenstoff-Federstahl C1070-C1075 oder Chrom-Vanadium je nach Verfügbarkeit zur Zeit der Herstellung.

Zertifikat zur chemischen Analyse auf Wunsch gegen besondere Berechnung erhältlich.

Aus 17-7 hergestellte Teile sind als Sonderbestellung erhältlich.

### Kräfte

Maximale Kraft wird in flacher Position erreicht. Kräfte sind errechnete Werte.

### Geschichtete Tellerfegerscheiben

Zusätzliche Kraft/Federweg kann durch die parallele oder reihenweise Schichtung der Scheiben erreicht werden (siehe Standardreihe von Tellerscheiben für Informationen zur Schichtung von Tellerfegerscheiben).

### KENNZEICHNEN DER ABMESSUNGEN

Dr = Spielpassung über Schraube oder Dordurchmesser

Di = Innendurchmesser (Min)

Do = Außendurchmesser (Max)

t = Dicke

Lo = Annähernde ungespannte Höhe

L<sub>1</sub> = Gespannte Höhe

Pf = Berechnete Kraft flach/ Newton

F<sub>1</sub> = Verbiegung = Lo-L<sub>1</sub>

## RONDELLE A TAZZA PER CARICHI FORTI

### Dimensioni standard in acciaio al carbonio

Le rondelle a tazza per carichi forti SPEC assicurano dei carichi considerevolmente più elevati che non le nostre rondelle standard dello stesso diametro. La deformazione di queste rondelle non è stata eliminata durante la fabbricazione poiché la maggior parte delle applicazioni sono statiche. Generalmente la deformazione viene eliminata durante l'installazione, il che comporta una riduzione dell'altezza libera.

### Materiale

Acciaio per molle al carbonio C1070 - C1075 o al cromo - vanadio secondo la disponibilità al momento della fabbricazione.

Il certificato d'analisi chimica è disponibile con costo aggiuntivo.

### Carichi

Il carico massimo è ottenuto a piatto. I carichi sono dei valori calcolati.

### Rondelle a tazza sovrapposte

Un carico o una flessione addizionale possono essere ottenute sovrapponendo i dischi in serie o in parallelo. Per informazioni sulla sovrapposizione vedi linea standard delle rondelle a tazza.

### LEGENDA

Dr = Dimensione consigliata del perno

Di = Diametro interno (min)

Do = Diametro esterno (max)

t = Spessore

Lo = Altezza libera approssimativa

L<sub>1</sub> = Altezza in carico

Pf = carico in posizione piatta

F<sub>1</sub> = deflessione Lo - L<sub>1</sub>

## ANILHAS DE DISCO DE CARGA PESADA

### Padronizadas em aço carbono

As anilhas de carga pesada SPEC agüentam mais carga que as anilhas comuns de mesmo diâmetro. Essa anilhas na sua produção permanecem com a forma, que será retirada durante a instalação o que resulta numa perda de altura livre.

### Material

Aço Carbono C1070-1075 ou Cromo Vanádio, baseado a disponibilidade na hora da fabricação.

Certificado de analise química , a custo extra.

Peças feitas com 17-7 são disponíveis como pedido especial.

### Carga

Maxima carga é atingida quando a peça esta completamente comprimida.

### Empilhagem

Adicional cargas ou flexão podem ser obtidas empilhando as peças em paralelo ou em serie.] Veja a linha padrão para informações de empilhamento.



### LEGENDA

Dr = Diâmetro livre

Di = Diâmetro interno

Do = Diâmetro externo

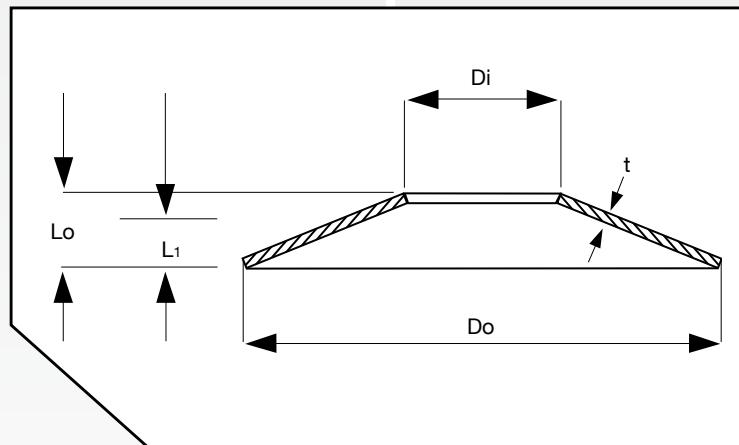
t = Espessura

Lo = Altura livre (aproximado)

L<sub>1</sub> = Carga na altura

Pf = Carga na posição totalmente comprimida

F<sub>1</sub> = Deflexão Lo-L<sub>1</sub>.



### United Kingdom

Tel: (44) 1386 443366

E-mail: sales@assocspring.co.uk

### France

Tel: (33) 01 30 68 6363

E-mail: info@ressortsspec.com

### Spain

Tel: (34) 945 147542

E-mail: ventas@bgespana.com

### Germany

Tel: (49) 6251 93-3252-04

E-mail: info@asraymond.de



## HIGH LOAD DISC WASHERS

Part Number	Do (mm)	Di (mm)	Dr (mm)	t (mm)	Lo (mm)	L1 (mm)	Pf (N)
B0197-012	5.00	2.20	2.00	0.30	0.51	0.41	289
B0236-016	6.00	2.70	2.50	0.41	0.66	0.51	649
B0276-020	7.00	3.20	3.00	0.51	0.76	0.64	934
B0315-020	8.00	3.70	3.50	0.51	0.79	0.69	783
B0354-031	8.99	4.30	4.00	0.79	1.09	0.94	2624
B0433-039	11.00	5.30	5.00	0.99	1.40	1.19	4759
B0551-050	14.00	6.40	6.00	1.27	1.70	1.42	6183
B0669-059	17.00	7.40	7.00	1.50	2.01	1.78	8006
B0709-078	18.00	8.40	8.00	1.98	2.59	2.24	21150
B0827-098	21.00	8.40	8.00	2.49	3.00	2.74	23770
B0906-078	23.00	10.50	10.00	1.98	2.69	2.39	14230
B0945-118	24.00	10.50	10.00	3.00	3.71	3.30	35540
B1142-098	29.00	13.00	12.00	2.49	3.30	2.95	20900
B1260-138	32.00	13.00	12.00	3.51	4.29	3.96	44040
B1378-118	35.00	15.00	14.00	3.00	3.99	3.58	28900
B1535-138	39.00	17.00	16.00	3.51	4.70	4.11	44480
B1535-157	39.00	15.00	14.00	3.99	5.00	4.60	53380
B1654-157	42.00	17.00	16.00	3.99	5.18	5.11	57820
B1850-197	47.00	19.00	18.00	5.00	6.20	5.64	88960
B2047-236	52.00	21.00	20.00	5.99	7.29	6.25	137890
B2205-236	56.00	23.00	22.00	5.99	7.90	6.81	179150
B2441-256	62.00	25.00	24.00	6.50	8.51	7.39	193930
B2756-276	70.00	28.00	27.00	7.01	9.19	8.05	204600
B3031-295	77.00	31.00	30.00	7.49	9.80	8.71	217950



**LOOKING FOR GAS AND MECHANICAL  
STRUT SOLUTIONS?**

See our Counterbalance catalogue –  
available to download from [asraymond.co.uk](http://asraymond.co.uk)

**VOUS RECHERCHEZ DES VERINS A GAZ  
OU A RESSORTS ?**

Consultez notre catalogue Véris - disponible en  
téléchargement sur [ressortsspec.com](http://ressortsspec.com)

**¿BUSCA RESORTES DE GAS Y  
MÉCANICOS?**

Vea nuestro catálogo de resortes a gas, disponible para  
descargar en [www.bgespana.com](http://www.bgespana.com)

### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** [sales@assocspring.co.uk](mailto:sales@assocspring.co.uk)

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** [info@ressortsspec.com](mailto:info@ressortsspec.com)

### Spain

**Tel:** (34) 945 147542

**E-mail:** [ventas@bgespana.com](mailto:ventas@bgespana.com)

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** [info@asraymond.de](mailto:info@asraymond.de)





**SUCHEN SIE NACH GASDRUCKFEDERN UND  
MECHANISCHEN FEDERHUBZYLINDERN ?**  
Weitere Informationen hierzu finden Sie in unserem  
Counterbalance-Katalog, der unter [asraymond.co.uk](http://asraymond.co.uk) zum  
Download bereit steht.

**STATE CERCANDO SOLUZIONI PER  
MARTINETTI A GAS E MECCANICI?**  
Consultate il nostro catalogo di controbilanciamento -  
disponibile per il download da [asraymond.co.uk](http://asraymond.co.uk)

**PROCURA SOLUÇÕES PARA GÁS E BRAÇOS  
MECÂNICOS?**  
Consulte o nosso catálogo Counterbalance – disponível para  
descarregar em [asraymond.co.uk](http://asraymond.co.uk)

**United Kingdom**  
**Tel:** (44) 1386 443366  
**E-mail:** [sales@assocspring.co.uk](mailto:sales@assocspring.co.uk)

**France**  
**Tel:** (33) 01 30 68 6363  
**E-mail:** [info@ressortsspec.com](mailto:info@ressortsspec.com)

**Spain**  
**Tel:** (34) 945 147542  
**E-mail:** [ventas@bgespana.com](mailto:ventas@bgespana.com)

**Germany**  
**Tel:** (49) 6251 93-3252-04  
**E-mail:** [info@asraymond.de](mailto:info@asraymond.de)



## DISC SPRING WASHERS FOR FLANGE APPLICATIONS

### Stock sizes in stainless steel

SPEC flange discs are designed to compensate for thermal expansion and mechanical shock associated with bolted joints. Typical applications include valves, pipe connections, pump connections and compression joints. These washers have had their set removed during manufacture.

### Material

Stainless steel

Commercial – Type 17-7 PH

Maximum application temperature for 17-7 is 570°F (300°C).

Certificate of chemical analysis available at extra cost.

### Stacked disc washers

Additional load or deflection can be obtained by the stacking of discs in series or parallel. See the standard line of disc spring washers for information on stacking of disc washers.

### Load tolerances

Load tolerances are plus or minus 20.0% of the values shown.

### KEY TO MEASUREMENTS

Dr = Free fit Bolt or Rod diameter

Di = Inside diameter (min)

Do = Outside diameter (max)

t = Thickness

Lo = Approximate Free Height

Tf = Calculated torque to flat position (N/M)

Pf = Calculated load at flat position (N)



## RESSORTS DISQUE POUR BRIDES

### Dimensions standard en acier inoxydable

Les disques à bride SPEC sont conçus pour compenser la dilatation thermique et l'impact mécanique associés aux joints boulonnés. Les applications types comprennent les valves, les raccords de tuyaux, les raccords de pompes et les joints de compression. Toute déformation de ces rondelles a été éliminée lors de la fabrication.

### Matériaux

Acier inoxydable

Commercial - Type 17-7 PH

Température d'application maximale pour 17-7° de 300°C.

Certificat d'analyse chimique disponible contre supplément.

### Ressorts disque empilés

Une charge ou une flexion supplémentaire peut être obtenue en empilant les disques en série ou en parallèle. Se reporter à la ligne standard de ressorts disque pour toute information concernant l'empilage.

### Tolérances de charge

Les tolérances de charge font plus ou moins 20,0% des valeurs indiquées.

### INDEX DES MESURES

Dr = Diamètre d'axe ou de filetage recommandé

Di = Diamètre intérieur (min)

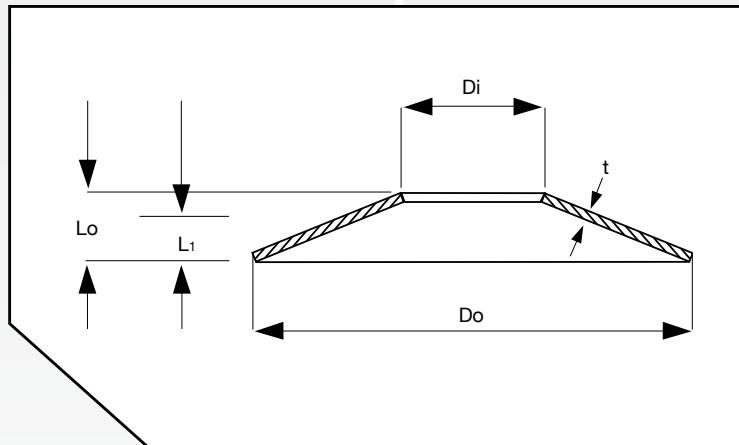
Do = Diamètre extérieur (max)

t = Epaisseur

Lo = Hauteur libre approximative

Tf = Couple calculé pour la position à plat (N-m)

Pf = Charge à plat



## ARANDELAS MUELLE/RESORTE DE DISCO PARA APLICACIONES DE BRIDA

### Medidas de stock en acero inoxidable

Los discos de brida SPEC están diseñados para compensar la expansión térmica y golpes mecánicos asociados con las juntas atornilladas. Aplicaciones típicas incluyen válvulas, conexiones de tuberías, conexiones de bombas y juntas de compresión. Las deformaciones de estas arandelas han sido eliminadas durante la fabricación.

### Material

Acerinoxidable

Comercial – Tipo 17-7 PH

Máxima temperatura de aplicación para el 17-7 es de 300°C

Disponible el certificado de composición química bajo coste extra.

### Arandelas de disco acumulables

Se pueden obtener fuerzas o deflexiones adicionales, acumulando discos ya sea en serie o en paralelo. Ver la línea estándar de arandelas muelle de disco para más información sobre acumulación de arandelas de disco.

### Tolerancias de fuerzas

Las tolerancias de las fuerzas son más o menos un 20% de las fuerzas que aparecen.

### CLAVES DE DIMENSIONES

Dr = Juego del tornillo o del diámetro del vástago

Di = Diámetro interior (Min)

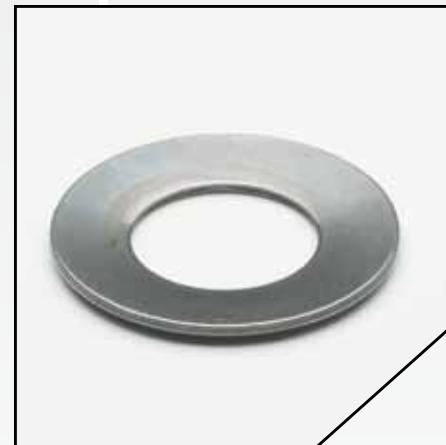
Do = Diámetro Exterior (Max)

t = Grosor

Lo = Altura libre aproximada

Tf = Torsión calculada en posición plana (N/M)

Pf = Fuerza calculada en la posición plana (N)



## TELLERFEDERSCHEIBEN FÜR FLANSCH-ANWENDUNGEN

### Größen in Edelstahl

SPEC Flanschscheiben haben die Aufgabe, die Wärmeausdehnung und mechanische Belastung bei Schraubenverbindungen auszugleichen. Typische Anwendungen sind Ventile, Rohrverbindungen, Pumpenanschlüsse und Klemmverbindungen. Set wird bei der Herstellung entfernt.

### Material

Edelstahl Kommerziell – Typ 17-7 PH  
Maximale Einsatztemperatur für 17-7 ist 300°C.  
Zertifikat zur chemischen Analyse auf Wunsch gegen besondere Berechnung erhältlich.

### Geschichtete Tellerfedorfscheiben

Zusätzliche Kraft/Federweg kann durch die parallele oder reihenweise Schichtung der Scheiben erreicht werden (siehe Standardreihe von Tellerscheiben für Informationen zur Schichtung von Tellerfedorfscheiben).

### Lasttoleranzen

Lasttoleranzen plus oder minus 20,0% der angezeigten Werte.

### KENNZEICHNEN DER ABMESSUNGEN

Dr = Spielpassung über Schraube oder Dordurchmesser  
Di = Innendurchmesser (min.)  
Do = Außendurchmesser (max.)  
t = Dicke  
Lo = Annähernde ungespannte Höhe  
Tf = Berechnetes Drehmoment zur flachen Position (N/M)  
Pf = Berechnete Last/Kraft bei flacher Position (N)

## RONDELLE A TAZZA PER APPLICAZIONI A FLANGIA

### Dimensioni standard in acciaio inox

I dischi a flangia SPEC sono concepiti per compensare la dilatazione termica e l'impatto meccanico associati ai giunti bullonati. Le applicazioni tipo comprendono le valvole, i raccordi dei tubi, i raccordi delle pompe e i giunti di compressione. Ogni deformazione di queste rondelle è stata limitata durante la fabbricazione.

### Materiale

Acciaio inox Commerciale - Tipo 17 - 7PH  
Temperatura massima d'applicazione per 17-7 è 570° F (300° C)  
Il certificato di analisi chimica è disponibile con costo aggiuntivo.

### Rondelle a tazza sovrapposte

Un carico o una flessione addizionale possono essere ottenute sovrapponendo i dischi in serie o in parallelo. Per informazioni sulla sovrapposizione vedi linea standard delle rondelle a tazza.

### Tolleranze di carico

Le tolleranze di carico costituiscono più o meno il 20% dei valori indicati.

### LEGENDA

Dr = Dimensione consigliata del perno  
Di = Diametro interno (min)  
Do = Diametro esterno (max)  
t = Spessore  
Lo = Altezza libera approssimativa  
Tf = Valore della coppia calcolato in posizione piatta (N/M)  
Pf = Carico in posizione piatta

## MOLAS DISCO PARA APPLICAÇÃO EM FLANGES

### Padronizadas em Aço Inox

As molas disco para flange SPEC, são desenhadas para compensar expansões térmicas e choques mecânicos. Aplicações típicas são para válvulas, tubos, e bombas elétricas.

### Material

Aço Inox – tipo comercial 17-7 PH  
Temperatura máxima de operação 17-7 PH ( 570 F ) (300 C)  
Analise química disponível a custo extra.

### Empilhamento

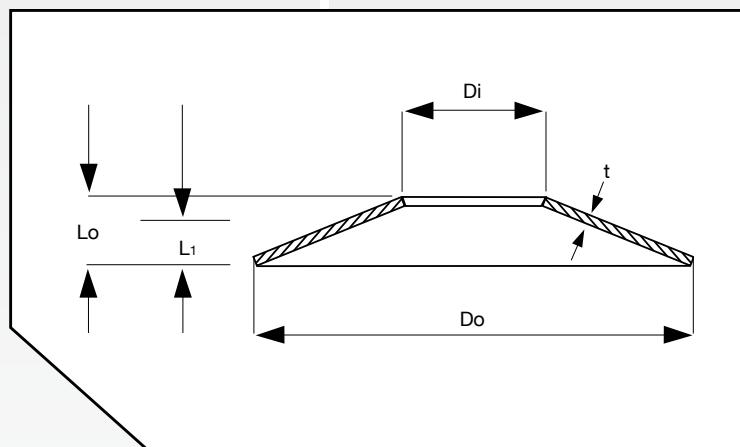
Carga adicional pode ser obtida empilhando-se as peças em serie ou em paralelo. Veja a linha padrão para informação de empilhamento.

### Tolerâncias

São de mais ou menos 20% da tabela.

### LEGENDA

Dr = Diâmetro livre  
Di = Diâmetro interno (min)  
Do = Diâmetro externo (max)  
t = Espessura  
Lo = Altura livre (aproximado)  
Tf = Torque na posição totalmente comprimida (N/M)  
Pf = Carga na posição totalmente comprimida



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



### DISC SPRING WASHERS FOR FLANGE APPLICATIONS

Part Number	Do (mm)	Di (mm)	Dr (mm)	t (mm)	Lo (mm)	Tf (Nm)	Pf (N)
B0714-080-S	18.14	9.91	9.5	2.03	2.18	11	5338
B0820-080-S	20.83	11.48	11	2.03	2.46	31	12455
B0900-089-S	22.86	13.08	12	2.26	2.54	26	9340
B1145-125-S	29.08	16.66	16	3.18	3.63	95	26688
B1365-131-S	34.67	19.84	19	3.33	3.81	95	22685
B1585-160-S	40.26	23.01	22	4.06	4.57	153	11580
B1805-168-S	45.85	26.21	26	4.27	4.95	211	18250
B2020-187-S	51.31	29.36	29	4.75	5.51	294	47150
B2240-190-S	56.9	32.54	32	4.83	5.72	324	46700
B2450-250-S	62.23	35.71	35	6.35	7.37	780	102300
B2680-250-S	68.07	38.89	38	6.35	7.37	705	84500
B2950-262-S	74.93	42.85	42	6.65	7.80	799	88960
B3170-281-S	80.52	46.02	45	7.14	8.36	989	102300
B3380-300-S	85.85	49.20	48	7.62	8.97	1301	124550
B3600-318-S	91.44	52.37	52	8.08	9.53	1518	142340
B4040-356-S	102.62	58.72	58	9.04	10.62	2168	173470
B4470-394-S	113.54	65.07	64	10.01	11.79	2981	213500

### METRIC DISC SPRING WASHERS FOR FLANGE APPLICATIONS

Part Number	Do (mm)	Di (mm)	Dr (mm)	t (mm)	Lo (mm)	Tf (Nm)	Pf (N)
B15-125-S	15	8.40	8	1.25	1.70	9.5	6000
B15-200-S	15	8.40	8	2.00	2.30	30	17000
B18-200-S	18	10.40	10	2.00	2.30	24	11000
B22-230-S	22	12.40	12	2.30	2.60	34	13000
B25-250-S	25	14.40	14	2.50	2.95	56	18000
B36-400-S	36	20.80	20	4.00	4.60	190	43000
B43-400-S	43	24.80	24	4.00	4.80	200	39000
B49-430-S	49	27.80	27	4.30	5.00	240	40000
B54-480-S	54	30.80	30	4.80	5.60	275	42000
B68-640-S	68	36.80	36	6.40	7.50	725	92000
B70-640-S	70	39.80	39	6.40	7.50	725	91000



OUR FULL RANGE OF DIE SPRINGS CAN BE  
VIEWED ONLINE OR IN THE DIE SPRING  
CATALOGUE  
available to download from [asraymond.co.uk](http://asraymond.co.uk)

NOTRE GAMME COMPLÈTE DE RESSORTS DE  
PRESSE PEUT ÊTRE CONSULTÉE EN LIGNE OU  
DANS LE CATALOGUE DES RESSORTS DE PRESSE  
disponible en téléchargement sur [ressortsspec.com](http://ressortsspec.com)

NUESTRA GAMA COMPLETA DE MUELLES DE  
TROQUEL PUEDE VERSE ONLINE O EN EL  
CATÁLOGO DE MUELLES DE TROQUEL  
disponible para descargar en [www.bgespana.com](http://www.bgespana.com)

#### United Kingdom

**Tel:** (44) 1386 443366  
**E-mail:** [sales@assocspring.co.uk](mailto:sales@assocspring.co.uk)

#### France

**Tel:** (33) 01 30 68 6363  
**E-mail:** [info@ressortsspec.com](mailto:info@ressortsspec.com)

#### Spain

**Tel:** (34) 945 147542  
**E-mail:** [ventas@bgespana.com](mailto:ventas@bgespana.com)

#### Germany

**Tel:** (49) 6251 93-3252-04  
**E-mail:** [info@asraymond.de](mailto:info@asraymond.de)



UNSER KOMPLETTES LIEFERSORTIMENT AN  
FORMFEDERN FINDEN SIE ONLINE IN UNSEREM  
FEDERNKATALOG  
der unter [asraymond.co.uk](http://asraymond.co.uk) zum Download bereit steht.

LA NOSTRA GAMMA COMPLETA DI MOLLE PER  
STAMPI PUÒ ESSERE VISUALIZZATA ONLINE O NEL  
CATALOGO DI MOLLE PER STAMPI  
disponibile per il download da [asraymond.co.uk](http://asraymond.co.uk)

A NOSSA GAMA COMPLETA DE MOLAS DE  
MATRIZ PODE SER CONSULTADA ONLINE OU NO  
CATÁLOGO DE MOLAS DE MATRIZ  
available to download from [asraymond.co.uk](http://asraymond.co.uk)

#### **United Kingdom**

**Tel:** (44) 1386 443366

**E-mail:** [sales@assocspring.co.uk](mailto:sales@assocspring.co.uk)

#### **France**

**Tel:** (33) 01 30 68 6363

**E-mail:** [info@ressortsspec.com](mailto:info@ressortsspec.com)

#### **Spain**

**Tel:** (34) 945 147542

**E-mail:** [ventas@bgespana.com](mailto:ventas@bgespana.com)

#### **Germany**

**Tel:** (49) 6251 93-3252-04

**E-mail:** [info@asraymond.de](mailto:info@asraymond.de)



## BELLEVILLE SPRING WASHERS

Belleville spring washers are especially suited for applications requiring high loads in small spaces. By combining them in varying sequences, each size gives numerous load-carrying possibilities. These washers have had all set removed during the manufacturing process.

### MATERIAL

Spring steel

Commercial 1074 - certified to ASTM A684

Stainless steel (parts with suffix 'S')

Thickness (t) up to and including 1.83mm

Commercial - Type 302

Government AMS 5906 type 302

Thickness (t) over 1.83mm

Commercial - Type 17-7PH certified to AMS 5528

### LOAD & DEFLECTION

Typical load-deflection curves for three characteristics proportions of washers listed are shown Figure 1 below. From them, loads at intermediate heights may be estimated. The nominal amount of dish or cone (h) is found by subtracting 't' from 'Lo'.

These typical curves are shown with dotted lines beyond 75% of deflection to indicate that load characteristics in this area are not reliable because of partial bottoming of the washers. Load at 75% deflection is approximately 87% of the load at flat position

### KEY TO MEASUREMENTS

Do = Outside diameter (max)

Di = Inside diameter (min)

t = Thickness

Lo = Approximate Free Height

L<sub>1</sub> = Loaded Height

P<sub>1</sub> = Load at deflection F (min/max)

F = Deflection Lo-L<sub>1</sub>

Dh = Free fit in hole diameter

Dr = Free fit over rod diameter

Pf = Load at flat position

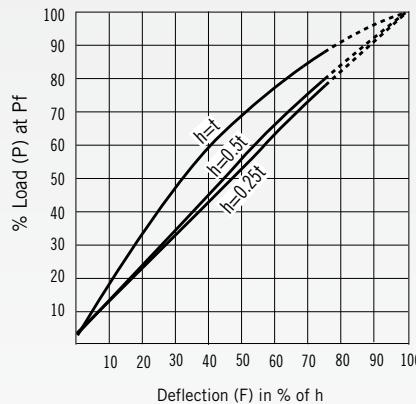


Fig. 1

## RONDELLES BELLEVILLE

Les rondelles Belleville sont particulièrement adaptées à des charges élevées dans des espaces réduits. En les combinant en séquence variée, chaque modèle offre de nombreuses possibilités de capacité de charge. Toute éventuelle perte de hauteur après mise à plat a été supprimée durant la fabrication.

### MATÉRIAUX

Acier à ressort

Commercial - 1074 - Certifié suivant ASTM-A684

Acier inoxydable (avec le suffixe « S ») :

Epaisseur (t) jusqu'à 1,83mm inclus:

Commercial - Type 302

Gouvernement - MIL-S-5059 Type 302

Epaisseur (t) supérieure à 1,83mm

Commercial - Type 17-7 PH certifié suivant AMS 5528

### CHARGES ET DEFLECTIONS

Des courbes de charge-déflexion types pour trois types caractéristiques de rondelles sont indiquées dans la figure 1. A partir de celles-ci, les charges à des hauteurs intermédiaires peuvent être estimées. La quantité nominale de concavité est obtenue en soustrayant "t" de "Lo".

Ces courbes type sont en pointillés au delà de 75% de déflexion pour indiquer que les charges indiquées dans cette zone ne sont pas fiables car les rondelles sont partiellement à plat.

### ABBREVIATIONS UTILISÉES

Do = Diamètre Extérieur (max)

Di = Diamètre Intérieur (min)

t = Epaisseur

Lo = Hauteur libre approx

L<sub>1</sub> = Hauteur en charge

P<sub>1</sub> = Charge à déflexion F (min/max)

F = Déflexion Lo-L<sub>1</sub>

Dh = Jeu du diamètre de logement

Dr = Jeu du diamètre de l'axe

Pf = Charge à plat

## ARANDELAS ELÁSTICAS BELLEVILLE

Las arandelas elásticas Belleville son especialmente adecuadas para cargas altas en espacios pequeños. Mediante su combinación en secuencias variables, cada tamaño ofrece numerosas posibilidades para soportar cargas. La flecha de estas arandelas ha sido eliminada durante la fabricación.

### MATERIAL

Acero para resortes

Comercial 1074 - Certificado según ASTM-A684

Acero inoxidable (referencia con sufijo "S")

Espesores (t) hasta e incluyendo 1,83 mm

Comercial - Tipo 302

Government AMS 5906 type 302

Espesores (t) superiores a 1,83 mm

Comercial - Tipo 17-7 PH certificado según AMS 5528

### CARGAS Y DEFLEXIONES

Las curvas de deflexión de carga típicas para tres tamaños usuales de arandelas se indican en Fig. 1. A partir de las mismas, se pueden estimar cargas a alturas intermedias. La cantidad nominal de concavidad o conicidad (h) se halla restando "t" de "Lo".

Las curvas típicas mostradas a partir del 75% de la deflexión son discontinuas para indicar que las cargas en esta área no son fiables debido a la apertura de las arandelas.

### CLAVES DE DIMENSIONES

Do = Diámetro externo (max)

Di = Diámetro interno (min)

t = Espesor

Lo = Altura libre

L<sub>1</sub> = Altura cargada

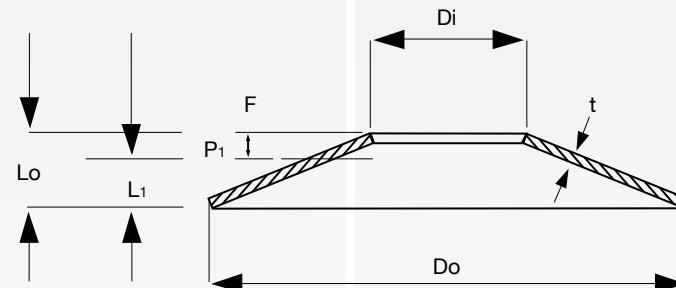
P<sub>1</sub> = Carga a deflexión F (min/max)

F = Deflexión Lo-L<sub>1</sub>

Dh = Juego en el diámetro de la cavidad

Dr = Juego sobre el diámetro del vástago

Pf = Carga en posición plana



## TELLERFEDERN TYPE BELLEVILLE

Tellerfedern der Ausführung Belleville sind anwendbar bei hohen Kräften bei wenig Platzbedarf. Je nach Schichtung ergibt jede Abmessung unterschiedliche Kräftebereiche. Alle Tellerfedern wurden bei der Herstellung gesetzt.

### WERKSTOFFE

Federstahl  
Commercial 1074 - testiert nach ASTM A684.

Rostfreierstahl (Bestellnummer mit "S" Nachbuchstabe) bis Materialstärken (t) einschließlich 1,83 mm.  
Commercial - Type 302  
Government AMS 5906 Type-302.

Materialstärken (t) über 1,83 mm.  
Commercial - Type 17-7PH testiert nach AMS 5528.

### KRAFT UND EINFEDERUNG

Typische Kraft/Einfederungskurven sind in Fig. 1 dargestellt. Mit Hilfe dieser Kurven können Kräfte bei unterschiedlichen Einfederungen bestimmt werden. Der Nominelle Wert  $h$  wird durch Subtraktion  $t$  von  $Lo$  ermittelt.

Diese Kraft/Einfederungskurven bei 75% der Einfederung sind mit Strichlinien gezeichnet um dass die Kraft, wegen der Eröffnung der Tellerfedern, in diesem Bereich nicht zuverlässig ist anzugeben.

### KENNZIECHEN DER ABMESSUNGEN

Do = Äußerer Durchmesser (max.)  
Di = Innerer Durchmesser (min.)  
t = Materialdicke  
Lo = Länge der unbelasteten Tellerfeder  
L<sub>1</sub> = Länge der belasteten Tellerfeder  
P<sub>1</sub> = Federkraft bei Federlänge F (min/max)  
F = Federweg Lo-L<sub>1</sub>  
Dh = Spielpassung in Hülsendurchmesser  
Dr = Spielpassung über Dorndurchmesser  
Pf = Kraft bei flacher Position

## RONDELLE "BELLEVILLE"

Le rondelle "Belleville" sono appositamente concepite per sopportare carichi forti in piccoli spazi. Con la possibilità di combinazione delle rondelle in sequenza, ogni dimensione offre infinite capacità di carico. Nelle Rondelle SPEC la deformazione iniziale successiva alla fabbricazione è stata eliminata.

### MATERIALE

Acciaio per molle Commerciale-1074- certificato per ASTM-A684

Acciaio inossidabile  
Spessore fino a 1.83 mm compresi  
Commerciale - Tipo 302  
- MIL - S 5059 Tipo 302

Spessore oltre 1.83 mm  
Commerciale - Tipo 17 - 7PH certificato per AMS 5528

### CARICHI E DEFLESSIONI

Le curve tipiche di deflessione per tre esempi caratteristici sono riportate in Fig. 2. Da esse possono essere calcolati i carichi ad altezze intermedie. La quota nominale di cono (h) si ottiene sottraendo "t" da Lo.

Queste curve sono tratteggiate oltre il 75% della deflessione per indicare che le caratteristiche di carico non sono affidabili in quanto le rondelle sono quasi in posizione piatta.

### LEGENDA

Do = Diametro esterno (max)  
Di = Diametro interno (min)  
t = Spessore  
Lo = Altezza libera  
L<sub>1</sub> = Altezza in carico  
P<sub>1</sub> = Carico in deflessione F (min/max)  
F = Deflessione Lo-L<sub>1</sub>  
Dh = Diametro sede  
Dr = Diametro perno  
Pf = Carico in posizione piatta

## ANILHAS DE MOLA BELLEVILLE

As anilhas de mola Belleville são especialmente adequadas a cargas elevadas em espaços reduzidos. Dada a respectiva combinação em sequências variáveis, cada um dos tamanhos permite diversas possibilidades de suporte de cargas. A flecha destas anilhas foi eliminada durante o fabrico.

### MATERIAL

Aço para molas comercial – 1074 – com certificação conforme à especificação ASTM – A684

Aço inoxidável ( peças com sufixo S ),  
Espessuras ( t ) até e incluindo 1,83 mm  
Comercial – Tipo 302  
Governo – MAS 5906 Tipo 302

Espessuras superiores a 1,83 mm  
Comercial – Tipo 17-7PH com certificação conforme à especificação AMS 5528

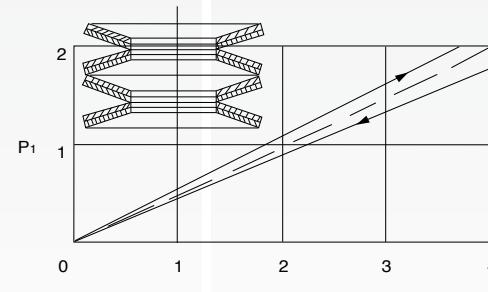
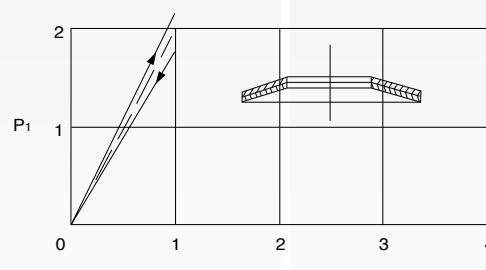
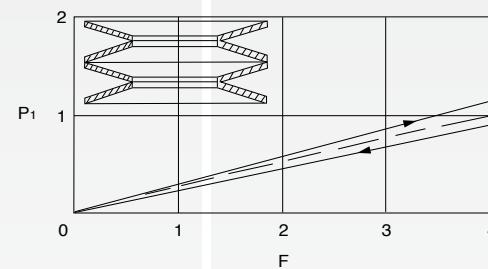
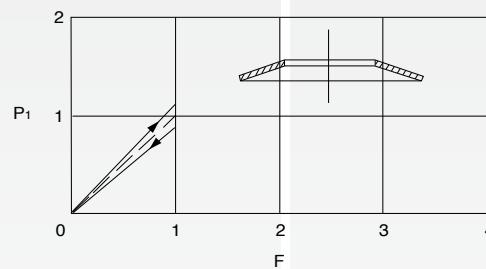
### CARGA E DEFLEXÃO

As curvas de deflexão de carga típicas para os três tamanhos mais comuns de anilhas, constam da Fig. 1 abaixo,( incluso graficos do catalogo). A partir destas, é possível estimar cargas a alturas intermédias. O valor nominal de concavidade ou conicidade (h) determina-se subtraindo "t" a 'Lo'.

Essas curvas são tipicamente marcadas por pontuação abaixo de 75% de deflexão para indicar as características de carga não pertinente devido a deflexão parcial das mesmas

### LEGENDA

Do = Diam Externo  
Di = Diam Interno (max)  
t = Espessura  
Lo = Altura livre  
L<sub>1</sub> = Carga em L<sub>1</sub>  
P<sub>1</sub> = Deflexão em carga F (min/max)  
F = Deflexão Lo-L<sub>1</sub>  
Dh = Espaço livre no furo  
Dr = Espaço livre no eixo  
Pf = Carga na posição totalmente comprimida



### United Kingdom

Tel: (44) 1386 443366

E-mail: sales@assocspring.co.uk

### France

Tel: (33) 01 30 68 6363

E-mail: info@ressortsspec.com

### Spain

Tel: (34) 945 147542

E-mail: ventas@bgespana.com

### Germany

Tel: (49) 6251 93-3252-04

E-mail: info@asraymond.de



**BELLEVILLE SPRING WASHERS**

Part Number	Do (mm)	Dh (mm)	Di (mm)	Dr (mm)	t (mm)	Lo (mm)	L1 (mm)	P1 (N)	Pf (N)
B0187-007	4.75	4.76	2.36	2.36	0.17	0.33	0.25	25.4-34.7	44
B0187-007-S					0.17	0.33	0.25	25.4-34.7	44
B0187-010					0.25	0.38	0.32	57.8-78.3	124
B0187-010-S					0.25	0.38	0.32	57.8-78.3	124
B0250-009	6.35	6.35	3.18	3.18	0.22	0.44	0.33	44-60.1	75
B0250-009-S					0.22	0.44	0.33	44-60.1	75
B0250-013					0.34	0.51	0.43	97.9-133.5	214
B0250-013-S					0.34	0.51	0.43	97.9-133.5	214
B0281-010	7.14	7.14	3.51	3.51	0.25	0.51	0.38	56.8-76.8	102
B0281-013					0.33	0.53	0.43	92.5-125.4	191
B0281-015					0.38	0.58	0.48	124.3-173.2	276
B0281-015-S					0.38	0.58	0.48	126.8-171.2	276
B0312-011	7.92	7.95	3.96	3.97	0.27	0.55	0.41	70.3-95.2	120
B0312-011-S					0.27	0.55	0.41	70.3-95.2	120
B0312-017					0.42	0.64	0.53	155.7-214	334
B0312-017-S					0.42	0.64	0.53	155.7-214	334
B0343-013	8.71	8.74	4.17	4.17	0.33	0.61	0.46	94.6-127.9	169
B0343-016					0.41	0.66	0.53	136.1-184.1	289
B0343-019					0.47	0.71	0.58	191.3-302.5	414
B0343-019-S					0.47	0.71	0.58	191.3-302.5	414
B0375-019	9.53	9.53	4.83	4.78	3.18	3.18	0.47	0.71	0.58
B0375-015					0.38	0.69	0.53	129-177.9	245
B0375-015-S					0.38	0.69	0.53	129-177.9	245
B0375-018					0.44	0.71	0.58	173-236	360
B0375-020	11.10	11.13	5.59	5.49	0.51	0.76	0.64	227-307	489
B0375-020-S					0.51	0.76	0.64	227-307	489
B0375-030					0.76	0.91	0.84	471.5-640.6	1036
B0437-022					3.51	3.51	0.56	0.81	0.69
B0437-016	11.10	11.13	5.59	5.49	0.41	0.79	0.58	151.2-205	267
B0437-016-S					0.51	0.81	0.66	213-393	436
B0437-020					0.58	0.86	0.74	289-396	618
B0437-023					4.17	4.17	0.64	0.94	0.79
B0499-025	12.70	12.70	6.48	6.35	0.46	0.86	0.66	169-231	311
B0500-018					0.46	0.86	0.66	169-231	311
B0500-018-S					0.46	0.86	0.66	169-231	311
B0500-022					0.55	0.91	0.74	245-343	512
B0500-022-S	15.88	15.88	8.05	7.94	0.55	0.91	0.74	245-343	512
B0500-025					0.64	0.97	0.79	356-489	712
B0500-025-S					0.64	0.97	0.79	356-489	712
B0500-038					0.97	1.19	1.09	716-974	1779
B0500-038-S	14.27	14.30	4.83	4.78	0.97	1.19	1.09	716-974	1779
B0562-019					0.48	0.94	0.71	169-231	298
B0562-028					0.71	1.07	0.89	329-445	725
B0625-022					0.56	1.07	0.81	262-360	467
B0625-022-S	17.45	17.48	5.59	5.49	0.56	1.07	0.81	262-360	467
B0625-032					0.81	1.22	1.02	547-743	1157
B0625-032-S					0.81	1.22	1.02	547-743	1157
B0625-047					1.19	1.50	1.35	1134-1535	2669
B0625-047-S	16.18	16.28	6.48	6.35	1.19	1.50	1.35	1134-1535	2669
B0637-032					0.81	1.22	1.02	444-605	988
B0687-034					0.86	1.27	1.07	471-641	1019
B0750-025	19.05	19.05	9.65	9.53	0.64	1.24	0.94	289-395	507
B0750-036					0.91	1.37	1.14	555-750	1161
B0750-052					1.32	1.65	1.47	1174-1592	2491
B0750-028					0.71	1.30	0.99	414-565	778
B0750-028-S	22.23	22.23	11.23	11.11	0.71	1.30	0.99	414-565	778
B0750-034					0.86	1.40	1.12	627-850	1254
B0750-034-S					0.86	1.40	1.12	627-850	1254
B0750-040					1.02	1.50	1.24	885-1205	1846
B0750-040-S	23.80	23.83	8.05	7.94	1.02	1.50	1.24	885-1205	1846
B0750-056					1.42	1.78	1.60	1624-2202	3759
B0750-056-S					1.42	1.78	1.60	1624-2202	3759
B0875-031					0.79	1.50	1.14	507-694	912
B0875-031-S	22.23	22.23	11.23	11.11	0.79	1.50	1.14	507-694	912
B0875-045					1.14	1.70	1.42	1018-1383	2202
B0875-045-S					1.14	1.70	1.42	1018-1383	2202
B0937-030	24.13	24.21	9.65	9.53	0.76	1.52	1.14	415.9-564.9	707
B0937-045					1.14	1.70	1.42	823-1117	1757
B0937-045-S					1.14	1.70	1.42	823-1117	1757
B0950-047					1.19	1.78	1.47	986-1334	2060
B1000-035	25.40	25.40	12.83	12.70	0.89	1.70	1.30	658-899	1157

**BELLEVILLE SPRING WASHERS**

	Do (mm)	Dh (mm)	Di (mm)	Dr (mm)	t (mm)	Lo (mm)	L1 (mm)	P1 (N)	Pf (N)
B1000-035-S					0.89	1.70	1.30	658-899	1157
B1000-043					1.09	1.80	1.45	943-1281	1917
B1000-043-S					1.09	1.80	1.45	943-1281	1917
B1000-050	25.40	25.40	12.83	12.70	1.27	1.91	1.57	1286-1739	2669
B1000-050-S					1.27	1.91	1.57	1286-1739	2669
B1000-073					1.85	2.31	2.08	2549-3456	5938
B1000-073-S					1.85	2.31	2.08	2549-3456	5938
B1125-053					1.35	2.03	1.68	1128-1530	2380
B1125-053-S			9.65	9.53	1.35	2.03	1.68	1128-1530	2380
B1125-078					1.98	2.46	2.24	2251-3056	5494
B1125-038	28.58	28.58			0.97	1.85	1.40	733-1001	1268
B1125-038-S			14.40	14.29	0.97	1.85	1.40	733-1001	1268
B1125-056					1.42	2.13	1.78	1530-2073	3269
B1125-056-S					1.42	2.13	1.78	1530-2073	3269
B1250-040					1.02	2.08	1.55	867-1179	1468
B1250-040-S					1.02	2.08	1.55	867-1179	1468
B1250-051					1.30	2.21	1.75	1361-1664	2589
B1250-062	31.75	31.75	16.00	15.88	1.57	2.34	1.96	1793-2433	3870
B1250-062-S					1.57	2.34	1.96	1793-2433	3870
B1250-089					2.26	2.82	2.54	3705-5013	8514
B1250-089-S					2.26	2.82	2.54	3705-5013	8514
B1262-060	32.05	32.16	12.83	12.70	1.52	2.31	1.91	1548-2091	3252
B1375-044					1.12	2.24	1.65	1001-1357	1668
B1375-044-S	34.93	34.93	17.58	17.46	1.12	2.24	1.65	1001-1357	1668
B1375-067					1.70	2.57	2.13	2260-2767	4559
B1500-047					1.19	2.36	1.78	947-1285	1628
B1500-070			12.83	12.70	1.78	2.64	2.21	1868-2535	3986
B1500-070-S					1.78	2.64	2.21	1868-2535	3986
B1500-102					2.59	3.25	2.92	3928-5316	9163
B1500-045					1.14	2.36	1.75	1072-1450	1779
B1500-045-S	38.10	38.10			1.14	2.36	1.75	1072-1450	1779
B1500-060					1.52	2.59	2.06	1721-2326	3443
B1500-062-S			19.18	19.05	1.57	2.72	2.06	1618-2428	3443
B1500-072					1.83	2.72	2.26	2513-3403	5249
B1500-072-S					1.83	2.72	2.26	2513-3403	5249
B1500-107					2.72	3.40	3.07	5293-7162	12602
B1500-107-S					2.72	3.40	3.07	5293-7162	12602
B1750-057					1.45	2.90	2.16	1699-2304	2891
B1750-057-S	44.45	44.45	22.23	22.23	1.45	2.90	2.16	1699-2304	2891
B1750-085					2.16	3.25	2.69	3180-4915	7251
B1750-085-S					2.16	3.25	2.69	2668-5427	7251
B1875-057					1.45	2.92	2.16	1481-1810	2322
B1875-086	47.63	47.63	16.00	15.88	2.18	3.28	2.72	2758-3737	5867
B1875-086-S					2.18	3.28	2.72	2758-3737	5867
B1875-127					3.23	4.01	3.61	5223-8420	13812
B2000-065					1.65	3.30	2.49	2233-3020	3825
B2000-065-S					1.65	3.30	2.49	2233-3020	3825
B2000-084	50.80	50.80	25.40	25.40	2.13	3.45	2.79	3322-4372	6619
B2000-097					2.46	3.68	3.07	4457-6041	9519
B2000-097-S					2.46	3.68	3.07	4457-6041	9519
B2000-142					3.61	4.50	4.06	9110-12330	21458
B2250-068					1.73	3.48	2.62	2059-2460	3256
B2250-102			19.18	19.05	2.59	3.89	3.23	4048-4951	8105
B2250-150	57.15	57.15			3.81	4.78	4.29	8242-11161	19105
B2250-073					1.85	3.76	2.87	2762-3736	4893
B2250-111			28.58	28.58	2.82	4.19	3.53	5520-7468	12366
B2250-159					4.04	5.03	4.55	11343-15390	26569
B2500-080					2.03	4.06	3.05	3287-4448	5605
B2500-080-S					2.03	4.06	3.05	3287-4448	5605
B2500-120	63.50	63.50	31.75	31.75	3.05	4.57	3.81	6655-9003	14234
B2500-120-S					3.05	4.57	3.81	6655-9003	14234
B2500-175					4.45	5.56	5.00	13722-18571	31800
B2750-087	69.85	69.85	34.93	34.93	2.21	4.39	3.35	3630-4911	6405
B2750-132					3.35	4.98	4.19	7375-9977	14279
B3000-090			25.40	25.40	2.29	4.57	3.43	3234-4372	5534
B3000-135	76.20	76.20			3.43	5.13	4.27	6886-8420	13870
B3000-093			38.10	38.10	2.36	4.80	3.63	4199-5681	7251
B3000-143					3.63	5.41	4.57	9127-11156	19483
B3750-168	95.25	95.25	31.75	31.75	4.27	6.38	5.31	10444-12766	21147
B4000-125	101.60	101.60	50.80	50.80	3.18	6.35	4.75	7602-10284	12944
B4000-187					4.75	7.11	5.92	15163-20514	32383



## CLOVER DOME SPRING WASHERS™

Clover Dome™ spring washers are well suited for applications where a belleville washer or disc spring does not provide adequate deflection, or where the load obtained from a wave washer is not sufficient for application. By combining washers in various sequences, each size provides multiple load-carrying or deflection possibilities. These washers have had the set removed during the manufacturing process.

### MATERIAL

Stainless steel: 17-7 PH per AMS5529

Carbon steel: Commercial 1074 - certified to ASTM A684

### LOAD & DEFLECTION

(Include drawing from catalogue)

Typical load-deflection curves for three characteristic proportions of washers listed are shown Figure 1 below (include graph from catalogue)

From them, loads at intermediate heights may be estimated. The nominal amount of dish or cone (h) is found by subtracting 't' from 'H'.

The typical curves show deflections beyond 75%. The area beyond 75% should be avoided due to partial bottoming of the Clover Dome™ and excessive stress concentrations above 75% deflection

### KEY TO MEASUREMENTS

Do = Outside diameter (maximum)

Di = Inside diameter (minimum)

t = Thickness

Lo = Approximate Free Height

L<sub>1</sub> = Loaded Height

P<sub>1</sub> = Load at deflection F (min/max)

F = Deflection Lo-L<sub>1</sub>

Dh = Free fit in hole diameter

Dr = Free fit over rod diameter

Pf = Load at flat position

## RONDELLES RESSORT CLOVER DOME™

Les rondelles ressort Clover Dome™ conviennent pour les applications où les rondelles Belleville ou les ressorts disque n'offrent pas assez de déflection, ou quand la charge d'une rondelle ondulée n'est pas suffisante. En combinant ces rondelles en différentes séquences, chaque taille permet de nombreuses combinaisons de charges-déflexions. Toute éventuelle perte de hauteur après mise à plat a été supprimée durant la fabrication.

### MATERIAU

Acier Inoxydable: 17-7 PH selon AMS5529

Acier à ressort: Commercial - 1074 - Certifié suivant ASTM-A684

### CHARGE & DEFLECTION

Des courbes de charge-déflexion types pour trois types caractéristiques de rondelles sont indiquées dans la figure 1.

A partir de celles-ci, les charges à des hauteurs intermédiaires peuvent être estimées. La quantité nominale de concavité est obtenue en soustrayant "t" de "H".

Ces courbes type montrent des charges au delà de 75%. Cette zone de travail doit être évitée car les rondelles Clover Dome™ y sont partiellement à plat ; de plus, après 75% de déflexion, le taux de stress est excessif.

### ABBREVIATIONS UTILISEES

Do = Diamètre Extérieur (max)

Di = Diamètre Intérieur (min)

t = Epaisseur

Lo = Hauteur libre approx

L<sub>1</sub> = Hauteur en charge

P<sub>1</sub> = Charge à déflexion F (min/max)

F = Déflexion Lo-L<sub>1</sub>

Dh = Jeu du diamètre de logement

Dr = Jeu du diamètre de l'axe

Pf = Charge à plat

## ARANDELAS ELÁSTICAS CLOVER DOME™

Las arandelas elásticas Clover Dome™ son una alternativa en aquellas aplicaciones en las que las arandelas belleville o muelles de disco DIN 2093 no proporcionan la carrera adecuada ó donde la carga que genera una arandela ondulada es insuficiente. Combinando las arandelas Clover Dome™ en distintas secuencias, cada tamaño posibilita múltiples cargas y carreras.

### MATERIAL

Acero inoxidable: 17-7 PH por AMS5529

Acero para resortes: Comercial 1074 - Certificado según ASTM-A684

### CARGA Y DEFLEXIÓN

Las curvas típicas de carga-deflexión para tres combinaciones de arandelas pueden observarse en la figura 1 mostrada a continuación.

Para las mismas, se podrían calcular cargas a distintas alturas. El número de discos o conos (h) puede calcularse sustrayendo "t" de "H".

Las curvas típicas en la figura 1 muestran deflexiones mayores del 75%. El área por encima del 75% debería evitarse debido a abombamiento parcial de las arandelas CLOVER DOME™ y la concentración de tensión excesiva en deflexiones de más del 75%.

### CLAVES DE DIMENSIONES

Do = Diámetro externo (max)

Di = Diámetro interno (min)

t = Espesor

Lo = Altura libre

L<sub>1</sub> = Altura cargada

P<sub>1</sub> = Carga a deflexión F (min/max)

F = Deflexión Lo-L<sub>1</sub>

Dh = Juego en el diámetro de la cavidad

Dr = Juego sobre el diámetro del vástago

Pf = Carga en posición plana

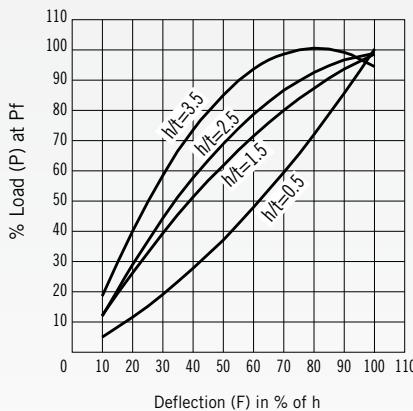
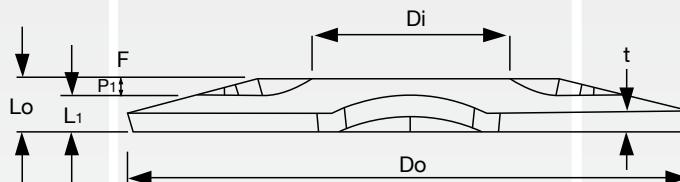


Fig. 1



### United Kingdom

Tel: (44) 1386 443366

E-mail: sales@assocspring.co.uk

### France

Tel: (33) 01 30 68 6363

E-mail: info@ressortsspec.com

### Spain

Tel: (34) 945 147542

E-mail: ventas@bgespana.com

### Germany

Tel: (49) 6251 93-3252-04

E-mail: info@asraymond.de

## CLOVER DOME TELLERFEDERN ALLGEMEINE

Tellerfedern der Ausführung Clover Dome sind anwendbar wo Belleville oder gewohnte Tellerfedern nicht genug Federweg oder wo gewellte Federscheiben wenig Federkraft anbieten. Je nach Schichtung ergibt jede Abmessung unterschiedliche Kräftebereichen. Alle Tellerfedern wurden bei der Herstellung gesetzt.

### WERKSTOFF

Rostfreier Federstahldraht: 17-7 PH per AMS5529  
Federstahl: Commercial 1074 - getestet nach ASTM A684.

### KRAFT UND EINFEDERUNG

Typische Kraft/Einfederungskurven sind in Fig. 1 dargestellt.

Mit Hilfe dieser Kurven können Kräfte bei unterschiedlichen Einfederungen bestimmt werden. Der Nominelle Wert  $h$  wird durch Subtraktion  $t$  von  $H$  ermittelt.

Diese Kraft/Einfederungskurven bei 75% der Einfederung sind mit Strichlinien gezeichnet um dass die Kraft, wegen der Eröffnung der Clover Dome Tellerfedern und der Überspannung, in diesem Bereich nicht zuverlässig ist anzugeben

### KENNZEICHNEN DER ABMESSUNGEN

$Do$  = Äußerer Durchmesser (max.)  
 $Di$  = Innerer Durchmesser (min.)  
 $t$  = Materialdicke  
 $Lo$  = Länge der unbelasteten Tellerfeder  
 $L_1$  = Länge der belasteten Tellerfeder  
 $P_1$  = Federkraft bei Federlänge  $F$  (min/max)  
 $F$  = Federweg  $Lo-L_1$   
 $Dh$  = Spielpassung in Hülsendurchmesser  
 $Dr$  = Spielpassung über Dorndurchmesser  
 $Pf$  = Kraft bei flacher Position

## RONDELLE CLOVER DOME™

Le rondelle Clover Dome™ vengono utilizzate nelle applicazioni dove le rondelle Belleville o le molle a tazza non forniscono una adeguata deflessione o dove il carico ottenuto da una rondella ondulata non è sufficiente per l'applicazione. Montando le rondelle in varie sequenze, ogni misura fornisce dei multipli di carico o di deflessione.

### MATERIALE

Acciaio Inox: Tipo 17-7 PH – Certificato per AMS 5529  
Acciaio al carbonio: commerciale 1074 – certificato per ASTM A684

### CARICHI E DEFLEXIONI

La tipica curva carico-deflessione per tre tipi di rondella si può osservare nella figura 1, grazie alla curva si può calcolare approssimativamente i carichi a differenti altezze di lavoro. Il numero di rondelle ( $h$ ) da utilizzare può essere calcolato sottraendo " $t$ " da " $H$ ".

La curva indicata mostra deflessioni maggiori del 75%. L'area oltre il 75% dovrebbe essere evitata a causa dell'eccessivo schiacciamento e di conseguenza eccessivo stress.

### LEGENDA

$Do$  = Diametro esterno (max)  
 $Di$  = Diametro interno (min)  
 $t$  = Spessore  
 $Lo$  = Altezza libera  
 $L_1$  = Altezza in carico  
 $P_1$  = Carico in deflessione  $F$  (min/max)  
 $F$  = Deflessione  $Lo-L_1$   
 $Dh$  = Diametro sede  
 $Dr$  = Diametro perno  
 $Pf$  = carico in posizione piatta

## ANILHAS DE MOLA CLOVER DOME™

As anilhas de mola Clover Dome™ constituem uma alternativa nas aplicações em que as anilhas belleville ou as anilhas de mola DIN 2093, não disponibilizam um curso adequado, ou nos casos em que a carga gerada por uma anilha ondulada não é suficiente. Combinando as anilhas Clover Dome™ em diferentes sequências, cada tamanho possibilita diferentes cargas e cursos.

### MATERIAL

Aço Inox 17-7 PH – MAS 5529  
Aço Carbono 1074 ASTM AG84

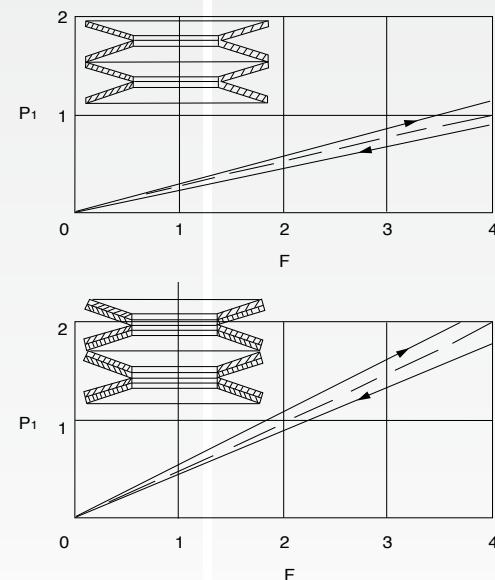
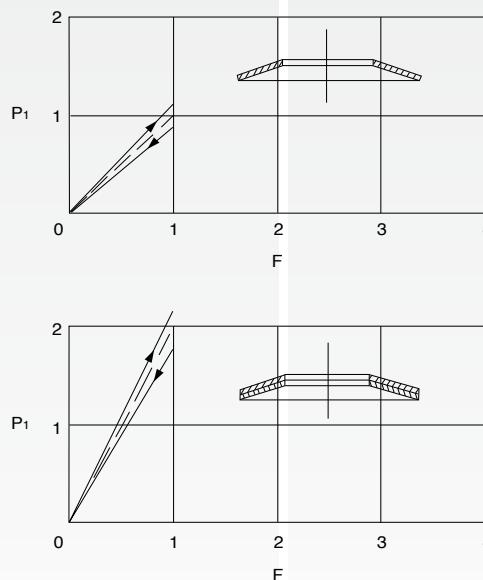
### CARGA E DEFLEXÃO

As curvas típicas de carga/deflexão para quatro relações de anilhas podem observar-se na figura 1 em baixo. Para estas, podem calcular-se cargas a diferentes alturas. O número de discos ou de cones ( $h$ ) pode ser calculado subtraindo " $t$ " da " $H$ ".

As curvas típicas na figura 1 mostram deflexões superiores a 75%. As deflexões superiores a 75% devem ser evitadas dada a deformação parcial das anilhas CLOVER DOME™ e a concentração excessiva de tensão, em deflexões superiores a 75%.

### LEGENDA

$Do$  = Diam Externo  
 $Di$  = Diam Interno (max)  
 $t$  = Espessura  
 $Lo$  = Altura livre  
 $L_1$  = Carga em  $L_1$   
 $P_1$  = Deflexão em carga  $F$  (min/max)  
 $F$  = Deflexão  $Lo-L_1$   
 $Dh$  = Espaço livre no furo  
 $Dr$  = Espaço livre no eixo  
 $Pf$  = Carga na posição totalmente comprimida



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



**CLOVER DOME SPRING WASHERS™ – CARBON**

Part Number	Do (mm)	Dh (mm)	Di (mm)	Dr (mm)	t (mm)	Lo (mm)	L1 (mm)	P1 (N)	Pf (N)	
BC0250-008-CA	6.35	6.35	3.00	2.79	0.20	0.57	0.29	19.8-29.7	36	
BC0250-012-CA			3.18	3.18	0.30	0.66	0.39	98.5-147.7	177	
BC0312-012-CA	7.92	7.95	3.63	3.51	0.30	0.78	0.43	97.2-145.9	159	
BC0312-018-CA	8.13	8.20			0.46	0.80	0.58	164.1-246.2	252	
BC0343-014-CA					0.35	0.80	0.48	121.9-182.8	262	
BC0343-016-CA		8.71	8.74	4.29	4.17	0.41	0.81	161.2-241.8	319	
BC0343-020-CA					0.51	0.84	0.64	179.1-268.6	348	
BC0375-010-CA					0.25	0.80	0.38	50.4-75.6	59	
BC0375-016-CA		9.65	9.93	4.95	4.83	0.41	0.82	0.54	165.3-247.9	368
BC0375-018-CA					0.46	0.83	0.59	177.8-266.7	303	
BC0375-020-CA					0.51	0.82	0.64	240.0-360.0	296	
BC0437-018-CA	11.10	11.13	5.59	5.49	0.45	1.08	0.62	198.3-297.4	324	
BC0437-022-CA					0.55	1.17	0.72	349.1-523.7	510	
BC0500-014-CA					0.35	1.07	0.53	90.5-135.7	245	
BC0500-018-CA		12.75	13.11	6.48	6.35	0.45	1.16	0.64	176.6-264.9	358
BC0500-022-CA					0.55	1.25	0.74	327.3-491.0	660	
BC0500-026-CA					0.65	1.34	0.84	467.0-700.5	693	
BC0562-020-CA	14.27	14.30	4.95	4.83	0.51	1.42	0.77	151.9-227.9	259	
BC0562-030-CA					0.76	1.52	1.03	535.6-803.4	1334	
BC0625-018-CA					0.45	1.36	0.69	140.1-210.1	422	
BC0625-022-CA		16.00	16.28	8.05	7.95	0.55	1.45	0.79	250.8-376.1	746
BC0625-030-CA					0.75	1.63	0.99	594.6-891.9	1295	
BC0625-033-CA					0.85	1.72	1.07	778.4-1167.5	1619	
BC0709-015-CA					0.38	1.70	0.71	914.1-1371.1	2060	
BC0709-020-CA		18.26	18.67	6.48	6.35	0.51	1.80	0.84	112.2-168.2	392
BC0709-025-CA					0.64	1.90	0.96	436.1-654.1	2021	
BC0750-022-CA					0.55	1.64	0.83	253.3-380.0	716	
BC0750-026-CA					0.65	1.73	1.26	271.9-407.9	834	
BC0750-030-CA		19.30	19.46	9.65	9.53	0.75	1.82	1.04	544.2-816.3	1275
BC0750-033-CA					0.85	1.91	1.11	782.5-1173.7	1834	
BC0750-039-CA					1.00	2.05	1.26	815.7-1223.5	2286	
BC0750-043-CA					1.10	2.14	1.37	1462.8-2194.2	3286	
BC0875-030-CA	22.33	22.63	11.23	11.13	0.75	2.02	1.08	489.8-734.7	1157	
BC0875-033-CA					0.85	2.11	1.16	590.2-885.3	1055	
BC0896-015-CA					0.38	2.13	0.8	68.1-102.2	172	
BC0896-020-CA		22.99	23.02	8.13	7.95	0.51	2.26	0.94	118.0-176.9	343
BC0896-025-CA					0.64	2.36	1.07	240.8-361.2	1391	
BC1000-033-CA					0.85	2.30	1.2	582.7-874.0	1709	
BC1000-037-CA		25.53	25.80	12.83	12.70	0.95	2.39	1.3	733.1-1099.7	1766
BC1000-039-CA					1.00	2.43	1.26	952.5-1428.7	2158	
BC1000-043-CA					1.10	2.52	1.45	827.3-1241.0	2570	
BC1070-020-CA		27.15	28.19	10.16	9.53	0.51	2.51	1.01	127.6-191.4	373
BC1070-025-CA					0.64	2.54	1.12	182.5-273.7	1109	

**CAN'T FIND THE SPECIFIC PART YOU ARE  
LOOKING FOR?**

See our Custom Engineered Solutions  
on page 111

**VOUS NE TROUVEZ PAS UNE PIÈCE  
SPÉCIFIQUE ?**

Voir nos solutions de développement sur mesures à  
la page 111

**¿NO ENCUENTRA LA PIEZA ESPECÍFICA  
QUE BUSCA?**

Vea nuestras soluciones de ingeniería  
personalizadas en la página 111

**United Kingdom**

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

**France**

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

**Spain**

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

**Germany**

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de

**CLOVER DOME SPRING WASHERS™ – STAINLESS STEEL**

Part Number	Do (mm)	Dh (mm)	Di (mm)	Dr (mm)	t (mm)	Lo (mm)	L1 (mm)	P1 (N)	Pf (N)
BC0250-008-S	6.35	6.35	3.18	3.18	0.20	0.56	0.29	27.1-40.5	49
BC0250-012-S					0.30	0.66	0.39	78.3-117	151
BC0312-012-S	7.92	7.95	3.63	3.51	0.30	0.81	0.43	81.4-122.4	102
BC0312-018-S					0.46	0.97	0.58	198-299	396
BC0343-014-S					0.36	0.86	0.48	106.3-159.7	156
BC0343-016-S	8.71	8.74	4.29	4.17	0.41	0.91	0.53	118-179	231
BC0343-020-S					0.51	1.02	0.64	231-349	463
BC0375-010-S					0.25	0.79	0.39	48-73	44
BC0375-016-S	9.53	9.53	4.95	4.95	0.41	0.94	0.54	102-155	200
BC0375-018-S					0.46	0.99	0.59	145-220	285
BC0375-020-S					0.51	1.04	0.64	200-302	400
BC0437-018-S	11.10	11.13	5.59	5.59	0.46	1.09	0.62	160.1-240.2	316
BC0437-022-S					0.56	1.19	0.72	363.4-545.4	725
BC0500-014-S					0.36	1.07	0.53	93.9-140.6	160
BC0500-018-S	12.70	12.70	6.48	6.35	0.46	1.17	0.64	127.7-191.7	222
BC0500-022-S					0.56	1.27	0.74	303.4-455.1	596
BC0500-026-S					0.66	1.37	0.84	397.7-596.5	796
BC0562-020-S	14.27	14.30	4.95	4.95	0.51	1.57	0.77	181-274	311
BC0562-030-S					0.76	1.83	1.03	613-926	1210
BC0625-018-S					0.46	1.37	0.69	112.5-169	196
BC0625-022-S	15.88	15.88	8.05	7.95	0.56	1.47	0.79	233.5-350.1	409
BC0625-030-S					0.76	1.68	0.99	626-940.6	1232
BC0625-033-S					0.84	1.75	1.07	677.5-1016	1352
BC0709-015-S					0.38	1.70	0.71	79.2-118.8	120
BC0709-020-S	18.01	18.26	6.48	6.35	0.51	1.83	0.84	151-226.4	249
BC0709-025-S					0.64	1.96	0.97	252.7-379	431
BC0750-022-S					0.56	1.65	0.83	205.5-308.3	351
BC0750-026-S					0.66	1.75	0.93	326.5-489.8	569
BC0750-030-S	19.05	19.05	9.65	9.53	0.76	1.85	1.04	458.2-687.3	899
BC0750-033-S					0.84	1.93	1.11	613.9-920.8	1205
BC0750-039-S					0.99	2.08	1.26	981.7-1472.4	1957
BC0750-043-S					1.09	2.18	1.37	1323.8-1985.7	2642
BC0875-030-S	22.23	22.23	11.23	11.13	0.76	2.03	1.08	409.7-614.7	716
BC0875-033-S					0.84	2.11	1.16	529.3-793.6	1036
BC0896-015-S					0.38	2.06	0.80	76.2-114.3	85
BC0896-020-S	22.76	23.02	8.13	8.00	0.51	2.18	0.93	141.9-212.8	209
BC0896-025-S					0.64	2.31	1.05	241.9-362.9	400
BC1000-033-S					0.84	2.29	1.20	454.6-681.5	792
BC1000-037-S	25.40	25.40	12.83	12.70	0.94	2.39	1.30	672.1-1008.4	1170
BC1000-039-S					0.99	2.44	1.35	822-1233.5	1610
BC1000-043-S					1.09	2.54	1.45	1130.7-1695.7	2215
BC1070-020-S	27.15	28.00	10.16	9.53	0.51	2.46	1.00	141.8-212.7	209
BC1070-025-S					0.64	2.59	1.12	222.3-334.4	347



**FINDEN SIE NICHT, WAS SIE SUCHEN?**  
Weitere Informationen erhalten Sie in unseren benutzerdefinierten Lösungen auf Seite 111.

**NON RIUSCITE A TROVARE IL COMPONENTE SPECIFICO CHE STATE CERCANDO?**  
Consultate le nostre soluzioni tecniche personalizzate a pagina 111

**NÃO CONSEGUE ENCONTRAR A PEÇA ESPECÍFICA QUE PROCURA?**  
Consulte as nossas Soluções de Engenharia Personalizada na página 111

**United Kingdom**

**Tel:** (44) 1386 443366  
**E-mail:** sales@assocspring.co.uk

**France**

**Tel:** (33) 01 30 68 6363  
**E-mail:** info@ressortsspec.com

**Spain**

**Tel:** (34) 945 147542  
**E-mail:** ventas@bgespana.com

**Germany**

**Tel:** (49) 6251 93-3252-04  
**E-mail:** info@asraymond.de



## CURVED SPRING WASHERS

Precision engineered curved washers are available in many stock sizes. These washers are made of finely tempered spring steel with some sizes being made of stainless steel. They come deburred and have had all set removed during manufacture. Curved washers exert relatively light thrust loads and are often used to absorb axial end play.

The rate is approximately linear between 10% and 80% of available deflection.

### FINISH

Standard finish for high carbon steel is plain finish. Stainless steel is supplied in plain finish. On special order, high carbon steel washers may be mechanically plated, a process which substantially reduces the possibility of hydrogen embrittlement.

### MATERIAL

Stainless steel (parts with suffix 'S')  
Commercial - Type 301 per ASTM-A666 (chemical only)

High carbon steel:

Commercial - 1074-1095 per ASTM-A684

### KEY TO DIMENSIONS

$D_o$  = Outside Diameter (max)  
 $D_i$  = Inside Diameter (min)  
 $t$  = Thickness  
 $L_o$  = Free Height (ref only)  
 $L_1$  = Loaded height  
 $P_1$  = Load at  $L_1$  (N) (+/- 15%)  
 $D_h$  = Free fit in hole diameter  
 $D_r$  = Free fit over hole diameter

## RONDELLES SINUS

Disponibilité sur stock en acier à haute teneur en carbone et en acier inoxydable. Les rondelles Sinus de précision sont disponibles sur stock chez Ressorts SPEC en un grand nombre de dimensions. Ces rondelles Sinus sont fabriquées en acier à ressort trempé, à haute teneur en carbone, certaines dimensions étant disponibles en acier inoxydable. Elles sont ébarbées et toute déformation est éliminée lors de leur fabrication. Les rondelles sinus exercent une poussée relativement faible et sont souvent utilisées pour compenser un jeu axial.

Leur raideur est pratiquement linéaire entre 10% et 80% de la course disponible.

### FINITION

Une finition brute est standard pour l'acier à haute teneur en carbone. L'acier inoxydable est fourni avec une finition brute. Par commande spéciale, les rondelles en acier à haute teneur en carbone peuvent être plaquées mécaniquement, un procédé qui réduit énormément les risques de fragilisation par hydrogène.

### MATERIAU

Acier Inoxydable (refs. Avec le suffixe « S ») :  
Commercial – Type 301 / ASTM-A666 (chimique uniquement).

Acier au Carbone :

Commercial - 1074-1095 / ASTM-A684

### INDEX DES MESURES

$D_o$  = Diamètre Extérieur (max)  
 $D_i$  = Diamètre Intérieur (min)  
 $t$  = Epaisseur  
 $L_o$  = Hauteur libre (pour référence)  
 $L_1$  = Hauteur en charge  
 $P_1$  = Charge à  $L_1 \pm 15\%$  Newton  
 $D_h$  = Jeu du diamètre de logement  
 $D_r$  = Jeu du diamètre de l'axe

## ARANDELAS ELASTICAS CURVADAS

Ponemos a su disposición una gran variedad de tamaños estándar de arandelas curvadas. Dichas arandelas se fabrican a partir de acero para resortes finamente templado y algunos tamaños están disponibles en acero inoxidable. Viene sin rebabas y se ha eliminado la flecha durante la fabricación. Las arandelas curvadas ejercen cargas de empuje relativamente ligeras y se utilizan a menudo para absorber el juego axial.

El coeficiente de compresión es aproximadamente lineal entre el 10% y el 80% de la deflexión.

### ACABADO

El acabado estándar para acero alto en carbono es el acabado simple. El acero inoxidable se suministra con el acabado simple. Bajo pedido, las arandelas de acero alto en carbono se pueden revestir mecánicamente, un proceso que reduce de forma substancial la posibilidad de la fisuración por fragilidad por absorción de hidrógeno.

### MATERIAL

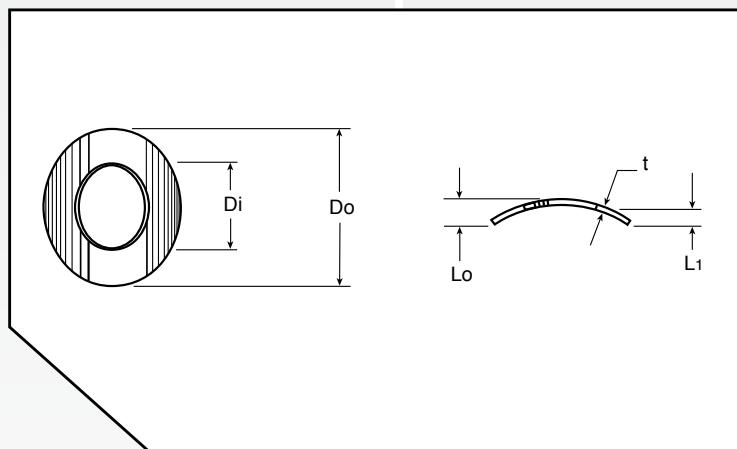
Acero inoxidable (referencia con sufijo "S")  
Comercial - Tipo 301 según ASTM-A666 (solamente químico)

Acero al carbono:

Comercial - 1074-1095 según ASTM-A684

### CLAVES DE CARACTERÍSTICAS

$D_o$  = Diámetro externo (max)  
 $D_i$  = Diámetro interno (min)  
 $t$  = Espesor  
 $L_o$  = Altura libre (referencia solo)  
 $L_1$  = Altura cargada  
 $P_1$  = Carga a deflexión (N) (+/- 15%)  
 $D_h$  = Juego en el diámetro de la cavidad  
 $D_r$  = Juego sobre el diámetro del vástago



## FEDERSCHEIBEN-GEWÜLBT

Gewölbte Federscheiben sind in größere Lagermengen an bereit gehalten. Diese Federscheiben sind aus wärmebehandeltem Federstahl wobei einige Abmessungen aus rostfreiem Stahl hergestellt sind. Die Federscheiben sind entgratet und werden bereits während der Herstellung gesetzt. Federscheiben sind für leichte Lastaufnahmen konstruiert und werden oft für den Außengleich von Axialspiel eingesetzt.

Die Federrate ist linear zwischen 10% und 80% des Federwegs.

### OBERFLÄCHE

Gewöhnlich Oberfläche ist Standard. Gleich für Rostfreierstahl. Als Sonderbestellung, könnten die Federscheiben mechanisch besichtet werden, wobei die Wasserstoffversprödung erheblich reduziert wird.

### WERKSTOFFE

Rostfreierstahl (Bestellnummer mit "S" Nachbuchstabe)  
Commercial - Type 301 nach ASTM-A666 (nur chemisch)

Kohlenstoffstahl:

Commercial - 1774-1095 nach ASTM-A684

### KENNZEICHNEN DER ABMESSUNGEN

$D_o$  = Äußerer Durchmesser (max.)  
 $D_i$  = Innerer Durchmesser (min.)  
 $t$  = Materialdicke  
 $L_o$  = Länge der unbelasteten Tellerfeder  
 $L_1$  = Länge der belasteten Tellerfeder  
 $P_1$  = Federkraft bei Federlänge (N) (+/-15%)  
 $D_h$  = Spielpassung in Hülsendurchmesser  
 $D_r$  = Spielpassung über Dorndurchmesser

## RONDELLE ARCUATE

Le rondelle arcuate di precisione SPEC sono disponibili in numerose dimensioni pronte a magazzino. Le rondelle sono costruite in acciaio temprato ed in alcune dimensioni sono anche disponibili in acciaio inossidabile. Esse vengono fornite sbavate, con eliminazione della deformazione iniziale successiva alla fabbricazione. Le rondelle arcuate esercitano carichi relativamente leggeri e vengono normalmente utilizzate per l'assorbimento di giochi assiali.

Il carico è approssimativamente lineare fra il 10% e l'80% della deflessione.

### FINITURA

Per l'acciaio ad alto contenuto di carbonio viene fornita una finitura standard. Su richiesta, le rondelle in acciaio possono essere placcate meccanicamente, un processo questo, che riduce sostanzialmente le possibilità di fragilità da idrogeno.

### MATERIALE

Acciaio inox (codici con suffisso 'S')  
Commerciale - Tipo 301 per ASTM-A666

Acciaio ad alto contenuto di carbonio  
Commerciale - 1074-1095 per ASTM-A684

### LEGENDA

$D_o$  = Diametro esterno (max)  
 $D_i$  = Diametro interno (min)  
 $t$  = Spessore  
 $L_o$  = Altezza libera (solo riferimento)  
 $L_1$  = Altezza sotto carico  
 $P_1$  = Carico a  $L_1 \pm 15\%$   
 $D_h$  = Diametro sede  
 $D_r$  = Diametro perno

## ANILHAS DE MOLA CURVAS

Associated Springs dispõe de muitos tamanhos standard de anilhas curvas. Estas anilhas são fabricadas em aço para molas com têmpora fina e alguns tamanhos estão disponíveis em aço inoxidável. Estão isentas de rebarbas tendo sido também eliminada a flecha durante o fabrico. As anilhas curvas exercem cargas de encosto relativamente leigeras, utilizando-se com frequência para compensação de folga axial.

A taxa linear está entre 10% a 80% de deflexão

### ACABAMENTO

O acabamento standard para aço de elevado teor de carbono, é o acabamento simples. O aço inoxidável é fornecido com acabamento simples. A pedido, as anilhas em aço de elevado teor de carbono podem ser revestidas mecanicamente, um processo que reduz de forma substancial a possibilidade de fissuras de fragilidade por absorção de hidrogénio.

### MATERIAL

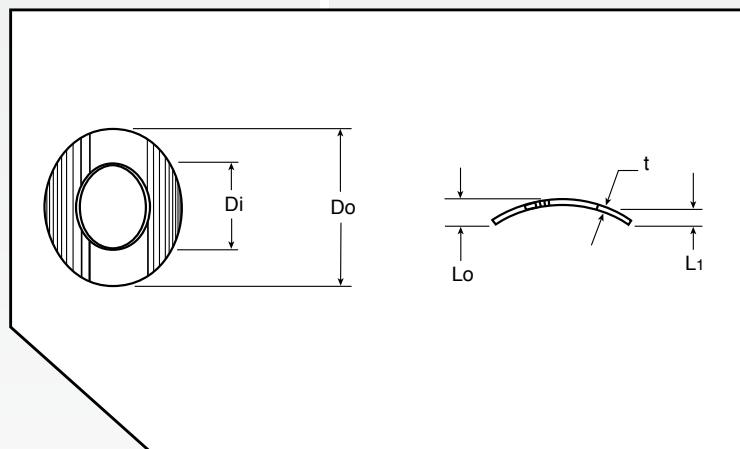
Aço Inoxidável (peças com sufixo 'S')  
Comercial - Tipo 301 por ASTM-A666 (químicos somente)

Alto carbono:

Comercial - 1074-1095 por ASTM-A684

### DIMENSÕES

$D_o$  = Diâmetro exterior (Máx)  
 $D_i$  = Diâmetro interior (Min)  
 $t$  = Espessura  
 $L_o$  = Altura livre aproximada  
 $L_1$  = Altura em carga  
 $P_1$  = Carga a  $L_1 \pm 15\%$  Newtons  
 $D_h$  = Espaço Livre do Furo  
 $D_r$  = Espaço Livre da Haste



### United Kingdom

Tel: (44) 1386 443366

E-mail: sales@assocspring.co.uk

### France

Tel: (33) 01 30 68 6363

E-mail: info@ressortsspec.com

### Spain

Tel: (34) 945 147542

E-mail: ventas@bgespana.com

### Germany

Tel: (49) 6251 93-3252-04

E-mail: info@asraymond.de



**CURVED SPRING WASHERS**

Part Number	Do (mm)	Dh (mm)	Di (mm)	Dr (mm)	t (mm)	Lo (mm)	L1 (mm)	P1 (N)
U093-0045-S	5.46	5.55	2.54	2.36	0.11	0.71	0.38	6.67
U093-0056-S					0.14	0.64	0.38	10.01
U125-0040-S	6.22	6.35			0.10	1.24	0.66	4.45
U125-0050-S	6.86	7.14			0.13	0.97	0.51	6.67
U125-0060-S	6.22	6.35	3.43	3.18	0.15	0.86	0.51	8.9
U125-0072-S	7.80	7.94			0.18	0.94	0.51	17.8
U125-0075-S	6.86	7.14			0.19	0.74	0.46	13.34
U125-0088-S	7.80	7.94			0.22	0.86	0.51	26.7
U138-0045-S	6.89	7.14			0.11	1.32	0.71	5.56
U138-0070-S			3.76	3.51	0.18	0.89	0.56	11.12
U138-0082-S					0.21	0.94	0.53	22.2
U138-0100-S	8.18	8.73			0.25	0.86	0.53	33.4
U164-0050-S					0.13	1.63	0.86	6.67
U164-0075-S					0.19	1.07	0.64	13.34
U164-0090-S			4.42	4.17	0.23	1.12	0.61	26.7
U164-0113	9.40	9.53			0.29	0.99	0.61	40
U164-0113-S					0.29	0.99	0.61	40
U190-0050-S	8.18	8.73	5.16		0.13	1.35	0.66	4.98
U190-0060-S	9.40	9.53	5.08		0.15	1.75	0.89	10.01
U190-0065-S	8.18	8.73	5.16		0.17	1.09	0.64	7.79
U190-0090-S	9.40	9.53	5.08	4.83	0.23	1.19	0.71	20
U190-0113			5.08		0.29	1.19	0.69	40
U190-0113-S					0.29	1.19	0.69	40
U190-0140	10.74	11.11			0.36	1.09	0.69	60.1
U216-0065-S			5.87		0.17	2.06	1.07	11.12
U216-0100-S				5.49	0.25	1.35	0.81	22.2
U216-0120	12.45	12.7	5.87		0.30	1.45	0.81	44.5
U216-0150					0.38	1.27	0.81	66.7
U250-0065-S	10.74	11.11	6.83		0.17	1.78	0.94	7.78
U250-0075-S	12.45	12.7	6.73		0.19	2.31	1.17	15.57
U250-0082-S	10.74	11.11	6.83		0.21	1.4	0.81	11.12
U250-0110	12.45	12.7		6.35	0.28	1.6	0.86	31.1
U250-0110-S					0.28	1.6	0.86	31.1
U250-0145			6.73		0.37	1.52	0.86	62.3
U250-0185					0.47	1.32	0.86	93.4
U250-0185-S	14.00	14.29			0.47	1.32	0.86	93.4
U281-0085-S			7.52	7.14	0.22	2.57	1.4	17.8
U281-0120					0.30	1.78	0.97	35.6
U312-0075-S	12.45	12.7	8.41		0.19	1.96	1.04	10.01
U312-0090-S	15.54	15.88	8.31		0.23	2.87	1.52	20
U312-0110	12.45	12.7	8.41		0.28	1.57	0.89	20
U312-0110-S				7.92	0.28	1.57	0.89	20
U312-0130	15.54	15.88	8.31		0.33	1.96	1.07	40
U312-0130-S					0.33	1.96	1.07	40
U312-0170	18.67	19.05	8.31		0.43	1.93	1.17	66.7
U312-0210					0.53	1.78	1.14	100.1
U343-0100-S	17.07	17.46	9.22	8.71	0.25	3.05	1.6	24.5
U343-0150					0.38	2.06	1.19	48.9
U375-0090-S	15.45	15.88	10.16		0.23	2.49	1.42	13.34
U375-0100-S	17.07	17.46			0.25	2.92	1.5	20
U375-0110	18.67	19.05	10.03		0.28	3.28	1.85	26.7
U375-0110-S				9.53	0.28	3.28	1.85	26.7
U375-0130	15.45	15.88	10.16		0.33	1.88	1.09	26.7
U375-0150	17.07	17.46			0.38	2.01	1.17	40
U375-0160	18.67	19.05	10.03		0.41	2.18	1.27	53.4
U375-0160-S					0.41	2.18	1.27	53.4
U437-0100-S	17.07	17.46	11.86		0.25	2.92	1.52	16.68
U437-0120	21.77	22.23	11.73		0.30	3.86	2.01	33.4
U437-0150	17.07	17.45	11.86		0.38	2.13	1.14	33.4
U437-0150-S				11.1	0.38	2.13	1.14	33.4
U437-0180	21.77	22.23	11.73		0.46	2.54	1.45	66.7
U437-0180-S					0.46	2.54	1.45	66.7
U437-0210	24.89	24.89	11.73		0.53	2.72	1.55	100.1
U500-0113	20.20	20.64	13.48		0.29	3.28	1.75	22.2
U500-0140	24.89	24.89	13.34		0.36	4.17	2.11	44.5
U500-0170	20.20	20.64	13.48		0.43	2.49	1.37	44.5
U500-0180	24.89	24.89		12.7	0.46	3.33	1.85	66.7
U500-0210			13.34		0.53	2.79	1.6	89
U500-0210-S	24.89	24.89			0.53	2.79	1.6	89
U500-0211	31.12	31.12			0.53	3.84	2.16	111.2
U562-0120-S	21.77	22.23	15.19	14.27	0.30	3.68	1.88	24.5

**CURVED SPRING WASHERS**

<b>Part Number</b>	<b>D<sub>o</sub> (mm)</b>	<b>D<sub>h</sub> (mm)</b>	<b>D<sub>i</sub> (mm)</b>	<b>D<sub>r</sub> (mm)</b>	<b>t (mm)</b>	<b>L<sub>o</sub> (mm)</b>	<b>L<sub>1</sub> (mm)</b>	<b>P<sub>1</sub> (N)</b>
U562-0180	21.77	22.23	15.19	14.27	0.46	2.79	1.5	48.9
U562-0180-S					0.46	2.79	1.5	48.9
U625-0140	24.89	24.89	16.84	15.88	0.36	4.29	2.34	31.1
U625-0210					0.53	3	1.7	62.3
U750-0160					0.41	4.7	2.49	35.6
U750-0210	28.02	28.58	20.32	19.05	0.53	3.51	1.75	53.4
U750-0210-S					0.53	3.51	1.75	53.4



## WAVE SPRING WASHERS

Wave spring washers are normally used in thrust-loading applications for small deflections, particularly where radial space is limited. A typical example is the axial loading of ball bearings.

The rate is approximately linear between 20% and 80% of available deflection.

### MATERIAL

Stainless steel (parts with suffix 'R' or 'S')  
Commercial – Type 302  
Government per AMS 5906 (chemical only) – Type 302

High Carbon Steel  
Part W0367-006 to W0855-010  
Commercial – 1074-1095 certified to ASTM-A684  
Part W0925-010 to W7325-065  
Commercial – 1074-1095 certified to ASTM-A684

### FINISH

Washers carried in stock are in plain finish suitable for various types of finishes: either with electroplated or mechanically plated, a process which reduces the possibility of hydrogen embrittlement.

### KEY TO DIMENSIONS

\*Do = Outside Diameter  
\*Di = Inside Diameter  
t = Thickness  
Lo = Free Height (ref only)  
L<sub>1</sub> = Loaded Height  
P<sub>1</sub> = Load at flat (Pf)

\*Blank size before forming

## RONDELLES ONDULEES

Fabriquées en acier à haute teneur en carbone, les rondelles ondulées SPEC sont spécialement utilisées pour compenser une charge axiale sous une déflexion minimale, surtout si l'espace radial est limité. L'exemple type est celui du chargement axial d'un roulement à billes.

Leur raideur est pratiquement linéaire entre 10% et 80% de la course disponible.

### MATÉRIAU

Acier Inoxydable (refs. Avec le suffixe 'R' ou 'S')  
Commercial – Type 302 – AMS 5906 (chimique uniquement).

Acier à haute teneur en Carbone  
Ref. W0367-006 à W0855-010:  
Commercial – 1074-1095 selon ASTM-A684  
Ref. W0925-010 à W7325-065:  
Commercial – 1074-1095 selon ASTM-A684

### FINITION

Les rondelles tenues en stock ont une finition brute mais des traitements de surface sont possibles : placage électrolytique ou mécanique pour prévenir les risques de fragilisation par hydrogène.

### INDEX DES MESURES

\*Do = Diamètre extérieur  
\*Di = Diamètre intérieur  
t = Epaisseur  
Lo = Hauteur libre (pour référence)  
L<sub>1</sub> = Hauteur en charge  
P<sub>1</sub> = Charge à plat (approx.)

\*Dimensions avant mise en forme

## ARANDELAS ELÁSTICAS ONDULADAS

Fabricadas en acero alto en carbono, las arandelas elásticas onduladas se utilizan habitualmente en aplicaciones con cargas axiales para pequeñas deflexiones, especialmente donde el espacio radial es limitado. Un ejemplo típico es la carga axial en rodamientos a bolas.

El coeficiente de compresión es aproximadamente lineal entre el 10% y el 80% de la deflexión.

### MATERIAL

Acero inoxidable (referencia con sufijo "R" ó "S")  
Comercial – Tipo 302  
Gubernamental según AMS 5906 (solo químico) – Tipo 302

Acero al carbono:

Referencia W0367-006 a W0855-010  
Comercial – 1074-1095 según ASTM-A684  
Referencia W0925-010 a W7325-065  
Comercial – 1074-1095 según ASTM-A684

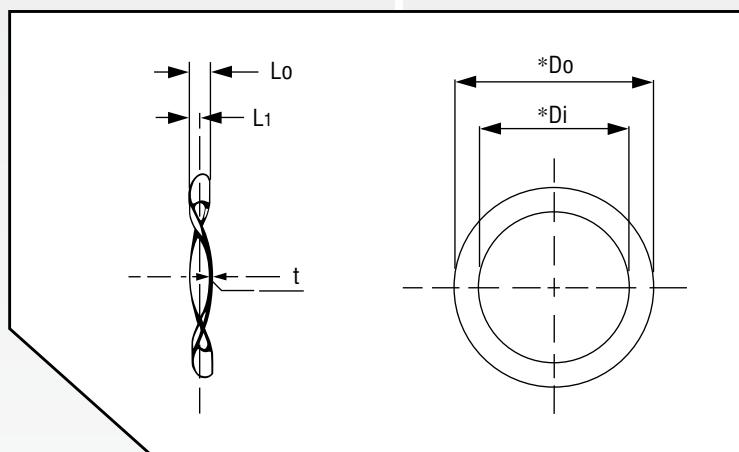
### ACABADO

Bajo pedido, las arandelas de acero alto en carbono se pueden tratar electromecánicamente o mecánicamente, un proceso que reduce de forma substancial la posibilidad de la fisuras por absorción de hidrógeno.

### CLAVES DE CARACTERÍSTICAS

\*Do = Diámetro externo  
\*Di = Diámetro interno  
t = Espesor  
Lo = Altura libre (referencia sólo)  
L<sub>1</sub> = Altura de carga  
P<sub>1</sub> = Carga a posición plana (Pf)

\*Dimensiones antes de carga



## GEWELLTE FEDERSCHEIBEN

Gewellte Federscheiben werden normalerweise bei Anwendungen mit Längskräfte für kurze Federwegen verwendet, besonders wo Radialplatz eng ist. Ein gutes Beispiel ist die Längskräfte bei Kugellagern.

Die Federrate ist lineal zwischen 10% und 80% des Federwegs.

### WERKSTOFFE

Rostfreierstahl (Bestellnummer mit "R" oder "S")

Nachbuchstabe)

Commercial – Type 302

Government nach AMS 5906 (nur chemisch) – Type 302

### Kohlenstoffstahl

Bestellnummer W0367-006 bis W0855-010

Commercial – 1774-1095 nach ASTM-A684

Bestellnummer W0925-010 bis W7325-065

Commercial – 1774-1095 nach ASTM-A684

### OBERFLÄCHE

Gewöhnlich Oberfläche ist Standard. Als Sonderbestellung, könnten die Federscheiben mechanisch oder elektromechanisch besichtet werden, wobei, die Wasserstoffversprödung erheblich reduziert wird.

### KENNZEICHNEN DER ABMESSUNGEN

\*Do = Äußerer Durchmesser

\*Di = Innerer Durchmesser

t = Materialdicke

Lo = Unbelastete Länge (approx.)

L<sub>1</sub> = Länge der belasteten Tellerfeder

P<sub>1</sub> = Federkraft bei flacher Stellung (Pf)

\* Durchmesser vor Biegung

## RONDELLE ONDULATE

Costruite in acciaio ad alto contenuto di carbonio, le rondelle ondulate sono ampiamente utilizzate per applicazioni di spinta con piccole deflessioni, particolarmente quando lo spazio radiale è limitato. Un tipico esempio è il carico assiale di un cuscinetto a sfera.

Il carico è approssimativamente lineare fra il 20% e l'80% della deflessione

### MATERIALE

Acciaio inox (codici con suffisso 'R' o 'S')

Commercial – Type 302 per AMS 5906

Governativo pae AMS 5906 – Tipo 302

Acciaio ad alto contenuto di carbonio

Codici da W0367-006 a W0855-010

Commerciale – 1074-1095 certificato per ASTM-A684

Codici da W0925-010 a W7325-065

Commerciale – 1074-1095 certificato per ASTM-A684

### FINITURA

Le rondelle disponibili a magazzino sono grezze. Sono fornibili con varie finiture su richiesta.

### LEGENDA

\*Do = Diametro esterno

\*Di = Diametro interno

t = Spessore

Lo = Altezza libera (solo riferimento)

L<sub>1</sub> = Altezza in carico

P<sub>1</sub> = Carico a pacco (Pf) (approssimativo)

\*molla a riposo

## ANILHAS DE MOLA ONDULADAS

Fabricadas em aço com um elevado teor de carbono, as anilhas de mola onduladas da SPEC, utilizam-se habitualmente em aplicações de compensação de folga axial com pequenas deflexões, em especial em situações em que o espaço radial é limitado. Um exemplo típico é da carga axial de rolamentos de esferas.

A taxa linear esta entre 10% a 80% de deflexão

### MATERIAL

Aço Inoxidável (peças com sufixo 'R' ou 'S')

Comercial – Tipo 302

Oficial AMS 5906 (para produtos Químicos) – Tipo 302

Aço alto carbono

De W0367-006 a W0855-010

Comercial – 1074-1095 certificado to ASTM-A684

De W0925-010 a W7325-065

Comercial – 1074-1095 certificado a ASTM-A684

### ACABAMENTO

Anilhas em estoque são de acabamento pleno e servem para varios tipos de acabados: podem ser Folheados eletricamente ou mecanicamente , processo este que reduz desgaste prematuro.

### LEGENDA

\*Do = Diâmetro exterior

\*Di = Diâmetro interior

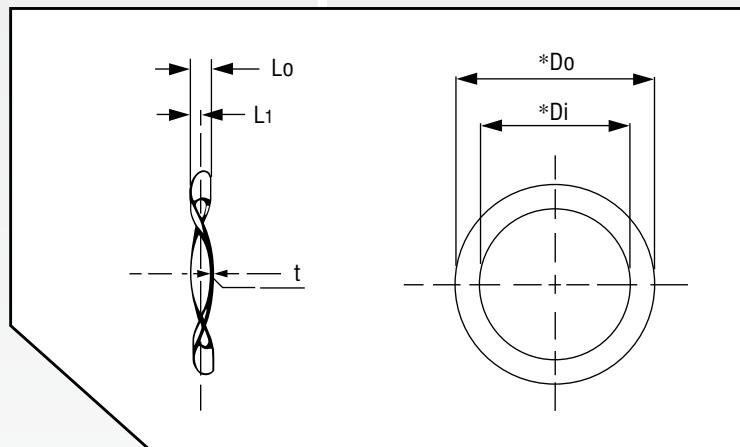
t = Espessura

Lo = Altura livre (só para efeitos de referência)

L<sub>1</sub> = Altura em carga

P<sub>1</sub> = Carga a L<sub>1</sub>

\*Espaço em branco antes da dobra



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



**STOCK WAVE SPRING WASHERS**

Part Number	Do (mm)	Di (mm)	t (mm)	Lo (mm)	L1 (mm)	P1 (N)
W0183-004-S	4.65	3.40	0.09	0.58	0.30	1.1-2.2
W0242-006-S	6.15	4.93	0.14	0.76	0.38	2.2-4.4
W0305-007-S	7.75	6.17	0.17	0.76	0.38	2.2-4.4
W0367-006	9.32	6.73	0.15	0.76	0.38	9-18
W0367-006-S	9.32	6.73	0.15	0.76	0.38	9-18
W0484-009	12.29	10.08	0.23	0.74	0.51	13-22
W0492-007	12.50	8.89	0.18	0.89	0.51	13-22
W0492-007-S	12.50	8.89	0.18	0.89	0.51	13-22
W0608-008	15.44	11.66	0.20	0.94	0.64	13-22
W0608-008-S	15.44	11.66	0.20	0.94	0.64	13-22
W0618-008	15.70	11.18	0.20	1.02	0.64	13-22
W0618-008-S	15.70	11.18	0.20	1.02	0.64	13-22
W0731-009	18.57	14.94	0.23	1.19	0.76	13-22
W0734-009	18.64	13.49	0.23	1.27	0.76	18-31
W0734-009-S	18.64	13.49	0.23	1.27	0.76	18-31
W0855-010	21.72	16.51	0.25	1.52	0.76	18-31
W0855-010-S	21.72	16.51	0.25	1.52	0.76	18-31
W0925-010	23.50	18.26	0.25	1.68	0.84	27-40
W0925-010-S	23.50	18.26	0.25	1.68	0.84	27-40
W1004-011	25.50	19.81	0.27	1.80	0.89	31-45
W1004-011-S	25.50	19.81	0.27	1.80	0.89	31-45
W1080-012	27.43	21.31	0.29	1.85	0.91	36-53
W1102-012	27.99	21.74	0.30	1.91	0.94	40-58
W1159-013	29.44	22.89	0.33	2.03	1.02	44-62
W1235-014	31.37	24.41	0.36	2.21	1.09	53-80
W1351-015	34.32	26.70	0.38	2.51	1.24	67-93
W1351-015-S	34.32	26.70	0.38	2.51	1.24	62-89
W1543-017	39.19	30.51	0.43	2.67	1.32	76-111
W1543-020	39.19	30.51	0.51	3.18	1.57	111-165
W1593-018	40.46	31.47	0.46	2.79	1.40	89-125
W1621-019	41.17	32.03	0.47	2.84	1.42	93-133
W1819-020	46.20	35.66	0.51	3.18	1.57	111-156
W2026-022	51.51	40.01	0.56	3.56	1.75	129-182
W2132-023	54.15	42.11	0.58	3.76	1.85	138-200
W2420-025	61.47	47.55	0.64	4.27	2.08	165-236
W2645-028	67.18	52.25	0.71	4.67	2.29	209-298
W2816-030	71.53	55.88	0.76	5.00	2.46	236-343
W3118-035	79.20	61.47	0.89	5.26	2.64	320-463
W3328-036	84.53	66.12	0.91	5.77	2.84	329-472
W3519-038	89.38	69.60	0.97	5.94	2.95	365-525
W3917-042	99.49	77.39	1.07	6.55	3.25	436-632
W4300-045	109.22	85.60	1.14	7.67	3.76	512-734
W4627-047	117.53	91.74	1.19	8.48	4.11	578-836
W4997-050	126.92	98.81	1.27	9.02	4.37	645-930
W5408-053	137.36	106.88	1.35	9.86	4.75	721-1032
W5817-055	147.75	115.06	1.40	11.18	5.31	792-1139
W6173-058	156.79	122.00	1.47	11.76	5.59	872-1254
W6550-061	166.37	130.05	1.55	12.60	5.97	930-1339
W6945-063	176.40	137.36	1.60	13.67	6.43	1028-1481
W7325-065	186.06	144.07	1.65	14.61	6.83	1112-1601



NOTES



151

**UK**
**WAVE SPRING WASHERS -  
COMPRESSION TYPE**

Compression type wave washers are normally used in thrust loading applications for medium deflections. These washers have a higher free height and load than precision wave washers (as above). During initial installation the compression washers will take a slight set. Subsequent set after initial is minimal.

**MATERIAL**

AISI 1070 Carbon steel

**FINISH**

Washers carried in stock are in plain finish suitable for various types of finishes: either electroplated or mechanically plated, a process which reduces the possibility of hydrogen embrittlement.

**KEY TO DIMENSIONS**

Db = Ball bearing Diameter  
 \*Do = Outside Diameter  
 \*Di = Inside Diameter  
 t = Thickness  
 Lo = Free Height (ref only)  
 L<sub>1</sub> = Loaded height  
 R = N/mm  
 Pf = Load at flat (approx)  
 Wx = Number of waves

\*Blank size before forming

**F**
**RONDELLES ONDULEES –  
TYPE COMPRESSION**

Ce type de rondelles ondulées est habituellement utilisé pour des applications de charges axiales à déflections moyennes. Ces rondelles ont une hauteur libre et une charge plus élevées que pour les rondelles ondulées de précision. Pendant l'installation initiale, les rondelles perdent légèrement de la hauteur. Par la suite, la perte est minimale.

**MATERIAU**

Acier au Carbone – AISI 1070

**FINITION**

Les rondelles tenues en stock ont une finition brute mais des traitements de surface sont possibles : placage électrolytique ou mécanique pour prévenir les risques de fragilisation par hydrogène.

**INDEX DES MESURES**

Db = Diamètre du roulement à billes  
 \*Do = Diamètre extérieur  
 \*Di = Diamètre intérieur  
 t = Epaisseur  
 Lo = Hauteur libre (pour référence)  
 L<sub>1</sub> = Hauteur en charge  
 R = N/mm  
 Pf = Charge à plat (approx.)  
 Wx = Nombre d'ondulations

\*Dimensions avant mise en forme

**E**
**ARANDELAS ONDULADAS  
DE COMPRESIÓN**

Los arandelas onduladas de compresión se utilizan habitualmente en aplicaciones con fuerzas axiales en deflexiones medianas. Estas arandelas proporcionan una altura libre y una fuerza mayores que las arandelas onduladas normales (ver sección). Durante la instalación inicial, las arandelas de compresión sufrirán una pequeña pérdida de altura. Posteriormente a este montaje inicial, la pérdida de altura es mínima.

**MATERIAL**

Acero al carbono según AISI 1070

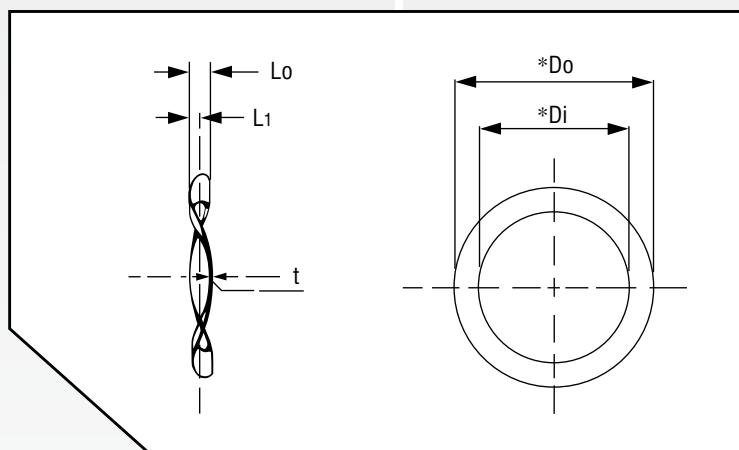
**ACABADO**

Las arandelas disponibles en stock pueden suministrarse con acabado electromecánico o mecánico bajo pedido, un proceso que reduce la posibilidad de fisuras por hidrógeno.

**CLAVES DE CARACTERÍSTICAS**

Db = Diámetro del rodamiento a bolas  
 \*Do = Diámetro externo  
 \*Di = Diámetro interno  
 t = Espesor  
 Lo = Altura libre (referencia sólo)  
 R = N/mm  
 L<sub>1</sub> = Altura cargada  
 Pf = Carga a deflexión (aprox.)  
 Wx = Número de olas

\*Dimensiones antes de carga

**United Kingdom**

**Tel:** (44) 1386 443366  
**E-mail:** sales@assocspring.co.uk

**France**

**Tel:** (33) 01 30 68 6363  
**E-mail:** info@ressortsspec.com

**Spain**

**Tel:** (34) 945 147542  
**E-mail:** ventas@bgespana.com

**Germany**

**Tel:** (49) 6251 93-3252-04  
**E-mail:** info@asraymond.de

## GEWELLTE DRUCKFEDERSCHEIBEN

Gewellte Druckfegerscheiben werden normalerweise bei Anwendungen mit Längskräfte für mittel Federwegen verwendet. Sie bieten eine grossere unbelastete Länge und Kraft als gewöhlte Federscheiben an (siehe oben). Am Anfang werden die Druckfegerscheiben leicht gesetz. Danach, die Setzung bleibt minimal.

### WERKSTOFFE

Kohlenstoffstahl nach AISI1070

### OBERFLÄCHE

Gewöhnlich Oberfläche ist Standard. Als Sonderbestellung, könnten die Federscheiben mechanisch oder elektromechanisch besichtetet werden, wobei, die Wasserstoffversprödung erheblich reduziert wird.

### KENNZEICHNEN DER ABMESSUNGEN

Db = Kugellager-Durchmesser  
 \*Do = Äußerer Durchmesser  
 \*Di = Innerer Durchmesser  
 t = Materialdicke  
 Lo = Unbelastete Länge (approx.)  
 R = N/mm  
 L<sub>1</sub> = Belastete Länge  
 Pf = Federkraft bei Federlänge (approx.)  
 Wx = Anzahl der Wellen

\* Durchmesser vor Biegung

## RONDELLE ONDULATE – ANELLI DI COMPENSAZIONE

Questo tipo di rondella ondulata è normalmente utilizzata in applicazioni dove il carico viene applicato ad una media deflessione. Hanno un altezza libera ed un carico maggiore rispetto alle normali rondelle ondulate. Durante i primi cicli queste rondelle si assestano leggermente, successivamente l'assestamento sarà minimo.

### MATERIALE

AISI 1070 Acciaio al carbonio

### FINITURA

Le rondelle disponibili a magazzino sono grotte. Sono fornibili con varie finiture su richiesta.

### LEGENDA

Db = Diametro del cuscinetto a sfera  
 \*Do = Diametro esterno  
 \*Di = Diametro interno  
 t = Spessore  
 Lo = Altezza libera (solo riferimento)  
 R = N/mm  
 L<sub>1</sub> = Altezza in carico  
 Pf = Carico a pacco (approssimativo)  
 Wx = Numero di onde

\*molla a riposo

## ANILHAS ONDULADAS DO TIPO COMPRESSÃO

As Anilhas de onduladas de compressão são para aplicações de deflexão media. Essa anilhas tem uma altura livre e carga maiores das anilhas de precisão. Durante a instalação inicial, as anilhas terão um ajuste mais apertado, depois da instalação, terá um mínimo de diferença.

### MATERIAL

AISI 1070 Aço Carbono.

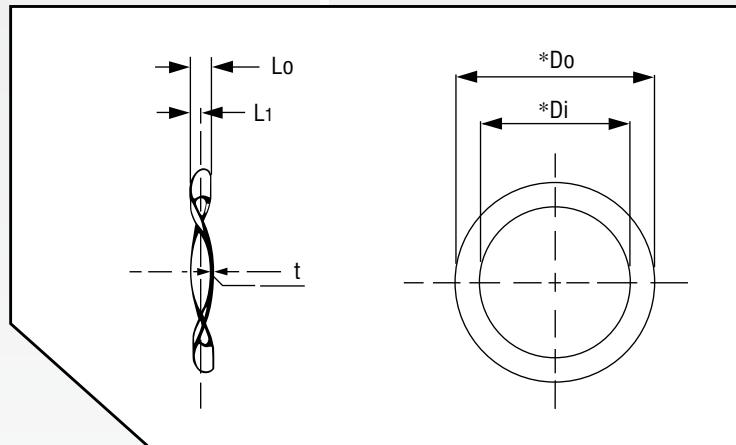
### ACABAMENTO

As anilhas em estoque tem acabamento pleno : podem ser folhados eletricamente ou mecanicamente , este processo diminuem a possibilidade de fragilização.

### LEGENDA

Db = Diâmetro do Rolamento  
 \*Do = Diâmetro Externo  
 \*Di = Diâmetro Interno  
 t = Espessura  
 Lo = Altura livre (só para efeitos de referência)  
 R = N/mm  
 L<sub>1</sub> = Carga de trabalho  
 Pf = Carga máxima (approx)  
 Wx = Número de ondas

\*Espaço vazio antes da dobragem



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



**STOCK WAVE SPRING WASHERS – COMPRESSION TYPE**

Part Number	Db (mm)	Do (mm)	Di (mm)	T (mm)	Lo (mm)	R (N/mm)	Pf (N)	Wx
W0386-008	10	9.8	6.2	0.20	1.20	23.9	23.9	3
W0472-008	13	12.0	7.2	0.20	1.40	127.5	196.1	3
W0622-006	16	15.8	10.5	0.15	1.40	127.5	166.7	3
W0622-012	16	15.8	10.5	0.30	1.50	230.5	343.2	3
W0669-012	18	17.0	12.0	0.30	1.50	117.7	156.9	3
W0740-008	19	18.8	13.2	0.20	1.60	63.7	245.2	3
W0740-012	19	18.8	11.4	0.30	1.60	294.2	490.3	3
W0858-008	22	21.8	15.8	0.20	2.50	29.4	392.3	3
W0858-008A	22	21.8	15.8	0.20	1.60	44.1	112.8	3
W0858-010	22	21.8	15.8	0.25	3.00	29.4	147.1	3
W0858-012	22	21.8	14.0	0.30	1.60	147.1	343.2	3
W0858-012A	22	21.8	15.8	0.3	2.35	39.2	392.3	3
W0937-008	24	23.8	17.5	0.2	1.70	34.3	117.7	3
W0937-012	24	23.8	17.5	0.30	1.70	98.1	181.4	3
W1016-012	26	25.8	19.3	0.30	1.70	78.5	176.5	3
W1016-020	26	25.8	19.3	0.50	1.70	294.2	451.1	3
W1094-012	28	27.8	21.0	0.30	1.70	53.9	107.9	3
W1094-012F	28	27.8	20.0	0.30	3.00	53.9	176.5	3
W1094-020	28	27.8	21.0	0.50	1.70	294.2	539.4	3
W1169-008	30	29.7	22.5	0.20	1.70	16.7	39.2	3
W1169-012	30	29.7	22.5	0.30	1.80	53.9	127.5	3
W1169-016	30	29.7	22.5	0.40	1.60	191.2	259.9	3
W1169-020	30	29.7	22.5	0.50	2.00	230.5	559	3
W1220-012	32	31.0	26.5	0.30	2.70	24.5	147.1	3
W1220-016	32	31.0	26.5	0.40	2.00	49.0	205.9	3
W1248-014	32	31.7	24.5	0.35	2.20	53.9	255	3
W1248-016	32	31.7	26.5	0.40	2.00	44.1	166.7	3
W1248-020	32	31.7	26.5	0.50	2.40	98.1	382.5	3
W1252-012	32	31.8	23.0	0.30	3.50	53.9	215.7	3
W1358-016	35	34.5	28.0	0.40	3.00	58.8	539.4	3
W1358-016F	35	34.5	28.3	0.40	4.00	44.1	441.3	3
W1358-020	35	34.5	24.5	0.50	2.50	588.4	1176.8	4
W1358-020B	35	34.5	28.0	0.50	3.00	103	539.4	3
W1374-012	35	34.9	25.0	0.30	2.00	166.7	382.5	4
W1437-012	37	36.5	30.2	0.30	2.50	53.9	147.1	4
W1437-020	37	36.5	30.2	0.50	2.50	147.1	490.3	4
W1539-016	40	39.1	33.0	0.40	2.70	107.9	343.2	4
W1539-020	40	39.1	33.0	0.50	3.00	156.9	637.4	4
W1539-020A	40	39.1	33.0	0.50	4.00	186.3	666.9	4
W1567-012	40	39.8	33.3	0.30	3.00	44.1	225.6	4
W1567-016	40	39.8	30.0	0.40	5.00	49.0	431.5	3
W1575-020	42	40.0	30.0	0.50	3.00	205.9	676.7	4
W1614-014	42	41.0	34.5	0.35	3.00	58.8	255	4
W1772-020F	47	45.0	37.0	0.50	3.00	250.1	706.1	5
W1772-020	47	45.0	37.0	0.50	3.00	147.1	637.4	4
W1831-016	47	46.5	40.0	0.40	3.00	68.6	333.4	4
W1831-020	47	46.5	40.0	0.50	3.00	137.3	539.4	4
W1846-020	47	46.9	37.0	0.50	2.00	235.4	843.4	4
W2008-016	52	51.0	42.0	0.40	3.50	132.4	701.2	4
W2008-016H	52	51.0	44.0	0.40	3.50	53.9	343.2	4
W2008-020	52	51.0	42.0	0.50	3.50	210.8	1274.9	5
W2039-016G	52	51.8	41.0	0.40	4.00	98.1	637.4	4
W2039-016	52	51.8	41.0	0.40	2.00	83.4	181.4	4
W2039-020E	52	51.8	41.0	0.50	3.50	323.6	931.6	5
W2039-020	52	51.8	41.0	0.50	2.00	127.5	225.6	4
W2157-020	55	54.8	46.9	0.50	2.00	49.0	323.6	4
W2157-020A	55	54.8	46.9	0.50	3.50	68.6	353	4
W2244-020	58	57.0	48.0	0.50	3.50	156.9	490.3	4
W2402-016	62	61.0	51.0	0.40	3.50	127.5	372.7	4
W2402-020	62	61.0	51.0	0.50	3.50	313.8	931.6	5
W2402-020A	62	61.0	51.0	0.50	4.00	98.1	559	4
W2402-024	62	61.0	51.0	0.60	3.50	313.8	1274.9	5
W2437-020	62	61.9	50.0	0.50	4.00	137.3	1127.8	4
W2476-016	62	62.9	54.2	0.40	3.70	58.8	343.2	4
W2657-024	68	67.5	55.0	0.60	4.00	147.1	657	4
W2795-016	72	71.0	61.0	0.40	3.50	83.4	323.6	5
W2795-020A	72	71.0	61.0	0.50	4.00	58.8	367.7	4
W2795-020	72	71.0	61.0	0.50	3.50	122.6	559	5
W2795-031	72	71.0	61.0	0.80	4.00	509.9	1716.2	5
W2827-024	72	71.8	58.0	0.60	4.00	166.7	686.5	4
W2945-024	75	74.8	66.0	0.60	4.00	73.5	343.2	4

**STOCK WAVE SPRING WASHERS – COMPRESSION TYPE**

Part Number	Db (mm)	Do (mm)	Di (mm)	T (mm)	Lo (mm)	R (N/mm)	Pf (N)	Wx
W3110-020	80	79	71	0.50	3.5	68.6	255	5
W3110-024	80	79	71	0.60	3.5	264.8	863	6
W3110-031	80	79	71	0.80	4	509.9	1716.2	6
W3142-028	80	79.8	64	0.70	4	255	980.7	4
W3307-020	85	84	74	0.50	3.6	73.5	323.6	5
W3307-024	85	84	74	0.60	3.5	279.5	1078.7	6
W3504-020	90	89	79	0.50	3.5	156.9	539.4	6
W3504-024	90	89	79	0.60	3.5	245.2	764.9	6
W3535-031	90	89.8	72	0.80	4	333.4	1323.9	4
W3898-020	100	99	89	0.50	4	98.1	451.1	6
W3898-024	100	99	89	0.60	3.5	196.1	647.2	6
W3929-035	100	99.8	82	0.90	4	343.2	1078.7	4
W4291-020	110	109	99	0.50	4.5	147.1	637.4	7
W4291-024	110	109	99	0.60	4.5	230.5	1147.4	7
W4291-028	110	109	99	0.70	4.5	323.6	1667.1	7
W4291-039	110	109	90	1.00	4	220.6	1225.8	4
W4685-031	120	119	104	0.80	4	480.5	1716.2	6
W4921-031	125	125	109	0.80	4	441.3	1471	6
W5079-031	130	129	110	0.80	4	441.3	1471	6
W5472-035	140	139	121	0.90	4	421.7	1569.1	6
W5866-035	150	149	126	0.90	4	490.3	1471	6
W6260-039	160	159	137	1.00	4	402.1	1618.1	6
W6654-039	170	169	147	1.00	4	568.8	1716.2	6



## SPLIT WAVE SPRING WASHERS

Associated Spring RAYMOND Wave spring washers provide medium loads in a small axial space. This series has ends that overlap, in other words the two ends of the material strip lay on top of each other. This open construction with some overlap allows the ends to move during compression, which if constrained in a bore prevents binding.

Applications with AQL requirements should contact ASR Engineering.

Standard parts are available in stainless steel & carbon steel.

Common applications for this type of parts is adjacent to smaller bearings, where shaft take up or thermal expansion & contraction accommodation is required. The overlap is advantageous for such applications where the bore is made of softer material than the spring and the material thickness of the spring is relatively small.

### KEY TO DIMENSIONS

Do	= Outside Diameter, max
Di	= Inner Diameter
t	= Material Thickness
H	= Free Height Approx
H1	= Load at Height
L1	= Load at L1
N	= Number of waves

## RONDELLAS ONDULÉES FENDUES

Les rondelles élastiques Associated Spring RAYMOND fournissent des charges moyennes dans un petit espace axial. Cette série présente des extrémités qui se chevauchent. En d'autres termes, les deux extrémités de la bande de matériau reposent l'une sur l'autre. Cette construction ouverte avec chevauchement permet aux extrémités de se déplacer lors de la compression, ce qui, si elle est contrainte dans un alésage, empêche la liaison.

Pour les applications avec exigences AQL, il est nécessaire de contacter ASR Engineering.

Les pièces standard sont disponibles en acier inoxydable et en acier au carbone.

Ce type de pièces est généralement utilisé à côté de petits roulements, lorsqu'il est nécessaire de ménager de la place pour la montée en charge ou la dilatation/contraction thermique. Le chevauchement est un avantage dans les cas où l'alésage est réalisé dans un matériau plus mou que le ressort et où l'épaisseur du matériau du ressort est relativement faible.

### INDEX DES DIMENSIONS

Do	= Diamètre extérieur, max
Di	= Diamètre intérieur
t	= Épaisseur du matériau
H	= Hauteur libre approx.
H1	= Charge en hauteur
L1	= Charge à L1
N	= Nombre d'ondes

## ARANDELAS ELÁSTICAS ONDULADAS PARTIDAS

Las arandelas elásticas onduladas de Associated Spring RAYMOND proporcionan cargas medias en un espacio axial pequeño. Esta serie dispone de extremos que se solapan, es decir, los dos extremos de la banda del material se apoyan uno sobre el otro. Esta estructura abierta con superposición permite a los extremos moverse durante la compresión, evitando que se doblen si se fuerzan en un rodamiento.

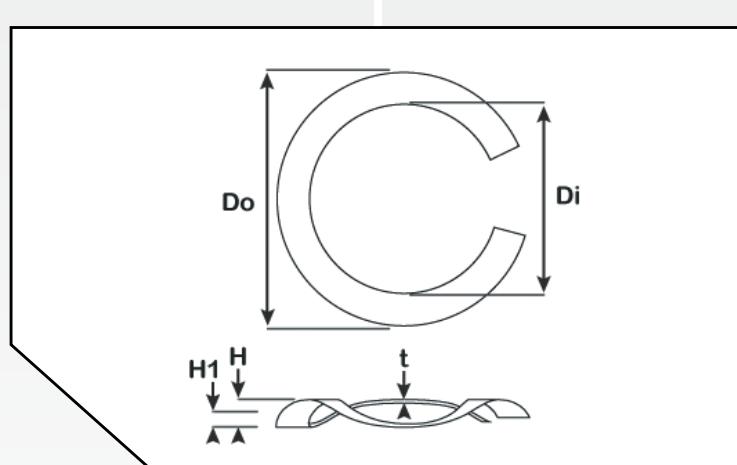
Para aplicaciones con requisitos de AQL se debe contactar con ASR Engineering.

Las piezas normalizadas están disponibles en acero inoxidable y acero al carbón.

Este tipo de piezas se utilizan, normalmente, junto a cojinetes más pequeños, donde es necesario ajustar los ejes o una expansión térmica y acomodación de la contracción. El solape es ventajoso para las aplicaciones donde el rodamiento está hecho de material más blando que el muelle/resorte y el grosor del muelle/resorte es relativamente pequeño.

### CLAVES DE DIMENSIONES

Do	= Diámetro externo, máx
Di	= Diámetro interno
t	= Grosor del material
H	= Altura libre aprox.
H1	= Carga en altura
L1	= Carga en L1
N	= Número de ondulaciones



### United Kingdom

Tel: (44) 1386 443366  
E-mail: sales@assocspring.co.uk

### France

Tel: (33) 01 30 68 6363  
E-mail: info@ressortsspec.com

### Spain

Tel: (34) 945 147542  
E-mail: ventas@bgespana.com

### Germany

Tel: (49) 6251 93-3252-04  
E-mail: info@asraymond.de

## GESCHLITZTE WELLFEDERSCHEIBE

Die Wellfegerscheiben von Associated Spring RAYMOND handeln mittlere Lasten auf kleinem, axialem Raum. Die Enden dieser Serie überlappen sich, die beiden Enden des Materialstreifens liegen also aufeinander. Durch die offene Konstruktion mit Überlappung können sich die Enden unter Druck bewegen, wodurch die Feder beispielsweise in einer Bohrung nicht festfressen kann.

Bei Anwendungen mit AQL-Anforderungen sollte vorab ASR Engineering kontaktiert werden.

Standard-Ersatzteile sind in Edelstahl und Kohlenstoffstahl verfügbar.

Diese Teile werden häufig in der Nähe von kleineren Lagern eingesetzt, wo die Welle aufgenommen bzw. das wärmebedingte Ausdehnen/Zusammenziehen ausgeglichen werden muss. Die Überlappung ist in Anwendungen, in denen eine Bohrung aus weicherem Material besteht als die Feder sowie die Materialdicke der Feder relativ gering ist, von großem Vorteil.

### ABKÜRZUNGEN – ABMESSUNGEN

$Do$  = Außendurchmesser, max.

$Di$  = Innendurchmesser

$t$  = Materialdicke

$H$  = Ungefähr freie Höhe

$H1$  = Last unter Höhe

$L1$  = Last unter  $L1$

$N$  = Anzahl der Wellen

## RONDELLE PER MOLLE ONDULATE DIVISE

Le rondelle a molla ondulate di Associated Spring RAYMOND forniscono carichi medi in un piccolo spazio assiale. Questa serie ha estremità che si sovrappongono, ossia le due estremità della striscia di materiale sono disposte una sull'altra. Questa costruzione aperta con una certa sovrapposizione consente alle estremità di spostarsi durante la compressione, il che, se vincolate in un foro, ne impedisce l'unione.

Per le applicazioni con requisiti AQL contattare il servizio tecnico ASR.

I componenti standard sono disponibili in acciaio inox e in acciaio al carbonio.

Le applicazioni comuni per questo tipo di componenti sono adiacenti a cuscinetti più piccoli, dove sono richiesti l'albero avvolgitore o la gestione dell'espansione termica e della contrazione. La sovrapposizione è vantaggiosa per le applicazioni in cui il foro è realizzato in materiale più morbido rispetto alla molla e lo spessore del materiale della molla è relativamente piccolo.

### LEGENDA DIMENSIONI

$Do$  = Diametro esterno

$Di$  = Diametro interno

$t$  = Spessore del materiale

$H$  = Altezza libera approssimativa

$H1$  = Carico in altezza

$L1$  = Carico a  $L1$

$N$  = Numero di onde

## ARRUELAS ONDULADAS

As arruelas onduladas da Associated Spring RAYMOND fornecem cargas médias num espaço axial reduzido. Esta série tem extremidades que se sobrepõem, por outras palavras, as duas extremidades da fita ficam uma por cima da outra. Esta construção aberta com alguma sobreposição permite às extremidades moverem-se durante a compressão, que se constritas num orifício impedem a ligação.

Aplicações com requisitos de nível de qualidade aceitável devem contactar a Engenharia da ASR.

As peças standard estão disponíveis em aço inoxidável e aço carbono.

As aplicações comuns para este tipo de peças estão associadas a rolamentos mais pequenos, em que o estiramento do eixo ou a acomodação de expansão e contração térmicas são necessários. A sobreposição é vantajosa para as aplicações em que o orifício é feito de material mais mole do que o da mola e a espessura do material da mola é relativamente reduzida.

### LEGENDA DAS DIMENSÕES

$Do$  = Diâmetro Externo, máx.

$Di$  = Diâmetro Interno

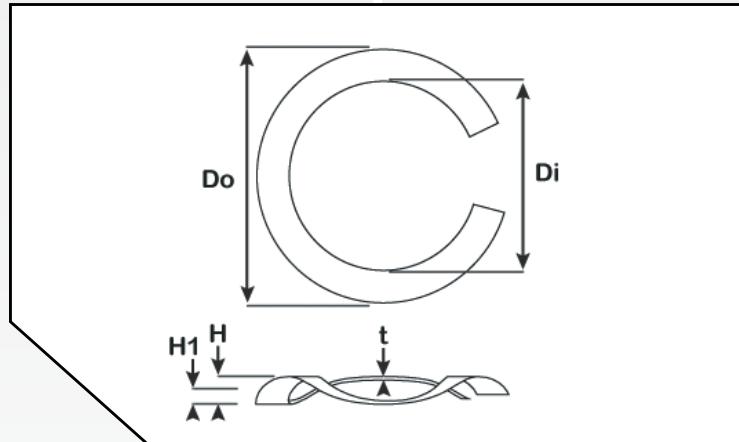
$t$  = Espessura do Material

$H$  = Altura Livre Aprox.

$H1$  = Altura em Carga

$L1$  = Carga em  $L1$

$N$  = Número de ondulações



### United Kingdom

Tel: (44) 1386 443366

E-mail: sales@assocspring.co.uk

### France

Tel: (33) 01 30 68 6363

E-mail: info@ressortsspec.com

### Spain

Tel: (34) 945 147542

E-mail: ventas@bgespana.com

### Germany

Tel: (49) 6251 93-3252-04

E-mail: info@asraymond.de



**SPLIT WAVE SPRING WASHERS**

Part Number	Do (mm)	Di (mm)	t (mm)	H (mm)	H1 (mm)	L1 (N)	N
WWMG039404572759	100.00	86.38	0.76	2.77	4.57	275.9	5
WWMG041305082892	105.00	91.38			5.08	289.2	
WWMG04330533026	110.00	96.38			5.33	302.6	
WWMG045306353159	115.00	101.38			6.35	315.9	
WWMG047207113293	120.00	106.38			7.11	329.3	
WWMG049207623426	125.00	111.38		3.18	7.62	342.6	
WWMG051208643560	130.00	116.38			8.64	356.0	
WWMG053209403693	135.00	121.38			9.40	369.3	
WWMG055106863827	140.00	126.38			6.86	382.7	
WWMG057107373960	145.00	131.38			7.37	396.0	
WWMG059107874049	150.00	136.38	0.81	3.96	7.87	404.9	6
WWMG063009404405	160.00	146.38			9.40	440.5	
WWMG065010414539	165.00	151.38			10.41	453.9	
WWMG066911184672	170.00	156.38			11.18	467.2	
WWMG068908134806	175.00	154.16			8.13	480.6	
WWMG070908644939	180.00	159.16		3.96	8.64	493.9	
WWMG072809145073	185.00	164.16			9.14	507.3	
WWMG074809915206	190.00	169.16			9.91	520.6	
WWMG078707115473	200.00	179.16			7.11	547.3	
WWMG080707375607	205.00	184.16			7.37	560.7	
WWMG082707875785	210.00	189.16	1.07	3.96	7.87	578.5	7
WWMG084708385918	215.00	194.16			8.38	591.8	
WWMG086608646052	220.00	199.16			8.64	605.2	
WWMG088607116185	225.00	204.16			7.11	618.5	
WWMG090606106319	230.00	209.16			6.10	631.9	
WWMG092506356452	235.00	214.16		3.96	6.35	645.2	
WWMG094506356586	240.00	219.16			6.35	658.6	
WWMG098406866853	250.00	229.16			6.86	685.3	
WWMG102407377120	260.00	239.16			7.37	712.0	
WWMG104307627253	265.00	244.16			7.62	725.3	
WWMG106308137698	270.00	249.16	0.81	3.96	8.13	743.1	9
WWMG110208647698	280.00	259.16			8.64	769.8	
WWMG114209407965	290.00	269.16			9.40	796.5	
WWMG118110418232	300.00	279.16			10.41	823.2	
WWMG122107118499	310.00	289.16			7.11	849.9	
WWMG126007628766	320.00	299.16		3.96	7.62	876.6	
WWMG133908649345	340.00	319.16			8.64	934.5	
WWMG137809409611	350.00	329.16			9.40	961.1	
WWMG141707629879	360.00	339.16			7.62	987.9	
WWMG145708131014	370.00	349.16			8.13	1014.6	
WWMG149609141041	380.00	359.16	1.07	3.96	8.64	1041.3	10
WWMG153509141072	390.00	369.16			9.14	1072.4	
WWMG157509651099	400.00	379.16			9.65	1099.1	
WWMG161408381125	410.00	382.82			8.38	1125.8	
WWMG165408891152	420.00	392.82			8.89	1152.5	
WWMG169307621179	430.00	402.82		3.96	7.62	1179.2	
WWMG173208131205	440.00	412.82			8.13	1205.9	11
WWMG181108891263	460.00	432.82			8.89	1263.7	
WWMG189008131317	480.00	452.82			8.13	1317.1	
WWMG196908891370	500.00	472.82			8.89	1370.5	
WWMG212608891481	540.00	512.82	0.81	3.96	8.89	1481.8	13
WWMG228408891593	580.00	552.82			8.89	1593.0	
WWMG039404572759S	100.00	86.38			4.57	275.9	
WWMG041305082892S	105.00	91.38		2.77	5.08	289.2	
WWMG04330533026S	110.00	96.38			5.33	302.6	
WWMG045306353159S	115.00	101.38		3.18	6.35	315.9	5
WWMG047207113293S	120.00	106.38			7.11	329.3	
WWMG049207623426S	125.00	111.38			7.62	342.6	
WWMG051208643560S	130.00	116.38	0.76	3.96	8.64	356.0	6
WWMG053209403693S	135.00	121.38			9.40	369.3	
WWMG055106863827S	140.00	126.38			6.86	382.7	
WWMG057107373960S	145.00	131.38			7.37	396.0	
WWMG059107874049S	150.00	136.38			7.87	404.9	
WWMG063009404405S	160.00	146.38		3.96	9.40	440.5	
WWMG065010414539S	165.00	151.38			10.41	453.9	
WWMG066911184672S	170.00	156.38			11.18	467.2	
WWMG068908134806S	175.00	154.16		3.96	8.13	480.6	
WWMG070908644939S	180.00	159.16			8.64	493.9	
WWMG072809145073S	185.00	164.16	0.81	3.96	9.14	507.3	7
WWMG074809915206S	190.00	169.16			9.91	520.6	
WWMG078707115473S	200.00	179.16			7.11	547.3	

**SPLIT WAVE SPRING WASHERS**

Part Number	Do (mm)	Di (mm)	t (mm)	H (mm)	H1 (mm)	L1 (N)	N
WWMG080707375607S	205.00	184.16	0.81	3.96	7.37	560.7	7
WWMG082707875785S	210.00	189.16			7.87	578.5	
WWMG084708385918S	215.00	194.16			8.38	591.8	
WWMG086608646052S	220.00	199.16			8.64	605.2	
WWMG088607116185S	225.00	204.16			7.11	618.5	8
WWMG090606106319S	230.00	209.16			6.10	631.9	
WWMG092506356452S	235.00	214.16			6.35	645.2	
WWMG094506356586S	240.00	219.16			6.35	658.6	
WWMG098406866853S	250.00	229.16			6.86	685.3	
WWMG102407377120S	260.00	239.16			7.37	712.0	
WWMG104307627253S	265.00	244.16			7.62	725.3	
WWMG106308137698S	270.00	249.16			8.13	743.1	9
WWMG110208647698S	280.00	259.16			8.64	769.8	
WWMG114209407965S	290.00	269.16			9.40	796.5	
WWMG118110418232S	300.00	279.16			10.41	823.2	
WWMG122107118499S	310.00	289.16	1.07	3.96	7.11	849.9	10
WWMG126007628766S	320.00	299.16			7.62	876.6	
WWMG133908649345S	340.00	319.16			8.64	934.5	
WWMG137809409611S	350.00	329.16			9.40	961.1	
WWMG141707629879S	360.00	339.16			7.62	987.9	
WWMG145708131014S	370.00	349.16			8.13	1014.6	
WWMG149609141041S	380.00	359.16			8.64	1041.3	
WWMG153509141072S	390.00	369.16			9.14	1072.4	
WWMG157509651099S	400.00	379.16			9.65	1099.1	
WWMG161408381125S	410.00	382.82			8.38	1125.8	
WWMG165408891152S	420.00	392.82			8.89	1152.5	
WWMG169307621179S	430.00	402.82			7.62	1179.2	
WWMG173208131205S	440.00	412.82			8.13	1205.9	11
WWMG181108891263S	460.00	432.82			8.89	1263.7	
WWMG189008131317S	480.00	452.82			8.13	1317.1	
WWMG196908891370S	500.00	472.82			8.89	1370.5	
WWMG212608891481S	540.00	512.82	1.07	3.96	8.89	1481.8	12
WWMG228408891593S	580.00	552.82			8.89	1593.0	
WWMG118110418232	300.00	279.16			10.41	823.2	
WWMG122107118499	310.00	289.16			7.11	849.9	13
WWMG126007628766	320.00	299.16			7.62	876.6	
WWMG133908649345	340.00	319.16			8.64	934.5	
WWMG137809409611	350.00	329.16			9.40	961.1	
WWMG141707629879	360.00	339.16			7.62	987.9	14
WWMG145708131014	370.00	349.16			8.13	1014.6	
WWMG149609141041	380.00	359.16			8.64	1041.3	
WWMG153509141072	390.00	369.16			9.14	1072.4	
WWMG157509651099	400.00	379.16	1.07	3.96	9.65	1099.1	15
WWMG161408381125	410.00	382.82			8.38	1125.8	
WWMG165408891152	420.00	392.82			8.89	1152.5	
WWMG169307621179	430.00	402.82			7.62	1179.2	
WWMG173208131205	440.00	412.82			8.13	1205.9	16
WWMG181108891263	460.00	432.82			8.89	1263.7	
WWMG189008131317	480.00	452.82			8.13	1317.1	
WWMG196908891370	500.00	472.82			8.89	1370.5	
WWMG212608891481	540.00	512.82	1.07	3.96	8.89	1481.8	17
WWMG228408891593	580.00	552.82			8.89	1593.0	



## OVERLAP WAVE SPRING WASHERS

Associated Spring RAYMOND Wave spring washers provide medium loads in a small axial space. This series has ends that overlap, in other words the two ends of the material strip lay on top of each other. This open construction with some overlap allows the ends to move during compression, which if constrained in a bore prevents binding.

Applications with AQL requirements should contact ASR Engineering.

Standard parts are available in stainless steel & carbon steel.

Common applications for this type of parts is adjacent to smaller bearings, where shaft take up or thermal expansion & contraction accommodation is required. The overlap is advantageous for such applications where the bore is made of softer material than the spring and the material thickness of the spring is relatively small.

### KEY TO DIMENSIONS

Do	= Outside Diameter, max
Di	= Inner Diameter
t	= Material Thickness
H	= Free Height Approx
H1	= Load at Height
L1	= Load at L1
N	= Number of waves

## RONDELLAS ONDULÉES A CHEVAUCHEMENT

Les rondelles élastiques Associated Spring RAYMOND fournissent des charges moyennes dans un petit espace axial. Cette série présente des extrémités qui se chevauchent. En d'autres termes, les deux extrémités de la bande de matériau reposent l'une sur l'autre. Cette construction ouverte avec chevauchement permet aux extrémités de se déplacer lors de la compression qui, si elle est contrainte dans un alésage, peut empêcher la liaison.

Pour les applications avec exigences AQL, il est nécessaire de contacter ASR Engineering.

Les pièces standard sont disponibles en acier inoxydable et en acier au carbone.

Ce type de pièces est généralement utilisé pour caler de petits roulements, lorsqu'il est nécessaire de ménager de la place pour la montée en charge ou la dilatation/contraction thermique. Le chevauchement est un avantage dans les cas où l'alésage est réalisé dans un matériau plus mou que le ressort et où l'épaisseur du matériau du ressort est relativement faible.

### INDEX DES DIMENSIONS

Do	= Diamètre extérieur, max
Di	= Diamètre intérieur
t	= Épaisseur du matériau
H	= Hauteur libre approx.
H1	= Charge en hauteur
L1	= Charge à L1
N	= Nombre d'ondes

## ARANDELAS ELÁSTICAS ONDULADAS SUPERPUESTAS

Las arandelas elásticas onduladas de Associated Spring RAYMOND proporcionan cargas medias en un espacio axial pequeño. Esta serie dispone de extremos que se solapan, es decir, los dos extremos de la banda del material se apoyan uno sobre el otro. Esta estructura abierta con superposición permite a los extremos moverse durante la compresión, evitando que se doblen si se fuerzan en un rodamiento.

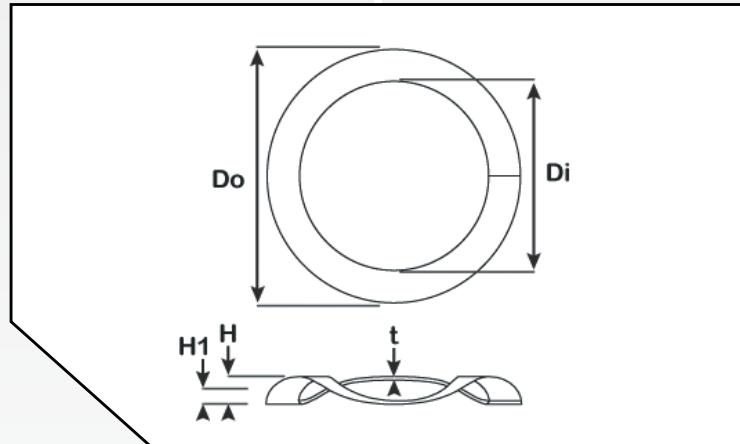
Para aplicaciones con requisitos de AQL se debe contactar con ASR Engineering.

Las piezas normalizadas están disponibles en acero inoxidable y acero al carbón.

Este tipo de piezas se utilizan, normalmente, junto a cojinetes más pequeños, donde es necesario ajustar los ejes o una expansión térmica y acomodación de la contracción. El solapamiento es ventajoso para las aplicaciones donde el rodamiento está hecho de material más blando que el muelle/resorte y el grosor del muelle/resorte es relativamente pequeño.

### CLAVES DE DIMENSIONES

Do	= Diámetro externo, máx
Di	= Diámetro interno
t	= Grosor del material
H	= Altura libre aprox.
H1	= Carga en altura
L1	= Carga en L1
N	= Número de ondulaciones



## SPIRAL WELLFEDERSCHEIBE

Die Wellfegerscheiben von Associated Spring RAYMOND handeln mittlere Lasten auf kleinem, axialem Raum. Die Enden dieser Serie überlappen sich, die beiden Enden des Materialstreifens liegen also aufeinander. Durch die offene Konstruktion mit Überlappung können sich die Enden unter Druck bewegen, wodurch die Feder beispielsweise in einer Bohrung nicht festfressen kann.

Bei Anwendungen mit AQL-Anforderungen sollte vorab ASR Engineering kontaktiert werden.

Standard-Ersatzteile sind in Edelstahl und Kohlenstoffstahl verfügbar.

Diese Teile werden häufig in der Nähe von kleineren Lagern eingesetzt, wo die Welle aufgenommen bzw. das wärmebedingte Ausdehnen/Zusammenziehen ausgeglichen werden muss. Die Überlappung ist in Anwendungen, in denen eine Bohrung aus weicherem Material besteht als die Feder sowie die Materialdicke der Feder relativ gering ist, von großem Vorteil.

### ABKÜRZUNGEN – ABMESSUNGEN

Do = Außendurchmesser, max.

Di = Innendurchmesser

t = Materialdicke

H = Ungefähr freie Höhe

H1 = Last unter Höhe

L1 = Last unter L1

N = Anzahl der Wellen

## RONDELLE PER MOLLE ONDULATE SOVRAPPONTE

Le rondelle a molla ondulate di Associated Spring RAYMOND forniscano carichi medi in un piccolo spazio assiale. Questa serie ha estremità che si sovrappongono, ossia le due estremità della striscia di materiale sono disposte una sull'altra. Questa costruzione aperta con una certa sovrapposizione consente alle estremità di spostarsi durante la compressione, il che, se vincolate in un foro, ne impedisce l'unione.

Per le applicazioni con requisiti AQL contattare il servizio tecnico ASR.

I componenti standard sono disponibili in acciaio inox e in acciaio al carbonio.

Le applicazioni comuni per questo tipo di componenti sono adiacenti a cuscinetti più piccoli, dove sono richiesti l'albero avvolgitore o la gestione dell'espansione termica e della contrazione. La sovrapposizione è vantaggiosa per le applicazioni in cui il foro è realizzato in materiale più morbido rispetto alla molla e lo spessore del materiale della molla è relativamente piccolo.

### LEGENDA DIMENSIONI

Do = Diametro esterno

Di = Diametro interno

t = Spessore del materiale

H = Altezza libera approssimativa

H1 = Carico in altezza

L1 = Carico a L1

N = Numero di onde

## ANILHAS DE MOLA ONDULADAS DE SOBREPOSIÇÃO

As arruelas onduladas da Associated Spring RAYMOND fornecem cargas médias num espaço axial reduzido. Esta série tem extremidades que se sobrepõem, por outras palavras, as duas extremidades da fita ficam uma por cima da outra. Esta construção aberta com alguma sobreposição permite às extremidades moverem-se durante a compressão, que se constritas num orifício impedem a ligação.

Aplicações com requisitos de nível de qualidade aceitável devem contactar a Engenharia da ASR.

As peças standard estão disponíveis em aço inoxidável e aço carbono.

As aplicações comuns para este tipo de peças estão associadas a rolamentos mais pequenos, em que o estiramento do eixo ou a acomodação de expansão e contração térmicas são necessários. A sobreposição é vantajosa para as aplicações em que o orifício é feito de material mais mole do que o da mola e a espessura do material da mola é relativamente reduzida.

### LEGENDA DAS DIMENSÕES

Do = Diâmetro Externo, máx.

Di = Diâmetro Interno

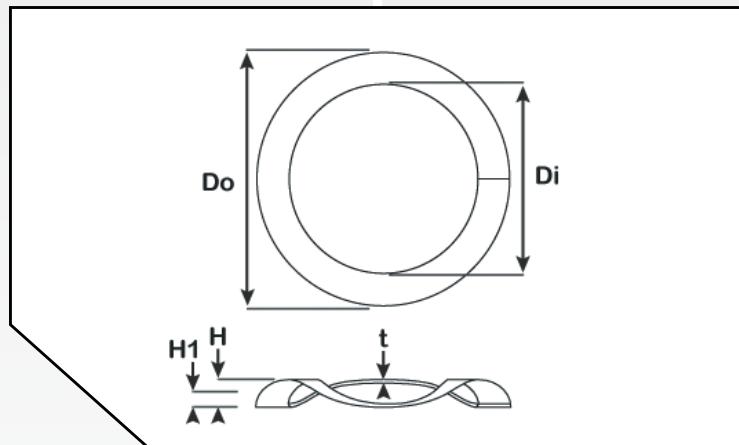
t = Espessura do Material

H = Altura Livre Aprox.

H1 = Altura em Carga

L1 = Carga em L1

N = Número de ondulações



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



**OVERLAP WAVE SPRING WASHERS**

Part Number	Do (mm)	Di (mm)	t (mm)	H (mm)	H1 (mm)	L1 (N)	N
WWM006302445	16.00	11.28	0.25	2.29		44.5	
WWM007503534	19.00	14.28		3.05	1.57	53.4	
WWM008702623	22.00	16.46	0.30	2.79		62.3	
WWM009503667	24.00	18.46		3.56		66.7	
WWM010202712	26.00	18.22		2.54		71.2	
WWM011002756	28.00	20.22		2.79		75.6	3
WWM011803845	30.00	22.22	0.41	3.30		84.5	
WWM012603890	32.00	24.22		3.81		89.0	
WWM013804722	35.00	27.22		4.57	1.98	97.9	
WWM014605023	37.00	28.72	0.46	3.81		102.3	
WWM015805112	40.00	31.72		5.08		111.2	
WWM016503157	42.00	33.72		3.05		115.7	
WWM018503290	47.00	38.72		3.81		129.0	
WWM020503424	52.00	43.11	0.61	3.56	2.36	142.4	
WWM021703513	55.00	46.11		3.81		151.3	
WWM024404691	62.00	51.69		4.32		169.1	
WWM026804869	68.00	57.17		4.32		186.9	
WWM027604913	70.00	59.17		4.32		191.3	4
WWM028404958	72.00	61.17		4.57		195.8	
WWM029505047	75.00	64.17	0.76	5.08	2.77	204.7	
WWM031505180	80.00	68.66		5.59		218.0	
WWM033505314	85.00	71.38		5.59		231.4	
WWM035406492	90.00	76.38		6.35		249.2	
WWM037407625	95.00	81.38		7.37		262.5	
WWM006302445S	16.00	11.28	0.25	2.29		44.5	
WWM007503534S	19.00	14.28		3.05	1.57	53.4	
WWM008702623S	22.00	16.46	0.30	2.79		62.3	
WWM009503667S	24.00	18.46		3.56		66.7	
WWM010202712S	26.00	18.22		2.54		71.2	
WWM011002756S	28.00	20.22		2.79		75.6	3
WWM011803845S	30.00	22.22	0.41	3.30		84.5	
WWM012603890S	32.00	24.22		3.81		89.0	
WWM013804722S	35.00	27.22		4.57	1.98	97.9	
WWM014605023S	37.00	28.72		3.81		102.3	
WWM015805112S	40.00	31.72	0.46	5.08		111.2	
WWM016503157S	42.00	33.72		3.05		115.7	
WWM018503290S	47.00	38.72		3.81		129.0	
WWM020503424S	52.00	43.11		3.56		142.4	
WWM021703513S	55.00	46.11	0.61	3.81	2.36	151.3	
WWM024404691S	62.00	51.69		4.32		169.1	
WWM026804869S	68.00	57.17		4.32		186.9	
WWM027604913S	70.00	59.17		4.32		191.3	4
WWM028404958S	72.00	61.17		4.57		195.8	
WWM029505047S	75.00	64.17	0.76	5.08	2.77	204.7	
WWM031505180S	80.00	68.66		5.59		218.0	
WWM033505314S	85.00	71.38		5.59		231.4	
WWM035406492S	90.00	76.38		6.35		249.2	
WWM037407625S	95.00	81.38		7.37		262.5	



## NOTES



## WAVE SPRINGS (ROUND WIRE)

### Advantages

- Accurate high force loading with greater deflection than bellevilles
- Economical and stocked in both carbon and stainless steel
- Fits in tight radial and axial spaces with inline force
- Special designs available with No-Tooling-Charges

### Applications

- Use in assemblies for variation as a result of tolerance stack-up
- Preload a mechanical assembly with greater force to reduce or eliminate vibration
- Compensate for the looseness that results in assembled components due to thermal expansion

### Design

- Fits in 25% of the radial space required of a belleville
- The theoretical rate is accurate until the spring approaches its solid height; see graph

### KEY TO MEASUREMENTS

D<sub>h</sub> = Operates in Bore diameter  
D<sub>r</sub> = Clearance on Rod diameter  
P<sub>1</sub> = Load (N)  
L<sub>1</sub> = Loaded Height  
L<sub>0</sub> = Free Height  
W<sub>x</sub> = Number of Waves  
d = Wire Diameter

## RESSORTS ONDULEÉS (FIL ROND)

### Advantages

- Fortes charges précises avec des déflections supérieures aux rondelles Belleville.
- Économiques – Stockés en acier et en Inox.
- Convient pour des espaces radiaux et axiaux limités, avec une force linéaire.
- Sur-mesure disponible sans frais d'outillage.

### Applications

- Utilisation sur des assemblages pour compenser des tolérances de montage.
- Pré charge d'un montage mécanique pour réduire ou éliminer les vibrations.
- Compensation de jeu dû à des dilatations thermiques.

### Design

- Occupe 25% de l'encombrement radial d'une rondelle Belleville.
- La courbe de raideur théorique est précise jusqu'à ce que le ressort approche de sa hauteur solide ; Cf graphique.

### INDEX DES MESURES

D<sub>h</sub> = Opère dans un logement de diamètre  
D<sub>r</sub> = Jeu sur le diamètre d'axe  
P<sub>1</sub> = Charge (N)  
L<sub>1</sub> = Hauteur en charge  
L<sub>0</sub> = Hauteur libre  
W<sub>x</sub> = Nombre d'ondulations  
d = Diamètre du fil

## MUELLE/RESORTE ONDULADOS (ALAMBRE DE PIANO)

### Ventajas

- Cargas más precisas con mayor recorrido que las arandelas Belleville.
- Económicas y disponibles en stock en acero al carbono y acero inoxidable.
- Encaja en alojamientos radiales y axiales estrechos, conservando la carga.

### Aplicaciones

- Colóquelas para conseguir eliminar holguras.
- Precargue una mecanismo con mayor fuerza para eliminar vibraciones.
- Compense cualquier dilatación.

### Diseño

- Se puede alojar en un 25% del espacio necesario para una arandela Belleville.
- El coeficiente de compresión se mantiene constante hasta alcanzar recorridos cercanos a la altura de bloque.

### CLAVES DE DIMENSIONES

D<sub>h</sub> = Trabaja en el diámetro del taladro  
D<sub>r</sub> = Juego en el diámetro del vástago  
P<sub>1</sub> = Carga (N)  
L<sub>1</sub> = Altura de carga  
L<sub>0</sub> = Altura libre  
W<sub>x</sub> = Número de ondulaciones  
D = Diámetro del alambre



## WELLENFEDERN (RUNDDRAHT)

### Vorteile

- Akkurate Belastung mit hoher Kraft und mehr Federweg als Tellerfedern.
- Wirtschaftlich und in Kohlenstoff- und Edelstahl erhältlich.
- Passt in enge radiale und axiale Räume mit Inline-Kraft.
- Spezialkonstruktionen ohne Werkzeugkosten erhältlich.

### Anwendungen

- Verwendung in Baugruppen zur Variation als Ergebnis von Toleranzberechnungen.
- Vorbelastung einer mechanischen Baugruppe mit größerer Kraft, um Schwingungen zu reduzieren oder zu eliminieren.
- Ausgleich für Lokaerheit, die bei Baugruppen auf Grund von Wärmeausdehnung auftreten kann.

### Design

- Passt in 25% des für eine Tellerfeder erforderlichen Platzes.
- Die theoretische Rate ist akkurat, bis die Feder ihre Blocklänge erreicht (siehe Darstellung)

### KENNZIECHNEN DER ABMESSUNGEN

D<sub>h</sub> = Operiert im Bohrungsdurchmesser  
 D<sub>r</sub> = Spiel an Dordndurchmesser  
 P<sub>1</sub> = Kraft (N)  
 L<sub>1</sub> = Gespannte Höhe  
 L<sub>0</sub> = Ungespannte Höhe  
 W<sub>x</sub> = Anzahl der Wellen  
 d = Drahtdurchmesser

## RONDELLE ONDULATE A FILO TONDO

### Vantaggi:

- accurata ed elevata forza di carico con deflessioni maggiori rispetto alle rondelle Belleville
- economiche e disponibili sia in acciaio ad alto contenuto di carbonio che in acciaio inox
- adatte in spazi radiali e assiali molto ristretti, con una forza lineare
- modelli su misura disponibili senza costi di impianto

### Applicazioni:

- utilizzo negli assemblaggi per compensare le tolleranze di montaggio
- pre-carica di un montaggio meccanico con una maggiore forza per ridurre o eliminare le vibrazioni.
- compensazione del gioco dovuto alla dilatazione termica

### Design:

- occupano uno spazio radiale pari al 25% di quello richiesto dalle rondelle Belleville
- la curva di rigidità teorica è precisa fino a che la rondella non si avvicina alla sua altezza a blocco (vedere grafico):

### LEGENDA

D<sub>h</sub> = Dimensione consigliata sede  
 D<sub>r</sub> = Dimensone consigliata perno  
 P<sub>1</sub> = Carico a L<sub>1</sub> (N)  
 L<sub>1</sub> = Altezza in carico  
 L<sub>0</sub> = Altezza libera  
 W<sub>x</sub> = Numero di onde  
 d = Diametro del filo

## ARRUELAS CURVAS COM ARAME REDONDO

### Vantagens

- Tem mais capacidade de deflexão que as molas prato, porem com mais capacidade.
- São padrão em aço Inox e carbono.
- Encaixam em ambos espaços radiais e axiais.
- Desenhos especias.

### Aplicações

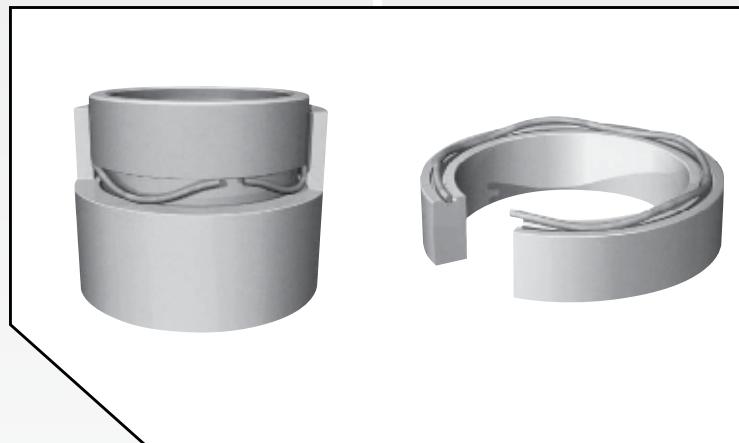
- Usadas em vários tipos de montagem como – resultado de sua tolerância na empilhagem.
- Precarga é usada para reduzir vibrações.
- compensar para componentes com expansão térmica.

### Desenho

- Ajusta-se a 25% do espaço radial de molas prato
- O padrão teórico é correto até que a mola atija o bloco, ver gráfico.

### LEGENDA

D<sub>h</sub> = Operação do diâmetro do furo  
 D<sub>r</sub> = Capacidade do diâmetro do furo  
 P<sub>1</sub> = Carga (N)  
 L<sub>1</sub> = Carga em P<sub>1</sub>  
 L<sub>0</sub> = Itura Livre  
 W<sub>x</sub> = Numero de ondas  
 d = Diâmetro do fio



### United Kingdom

Tel: (44) 1386 443366

E-mail: sales@assocspring.co.uk

### France

Tel: (33) 01 30 68 6363

E-mail: info@ressortsspec.com

### Spain

Tel: (34) 945 147542

E-mail: ventas@bgespana.com

### Germany

Tel: (49) 6251 93-3252-04

E-mail: info@asraymond.de



**WAVE SPRINGS (ROUND WIRE)**

Part Number	Dh (mm)	Dr (mm)	d (mm)	Lo (mm)	L1 (mm)	P1 (N)	Wx
RW-0050	12.70	10.36	0.79	1.57	1.32	156	
RW-0062	15.88	13.13	0.97	1.96	1.63	223	
RW-0075	19.05	15.95	1.14	2.34	1.93	312	
RW-0087	22.23	18.80	1.30	2.64	2.18	356	3
RW-0100	25.40	21.72	1.42	2.95	2.41	401	
RW-0112	28.58	24.56	1.52	3.23	2.59	445	
RW-0125	31.75	27.46	1.65	3.51	2.79	490	
RW-0137	34.93	31.06	1.42	3.07	2.41	534	
RW-0150	38.10	34.01	1.52	3.25	2.59	579	
RW-0162	41.28	36.68	1.65	3.48	2.79	623	
RW-0175	44.45	39.73	1.70	3.66	2.87	668	
RW-0187	47.63	42.72	1.78	3.94	3.02	712	
RW-0200	50.80	45.80	1.83	4.19	3.15	757	
RW-0212	53.98	48.41	1.93	4.11	3.28	801	4
RW-0225	57.15	51.38	2.03	4.27	3.45	846	
RW-0237	60.33	54.38	2.11	4.52	3.58	890	
RW-0250	63.50	57.43	2.16	4.70	3.66	935	
RW-0262	66.68	60.30	2.29	5.16	3.89	979	
RW-0275	69.85	63.42	2.31	5.38	3.91	1024	
RW-0287	73.03	66.50	2.36	5.33	4.01	1068	
RW-0300	76.20	70.28	2.11	4.55	3.58	1113	
RW-0312	79.38	73.10	2.16	4.67	3.66	1157	
RW-0325	82.55	76.00	2.29	4.83	3.89	1202	
RW-0337	85.73	79.12	2.31	4.95	3.91	1246	
RW-0350	88.90	82.19	2.36	5.11	4.01	1291	
RW-0362	92.08	85.24	2.41	5.23	4.09	1335	
RW-0375	95.25	88.27	2.49	5.38	4.22	1380	
RW-0387	98.43	91.31	2.54	5.28	4.32	1424	
RW-0400	101.60	94.44	2.54	5.72	4.32	1469	
RW-0412	104.78	97.21	2.62	5.61	4.45	1491	5
RW-0425	107.95	100.28	2.67	5.72	4.52	1535	
RW-0437	111.13	103.20	2.79	6.10	4.75	1558	
RW-0450	114.30	106.30	2.79	6.27	4.75	1602	
RW-0462	117.48	109.47	2.79	6.43	4.75	1624	
RW-0475	120.65	112.55	2.84	6.53	4.83	1669	
RW-0487	123.83	115.70	2.84	6.71	4.83	1691	
RW-0500	127.00	118.67	2.95	6.73	4.95	1736	
RW-0512	130.18	121.21	3.00	6.96	5.08	1780	
RW-0525	133.35	124.28	3.05	7.09	5.18	1825	
RW-0537	136.53	127.94	2.79	6.22	4.75	1869	
RW-0550	139.70	131.11	2.79	6.38	4.75	1914	
RW-0562	142.88	134.19	2.84	6.22	4.83	1958	6
RW-0575	146.05	137.31	2.84	6.38	4.83	2003	
RW-0587	149.23	140.31	2.95	6.65	5.00	2047	
RW-0600	152.40	143.36	3.00	6.81	5.08	2092	



## NOTES

3

## MULTIWAVE COMPRESSION SPRINGS

Multiwave springs replace conventional round wire springs when space is critical; they will occupy only 1/3 to 1/2 of the compressed height space of a traditional round wire spring, while providing more deflection with the same load specifications.

SPEC Multiwave springs should be used for all applications requiring tight load deflection specifications where axial space is critical.

Unique manufacturing where a single filament of round edged, pre-tempered flat wire is used to form the springs from a continuous coil. This results in uniform diameters and wave heights.

### MATERIAL

Stainless steel commercial type 17-7 PH (slightly magnetic).

Maximum application temperature is 650°F (340°C)

### FINISH

Plain finish is standard

### KEY TO DIMENSIONS

D<sub>h</sub> = Hole Size  
D<sub>r</sub> = Shaft Size  
t = Thickness  
L<sub>o</sub> = Free Height (ref only)  
L<sub>1</sub> = Loaded height  
N = Nominal load  
R = Rate  
F = Force  
D = Deflection

Other references and specials are available on request.

## RESSORTS DE COMPRESSION MULTIWAVE

Les ressorts Multiwave remplacent les ressorts de compression conventionnels quand l'encombrement est critique : ils occupent du tiers à la moitié de la place prise par un ressort comprimé, pour une course supérieure et une charge similaire.

Les ressorts Multiwave SPEC doivent être utilisés pour les applications où le rapport course / encombrement est important.

Le procédé de fabrication unique consiste en un filament de fil plat aux bords arrondis, pré-trempe, puis enroulé en continu. Il en résulte des diamètres et des hauteurs de vague uniformes.

### MATERIAU

Acier inoxydable commercial type 17-7PH (légèrement magnétique).

Température maximum d'application : 340°C.

### FINITION

Finition brute.

### INDEX DES MESURES

D<sub>h</sub> = Taille de logement  
D<sub>r</sub> = Taille d'axe  
t = Epaisseur  
L<sub>o</sub> = Hauteur libre (pour référence)  
L<sub>1</sub> = Hauteur en charge  
N = Charge nominale  
R = Raideur  
F = Force  
D = Déflexion

Disponibilité sur demande pour fabrication spécial.

## MUELLES/RESORTES DE COMPRESIÓN ONDULADO

Los muelles/resortes de compresión ondulado reemplazan a los muelles/resortes convencionales de alambre de redondo allí donde el espacio es crítico; ocuparían solamente un tercio o la mitad de la altura comprimida de los muelles/resortes tradicionales de hilo redondo, mientras que proporcionan más recorrido con la misma carga.

Los muelles de compresión ondulado SPEC son idóneos en aquellas aplicaciones en donde se necesiten significativos ratios de carga/deflexión en espacios reducidos.

Partiendo de un fleje en acero para muelles/resortes con esquinas redondeadas y templado se fabrican estos muelles de compresión ondulado. Como resultado se obtiene un muelle/resorte con diámetros y altura de ondas uniformes.

### MATERIALES

Acero inoxidable. Comercial tipo 17-7 PH (ligeramente magnético).

Temperatura máxima de trabajo 340°.

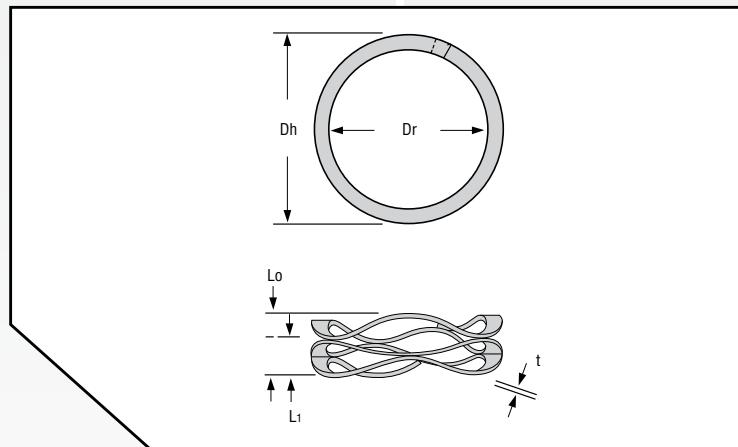
### ACABADO

El acabado es el original del material.

### CLAVES DE CARACTERÍSTICAS

D<sub>h</sub> = Diámetro alojamiento  
D<sub>r</sub> = Diámetro eje  
t = Espesor  
L<sub>o</sub> = Longitud libre (sólo de referencia)  
L<sub>1</sub> = Longitud cargada  
N = Carga  
R = Coeficiente carga  
F = Fuerza  
D = Deflexión

Disponibles bajo pedido otras referencias o materiales especiales.



### United Kingdom

**Tel:** (44) 1386 443366  
**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363  
**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542  
**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04  
**E-mail:** info@asraymond.de

## FEDERSCHEIBE MULTIGEWEILT

Die Federscheiben multigewellt ersetzen Druckfedern mit runden Querschnitten wenn die Bauhöhe begrenzt ist. Diese Feder hat eine 1/3-1/2 kleiner Blocklänge im Verhältnis zur Spiralfeder mit rundem Querschnitt bei linearem Kraft-Weg-Verlauf.

Alle Anwendungen mit leichten Belastungen bei kleinsten Bauräumen

Aus einem Flachdraht gefertigt  
Ein an den Kanten abgerundeter, wärmebehandelter Flachdraht wird kontinuierlich zur einer Feder gewickelt mit gleichförmigen Wellen und Wellenhöhen.

## MOLLE A COMPRESSIONE MULTIWAVE

Le molle a compressione Multiwave sostituiscono le convenzionali molle a filo quando lo spazio è critico poiché occupano solo 1/3 o metà di una molla a filo compressa, assicurano una maggiore deflessione con le stesse specifiche di carico.

Le Multiwave dovrebbero essere utilizzate per tutte le applicazioni dove lo spazio di lavoro è ridotto.

Partendo da un unico nastro in acciaio temprato per molle si fabbrica questo tipo di molla ondulata. Come risultato si ottiene una molla con diametro e altezza delle onde uniforme.

## MOLAS DE COMPRESSÃO MULTI ONDULADAS

As molas multi onduladas substituem as molas convencionais em arame redondo, sempre que o espaço constitua um factor crítico; ocupam apenas entre 1/3 e 1/2 do espaço ocupado pelas molas de arame redondo comprimido, desenvolvendo maior deflexão com idênticas especificações de carga.

Todas as aplicações que carecem de especificações de deflexão e força rigorosas e em que o espaço constitua um factor crítico.

Utiliza-se um único filamento em aço com rebordo arredondado para formar a mola, a partir de um rolo de arame contínuo. Obtém-se diâmetros uniformes e alturas em formato ondulado.

### WERKSTOFF

Rostfreier Federstahl Type Commercial Type 17-7 PH  
(leicht magnetisch)

Maximale Einsatztemperatur 340°C

### OBERFLÄCHE

Mit glatter Oberfläche geliefert

### KENNZEICHNEN DER ABMESSUNGEN

D<sub>h</sub> = Hülsendurchmesser  
D<sub>r</sub> = Dorndurchmesser  
t = Materialdicke  
L<sub>o</sub> = Länge der unbelasteten Feder (approx.)  
L<sub>1</sub> = Länge der belasteten Feder  
N = Federkraft  
R = Federrate  
F = Kraft  
D = Federweg

Andere Referenzen und Sonderteile sind auf Anfrage erhältlich.

### MATERIALE

Acciaio inox commerciale tipo 17-7 PH (leggermente magnetico)

Massima temperatura 650°F (340°C)

### FINITURA

Grezza

### LEGENDA

D<sub>h</sub> = Diametro sede  
D<sub>r</sub> = Diametro del perno  
t = Spessore  
L<sub>o</sub> = Lunghezza libera (solo riferimento)  
L<sub>1</sub> = Altezza in carico  
N = Carico nominale  
R = Rate  
F = Forza  
D = Deflessione

Altri riferimenti e speciali sono disponibili su richiesta.

### MATERIAL

Aço inoxidável.

Tipo Comercial 17-7 PH.

Este material é ligeiramente magnético e dispõe de um acabamento simples.

A temperatura de trabalho máxima é de 650 graus F.  
(340° C).

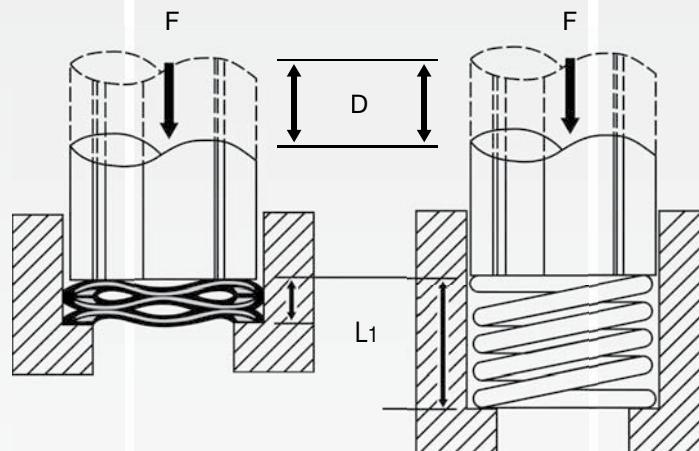
### ACABAMENTO

O acabamento é simples

### DIMENSÕES

D<sub>h</sub> = Furo  
D<sub>r</sub> = Haste  
t = Espesura  
L<sub>o</sub> = Altura Livre (só para referencia)  
L<sub>1</sub> = Carga  
N = Carga Nominal  
R = Taxa de compressão  
F = Força  
D = Deflexão

Outras referências e especiais estão disponíveis sob pedido.



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



**MULTIWAVE COMPRESSION SPRINGS**

Part Number	Dh (mm)	Dr (mm)	t (mm)	Lo (mm)	L1 (mm)	N (N)	R (N/mm)
MW0375-0150-04S	9.5	6.4	0.2	3.8	1.58	17.8	7.9
MW0375-0150-07S			0.3		2.06	31.1	17.7
MW0375-0250-04S			0.2	6.4	2.74	17.8	4.9
MW0375-0250-07S			0.3		3.68	31.1	11.7
MW0375-0350-04S			0.2	8.9	3.81	17.8	3.5
MW0375-0350-07S			0.3		5.13	31.1	8.2
MW0375-0450-04S			0.2	11.4	4.95	17.8	2.8
MW0375-0450-07S			0.3		6.66	31.1	6.5
MW0437-0165-04S	11.1	7.1	0.2	4.2	1.6	17.8	6.8
MW0437-0165-08S			0.3		2.08	35.6	16.8
MW0437-0275-04S			0.2	7.0	2.77	17.8	4.2
MW0437-0275-08S			0.3		3.61	35.6	10.5
MW0437-0385-04S			0.2	9.8	4.06	17.8	3.2
MW0437-0385-08S			0.3		5.03	35.6	7.5
MW0500-0180-05S			0.2	4.6	1.58	22.2	7.4
MW0500-0180-10S			0.3		1.65	44.5	15.2
MW0500-0300-05S	12.7	7.9	0.2	7.6	2.72	22.2	4.6
MW0500-0300-10S			0.3		2.9	44.5	9.5
MW0500-0420-05S			0.2	10.7	3.81	22.2	3.3
MW0500-0420-10S			0.3		4.12	44.5	6.8
MW0562-0195-05S			0.2	5.0	2.03	22.2	7.5
MW0562-0195-11S			0.3		2.18	48.9	17.7
MW0562-0325-05S			0.2	8.3	3.43	22.2	4.6
MW0562-0325-11S			0.3		3.68	48.9	10.7
MW0562-0455-05S	14.3	9.5	0.2	11.6	4.83	22.2	3.3
MW0562-0455-11S			0.3		5.31	48.9	7.9
MW0625-0180-06S			0.3	4.6	1.4	26.7	8.4
MW0625-0180-12S			0.3		2.64	53.4	27.7
MW0625-0300-06S			0.3	7.6	2.16	26.7	4.9
MW0625-0300-12S			0.3		4.45	53.4	16.8
MW0625-0420-06S			0.3	10.7	3.25	26.7	3.7
MW0625-0420-12S			0.3		6.25	53.4	12.1
MW0625-0780-06S	15.9	11.4	0.3	19.8	6.05	26.7	1.9
MW0625-0780-12S			0.3		11.53	53.4	6.5
MW0750-0250-07S			0.2		3.61	31.1	11.4
MW0750-0250-13S			0.3	6.4	4.04	57.8	25
MW0750-0250-22S			0.3		4.29	97.9	47.6
MW0750-0417-07S			0.2		6.25	31.1	7.2
MW0750-0417-13S			0.3	10.6	6.86	57.8	15.4
MW0750-0417-22S			0.3		7.39	97.9	30.6
MW0875-0250-12S	19.1	14	0.3		2.97	53.4	15.8
MW0875-0250-18S			0.3	6.4	3.15	80.1	25
MW0875-0250-25S			0.4		4.22	111.2	52.2
MW0875-0417-12S			0.3		5.26	53.4	10
MW0875-0417-18S			0.3	10.6	5.44	80.1	15.6
MW0875-0417-25S			0.4		7.06	111.2	31.5
MW0875-0583-25S			0.4	14.8	10.03	111.2	23.3
MW1000-0250-12S			0.3		2.13	53.4	12.6
MW1000-0250-18S	22.2	15.2	0.3	6.4	2.21	80.1	19.3
MW1000-0250-25S			0.4		3.33	111.2	36.8
MW1000-0417-12S			0.3		3.68	53.4	7.7
MW1000-0417-18S			0.3	10.6	3.76	80.1	11.7
MW1000-0417-25S			0.4		5.77	111.2	23.1
MW1000-0583-12S			0.3		5.11	53.4	5.4
MW1000-0583-18S			0.3	14.8	5.39	80.1	8.6
MW1000-0583-25S			0.4		8.1	111.2	16.6
MW1125-.050-020S	25.4	18.5	0.4	12.7	6.86	89	15.2
MW1125-0300-12S			0.3		3.71	53.4	13.7
MW1125-0300-20S			0.4	7.6	4.06	89	25
MW1125-0300-30S			0.5		4.52	133.4	43.1
MW1125-0500-12S			0.3	12.7	6.35	53.4	8.4
MW1125-0500-30S			0.5		7.7	133.4	26.6
MW1125-0700-12S			0.3		8.74	53.4	6
MW1125-0700-20S			0.4	17.8	9.68	89	11
MW1125-0700-30S	31.8	25.4	0.5		10.69	133.4	18.9
MW1250-0300-12S			0.3		2.13	53.4	9.8
MW1250-0300-20S			0.4	7.6	3.15	89	20
MW1250-0300-30S			0.5		4.01	133.4	36.8
MW1250-0500-12S			0.3		3.78	53.4	6
MW1250-0500-20S			0.4	12.7	5.46	89	12.3
MW1250-0500-30S			0.5		6.91	133.4	23.1



## MULTIWAVE COMPRESSION SPRINGS

Part Number	Dh (mm)	Dr (mm)	t (mm)	Lo (mm)	L1 (mm)	N (N)	R (N/mm)
MW1250-0700-12S	31.8	25.4	0.3	17.8	5.26	53.4	4.2
MW1250-0700-20S			0.4		7.7	89	8.8
MW1250-0700-30S			0.5		9.75	133.4	16.6
MW1375-0300-15S			0.3		1.91	66.7	11.7
MW1375-0300-25S			0.4	7.6	3.61	111.2	27.7
MW1375-0300-35S			0.5		3.78	155.7	40.6
MW1375-0500-15S			0.3		3.28	66.7	7
MW1375-0500-25S			0.4	12.7	6.1	111.2	16.8
MW1375-0500-35S			0.5		6.27	155.7	24.2
MW1375-0700-15S			0.3		4.55	66.7	5.1
MW1375-0700-25S			0.4	17.8	8.64	111.2	12.1
MW1375-0700-35S			0.5		8.71	155.7	17.2
MW1500-0300-20S	38.1	29	0.4		3.28	89	20.5
MW1500-0300-35S			0.5	7.6	3.1	155.7	34.5
MW1500-0300-60S			0.5		4.22	266.9	78.4
MW1500-0500-20S			0.4		5.41	89	12.3
MW1500-0500-35S			0.5	12.7	5.23	155.7	20.8
MW1500-0500-60S			0.5		7.06	266.9	47.3
MW1500-0700-20S			0.4		7.65	89	8.8
MW1500-0700-35S			0.5	17.8	7.39	155.7	15.1
MW1500-0700-60S			0.5		9.91	266.9	34
MW1750-0375-25S	44.5	34	0.5		3.94	111.2	20
MW1750-0375-50S			0.5	9.5	4.78	222.4	46.7
MW1750-0375-90S			0.6		5.89	400.3	110.1
MW1750-0625-25S			0.5		6.73	111.2	12.1
MW1750-0625-50S			0.5	15.9	8	222.4	28.2
MW1750-0625-90S			0.6		10.39	400.3	73
MW1750-0870-25S			0.5		9.32	111.2	8.8
MW1750-0870-50S			0.5	22.1	11.48	222.4	21
MW1750-0870-90S			0.6		14.66	400.3	53.7
MW2000-0375-25S	50.8	40.6	0.5		2.39	111.2	15.6
MW2000-0375-50S			0.5	9.5	3.56	222.4	37.3
MW2000-0375-90S			0.6		5	400.3	88.6
MW2000-0625-25S			0.5		4.01	111.2	9.5
MW2000-0625-50S			0.5	15.9	6.22	222.4	23.1
MW2000-0625-90S			0.6		8.43	400.3	53.7
MW2000-0870-25S			0.5		5.51	111.2	6.7
MW2000-0870-50S			0.5	22.1	8.76	222.4	16.6
MW2000-0870-90S			0.6		11.81	400.3	38.9



### DIMENSION NOT LISTED?

Contact Engineering and we will quote your specific requirements: [engineering@assocspring.co.uk](mailto:engineering@assocspring.co.uk)

### DIMENSION MANQUANTE ?

Contactez nos techniciens et nous vous ferons un devis pour vos besoins spécifiques : [technique@ressortsspec.com](mailto:technique@ressortsspec.com)

### ¿DIMENSIONES NO INCLUIDAS?

Contacte con nuestros servicio de ingeniería e intentaremos cumplir sus requisitos específicos: [ventas@bgespana.com](mailto:ventas@bgespana.com)

### IST IHRE ABMESSUNGEN NICHT AUFGEFÜHRT ?

Bitte kontaktieren Sie unsere Engineering-Abteilung wir unterbreiten Ihnen gerne ein Angebot auf Anfrage: [engineering@assocspring.co.uk](mailto:engineering@assocspring.co.uk)

### DIMENSIONE NON ELENATA?

Contattate il servizio tecnico e invieremo un preventivo per le vostre specifiche esigenze: [engineering@assocspring.co.uk](mailto:engineering@assocspring.co.uk)

### DIMENSÃO NÃO LISTADA?

Contacte o departamento de Engenharia e iremos orçamentar os seus requisitos específicos: [engineering@assocspring.co.uk](mailto:engineering@assocspring.co.uk)

### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** [sales@assocspring.co.uk](mailto:sales@assocspring.co.uk)

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** [info@ressortsspec.com](mailto:info@ressortsspec.com)

### Spain

**Tel:** (34) 945 147542

**E-mail:** [ventas@bgespana.com](mailto:ventas@bgespana.com)

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** [info@asraymond.de](mailto:info@asraymond.de)



## FINGER SPRING WASHERS

Our finger spring washers are designed to counteract noise, excess wear and vibrations, especially at high speeds. They promote efficiency and smooth operation, reducing skidding wear on rotating elements, as in ball bearing applications. They are also extremely useful in cases of unavoidable loose internal clearance due to special application conditions.

### MATERIAL

High-carbon finely tempered spring steel. Type 1074

### FINISH

Blued surface finish

### SPECIFICATION

Finger height (L) is approximately 3.17mm for all sizes except F0595-010 which has approximately 2.38mm finger height.

### KEY TO DIMENSIONS

Do = Outside Diameter \*\*\*  
 Di = Inside Diameter  
 Lo = Free Height (ref only)  
 L<sub>1</sub> = Loaded Height  
 P<sub>1</sub> = Load (N) at L<sub>1</sub>  
 t = Thickness  
 Db = Outside diameter of bearing\*\*

\* This washer has three fingers only.  
All others have six fingers

\*\* Not adapted to some special shaped bearings with double protruding seals

\*\*\* Maximum outside diameter of washer to be the same as that of specified bearing

## RONDELLES RESSORT

Etudiées pour combattre le bruit, l'usure excessive et les vibrations, surtout à des vitesses élevées, les rondelles ressort renforcent l'efficacité et le fonctionnement sans à-coups, en réduisant l'usure par dérapage des éléments tournants, comme par exemple dans le cas de roulements à billes. Elles sont aussi spécialement utiles en cas de jeu excessif intérieur inévitable en raison des conditions d'application particulières.

### MATÉRIAU

Acier à ressort, trempé à haute teneur en carbone. Type 1074

### ETAT DE SURFACE

Bleui.

### SPÉCIFICATION

La hauteur des doigts (L) est d'environ 3.17mm pour toutes les tailles sauf la référence F0595-010 dont les doigts mesurent environ 2.38mm.

### INDEX DES MESURES

Do = Diamètre extérieur \*\*\*  
 Di = Diamètre intérieur  
 Lo = Hauteur libre (pour référence)  
 L<sub>1</sub> = Hauteur en charge  
 P<sub>1</sub> = Charge (N) à L<sub>1</sub>  
 t = Epaisseur  
 Db = diamètre extérieur du roulement\*\*

\* Cette rondelle comporte seulement trois doigts.

\*\* Non adaptée à certains types de roulements à joints doubles saillants.

\*\*\* Le diamètre extérieur de la rondelle devant être le même que celui du roulement correspondant.

## ARANDELAS ELÁSTICAS DE OREJETAS

Concebidas para disminuir el ruido, el desgaste excesivo y vibraciones, especialmente a altas velocidades, las arandelas elásticas de orejetas facilitan la eficacia y un movimiento suave, reduciendo el desgaste debido al deslizamiento en elementos giratorios, tales como las aplicaciones de rodamientos a bolas. También son extremadamente útiles en casos de holguras internas inevitables, debido a condiciones especiales de la aplicación.

### MATERIAL

Acero para muelle templado. Tipo 1074

### ACABADO

Azul.

### ESPECIFICACIONES

La altura libre (L) es de aproximadamente 3,17 mm excepto para la referencia F0595-010, que tiene una altura aproximada de 2,38 mm.

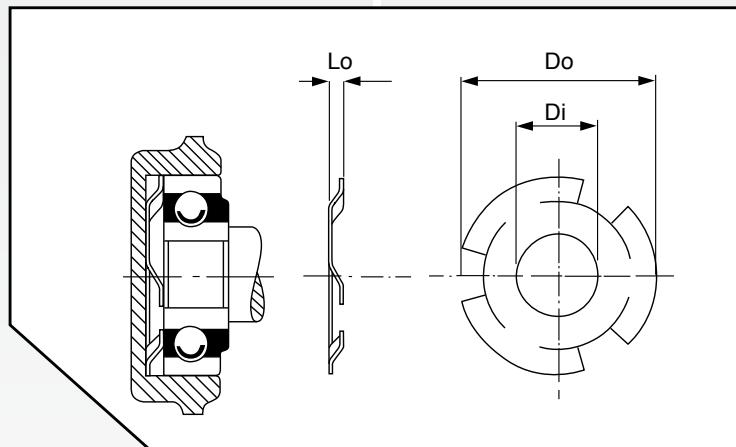
### CLAVES DE CARACTERÍSTICAS

Do = Diámetro externo \*\*\*  
 Di = Diámetro interno  
 Lo = Altura libre (referencia sólo)  
 L<sub>1</sub> = Altura de carga  
 P<sub>1</sub> = Carga (N) en L<sub>1</sub>  
 t = Espesor  
 Db = Diámetro exterior del rodamiento

\* Esta arandela tiene solamente tres orejeras. Todas las demás tienen seis orejeras

\*\* No se adapta a ciertas formas de rodamiento con juntas dobles afiladas.

\*\*\* El diámetro exterior máximo de la arandela debe ser el mismo que el del correspondiente rodamiento.



## FEDERSCHEIBEN FÜR KUGELLAGER

Diese Federscheiben wurden entwickelt, um Geräusche zu dämpfen und Schwingungen bei übermäßiger Belastung zu kompensieren, besonders bei hohen Drehzahlen. Die Lebensdauer von Kugellagern wird durch den Einsatz dieser Federscheiben erhöht. Sie sind auch geeignet für Montagen wo das Spiel zwischen Teilen unvermeidbar ist.

### WERKSTOFF

Gehärteter Federstahldraht. 1074

### ÖBERFLÄCHE

Anglassen.

### ANGABEN

Federscheibenhöhe (L) circa 3,17 mm für alle Teilnummern ausserhalb F0595-010 mit circa 2,38 mm.

### KENNZEICHNEN DER ABMESSUNGEN

Do = Äußerer Durchmesser \*\*\*  
 Di = Innerer Durchmesser  
 Lo = Unbelastete Länge (approx.)  
 L<sub>1</sub> = Länge der belasteten Tellerfeder  
 P<sub>1</sub> = Kraft(N) bei L<sub>1</sub>  
 t = Materialdicke  
 Db = Außendurchmesser des Lagers\*\*

- \* Diese Scheibe hat nur drei Finger. Alle anderen haben sechs Finger.
- \*\* Nicht an einige besonders geformte Lager mit doppelt vorstehenden Dichtungen angepasst.
- \*\*\* Maximaler Außendurchmesser der Scheibe entspricht dem Durchmesser des jeweiligen Lagers.

## RONDELLE PER CUSCINETTI A SFERA

Progettate per neutralizzare la rumorosità, l'eccesso di usura e le vibrazioni, particolarmente in applicazioni ad alta velocità, queste rondelle favoriscono l'efficienza e l'operatività omogenea riducendo l'usura dovuta allo slittamento di elementi rotanti, quali i cuscinetti a sfera. Esse sono anche estremamente utili in casi di grandi giochi interni dovuti a condizioni speciali di applicazione.

### MATERIALE

Acciaio temprato ad alto contenuto di carbonio. Tipo 1074

### FINITURA

Brunitura

### SPECIFICHE

L'altezza libera (L) è approssimativamente 3.17 mm per tutte le dimensioni eccetto per F0595-010 che ha un'altezza libera di 2.38 mm

### LEGENDA

Do = Diametro esterno \*\*\*  
 Di = Diametro interno  
 Lo = Altezza libera (solo riferimento)  
 L<sub>1</sub> = Altezza in carico  
 P<sub>1</sub> = Carico (N) a L<sub>1</sub>  
 t = Spessore  
 Db = Diametro esterno del cuscinetto

- \* questa rondella ha tre linguette, tutte le altre ne hanno sei
- \*\* non adatte per alcuni cuscinetti sagomati con doppi ripari sporgenti
- \*\*\* Diametro esterno massimo della rondella

## ANILHAS DE MOLA DE PALHETAS

Concebidas para reduzir o ruído, o desgaste excessivo e as vibrações, em especial a velocidades elevadas, as anilhas de mola de palhetas promovem a eficácia e o trabalho sem problemas, reduzindo o desgaste resultante do deslizamento em elementos giratórios, tais como as aplicações de rolamentos de esferas. São de extrema utilidade em casos de folgas internas inevitáveis, devido a condições especiais de aplicação.

### MATERIAL

Aço de elevado teor de carbono de tempera fina para molas. Tipo 1074

### ACABAMENTO

Externo pintado em azul

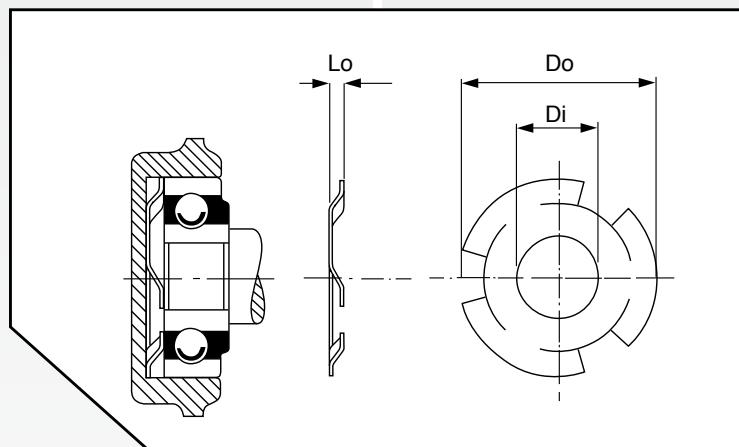
### SPECIFICAÇÃO

Altura das palhetas(L) é de aproximadamente 3,17mm para todas as medidas exceto F0595-010 que tem aproximadamente 2,38mm.

### DIMENSÕES

Do = Diâmetro exterior \*\*\*  
 Di = Diâmetro interior  
 Lo = Altura livre (só para efeitos de referência)  
 L<sub>1</sub> = Altura em carga  
 P<sub>1</sub> = Carga em L<sub>1</sub>  
 t = Espessura  
 Db = Diâmetro Externo do Rolamento

- \* Arruela com três Lóbulos
- \*\* Não adaptáveis a alguns modelos com seladores duplos
- \*\*\* Diametro Maximo da Arruela tem que ser o mesmo do Rolamento



### United Kingdom

Tel: (44) 1386 443366

E-mail: sales@assocspring.co.uk

### France

Tel: (33) 01 30 68 6363

E-mail: info@ressortsspec.com

### Spain

Tel: (34) 945 147542

E-mail: ventas@bgespana.com

### Germany

Tel: (49) 6251 93-3252-04

E-mail: info@asraymond.de



**FINGER SPRING WASHERS**

Part Number	D <sub>o</sub> *** (mm)	D <sub>i</sub> (mm)	t (mm)	L <sub>o</sub> (mm)	L <sub>1</sub> (mm)	P1	DB **
F0595-010	15.11	7.92	0.254	2.38		1.33-4.45	16
F0728-006	18.49	8.74	0.152			17.79-35.6	19
F0846-006	21.49		0.152			13.34-31.1	22
F0846-008		11.51	0.203			40.0-62.2	22
F0926-007	23.52		0.178			26.7-44.5	24
F0926-010		8.74	0.254			93.3-133.4	24
F1004-006	25.50	13.11	0.152			22.2-44.5	26
F1004-007			0.178			31.1-57.8	26
F1164-009		17.48	0.229			35.6-62.2	30
F1164-010	29.57	10.31	0.254		1.57	62.2-102.2	30
F1164-018		17.48	0.018	3.18		244.5-360	30
F1240-008			0.203			40-66.7	32
F1240-009	31.50	14.30	0.229			66.7-97.8	32
F1240-010		17.48	0.254			62.2-102.2	32
F1360-011	34.54	20.68	0.279			44.5-75.6	35
F1360-014			0.36			71.1-115.6	35
F1555-014	39.50	24.66	0.36			57.8-102.2	40
F1555-018		25.40	0.457			124.5-186.7	40
F1830-016	46.48	30.20	0.406			62.2-115.6	47
F2022-019	51.36	34.52	0.483			57.8-120	52





## CONSTANT-FORCE SPRINGS

Constant-force springs are a very special variety of extension spring. They consist of a spiral of strip material with built-in curvature so that each turn of the strip wraps tightly on its inner neighbour. When the strip is extended (deflected) the inherent stress resists the loading force, just as in a common extension spring, but at a nearly constant (zero) rate.

The constant force spring is well suited to long extensions with no load build up. In use, the spring is usually mounted with the ID tightly wrapped on a drum and the free end attached to the loading force, such as in a counterbalance application. The relationship can be reversed, however, with the free end mounted stationary and the spring itself providing the working force, as with carbon brushes in electrical apparatus.

**NOTE:** Be sure to allow at least 1.1/2 cols of material on the drum at full extension. The spring ID will wrap tightly on the drum so that in most applications no fastening method on the drum is required.

### MATERIAL

Type 301 stainless steel.

### HOW TO MULTIPLY CONSTANT FORCE SPRING LOAD

Considerable flexibility is possible with constant-force springs because the load capacity can be multiplied by using two or more strips in tandem or back-to-back, as illustrated.

### KEY TO DIMENSIONS

t	= Material thickness
W	= Width
Lo	= Length
In/Ext	= Initial extension
Wo/Ext	= Working extension
Di	= Inside diameter (+/-10%)
Do	= Outside diameter (+/-10%)
P	= Load (+/-10%)
A	= End configuration centre-line hole to end
d	= End configuration hole diameter
FL	= Fatigue life (cycles)

## RESSORTS A FORCE CONSTANTE

Les ressorts à force constante sont une variété spéciale de ressort de traction. Ils consistent en une bande d'acier spiralée avec une courbure afin que chaque tour de la bande s'enroule fermement autour de sa voisine. Lorsque la bande est allongée (étirée) la tension inhérente résiste à la charge appliquée, comme dans le cas d'un ressort de traction commun, mais à un taux presque constant (zéro).

Le ressort à force constante est bien adapté aux longues extensions sans augmentation de la charge. Pendant l'utilisation, le ressort est normalement monté avec son diamètre intérieur enroulé fermement autour d'un arbre et l'extrémité libre attachée à la charge appliquée, comme pour le cas d'un contre balancier. Néanmoins, cette relation peut être inversée en immobilisant l'extrémité libre et en faisant que le ressort lui-même fournit l'effort de mouvement, comme dans le cas des balais en carbone.

**NOTA:** Assurez vous de prévoir au moins un tour et demi du ressort sur l'arbre en extension maximum. Le diamètre intérieur du ressort s'enroulera fermement sur l'arbre afin, pour la majorité des applications, qu'aucune méthode de fixation sur l'arbre ne soit nécessaire.

### MATÉRIAUX

Acier inoxydable type 301

### COMMENT MULTIPLIER LA CHARGE DES RESSORTS A FORCE CONSTANTE

Ces ressorts permettent une grande flexibilité car les capacités de charges peuvent être ajoutées en utilisant deux (ou plus) bandes et en les montant en tandem ou dos-à-dos, comme sur l'illustration.

### INDEX DES DIMENSIONS

t	= Epaisseur du matériau
W	= Largeur
Lo	= Longueur
In/Ext	= Extension initiale
Wo/Ext	= Extension en utilisation
Di	= Diamètre intérieur (+/-10%)
Do	= Diamètre extérieur (+/-10%)
P	= Charge (+/-10%)
Configurations d'extrémité:	
A	= Dimension axe du trou – extrémité
d	= Diamètre du trou
FL	= Durée de vie optimale (cycles)

## MUELLES/RESORTES DE FUERZA CONSTANTE

Los muelles/resortes de fuerza constante representan una variedad especial de muelle de tracción. Consisten en un espiral o fleje con curvatura de forma que cada espiral del fleje se apriete fuertemente sobre la anterior. Cuando se extiende (deflexión), el esfuerzo inherente resiste la fuerza de carga, al igual que en el resorte de tracción común, pero con una constante casi constante (cero).

El muelle/resorte de fuerza continua es muy adecuado para largas extensiones sin acumulación de carga. En la utilización el muelle/resorte se monta normalmente con el diámetro interior enrollado apretadamente alrededor de un tambor y con el extremo libre fijado a la fuerza de carga, como en la aplicación de un contrapeso. Dicha relación puede invertirse, con el extremo libre fijo y la fuerza de trabajo siendo proporcionada por el mismo muelle/resorte, como en el caso de las escobillas en motores eléctricos.

**NOTA:** Asegúrese de que al menos se quedan 1-1/2 espirales de material sobre el tambor cuando está totalmente extendido. El diámetro interior del muelle se enrollará apretadamente alrededor del tambor de forma que en la mayoría de las aplicaciones no se requiere ningún método de sujeción sobre el tambor.

### MATERIAL

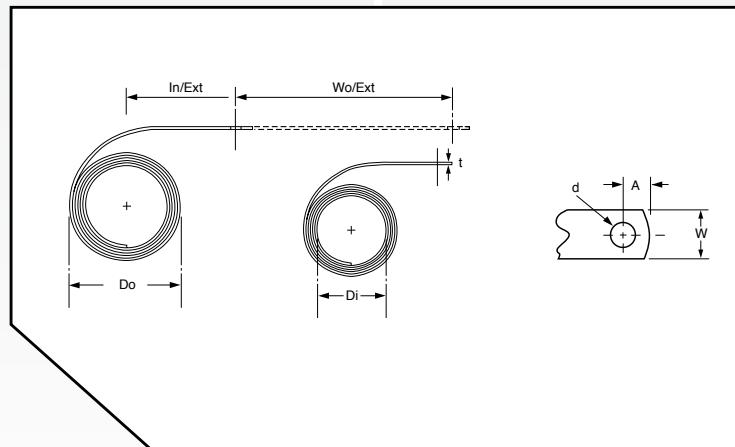
Acero inoxidable tipo 301.

### AUMENTO DE LA CARGA DE LOS MUELLES/RESORTES DE FUERZA CONSTANTE

La carga del muelle/resorte se puede aumentar mediante el montaje de dos o más muelles/resortes de fuerza constante en tandem u opuestos, como muestra el gráfico.

### CLAVES DE CARACTERÍSTICAS

t	= Espesor del material
W	= Anchura
Lo	= Longitud
In/Ext	= Extensión inicial
Wo/Ext	= Extensión de trabajo
Di	= Diámetro interior (+/-10%)
Do	= Diámetro externo (+/-10%)
P	= Carga (+/-10%)
A	= Tipo de extremo
d	= Diámetro agujero
FL	= Vida muelle en ciclos



### United Kingdom

Tel: (44) 1386 443366  
E-mail: sales@assocspring.co.uk

### France

Tel: (33) 01 30 68 6363  
E-mail: info@ressortsspec.com

### Spain

Tel: (34) 945 147542  
E-mail: ventas@bgespana.com

### Germany

Tel: (49) 6251 93-3252-04  
E-mail: info@asraymond.de

## KONSTANTKRAFTFEDERN

Konstant-Kraft Federn sind Sonderformen der Zugfedern. Sie Bestehen aus einer Spirale die so konstruiert ist, daß jede Windung leicht die nächste Windung berührt. Wenn sich die Federn ausdehnt, heben sich Reibungswiderstand und Kraft so auf, daß eine nahezu konstante Kraft entsteht.

Die Konstant-Kraft-Federn ist auf lange Federwege mit konstanter Kraft ausgelegt. In der Praxis wird die Feder fest auf einer Trommel befestigt, wobei das freie Ende die Last aufnimmt. Dieses Prinzip kann umgekehrt werden mit dem freien Ende befestigt und die Feder nimmt die Last auf, wie, z. B., Köhlebürste.

**ANMERKUNG:** Minimum 1,1/2 Federnwicklungen sollten bei voller Expansion der Feder auf der Trommel verbleiben. Der Innendurchmesser der Feder versucht sich auf der Trommel zu verkleinern, so daß normalerweise keine Befestigung auf der Trommel (Aufnahme) nötig ist.

### WERKSTOFF

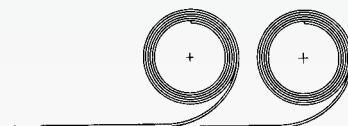
Rostfreierstahl Type 301.

### WIE WIRD DIE FEDERKRAFT ERHÖHT

Die Feder kann flexibel angewendet werden, da die Kraftwerte durch Tandemanordnung oder gegenläufige Anordnung oder ineinanderschachtelung erhöht werden können.

### KENNZEICHNEN DER ABMESSUNGEN

t	= Materialdicke
W	= Materialbreite
Lo	= Grundlänge
In/Ext	= Anfangslänge
Wo/Ext	= Arbeitslänge
Di	= Innerer Durchmesser (+/-10%)
Do	= Äußerer Durchmesser (+/-10%)
P	= Federkraft (+/-10%)
A	= Ende
d	= Bohrungsdurchmesser
FL	= Lebensdauern Hüben



## MOLLE A SPIRALE

Le molle a spirale sono un tipo speciale di molla a trazione. Esse sono costituite da una striscia di lamiera curvata a spirale, in modo che ogni spira aderisca a quella interna. Quando la striscia viene estesa (deflessa) lo stress intrinseco resiste alla forza di carica come in una molla a trazione, ma in percentuale quasi costante (zero).

La molla a spirale viene utilizzata per lunghe estensioni senza incremento di carico. La molla viene normalmente montata con il diametro interno avvolto ad un perno e con l'estremità libera collegata alla forza di carico, ad esempio in applicazioni come contrappeso.

Questa relazione può essere anche invertita, con l'estremità libera montata fissa ed il corpo della molla a fungere da forza di lavoro, come per le spazzole in grafite nei motori elettrici.

Una notevole flessibilità è ottenibile con le molle a spirale, poiché la loro capacità di carico è moltiplicabile attraverso l'utilizzo di due o più strisce in tandem, in contrapposizione, o laminate.

**NOTA:** Bisogna assicurarsi che almeno 1½ delle spire si avvolga sul perno a piena estensione. Il diametro interno della molla si stringerà saldamente sul perno in modo che nella maggior parte delle applicazioni sia possibile evitare un qualsiasi fissaggio della molla.

### MATERIALE

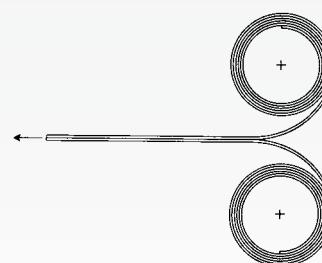
Acciaio Inox Tipo 301

### COME MOLTIPLICARE IL CARICO DELLE MOLLE A SPIRALE

Una notevole flessibilità è ottenibile con le molle a spirale, poiché la loro capacità di carico è moltiplicabile attraverso l'utilizzo di due o più nastri in tandem, in contrapposizione, o laminate.

### LEGENDA

t	= Spessore materiale
W	= Larghezza
Lo	= Lunghezza
In/Ext	= Estensione iniziale
Wo/Ext	= Estensione di lavoro
Di	= Diametro interno (+/-10%)
Do	= Diametro esterno (+/-10%)
P	= Carico Newton (+/-10%)
A	= Config. estremità (centro foro- estremità)
d	= Diametro foro estremità
FL	= Cicli



## MOLAS DE FORÇA CONSTANTE

As molas de força constante são um tipo especial de molas de tração. Consistem numa espiral ou flecha com uma curvatura incorporada, para que cada uma das espirais da flecha se encoste com firmeza à anterior. Quando em extensão (sem flexão), o esforço inherentemente resiste à força de carga, tal como acontece numa mola de tração comum, embora com uma cadência quase constante (zero).

A mola de força contínua é muito adequada a extensões pronunciadas sem acumulação de carga. Na aplicação, a mola instala-se normalmente com o diâmetro interior apertadamente enrolado em torno de um tambor, e com a extremidade livre fixa à força de carga, como no caso da aplicação de um contrapeso. No entanto, este tipo de relação pode ser invertida, com a extremidade livre fixa, sendo a força de trabalho disponibilizada pela própria mola, como no caso das escovas de equipamentos eléctricos.

**NOTA:** Certifique-se de que ficam pelo menos 11/2 espirais de material sobre o tambor, quando em extensão total. O diâmetro interior da mola enrola-se apertadamente em torno do tambor, fazendo com que na maior parte das aplicações não seja necessário qualquer método de fixação ao tambor.

### MATERIAL

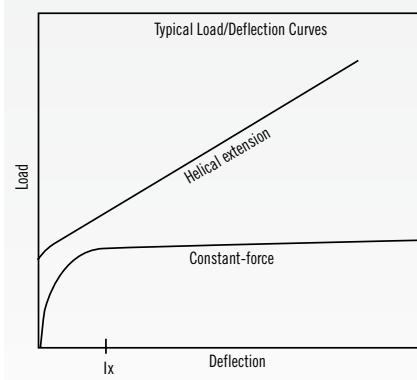
Tipo 301 aço inoxidável.

### COMO MULTIPLICAR A CARGA DE MOLAS DE FORÇA CONSTANTE

Uma flexibilidade considerável é possível com essas molas pois a capacidade de carga pode ser multiplicada encostando-se costas com costas ou uma acima da outra, como na ilustração.

### LEGENDA

t	= Espessura do material
W	= Largura
Lo	= Comprimento
In/Ext	= Extensão inicial
Wo/Ext	= Extensão de trabalho
Di	= Diâmetro interior (ref) (+/-10%)
Do	= Diâmetro externo (+/-10%)
P	= Carga em Newtons (+/-10%)
Config.	= Configuração da extremidade
A	= Orifício da linha central à extremidade
d	= Diâmetro do orifício da configuração da extremidade
FL	= Vida útil (ciclos)



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de

**CONSTANT FORCE SPRINGS - STAINLESS STEEL / INOX**

Part Number	t (mm)	W (mm)	L <sub>0</sub> (mm)	In/Ext (mm)	W <sub>0</sub> /Ext (mm)	P (N)	D <sub>i</sub> (mm)	D <sub>o</sub> (mm)	A (mm)	d (mm)	FL
<b>FL = 4,000</b>											
CF012-0038	0.08	4.75	305	9.54	269	1.70	5.33	7.62	2.54	2.4	
CF015-0049				13.17	333	2.20	7.36	10.16			
CF015-0050	0.10	6.35	381	15.49	305	2.20	8.64	10.16	9.50		
CF015-0065				11.36	333	2.90	6.35	10.16			
CF015-0083		7.90		12.72	333	3.70	7.11	10.16	4.75	3.3	
CF017-0103	0.13		432	16.82	372	4.60	9.40	12.70			
CF018-0075			457	19.05	381	3.34	10.67	12.70	9.50		
CF022-0112	0.15	9.40	559	23.37	457	4.98	12.95	15.75			
CF024-0148		9.50	610	20.46	536	6.60	11.43	15.70			
CF024-0402	0.23	19.00		28.19	511	17.90	15.75	21.00	8.70	5.0	
CF025-0198	0.15	12.70	635	20.46	557	8.80	11.43	16.50			
CF026-0162	0.18		660	26.92	533	7.21	14.99	19.05	9.50	3.3	
CF030-0237		14.99		30.99	610	10.54	17.27	22.10		4.7	4000
CF030-0263	0.20	12.70	762	26.85	663	11.70	15.00	21.00			
CF030-0330		15.87		27.74	663	14.70	15.50	21.00	8.70	5.0	
CF033-0413			838	33.11	720	18.40	18.50	25.00			
CF033-0494	0.25	19.00		32.22	722	22.00	18.00	24.60			
CF034-0350		17.27	864	38.86	686	15.57	21.59	25.40	9.50	4.7	
CF038-0500		20.57	965	46.74	762	22.24	25.91	31.75			
CF039-0595	0.30	19.00	991	40.00	850	26.50	22.40	30.00			
CF039-0795		25.40		40.00	847	35.40	22.40	30.50	8.70	5.0	
CF040-1063	0.40		1016	54.60	834	47.30	30.50	38.60			
CF043-0700	0.36		1092	54.36	838	31.14	30.23	38.10	9.50	4.7	
CF050-1656	0.50	31.75	1270	66.76	1044	73.70	37.30	48.00	8.70	5.0	
CF052-2494	0.64	38.00	1321	80.55	1052	111.00	45.00	57.00			
CF052-3303		50.80		80.99	1052	147.00	45.25	57.00	15.87	6.7x2	
CF060-4089	0.79		1524	113.66	1161	182.00	63.50	77.00			
<b>FL = 25,000</b>											
CF018-0023	0.10	6.35	457	24.30	383	1.03	13.50	15.75			
CF018-0036	0.13	7.90		31.50	363	1.61	17.50	20.00	4.75	3.3	
CF025-0043		9.50		29.70	541	1.92	16.50	20.00			
CF025-0052	0.15		635	32.40	533	2.30	19.55	21.83			
CF025-0070		12.70		36.00	524	3.10	20.00	23.50			
CF033-0094	0.20		838	48.60	691	4.20	27.00	31.25			
CF035-0146	0.25	15.87	889	62.10	705	6.50	34.50	39.00			
CF045-0209	0.30	19.00	1143	73.08	925	9.30	40.60	46.25	8.70	5.0	25000
CF045-0281		25.40		73.80	921	12.50	41.00	47.00			
CF046-0411	0.40		1168	90.00	904	18.30	50.00	56.00			
CF048-0350	0.38		1219	90.00	955	15.60	50.00	56.00			
CF048-0438		31.75		92.70	946	19.50	51.50	58.00			
CF055-0584	0.50		1397	115.66	1058	26.00	64.26	72.00			
CF060-0843	0.64	38.00	1524	153.00	1081	37.50	85.00	94.00			
CF060-1175		50.80		154.08	1083	52.30	85.60	93.50	15.87	6.7x2	
CF070-1445	0.79		1778	198.90	1210	64.30	110.50	120.50			
<b>FL = 40,000</b>											
CF021-0025	0.15	9.40	533	51.56	305	1.11	28.70	34.54		3.3	
CF025-0037	0.18	12.70	635	59.94	381	1.65	33.27	40.13			
CF030-0050	0.20	14.99	762	69.09	457	2.22	38.35	45.97	9.50		40000
CF036-0075	0.25	17.27	914	85.85	533	3.34	47.75	57.40		4.7	
CF042-0112	0.30	20.57	1067	103.40	610	4.98	57.40	68.83			
CF048-0162	0.36	25.40	1219	120.40	686	7.21	66.80	80.26			





**Associated Spring**   
A business of BARNES GROUP INC

**SINCE 1857**

## Engineered Precision Transmission SPRING & STAMPING SOLUTIONS

**Our DNA is Spring Innovation**



**Your Challenges:**  
• Emissions • Performance • Shift Quality • Globalization

**Our Solutions:**  
• Innovative • Customized • Optimized • Global

**Barnes**  
GROUP INC  
ENGINEERED COMPONENTS

[www.asbg.com](http://www.asbg.com) [associatedspring@asbg.com](mailto:associatedspring@asbg.com)

**CIRCLIPS TO DIN 471/472**

For shafts and bores are the most universally applicable retaining systems. These series offer a favourable solution with regard to thickness and radial width. They transfer large axial forces from the located component onto the groove wall. The external rings can also be used for very high speeds.

**Applications:**

Mechanical, automotive and electrical engineering. Gear systems, precision mechanics and apparatus engineering.

**Material:**

Spring Steel

**Hardness:**

d1: 3 - 48 = 47-54 HRC  
d1: 50 - 200 = 44-51 HRC  
d1: 202 - 300 = 40-47 HRC  
d1: 305 - 1000 = 38-43 HRC

**Surface Protection:**

Phosphated and oiled

**Special options - please enquire:**

Self-finished and oiled  
Zinc plated  
Bronze CuSn8  
Corrosion resistant steels

\*\*Rings in excess of 650mm nominal diameter are manufactured as concentric circlips.

**KEY TO DIMENSIONS**

L = Lug dimension  
h = Hole dimension  
b = Beam dimension  
D1 = Internal diameter (DIN 471)  
D2 = Outside diameter (DIN 472)  
t = thickness  
S = Shaft diameter  
B = Bore diameter  
n = Shoulder dimension  
W = Groove width  
G = Groove diameter  
Fr = Load bearing capacity of Circlip  
Fn = Load bearing capacity of groove

**CIRCLIPS SELON LA DIN 471/472**

Pour des axes et des alésages sont les systèmes de conservation le plus universellement applicables. Ces séries offrent une solution favorable en ce qui concerne l'épaisseur et la largeur radiale. Elles transfèrent les forces axiales importantes à partir du composant localisé sur le mur de cannelure. Les anneaux externes peuvent également être employés pour très des vitesses.

**Applications:**

Électrotechnique mécanique, des véhicules à moteur et. Embrayez les systèmes, la mécanique de précision et la technologie d'appareil.

**Matériel:**

Aacier de ressort

**Dureté:**

d1: 3 - 48 = 47-54 HRC  
d1: 50 - 200 = 44-51 HRC  
d1: 202 - 300 = 40-47 HRC  
d1: 305 - 1000 = 38-43 HRC

**Protection extérieure:**

Phosphaté et huilé

**Options spéciales - enquérez-vous svp :**

Individu-de finition et huilé  
Zinguee  
Bronze CuSn8  
Aciers résistants à la corrosion

\*\* Les anneaux dont le diamètre extérieur nominal excède 650mm sont fabriqués comme des anneaux d'arrêt concentriques.

**ABBREVIATIONS UTILISÉES**

L = Taille de l'oreille  
h = Taille du trou  
b = Hauteur radiale  
D1 = Diamètre Intérieur (DIN 471)  
D2 = Diamètre Extérieur (DIN 471)  
t = Epaisseur  
S = Diamètre d'arbre  
B = Diamètre d'alésage  
n = Longueur cisaillée à fond de gorge  
W = Largeur de gorge  
G = Diamètre de gorge  
Fr = Capacité de charge du segment  
Fn = Capacité de charge de la gorge

**ANILLOS DE RETENCIÓN DIN 471/472**

Para los ejes y los alesajes son los sistemas de retención lo más universal posible aplicables. Estas series ofrecen una solución favorable con respecto a grueso y a anchura radial. Transfieren fuerzas axiales grandes del componente localizado sobre la pared del surco. Los anillos externos se pueden también utilizar para misma las velocidades.

**Usos:**

Ingeniería mecánica, automotora y eléctrica. Engrane los sistemas, los mecánicos de la precisión y la ingeniería del aparato.

**Material:**

Acero del resorte

**Dureza**

d1: 3 - 48 = 47-54 HRC  
d1: 50 - 200 = 44-51 HRC  
d1: 202 - 300 = 40-47 HRC  
d1: 305 - 1000 = 38-43 HRC

**Protección superficial:**

Fosfatado y engrasado

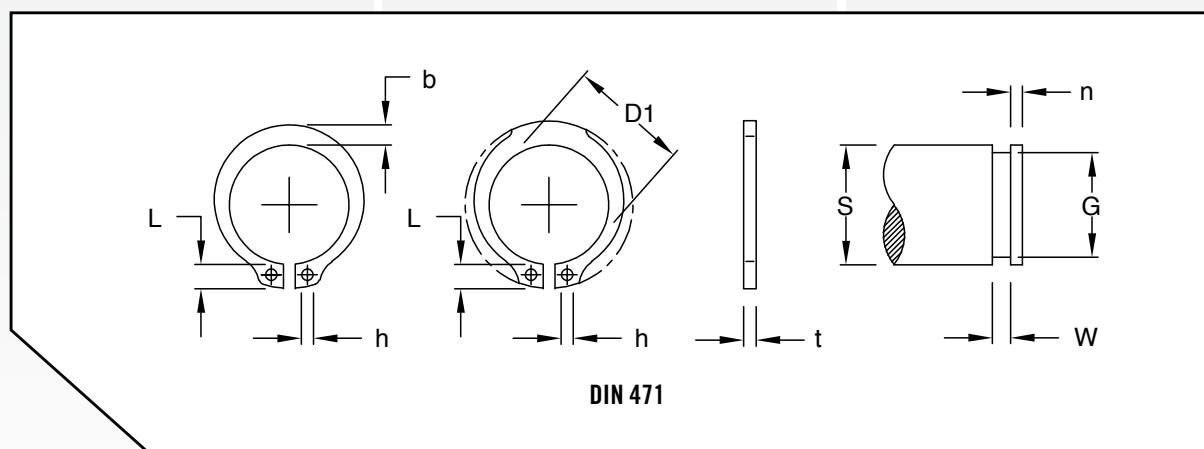
**Opciones especiales - investigue por favor:**

Uno mismo-acabado y engrasado  
Cinc plateado  
Bronce CuSn8  
Aceros resistentes a la corrosión

\*\*Los anillos con un diámetro nominal mayor a 650 mm se fabrican como anillos de retención al estruendo concéntricos

**CLAVES DE DIMENSIONES**

L = Dimensión de la oreja  
h = Dimensión del agujero  
b = Altura radial  
D1 = Diámetro interior (DIN 471)  
D2 = Diámetro exterior (DIN 471)  
t = Espesor  
S = Diámetro del eje  
B = Diámetro del rodamiento  
n = Dimensión de la espalda  
W = Anchura de la ranura  
G = Diámetro de la ranura  
Fr = Capacidad de carga del segmento  
Fn = Capacidad de carga de la ranura



## SEEGERRINGE ZUM LÄRM 471/472

Für Wellen und Ausbohrungen sind die allgemein hin anwendbaren Haltesysteme. Diese Reihen bieten eine vorteilhafte Lösung hinsichtlich der Stärke und der Radialbreite an. Sie bringen große axiale Kräfte vom lokalisierter Bestandteil auf die Nutwand. Die externen Ringe können für große Geschwindigkeiten auch sehr benutzt werden.

### Anwendung:

Mechanische, Automobil- und Elektrotechnik. Übersetzen Sie Systeme, Präzisionsmechaniker und Apparate technik.

### Werkstoff:

Federstahl

### Härte:

d1: 3 - 48 = 47-54 HRC  
d1: 50 - 200 = 44-51 HRC  
d1: 202 - 300 = 40-47 HRC  
d1: 305 - 1000 = 38-43 HRC

### Oberflächenschutz:

Phosphatiert und geölt

Spezielle Wahlen - erkundigen Sie bitte sich:

Selbst-fertig und geölt  
Verzinkt  
Bronze CuSn8  
Korrosionsbeständige Stahle

\*\*Ringe mit einem Nenndurchmesser von über 650mm werden als konzentrische Sicherungsringe hergestellt.

### KENNZEICHNEN DER ABMESSUNGEN

L = Ansatz  
h = Öffnung  
b = Balken  
D1 = Innendurchmesser (DIN 471)  
D2 = Außendurchmesser (DIN 472)  
t = Dicke  
S = Wellendurchmesser  
B = Bohrungsdurchmesser  
n = Schulter  
W = Nutbreite  
G = Nutdurchmesser  
Fr = Belastbarkeit von Circlip  
Fn = Belastbarkeit von Nut

## ANELLO DIN 471/472

Per i pozzi e fori sono i sistemi di conservazione il più universalmente applicabili. Queste serie offrono una soluzione favorevole riguardo a spessore ed alla larghezza radiale. Trasferiscono le grandi forze assiali dalla componente individuata sulla parete della scanalatura. Gli anelli esterni possono anche essere usati per molto le alte velocità.

### Applicazioni:

Ingegneria elettrica meccanica, automobilistica e. Innesti i sistemi, i meccanici di precisione e l'ingegneria dell'apparecchio.

### Materiale:

Acciaio della molla

### Durezza

d1: 3 - 48 = 47-54 HRC  
d1: 50 - 200 = 44-51 HRC  
d1: 202 - 300 = 40-47 HRC  
d1: 305 - 1000 = 38-43 HRC

### Protezione di superficie:

Fosfatizzato e lubrificato

Scelte particolari - domandi prego:

Auto-rifinito e lubrificato  
Zinco placcato  
Bronzo CuSn8  
Acciai resistenti alla corrosione

\*\*Gli anelli con un diametro esterno nominale superiore a 650mm sono costruiti come anelli concentrici.

### LEGENDA

L = Dimensioni aletta  
h = Dimensioni del foro  
b = Vedi disegno  
D1 = Diametro interno (DIN 471)  
D2 = Diametro esterno (DIN 472)  
t = Spessore  
S = Diametro del perno  
B = Diametro della sede  
n = Dimensioni spalla  
W = Larghezza scanalatura  
G = Diametro scanalatura  
Fr = Capacità di carico dell'anello  
Fn = Capacità di carico della sede

## OS GRAMPOS DE RETENÇÃO AO RUÍDO 471/472

Para eixos e furos são os sistemas de retenção o mais universal aplicáveis. Estas séries oferecem uma solução favorável no que diz respeito à espessura e à largura radial. Transferem grandes forças axiais do componente encontrado na parede do sulco. Os anéis externos podem igualmente ser usados para muito altas velocidades.

### Aplicações:

Engenharia mecânica, automotriz e elétrica. Engrene sistemas, mecânicos da precisão e engenharia do instrumento.

### Material:

Aço da mola

### Dureza

d1: 3 - 48 = 47-54 HRC  
d1: 50 - 200 = 44-51 HRC  
d1: 202 - 300 = 40-47 HRC  
d1: 305 - 1000 = 38-43 HRC

### Proteção de superfície:

Fosfatado e oleado

Opções especiais - inquirir por favor:

Auto-terminado e oleado  
Zinco chapeado  
Bronze CuSn8  
Aços resistentes à corrosão

\*\*Anéis com mais de 650mm de diâmetro nominal são manufaturados com anéis concentricos.

### LEGENDA

L = Lobulo  
h = Furo  
b = Travamento  
D1 = Diametro Interno (Din 471)  
D2 = Diametro Externo (Din 4720)  
t = Espessura  
S = Diametro do eixo  
B = Diametro do furo  
n = Suporte  
W = Largura do encaixe  
G = Diametro do encaixe  
Fr = Capacidade de carga  
Fn = Encaixe



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



**CIRCLIPS DIN472 - J PARTS**

No.	S (mm)	Product Dimensions							Groove Dimensions					
		t (mm)	Tol (mm)	D (mm)	Tol (mm)	L (mm)	b (mm)	hi (mm)	Fr (kN)	G (mm)	Tol (mm)	W (mm)	n (mm)	FN (kN)
A12	12			11		3.3	1.8		5	11.5			0.8	1.5
A14	14	1		12.9		3.5	2.1	1.7	6.4	13.4		1.1	0.9	2.1
A15	15			13.8	+0.10-0.36	3.6	2.2		6.9	14.3			1.1	2.6
A17	17			15.7		3.8	2.3		8	16.2	-0.11		1.2	3.4
A18	18			16.5		3.9	2.4		17	17				4.5
A19	19			17.5		3.9	2.5		17	18				4.8
A20	20			18.5		4	2.6		17.1	19			1.5	5
A21	21	1.2		19.5		4.1	2.7		16.8	20	-0.13	1.3		5.3
A22	22			20.5		4.2	2.8	2	16.9	21				5.6
A23	23			21.5	+0.13-0.42	4.3	2.9		16.6	22	-0.15			5.9
A24	24		-0.06	22.2		4.4	3		16.1	22.9			1.7	6.7
A25	25			23.2		4.4	3		16.2	23.9	-0.21			7
A28	28			25.9		4.7	3.2		32.1	26.6			2.1	10
A32	32	1.5		29.6		5.2	3.6		31.2	30.3		1.6	2.6	13.8
A34	34			31.5		5.4	3.8		31.3	32.3				14.7
A35	35			32.2	+0.25-0.50	5.6	3.9		30.8	33				17.8
A36	36			33.2		5.6	4		49.4	34			3	18.3
A38	38			35.2		5.8	4.2		49.5	36				19.3
A40	40			36.5		6	4.4		51	37.5	-0.25			25.3
A42	42	1.8		38.5		6.5	4.5		50	39.5		1.85		26.7
A44	44			40.5		6.6	4.6	2.5	48.5	41.5			3.8	28
A45	45			41.5	+0.39-0.90	6.7	4.7		49	42.5				28.6
A48	48			44.5		6.9	5		49.4	45.5				30.7
A50	50			45.8		6.9	5.1		73.3	47				38
A52	52			47.8		7	5.2		73.1	49				39.7
A55	55	2		50.8		7.2	5.4		71.4	52		2.15		42
A58	58			53.8		7.3	5.6		71.1	55			4.5	44.3
A60	60		-0.07	55.8		7.4	5.8		69.2	57				46
A65	65			60.8		7.8	6.3		135	62	-0.30			49.8
A70	70			65.5	+0.46-1.10	8.1	6.6		134	67				53.8
A72	72	2.5		67.5		8.2	6.8	3	131	69		2.65		55.3
A80	80			74.5		8.6	7.4		128	76.5				71.6
A82	82			76.5		8.7	7.6		128	78.5				73.5
A85	85			79.5		8.7	7.8		215	81.5			5.3	76.2
A90	90	3	-0.08	84.5		8.8	8.2		217	86.5	-0.35	3.15		80
A95	95			89.5		9.4	8.6		212	91.5				85
A100	100			94.5		9.6	9	3.5	206	96.5				90
A105	105			98	+0.54-1.30	9.9	9.3		471	101				107
A110	110			103		10.1	9.6		457	106	-0.54			113
A115	115			108		10.6	9.8		438	111				118
A120	120			113		11	10.2		424	116			6	123
A130	130			123		11.6	10.7		395	126				134
A135	135			128		11.8	11		389	131				139
A140	140	4	-0.10	133		12	11.2		376	136		4.15		144
A145	145			138		12.2	11.5		367	141				149
A150	150			142	+0.63-1.50	13	11.8		357	145	-0.63			193
A160	160			151		13.3	12.2		349	155				206
A165	165			155.5		13.5	12.5	4	345	160			7.5	212
A170	170			160.5		13.5	12.9		349	165				219
A180	180			170.5		14.2	13.5		345	175				232
A200	200			190.5		14.2			319	195				258
A210	210			198		14.2			598	204				325
A230	230			218	+0.72-1.70	14.2	14		548	224	-0.72		9	356
A240	240	5	-0.12	228		14.2			530	234		5.15		372
A250	250			238		14.2			504	244				388
A260	260			245		16.2	16	5	540	252			12	535
A280	280			265	+0.81-2.00	16.2			508	272	-0.81			576
A320	320			303					988	310				825
A340	340			323					932	330				876
A350	350			333					906	340				903
A360	360	6		343	+0.90-2.00		20		880	350	-0.89	6.2	15	928
A380	380			363					833	370				980
A390	390		-0.15	373				6	814	380				1008
A400	400			383					793	390				1033
A440	440			420					1500	428				1363
A460	460	7		440	+1.00-2.00				1443	448		7.2	18	1426
A500	500			480				26	1329	488	-1.00			1550
A560	560	8		535	+1.50-3.00				1777	546		8.2	21	2026
A600	600			575					1600	586				2170



**CIRCLIPS DIN472 - J PARTS**

No.	S (mm)	Product Dimensions								Groove Dimensions				
		t (mm)	Tol (mm)	D (mm)	Tol (mm)	L (mm)	b (mm)	hi (mm)	Fr (kN)	G (mm)	Tol (mm)	W (mm)	n (mm)	FN (kN)
J16	16			17.3	+0.36-0.10	3.8	2	1.7	5.5	16.8	0.11		1.2	3.4
J20	20	1		21.5	+0.42-0.13	4.1	2.3		7.2	21	0.13	1.1	1.5	5.4
J22	22			23.5		4.2	2.5		8	23			1.5	5.9
J24	24			25.9	+0.42-0.21	4.3	2.6	2	13.9	25.2			1.8	7.7
J26	26			27.9		4.7	2.8		13.8	27.2	0.21		1.8	8.4
J28	28	1.2		30.1		4.8	2.9		13.3	29.4		1.3	2.1	10.5
J30	30			32.1		4.8	3		13.7	31.4			2.1	11.3
J32	32		-0.06	34.4	+0.50-0.25	5.4	3.2		13.8	33.7			2.6	14.6
J35	35			37.8		5.4	3.4		26.9	37				18.8
J36	36	1.5		38.8		5.4	3.5		26.4	38		1.6	3	19.4
J38	38			40.8		5.5	3.7		28.2	40	0.25			22.5
J40	40			43.5		5.8	3.9		44.6	42.5				27
J42	42			45.5	+0.90-0.39	5.9	4.1		44.7	44.5				28.4
J45	45	1.75		48.5		6.2	4.3		43.1	47.5		1.85	3.8	30.2
J47	47			50.5		6.4	4.4	2.5	43.5	49.5				31.4
J48	48			51.5		6.4	4.5		43.2	50.5				32
J50	50			54.2		6.5	4.6		60.8	53				40.5
J52	52			56.2		6.7	4.7		60.2	55				42
J55	55			59.2		6.8	5		60.3	58				44.4
J58	58	2		62.2		6.9	5.2		60.8	61		2.15		46.7
J60	60			64.2	+1.10-0.46	7.3	5.4		61	63				48.3
J62	62			66.2		7.3	5.5		60.9	65	0.3			49.8
J64	64		-0.07	68.2		7.4	5.7		60.6	67			4.5	51.4
J65	65			69.2		7.6	5.8		121	68				51.8
J67	67			71.5		7.7	6		121	70				53.8
J68	68			72.5		7.8	6.1		119	71				56.2
J72	72	2.5		76.5		7.8	6.4	3	119	75		2.65		58
J75	75			79.5		7.8	6.6		118	78				60
J78	78			82.5		8.5	6.8		122	81				62.3
J80	80			85.5		8.5	7		120	83.5				74.6
J82	82			87.5		8.5	7		119	85.5				76.6
J85	85			90.5		8.6	7.2		201	88.5				79.5
J88	88			93.5		8.6	7.4		209	91.5	0.35		5.3	82
J90	90	3	-0.08	95.5	+1.30-0.54	8.6	7.6		199	93.5		3.15		84
J92	92			97.5		8.7	7.8		201	95.5				85
J95	95			100.5		8.8	8.1	3.5	195	98.5				88
J100	100			105.5		9.2	8.4		188	103.5				93
J105	105			112		9.5	8.7		436	109				112
J110	110			117		10.4	9		415	114	0.54			117
J115	115			122		10.5	9.3		409	119				122
J120	120			127		11	9.7		396	124				127
J125	125			132		11	10		385	129		6		132
J130	130			137		11	10.2		374	134				138
J135	135			142		11.2	10.5		358	139				143
J145	145			152	+1.50-0.63	11.4	10.9		336	149				153
J148	148			155		11.8	11.1		331	152	0.63	4.15		157
J150	150	4	-0.10	158		12	11.2		326	155				191
J155	155			164		12	11.4		324	160				206
J160	160			169		13	11.6		321	165				212
J165	165			174.5		13	11.8		319	170				219
J170	170			179.5		13.5	12.2		349	175		7.5		225
J175	175			184.5		13.5	12.7	4	351	180				232
J180	180			189.5			13.2		347	185				238
J190	190			199.5			13.8		340	195				251
J195	195			204.5			13.8		330	200				258
J200	200			209.5	+1.70-0.72		14		325	205				265
J205	205			217			14		616	211				326
J210	210			222			14.2	14	601	216	0.72			333
J215	215			227			14		586	221				341
J220	220			232			14		574	226		9		349
J230	230			242			14		549	236				365
J240	240			252			14		525	246		5.15		380
J250	250	5	-0.12	262			14		504	256				396
J255	255			270			16		549	263				541
J260	260			275	+2.00-0.81		16		538	268				553
J270	270			285			16.2	16	518	278	0.81	12		573
J280	280			295			16		499	288				593
J285	285			300			16		491	293				605
J290	290			305			16		482	298				615



**CIRCLIPS DIN472 - J PARTS**

No.	S (mm)	Product Dimensions								Groove Dimensions				
		t (mm)	Tol (mm)	D (mm)	Tol (mm)	L (mm)	b (mm)	hi (mm)	Fr (kN)	G (mm)	Tol (mm)	W (mm)	n (mm)	FN (kN)
J300	300	5	-0.12	315	+2.00-0.81	16.2	16	5	466	308	0.81	5.15	12	636
J310	310			327					947	320				823
J320	320			337					919	330				850
J330	330			347					894	340				876
J340	340			357	+2.00-0.90				869	350	0.89	6.2	15	903
J350	350	6		367			20		846	360				929
J360	360			377					823	370				955
J380	380			397					784	390				1008
J390	390			407					764	400				1033
J400	400		-0.15	417				6	746	410				1060
J420	420			440	+2.00-1.00				1480	432				1338
J440	440			460					1418	452				1401
J450	450	7		470					1388	462		7.2	18	1431
J470	470			490			26		1330	482	1			1495
J500	500			520					1256	512				1588
J520	520			545	+3.00-1.50				1802	534				1931
J540	540	8		565					1738	554		8.2	21	2004
J600	600			625					1571	614				2221



NOTES

CC



185

**UK****E TYPE RETAINER TO DIN 6799**

Radially installed retaining ring for shafts. Widely used in a diverse range of applications including; Automotive and electrical engineering, office machines and precision mechanics.

**Material:**

Spring Steel

**Surface Protection:**

Phosphated and oiled

Special options - please enquire:

Self-finished and oiled

Zinc plated

Bronze CuSn8

Corrosion resistant steels

**KEY TO DIMENSIONS**

D	= Outside diameter
g	= Gap dimension
b	= Beam dimension
d3	= Expanded diameter
t	= thickness
d1	= Shaft diameter
W	= Groove width
d2	= Groove diameter
n	= Shoulder length
Fr	= Load bearing capacity of ring
Fn	= Load bearing capacity of groove

**F****ANNEAUX D'ARRET TYPE "E" - DIN 6799**

Circlip radialement installé pour des axes. Employé couramment dans une étendue des applications diverses comprenant ; Electrotechnique des véhicules à moteur et, équipements de bureau et mécanique de précision.

**Matériel:**

Acier de ressort

**Protection extérieure:**

Phosphaté et huilé

Options spéciales - enquérez-vous svp :

Individu-de finition et huilé

Zinguee

Bronze CuSn8

Aciers résistants à la corrosion

**ABBREVIATIONS UTILISEES**

D	= Diamètre extérieur
g	= Ouverture
b	= Hauteur radiale
d3	= Diamètre extérieur en place
t	= Epaisseur
d1	= Diamètre d'arbre
W	= Largeur de gorge
d2	= Diamètre de gorge
n	= Longueur cisailée à fond de gorge
Fr	= Capacité de charge du segment
Fn	= Capacité de charge de la gorgew

**E****TIPO DETENEDOR DE E AL DIN 6799**

Anillo de retención radialmente instalado para los ejes. Ampliamente utilizado en una gama de usos diversa incluyendo; Ingeniería automotora y eléctrica, máquinas de oficina y mecánicos de la precisión.

**Material:**

Acero del resorte

**Protección superficial:**

Fosfatado y engrasado

Opciones especiales - investigue por favor:

Uno mismo-acabado y engrasado

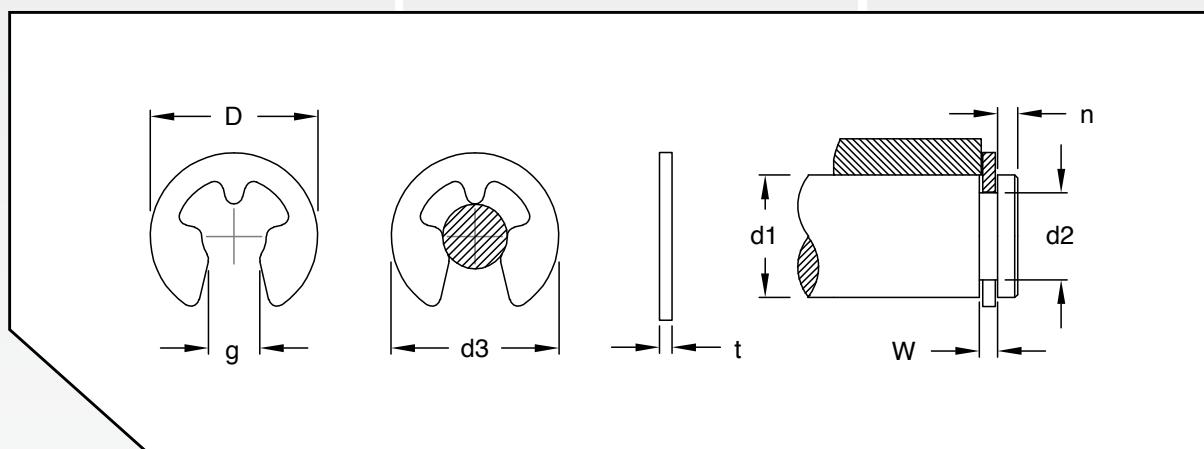
Cinc plateado

Bronce CuSn8

Aceros resistentes a la corrosión

**CLAVES DE DIMENSIONES**

D	= Diámetro exterior
g	= Obertura
b	= Altura radial
d3	= Diámetro exterior expandido
t	= Espesor
d1	= Diámetro del eje
W	= Largura de la ranura
d2	= Diámetro de la ranura
n	= argura de la espalda
Fr	= Capacidad de carga del segmento
Fn	= Capacidad de carga de la ranura

**United Kingdom**

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

**France**

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

**Spain**

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

**Germany**

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de

## E-ART HALTER ZUM DIN 6799

Radial angebrachter Seegerring für Wellen. Am meisten benutzt in einer verschiedenen Benutzungsmöglichkeit einschließlich; Automobil- und Elektrotechnik, Büromaschinen und Präzisionsmechaniker.

### Werkstoff:

Federstahl

### Oberflächenschutz:

Phosphatiert und geölt

Spezielle Wahlen - erkundigen Sie bitte sich:

Selbst-fertig und geölt

Verzinkt

Bronze CuSn8

Korrosionsbeständige Stähle

### KENNZEICHNEN DER ABMESSUNGEN

D = Außendurchmesser

g = Abstand

g = Balken

d3 = Erweiterter Durchmesser

t = Dicke

d1 = Wellendurchmesser

W = Nutbreite

d2 = Nutdurchmesser

n = Schulterlänge

Fr = Belastbarkeit des Rings

Fn = Belastbarkeit der Nut

## ANELLO D'ARRESTO DIN 6799

Anello di conservazione radialmente installato per i pozzi. Ampiamente usato in una gamma delle applicazioni varia compreso: Ingegneria elettrica automobilistica e, macchine di ufficio e meccanici di precisione.

### Materiale:

Acciaio della molla

### Protezione di superficie:

Fosfatizzato e lubrificato

Scelte particolari - domandi prego:

Auto-rifinito e lubrificato

Zinco placcato

Bronzo CuSn8

Acciai resistenti alla corrosione

## TIPO RETENTOR DE E AO DIN 6799

Anel de retenção radial instalado para eixos. Amplamente utilizado em uma escala diversa de incluir das aplicações: Engenharia automotriz e elétrica, máquinas de escritório e mecânicos da precisão.

### Material:

Aço da mola

### Proteção de superfície:

Fosfatado e oleado

Opções especiais - inquire por favor:

Auto-terminado e oleado

Zinco chapeado

Bronze CuSn8

Aços resistentes à corrosão

### LEGENDA

D = Diametro Esterno

g = Dimensione apertura

cVedi Disegno

d3 = Diametro esterno ad anello assemblato

t = Spessore

d1 = Diametro del perno

W = Larghezza scanalatura

d2 = Diametro scanalatura

n = Lunghezza della spalla

Fr = Capacità di carico dell'anello

Fn = Capacità di carico della sede

### LEGENDA

D = Diametro Externo

g = Abertura

b = Trava

d3 = Diametro expandido

t = Espessura

d1 = Diametro do eixo]

W = Largura do encaixe

d2 = Diametro do encaixe

n = Comprimento do suporte

Fr = Capacidade de carga do anel

Fn = Capacidade de carga do encaixe



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



**STANDARD 'E' TYPE RETAINING RINGS RA 1,2 – RA 24,0 / DIN 6799**

No.	d2 (mm)	d1		t (mm)	Tol (mm)	D (mm)	g (mm)	Tol (mm)	d3 (mm)	Fr (kN)	d2 (mm)	Tol (mm)	W (mm)	n (mm)	FN (kN)
		Min -mm	Max - mm												
RA 1,2	1,2	1,4	2,0	0,30		2,90	1,01		3,0	0,12	1,2		0,34	0,6	0,04
RA 1,5	1,5	2,0	2,5	0,40		3,90	1,28		4,0	0,22	1,5	-0,060	0,44	0,8	0,07
RA 1,9	1,9	2,5	3,0	0,50		4,40	1,61	± 0,040	4,5	0,35	1,9		0,54	1,0	0,10
RA 2,3	2,3	3,0	4,0	0,60		5,90	1,94		6,0	0,50	2,3		0,64	1,0	0,15
RA 3,2	3,2	4,0	5,0	0,60	± 0,02	6,90	2,70		7,0	0,65	3,2		0,64	1,0	0,22
RA 4,0	4,0	5,0	7,0	0,70		8,85	3,34	± 0,048	9,0	0,95	4,0	-0,075	0,74	1,2	0,25
RA 5,0	5,0	6,0	8,0	0,70		10,85	4,11		11,0	1,15	5,0		0,74	1,2	0,90
RA 6,0	6,0	7,0	9,0	0,70		11,80	5,26		12,0	1,35	6,0		0,74	1,2	1,10
RA 7,0	7,0	8,0	11,0	0,90		13,80	5,84		14,0	1,80	7,0		0,94	1,5	1,25
RA 8,0	8,0	9,0	12,0	1,00		15,75	6,52	± 0,058	16,0	2,50	8,0	-0,090	1,05	1,8	1,42
RA 9,0	9,0	10,0	14,0	1,10		18,20	7,63		18,5	3,00	9,0		1,15	2,0	1,60
RA 10,0	10,0	11,0	15,0	1,20		19,70	8,32		20,0	3,50	10,0		1,25	2,0	1,70
RA 12,0	12,0	13,0	18,0	1,30	± 0,03	22,70	10,45	± 0,070	23,0	4,70	12,0	-0,110	1,35	2,5	3,10
RA 15,0	15,0	16,0	24,0	1,50		28,70	12,61		29,0	7,80	15,0		1,55	3,0	7,00
RA 19,0	19,0	20,0	31,0	1,75		36,50	15,92	± 0,084	37,0	11,00	19,0	-0,130	1,80	3,5	10,00
RA 24,0	24,0	25,0	38,0	2,00		43,50	21,88		44,0	15,00	24,0		2,05	4,0	13,00



seeger-orbis.com

since 1917

# PRECISION RINGS FOR PRECISION APPLICATIONS



A business of BARNES GROUP INC

## SEEGER-ORBIS

**A Leader in Engineering and Manufacturing of  
Retaining Rings and Snap Rings**

Do you need proven technology from a global leader in retaining rings and snap rings?

Retaining Rings, Snap Rings, Shims and Washers, 3 to 3,000 mm in diameter, all kinds of surface treatments, 10 $\mu$  tolerance.

Celebrating 99 years of Innovation and Customer Partnerships.

Let us be your partner, allowing you to focus on growing your business. Call us... +49 6174 205 -0

©2016 SEEGER-ORBIS

Barnes  
GROUP INC  
ENGINEERED COMPONENTS



engineered  
in  
Germany



seeger-orbis.com

Certified according to ISO/TS 16949, DIN EN ISO 9001, BS OHSAS 18001, DIN EN ISO 14001



## URETHANE COMPRESSION SPRINGS

### Stock sizes in multiple durometers

Associated Spring Stock Urethane compression springs are designed to complement our steel wire applications where corrosion, vibration and magnetism prevent the use of a conventional steel spring. The SPEC line of urethane springs feature multiple durometers. This allows various load capacities within each specific size. SPEC urethane springs are compounded specially for optimized spring characteristics. Typical applications include vibration dampening, corrosive environments, high loads in confined spaces, cycle and static loading and nonmagnetic requirements.

### Material

Urethane rubber Durometers of 60A, 80A, 90A, 95A. SPEC urethane is compounded to provide optimum spring characteristics.

### Loading Applications

Urethane is a non-compressible material. The load of urethane spring is obtained by bulging of the tube walls. Most of the bulging is to the outside diameter. The growth in outside diameter is approximately equal to the percentage of spring deflection. Example: a 25mm spring is deflected 5mm or 20%. Increase the outside diameter by 20%. A spring with an initial outside diameter 19mm would bulge to 23mm. This expansion should be considered when selecting O.D. clearances.

### Properties

- Water and oil resistant.
- Operating temperatures: From -60 degrees F. (-17.8 degrees C.) to 200 degrees F. (93.3 degrees C.).
- Non magnetic.
- 360 degree contact area.
- Bondable to mating parts.
- Can be mated to soft materials.
- Series stackable for additional deflection with use of spacers.

### KEY TO DIMENSIONS

Do	=	Outside Diameter
Di	=	Inside Diameter
Lo	-	Approx. Free Length
DUR	=	Durometer
L.D.G	=	Load Data Graph

## RESSORTS DE COMPRESSION URÉTHANE

### Dimensions standard dans plusieurs duromètres

Les ressorts de compression Associated Spring en uréthane sont conçus pour compléter nos applications de fil métallique lorsque la corrosion, les vibrations et le magnétisme empêchent l'utilisation d'un ressort en acier classique. La gamme SPEC de ressorts en uréthane comporte plusieurs duromètres. Cette caractéristique autorise plusieurs capacités de charge pour chaque taille spécifique. Les ressorts en uréthane SPEC sont spécialement conçus pour les caractéristiques de ressorts optimisées. Ils sont généralement utilisés pour l'amortissement des vibrations, les environnements corrosifs, les charges élevées dans des espaces confinés, le cycle et la charge statique et les exigences non magnétiques.

### Matériaux

Duromètres en caoutchouc d'uréthane de 60A, 80A, 90A, 95A. Les pièces SPEC en uréthane sont conçues pour fournir des caractéristiques élastiques optimales.

### Applications de chargement

L'uréthane est un matériau non compressible. La charge du ressort en uréthane est obtenue par gonflement des parois du tube. Le gonflement se fait principalement sur le diamètre extérieur. La croissance du diamètre extérieur est environ égale au pourcentage de déviation du ressort. Exemple : un ressort de 25 mm est dévié de 5 mm ou de 20 %. Augmenter le diamètre extérieur de 20 %. Un ressort avec un diamètre extérieur initial de 19 mm passerait à 23 mm. Cette expansion doit être prise en compte lors de la sélection des jeux de diamètre extérieur.

### Propriétés

- Résistance à l'eau et à l'huile.
- Températures de fonctionnement : De -60 degrés F. (-17,8 degrés C.) à 200 degrés F. (93,3 degrés C.).
- Non magnétique.
- Zone de contact à 360 degrés.
- Pouvant être lié aux pièces d'accouplement.
- Peut être couplé à des matériaux doux.
- Empilable en série pour plus de déviation avec l'utilisation d'entretoises.

### INDEX DES DIMENSIONS

Do	= Diamètre extérieur
Di	= Diamètre intérieur
Lo	= Diamètre Intérieur approx.
DUR	= Duromètre
L.D.G	= Graphique des données de charge

## MUELLES/RESORTES DE COM-PRESIÓN DE URETANO

### Tamaños disponibles en múltiples durómetros

Los muelles/resortes de compresión de uretano en stock asociados con los muelles/resortes han sido diseñados para complementar nuestras aplicaciones de hilo de acero donde la corrosión, vibración y magnetismo evitan el uso de muelles/resortes de acero. La línea SPEC de muelles de uretano presenta múltiples durómetros. Esto permite que existan varias capacidades de carga dentro de cada tamaño específico. Los muelles/resortes de uretano SPEC presentan unas características optimizadas. Las aplicaciones comunes incluyen el amortiguamiento de vibraciones, entornos corrosivos, altas cargas en espacio reducido, cargas estáticas y en ciclo y aplicaciones no magnéticas.

### Material

Durómetros de caucho de uretano de 60 A, 80 A, 90 A, 95 A. La compresión del uretano SPEC proporciona unas características óptimas para el muelle/resorte.

### Aplicaciones de carga

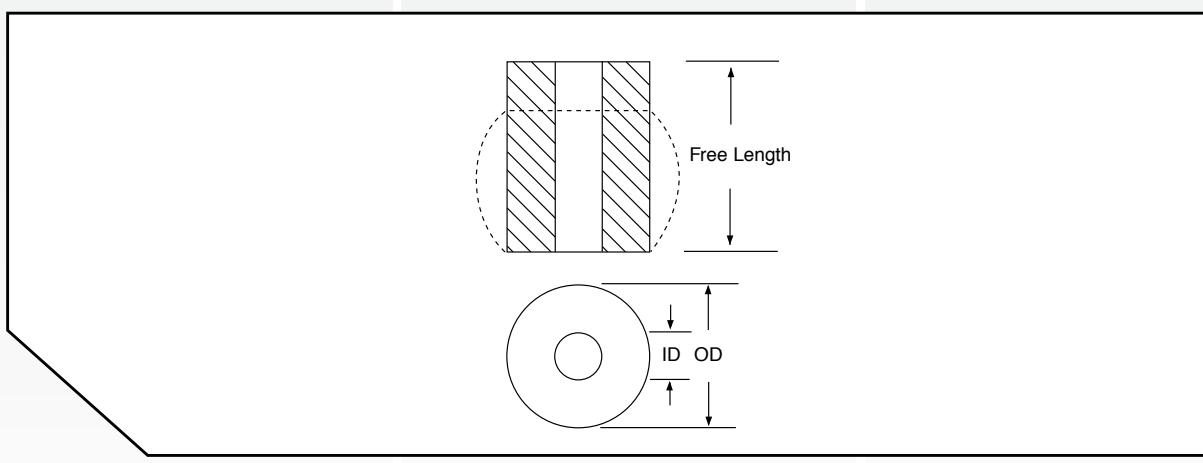
El uretano es un material que no se comprime. La carga del muelle/resorte de uretano se realiza abombando las paredes del tubo. La mayor parte del abombado se realiza en el diámetro externo. El aumento del diámetro externo es similar al porcentaje de deflexión del muelle/resorte. Ejemplo: un muelle/resorte de 25 mm sufre una deflexión de 5 mm o del 20 %. El aumento del diámetro externo es del 20 %. Un muelle/resorte con un diámetro externo inicial de 19 mm se abombará hasta los 23 mm. Esta expansión debe tenerse en cuenta al seleccionar la holgura del diámetro externo.

### Propiedades

- Resistente al agua y al aceite
- Temperatura de funcionamiento: De -60 grados F. (-17,8 grados C.) a 200 grados F. (93,3 grados C.).
- No magnético.
- Zona de contacto de 360 grados
- Soldable a piezas de unión.
- Puede unirse a materiales blandos.
- Apilable en serie para deflexión adicional con uso de espaciadores.

### CLAVES DE DIMENSIONES

Do	= Diámetro externo
Di	= Diámetro interno
Lo	= Longitud libre aprox.
DUR	= Durómetro
L.D.G	= Gráfico de datos de carga



## URETHAN-DRUCKFEDERN

### Bestandsgrößen in mehreren Härten

Die standardmäßigen Urethan-Druckfedern von Associated Spring sind in Standardgrößen und unterschiedlichen Härten verfügbar und ergänzen unsere Stahldrahtanwendungen, bei denen aufgrund von Korrosion, Vibration und Magnetismus keine herkömmlichen Stahlfedern verwendet werden können. Die SPEC-Linie der Urethan-Federn bietet verschiedene Härten. Dies ermöglicht unterschiedliche Lastkapazitäten in jeder Größe. Der Verbund der SPEC-Urethanfedern ist speziell auf optimierte Federeigenschaften ausgerichtet. Typische Anwendungen sind: Vibrationsdämpfung, korrosionsintensive Umgebungen, hohe Lasten in engen Räumen, zyklische und statische Belastung und nichtmagnetische Anforderungen.

### Material

Urethan-Gummi-Durometer in 60A, 80A, 90A, 95A. SPEC-Urethan ist ein Verbund, der optimale Federeigenschaften ermöglicht.

### Lastanwendungen

Urethan ist ein nicht-pressbares Material. Die Last einer Urethan-Feder wird durch Wölbung der Rohrwände erreicht. Der Großteil der Wölbung findet am Außendurchmesser statt. Die Zunahme des Außendurchmessers entspricht dabei ungefähr dem prozentualen Anteil der Defektion. Beispiel: Eine Feder von 25 mm wird 5 mm bzw. 20 % verformt. Die Zunahme des Außendurchmessers beträgt 20 %. Eine Feder mit einem anfänglichen Außendurchmesser von 19 mm würde sich also bis auf 23 mm wölben. Diese Ausdehnung sollte bei der Auswahl der Außendurchmesser-Abstände berücksichtigt werden.

### Eigenschaften

- Wasser- und ölfest.
- Betriebstemperaturen: Von -17,8 °C (-60 °F) bis 93,3 °C (200 °F).
- Nicht magnetisch.
- 360 Grad Kontaktbereich
- Kann mit passenden Teilen verbunden werden.
- Kann mit weichen Materialien verbunden werden.
- Kann für mehr Defektion mithilfe von Distanzstücken aneinandergereiht werden.

### ABKÜRZUNGEN – ABMESSUNGEN

Do = Außendurchmesser  
Di = Innendurchmesser  
Lo = Ungefähr freie Länge  
DUR = Durometer (Härte)  
L.D.G = Lastdatenkennlinie

## MOLLE DI COMPRESSIONE IN URETANO

### Dimensioni di stock con diverse durezze

Le molle di compressione in uretano di Associated Spring sono progettate per completare le nostre applicazioni in filo di acciaio laddove la corrosione, le vibrazioni e il magnetismo impediscono l'uso di una molla in acciaio convenzionale. La linea SPEC di molle in uretano prevede diverse durezze, consentendo varie capacità di carico per ogni dimensione specifica. Le molle in uretano SPEC sono composte appositamente per ottenere caratteristiche della molla ottimizzate. Le applicazioni tipiche includono smorzamento delle vibrazioni, ambienti corrosivi, elevati carichi in spazi ristretti, carico statico e ciclico e requisiti non magnetici.

### Materiale

Gomma uretanica con durezza di 60A, 80A, 90A, 95A. L'uretano SPEC è composto per fornire caratteristiche ottimali alle molle.

### Applicazioni di carico

L'uretano è un materiale non comprimibile. Il carico della molla di uretano è ottenuto facendo sporgere le pareti del tubo. La maggior parte della spongiosa è nel diametro esterno. L'aumento del diametro esterno è circa pari alla percentuale di deflessione della molla. Esempio: una molla da 25 mm è deflessa di 5 mm o del 20%. Aumentare il diametro esterno del 20%. Una molla con un diametro esterno iniziale di 19 mm aumenterà a 23 mm. Considerare quest'espansione quando si selezionano i giochi del diametro esterno.

### Proprietà

- Resistente all'acqua e all'olio
- Temperature di esercizio: Da -60 °F (-17,8 °C.) a 200 °F (93,3 °C.).
- Non magnetico.
- Area di contatto di 360°.
- Unibile a parti di accoppiamento.
- Può essere accoppiato a materiali morbidi.
- Impilabile in serie per ulteriore flessione con l'uso di distanziatori.

### LEGENDA DIMENSIONI

Do = Diametro esterno  
Di = Diametro interno  
Lo = Lunghezza libera approssimativa  
DUR = Durezza  
L.D.G. = Grafico dati di carico

## MOLAS DE COMPRESSÃO DE URETANO

### Tamanhos em stock para vários durómetros

As molas de compressão de uretano da Associated Spring foram concebidas para complementar as nossas aplicações de arame de aço em que a corrosão, vibração e magnetismo impedem a utilização de uma mola de aço convencional. A linha SPEC de molas de uretano inclui vários durómetros. Isto permite diversas capacidades de carga em cada tamanho específico. As molas de uretano SPEC são especialmente concebidas para características de molas otimizadas. As aplicações típicas incluem amortecimento da vibração, ambientes corrosivos, cargas elevadas em espaços confinados, carga cíclica e estática e requisitos não magnéticos.

### Material

Durómetros borracha uretano de 60A, 80A, 90A, 95A. Os SPEC de uretano são concebidos para fornecer características de molas ideais.

### Aplicações de Carga

O uretano é um material não comprimível. A carga da mola de uretano é obtida através da distorção das paredes do tubo. A maior parte da distorção ocorre no diâmetro externo. O crescimento no diâmetro externo é aproximadamente igual à percentagem da deflexão da mola. Exemplo: uma mola de 25 mm tem uma deflexão de 5 mm ou 20%. O diâmetro externo aumenta em 20%. Uma mola com um diâmetro externo inicial de 19 mm iria distorcer até 23 mm. Esta expansão deve ser considerada aquando da seleção das distâncias do D.E.

### Propriedades

- Resistente ao óleo e à água.
- Temperaturas de funcionamento: De -60 graus F. (-17,8 graus C.) a 200 graus F. (93,3 graus C.).
- Não magnético.
- Área de contacto de 360 graus.
- Ligável a peças acopláveis.
- Pode ser acoplável a materiais moles.
- Série empilhável para deflexão adicional com utilização de espaçadores.

### LEGENDA DAS DIMENSÕES

Do = Diâmetro Externo  
Di = Diâmetro Interno  
Lo – Comprimento Livre Aprox.  
DUR = Durómetro  
L.D.G = Gráfico Dados Carga



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de



**URETHANE COMPRESSION SPRINGS**

Part Number	Di (mm)	Do (mm)	Lo (mm)	DUR	COLOUR	L.D.G
P0188-0500-60A	4.3	17.5	12.7	60A	Natural	P0188XXXX60A
P0188-0500-80A				80A	Green	P0188XXXX80A
P0188-0500-90A				90A	Red	P0188XXXX90A
P0188-0500-95A				95A	Amber	-
P0188-0750-60A			19.1	60A	Natural	P0188XXXX60A
P0188-0750-80A				80A	Green	P0188XXXX80A
P0188-0750-90A				90A	Red	P0188XXXX90A
P0188-0750-95A			25.4	95A	Amber	-
P0188-1000-60A				60A	Natural	P0188XXXX60A
P0188-1000-80A				80A	Green	P0188XXXX80A
P0188-1000-90A				90A	Red	P0188XXXX90A
P0188-1000-95A			31.8	95A	Amber	-
P0188-1250-60A				60A	Natural	P0188XXXX60A
P0188-1250-80A				80A	Green	P0188XXXX80A
P0188-1250-90A				90A	Red	P0188XXXX90A
P0188-1250-95A			38.1	95A	Amber	-
P0250-0500-60A	5.8	19.1	12.7	60A	Natural	P0250XXXX60A
P0250-0500-80A				80A	Green	P0250XXXX80A
P0250-0500-90A				90A	Red	P0250XXXX90A
P0250-0500-95A			19.1	95A	Amber	-
P0250-0750-60A				60A	Natural	P0250XXXX60A
P0250-0750-80A				80A	Green	P0250XXXX80A
P0250-0750-90A				90A	Red	P0250XXXX90A
P0250-0750-95A				95A	Amber	-
P0250-1000-60A			25.4	60A	Natural	P0250XXXX60A
P0250-1000-80A				80A	Green	P0250XXXX80A
P0250-1000-90A				90A	Red	P0250XXXX90A
P0250-1000-95A			31.8	95A	Amber	-
P0250-1250-60A				60A	Natural	P0250XXXX60A
P0250-1250-80A				80A	Green	P0250XXXX80A
P0250-1250-90A				90A	Red	P0250XXXX90A
P0250-1250-95A			38.1	95A	Amber	-
P0250-1500-60A				60A	Natural	P0250XXXX60A
P0250-1500-80A				80A	Green	P0250XXXX80A
P0250-1500-90A				90A	Red	P0250XXXX90A
P0250-1500-95A				95A	Amber	-
P0312-0500-60A	7.5	20.7	12.7	60A	Natural	P0312XXXX60A
P0312-0500-80A				80A	Green	P0312XXXX80A
P0312-0500-90A				90A	Red	P0312XXXX90A
P0312-0500-95A			19.1	95A	Amber	-
P0312-0750-60A				60A	Natural	P0312XXXX60A
P0312-0750-80A				80A	Green	P0312XXXX80A
P0312-0750-90A				90A	Red	P0312XXXX90A
P0312-0750-95A				95A	Amber	-
P0312-1000-60A			25.4	60A	Natural	P0312XXXX60A
P0312-1000-80A				80A	Green	P0312XXXX80A
P0312-1000-90A				90A	Red	P0312XXXX90A
P0312-1000-95A			31.8	95A	Amber	-
P0312-1250-60A				60A	Natural	P0312XXXX60A
P0312-1250-80A				80A	Green	P0312XXXX80A
P0312-1250-90A				90A	Red	P0312XXXX90A
P0312-1250-95A			38.1	95A	Amber	-
P0312-1500-60A				60A	Natural	P0312XXXX60A
P0312-1500-80A				80A	Green	P0312XXXX80A
P0312-1500-90A				90A	Red	P0312XXXX90A
P0312-1500-95A				95A	Amber	-
P0375-0500-60A	9.0	22.2	12.7	60A	Natural	P0375XXXX60A
P0375-0500-80A				80A	Green	P0375XXXX80A
P0375-0500-90A				90A	Red	P0375XXXX90A
P0375-0500-95A			19.1	95A	Amber	-
P0375-0750-60A				60A	Natural	P0375XXXX60A
P0375-0750-80A				80A	Green	P0375XXXX80A
P0375-0750-90A				90A	Red	P0375XXXX90A
P0375-0750-95A			25.4	95A	Amber	-
P0375-1000-60A				60A	Natural	P0375XXXX60A
P0375-1000-80A				80A	Green	P0375XXXX80A
P0375-1000-90A				90A	Red	P0375XXXX90A
P0375-1000-95A			31.8	95A	Amber	-
P0375-1250-60A				60A	Natural	P0375XXXX60A
P0375-1250-80A				80A	Green	P0375XXXX80A
P0375-1250-90A				90A	Red	P0375XXXX90A



**URETHANE COMPRESSION SPRINGS**

Part Number	Di (mm)	Do (mm)	Lo (mm)	DUR	COLOUR	L.D.G
P0375-1250-95A			31.8	95A	Amber	-
P0375-1500-60A				60A	Natural	P0375XXXX60A
P0375-1500-80A			38.1	80A	Green	P0375XXXX80A
P0375-1500-90A	9.0	22.2		90A	Red	P0375XXXX90A
P0375-1500-95A				95A	Amber	-
P0375-1750-80A				80A	Green	P0375XXXX80A
P0375-1750-90A			44.5	90A	Red	P0375XXXX90A
P0375-1750-95A				95A	Amber	-
P0500-0500-60A				60A	Natural	P0500XXXX60A
P0500-0500-80A			12.7	80A	Green	P0500XXXX80A
P0500-0500-90A				90A	Red	P0500XXXX90A
P0500-0500-95A				95A	Amber	-
P0500-0750-60A				60A	Natural	P0500XXXX60A
P0500-0750-80A			19.1	80A	Green	P0500XXXX80A
P0500-0750-90A				90A	Red	P0500XXXX90A
P0500-0750-95A				95A	Amber	-
P0500-1000-60A				60A	Natural	P0500XXXX60A
P0500-1000-80A			25.4	80A	Green	P0500XXXX80A
P0500-1000-90A		25.4		90A	Red	P0500XXXX90A
P0500-1000-95A	12.1			95A	Amber	-
P0500-1250-60A				60A	Natural	P0500XXXX60A
P0500-1250-80A			31.8	80A	Green	P0500XXXX80A
P0500-1250-90A				90A	Red	P0500XXXX90A
P0500-1250-95A				95A	Amber	-
P0500-1500-60A				60A	Natural	P0500XXXX60A
P0500-1500-80A			38.1	80A	Green	P0500XXXX80A
P0500-1500-90A				90A	Red	P0500XXXX90A
P0500-1500-95A				95A	Amber	-
P0500-1750-80A				80A	Green	P0500XXXX80A
P0500-1750-90A			44.5	90A	Red	P0500XXXX90A
P0500-1750-95A				95A	Amber	-
P0500-2000-80A				80A	Green	P0500XXXX80A
P0500-2000-90A			50.8	90A	Red	P0500XXXX90A
P0500-2000-95A				95A	Amber	-
P0625-0500-60A				60A	Natural	P0625XXXX60A
P0625-0500-80A			12.7	80A	Green	P0625XXXX80A
P0625-0500-90A				90A	Red	P0625XXXX90A
P0625-0500-95A				95A	Amber	-
P0625-0750-60A				60A	Natural	P0625XXXX60A
P0625-0750-80A			19.1	80A	Green	P0625XXXX80A
P0625-0750-90A				90A	Red	P0625XXXX90A
P0625-0750-95A				95A	Amber	-
P0625-1000-60A				60A	Natural	P0625XXXX60A
P0625-1000-80A			25.4	80A	Green	P0625XXXX80A
P0625-1000-90A		25.4		90A	Red	P0625XXXX90A
P0625-1000-95A	15.2			95A	Amber	-
P0625-1250-60A				60A	Natural	P0625XXXX60A
P0625-1250-80A			31.8	80A	Green	P0625XXXX80A
P0625-1250-90A				90A	Red	P0625XXXX90A
P0625-1250-95A				95A	Amber	-
P0625-1500-60A				60A	Natural	P0625XXXX60A
P0625-1500-80A			38.1	80A	Green	P0625XXXX80A
P0625-1500-90A				90A	Red	P0625XXXX90A
P0625-1500-95A				95A	Amber	-
P0625-1750-80A				80A	Green	P0625XXXX80A
P0625-1750-90A			44.5	90A	Red	P0625XXXX90A
P0625-1750-95A				95A	Amber	-
P0625-2000-80A				80A	Green	P0625XXXX80A
P0625-2000-90A			50.8	90A	Red	P0625XXXX90A
P0625-2000-95A				95A	Amber	-
P0750-0750-60A				60A	Natural	P0750XXXX60A
P0750-0750-80A			19.1	80A	Green	P0750XXXX80A
P0750-0750-90A				90A	Red	P0750XXXX90A
P0750-0750-95A				95A	Amber	-
P0750-1000-60A				60A	Natural	P0750XXXX60A
P0750-1000-80A	18.8	34.9	25.4	80A	Green	P0750XXXX80A
P0750-1000-90A				90A	Red	P0750XXXX90A
P0750-1000-95A				95A	Amber	-
P0750-1250-60A				60A	Natural	P0750XXXX60A
P0750-1250-80A			31.8	80A	Green	P0750XXXX80A
P0750-1250-90A				90A	Red	P0750XXXX90A



**URETHANE COMPRESSION SPRINGS**

Part Number	Di (mm)	Do (mm)	Lo (mm)	DUR	COLOUR	L.D.G
P0750-1250-95A			31.8	95A	Amber	-
P0750-1500-60A				60A	Natural	P0750XXXX60A
P0750-1500-80A			38.1	80A	Green	P0750XXXX80A
P0750-1500-90A				90A	Red	P0750XXXX90A
P0750-1500-95A				95A	Amber	-
P0750-1750-60A				60A	Natural	P0750XXXX60A
P0750-1750-80A	18.8	34.9	44.5	80A	Green	P0750XXXX80A
P0750-1750-90A				90A	Red	P0750XXXX90A
P0750-1750-95A				95A	Amber	-
P0750-2000-60A				60A	Natural	P0750XXXX60A
P0750-2000-80A			50.8	80A	Green	P0750XXXX80A
P0750-2000-90A				90A	Red	P0750XXXX90A
P0750-2000-95A				95A	Amber	-
P0750-2500-90A			63.5	90A		P0750XXXX90A
P0750-2500-95A				95A		-
P0875-1000-60A				60A	Natural	P0875XXXX60A
P0875-1000-80A			25.4	80A	Green	P0875XXXX80A
P0875-1000-90A				90A	Red	P0875100090A
P0875-1000-95A				95A	Amber	-
P0875-1250-60A				60A	Natural	P0875XXXX60A
P0875-1250-80A			31.8	80A	Green	P0875XXXX80A
P0875-1250-90A				90A	Red	P0875100090A
P0875-1250-95A				95A	Amber	-
P0875-1500-60A				60A	Natural	P0875XXXX60A
P0875-1500-80A			38.1	80A	Green	P0875XXXX80A
P0875-1500-90A				90A	Red	P0875100090A
P0875-1500-95A				95A	Amber	-
P0875-1750-60A				60A	Natural	P0875XXXX60A
P0875-1750-80A	22.0	41.3	44.5	80A	Green	P0875XXXX80A
P0875-1750-90A				90A	Red	P0875100090A
P0875-1750-95A				95A	Amber	-
P0875-2000-60A				60A	Natural	P0875XXXX60A
P0875-2000-80A			50.8	80A	Green	P0875XXXX80A
P0875-2000-90A				90A	Red	P0875100090A
P0875-2000-95A				95A	Amber	-
P0875-2500-60A				60A	Natural	P0875XXXX60A
P0875-2500-80A			63.5	80A	Green	P0875XXXX80A
P0875-2500-90A				90A	Red	P0875100090A
P0875-2500-95A				95A	Amber	-
P0875-3000-60A				60A	Natural	P0875XXXX60A
P0875-3000-80A			76.2	80A	Green	P0875XXXX80A
P0875-3000-90A				90A	Red	P0875100090A
P0875-3000-95A				95A	Amber	-
P1000-1000-60A				60A	Natural	P1000XXXX60A
P1000-1000-80A			25.4	80A	Green	P1000XXXX80A
P1000-1000-90A				90A	Red	P1000XXXX90A
P1000-1000-95A				95A	Amber	-
P1000-1250-60A				60A	Natural	P1000XXXX60A
P1000-1250-80A			31.8	80A	Green	P1000XXXX80A
P1000-1250-90A				90A	Red	P1000XXXX90A
P1000-1250-95A				95A	Amber	-
P1000-1500-60A				60A	Natural	P1000XXXX60A
P1000-1500-80A			38.1	80A	Green	P1000XXXX80A
P1000-1500-90A				90A	Red	P1000XXXX90A
P1000-1500-95A				95A	Amber	-
P1000-1750-60A				60A	Natural	P1000XXXX60A
P1000-1750-80A	25.2	44.5	44.5	80A	Green	P1000XXXX80A
P1000-1750-90A				90A	Red	P1000XXXX90A
P1000-1750-95A				95A	Amber	-
P1000-2000-60A				60A	Natural	P1000XXXX60A
P1000-2000-80A			50.8	80A	Green	P1000XXXX80A
P1000-2000-90A				90A	Red	P1000XXXX90A
P1000-2000-95A				95A	Amber	-
P1000-2500-60A				60A	Natural	P1000XXXX60A
P1000-2500-80A			63.5	80A	Green	P1000XXXX80A
P1000-2500-90A				90A	Red	P1000XXXX90A
P1000-2500-95A				95A	Amber	-
P1000-3000-60A				60A	Natural	P1000XXXX60A
P1000-3000-80A			76.2	80A	Green	P1000XXXX80A
P1000-3000-90A				90A	Red	P1000XXXX90A
P1000-3000-95A				95A	Amber	-



## URETHANE RODS

Part Number	Do (mm)	Lo (mm)	DRU	COLOUR
PR0100-12000-60A			60A	Natural
PR0100-12000-70A			70A	Blue
PR0100-12000-80A	25.40		80A	Green
PR0100-12000-90A			90A	Red
PR0100-12000-95A			95A	Amber
PR0125-12000-60A			60A	Natural
PR0125-12000-70A			70A	Blue
PR0125-12000-80A	31.75		80A	Green
PR0125-12000-90A			90A	Red
PR0125-12000-95A			95A	Amber
PR0250-12000-60A			60A	Natural
PR0250-12000-70A			70A	Blue
PR0250-12000-80A	6.35		80A	Green
PR0250-12000-90A			90A	Red
PR0250-12000-95A			95A	Amber
PR0375-12000-60A			60A	Natural
PR0375-12000-70A			70A	Blue
PR0375-12000-80A	9.53		80A	Green
PR0375-12000-90A			90A	Red
PR0375-12000-95A			95A	Amber
PR0500-12000-60A			60A	Natural
PR0500-12000-70A			70A	Blue
PR0500-12000-80A	12.70		80A	Green
PR0500-12000-90A			90A	Red
PR0500-12000-95A			95A	Amber
PR0625-12000-60A			60A	Natural
PR0625-12000-70A			70A	Blue
PR0625-12000-80A	15.88		80A	Green
PR0625-12000-90A			90A	Red
PR0625-12000-95A			95A	Amber
PR0750-12000-60A			60A	Natural
PR0750-12000-70A			70A	Blue
PR0750-12000-80A	19.05		80A	Green
PR0750-12000-90A			90A	Red
PR0750-12000-95A			95A	Amber
PR0875-12000-60A			60A	Natural
PR0875-12000-70A			70A	Blue
PR0875-12000-80A	22.23		80A	Green
PR0875-12000-90A			90A	Red
PR0875-12000-95A			95A	Amber



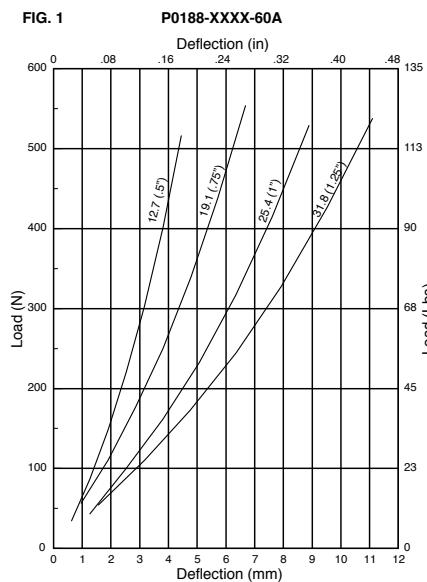
**URETHANE TUBES**

Part Number	Di (mm)	Do (mm)	Lo (mm)	DRU	COLOUR
P0100-12000-60A				60A	Natural
P0100-12000-70A				70A	Blue
P0100-12000-80A	25.20	44.50		80A	Green
P0100-12000-90A				90A	Red
P0100-12000-95A				95A	Amber
P0188-12000-60A				60A	Natural
P0188-12000-70A				70A	Blue
P0188-12000-80A	4.30	17.50		80A	Green
P0188-12000-90A				90A	Red
P0188-12000-95A				95A	Amber
P0250-12000-60A				60A	Natural
P0250-12000-70A				70A	Blue
P0250-12000-80A	5.80	19.00		80A	Green
P0250-12000-90A				90A	Red
P0250-12000-95A				95A	Amber
P0312-12000-60A				60A	Natural
P0312-12000-70A				70A	Blue
P0312-12000-80A	7.50	20.50		80A	Green
P0312-12000-90A				90A	Red
P0312-12000-95A				95A	Amber
P0375-12000-60A				60A	Natural
P0375-12000-70A				70A	Blue
P0375-12000-80A	9.00	22.30	305	80A	Green
P0375-12000-90A				90A	Red
P0375-12000-95A				95A	Amber
P0500-12000-60A				60A	Natural
P0500-12000-70A				70A	Blue
P0500-12000-80A	12.10	25.40		80A	Green
P0500-12000-90A				90A	Red
P0500-12000-95A				95A	Amber
P0625-12000-60A				60A	Natural
P0625-12000-70A				70A	Blue
P0625-12000-80A	15.30	28.60		80A	Green
P0625-12000-90A				90A	Red
P0625-12000-95A				95A	Amber
P0750-12000-60A				60A	Natural
P0750-12000-70A				70A	Blue
P0750-12000-80A	18.80	34.90		80A	Green
P0750-12000-90A				90A	Red
P0750-12000-95A				95A	Amber
P0875-12000-60A				60A	Natural
P0875-12000-70A				70A	Blue
P0875-12000-80A	22.00	41.30		80A	Green
P0875-12000-90A				90A	Red
P0875-12000-95A				95A	Amber

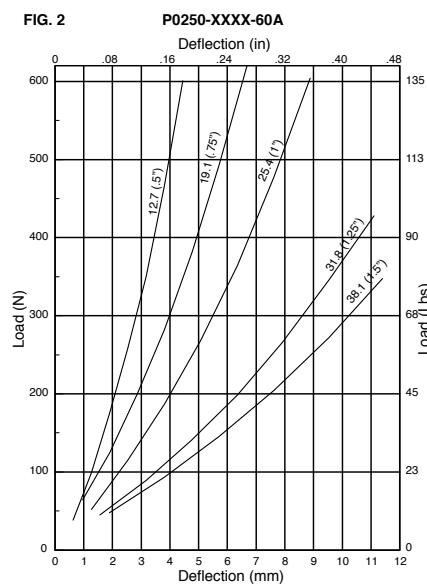


# STOCK URETHANE COMPRESSION SPRINGS Multiple Durometers

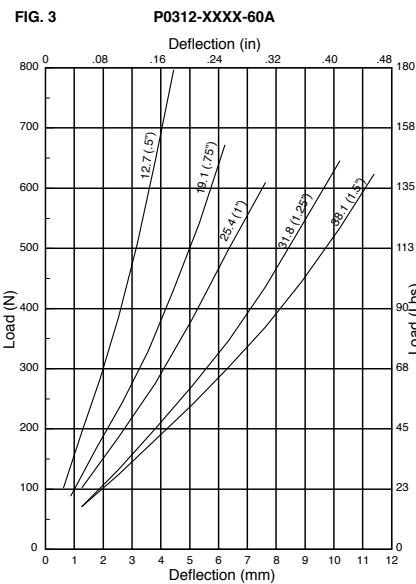
**FIG. 1**



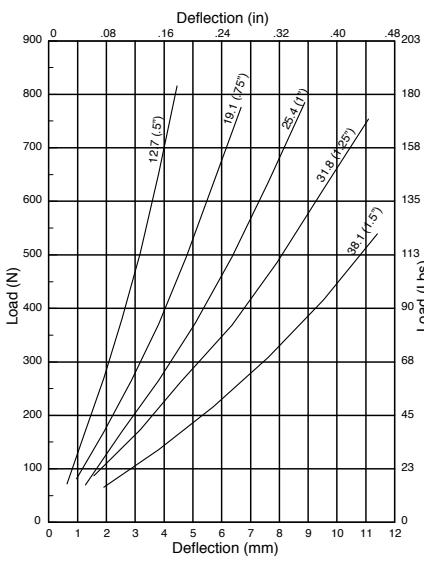
**FIG. 2**



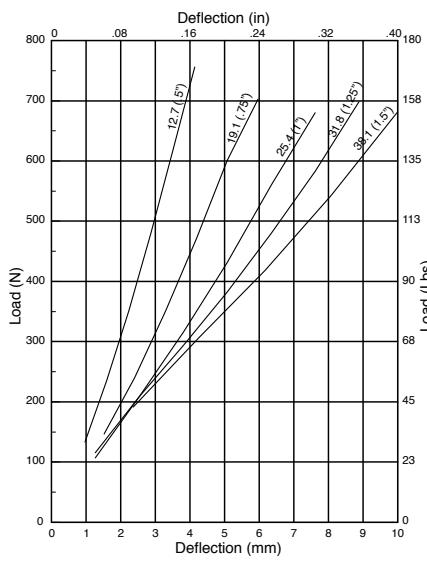
**FIG. 3**



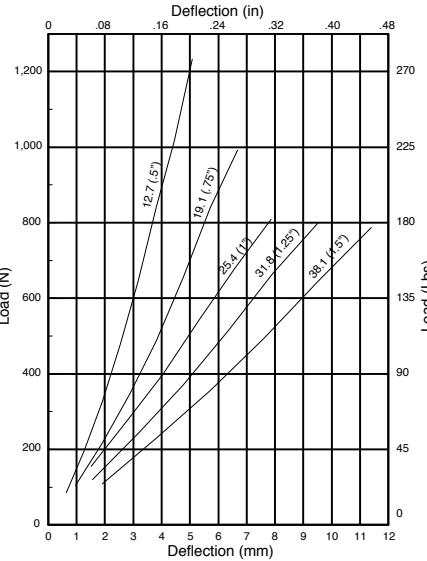
**FIG. 4**



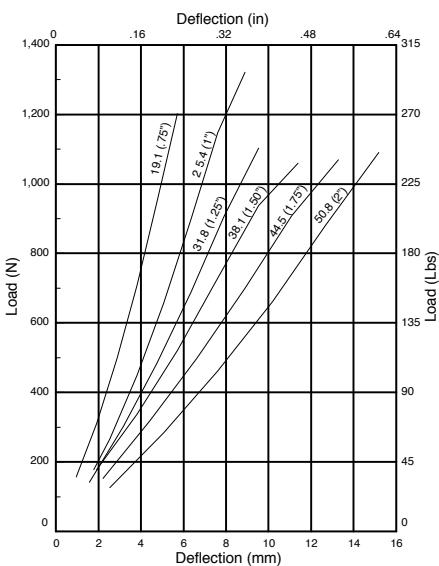
**FIG. 5**



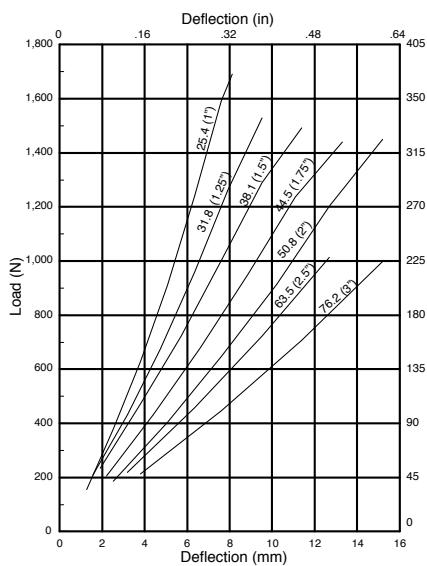
**FIG. 6**



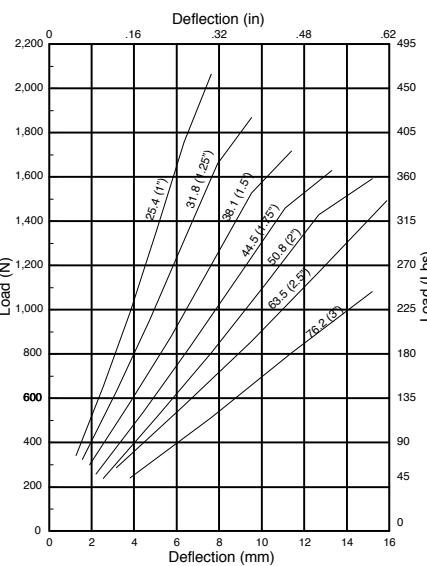
**FIG. 7**



**FIG. 8**

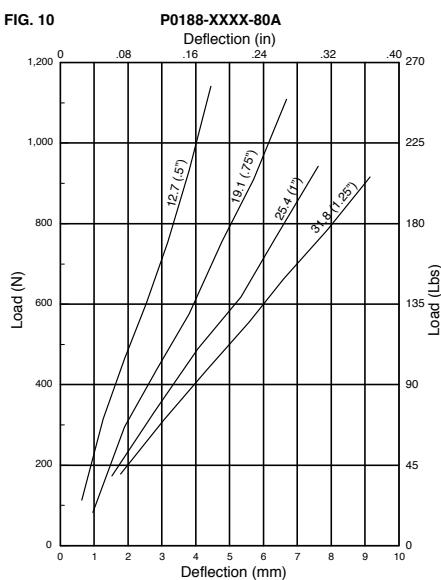


**FIG. 9**

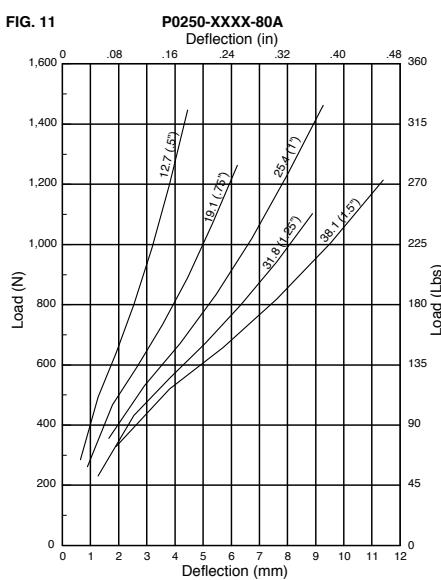


## STOCK URETHANE COMPRESSION SPRINGS Multiple Durometers

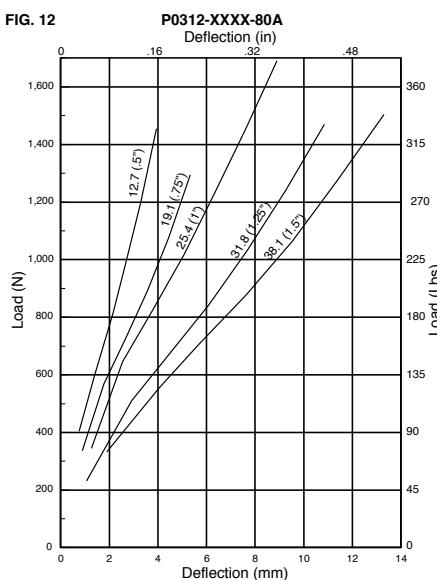
**FIG. 10**



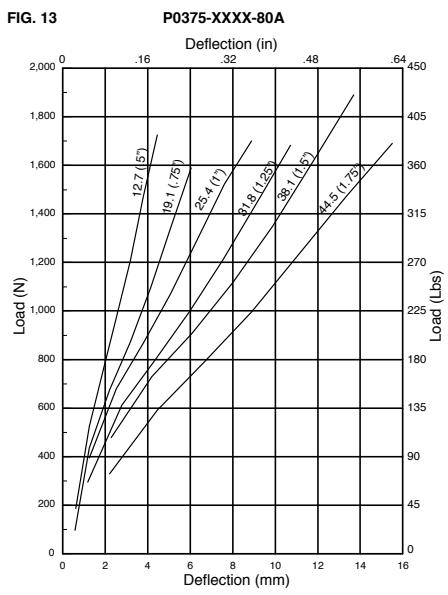
**FIG. 11**



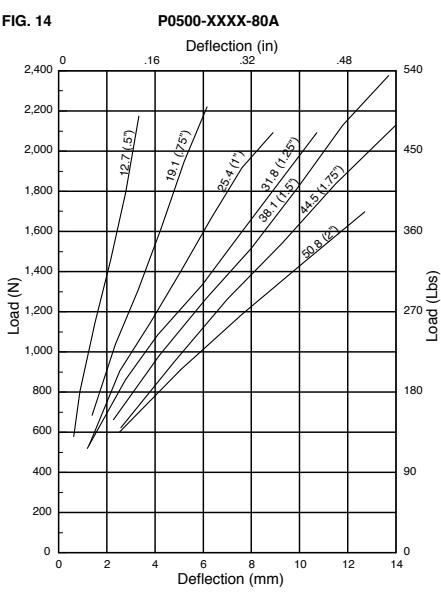
**FIG. 12**



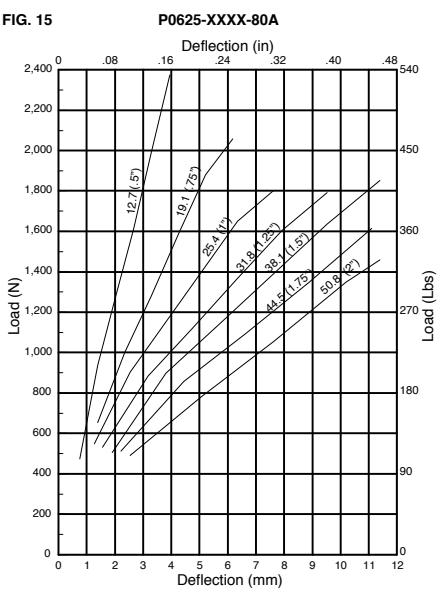
**FIG. 13**



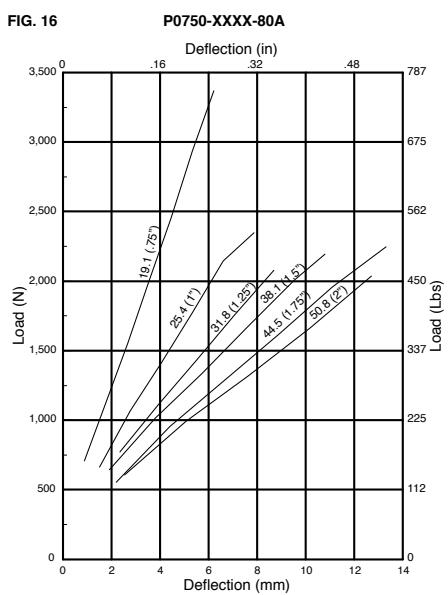
**FIG. 14**



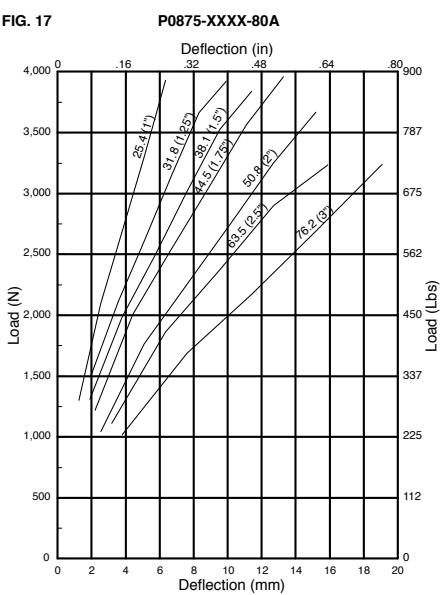
**FIG. 15**



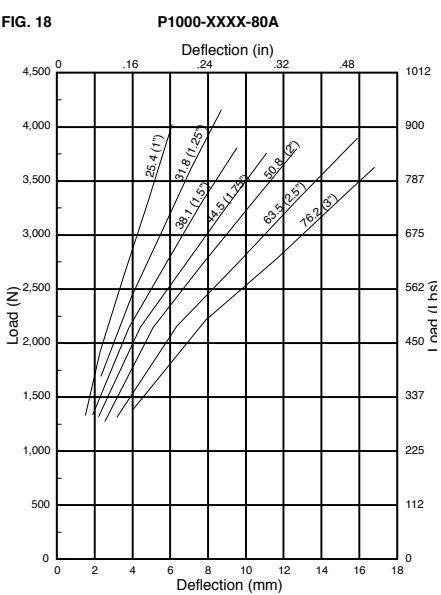
**FIG. 16**



**FIG. 17**

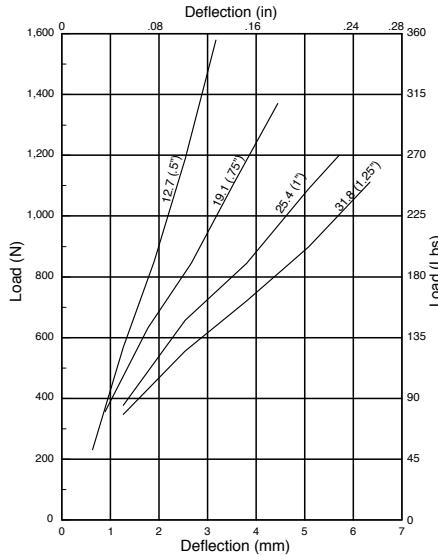


**FIG. 18**

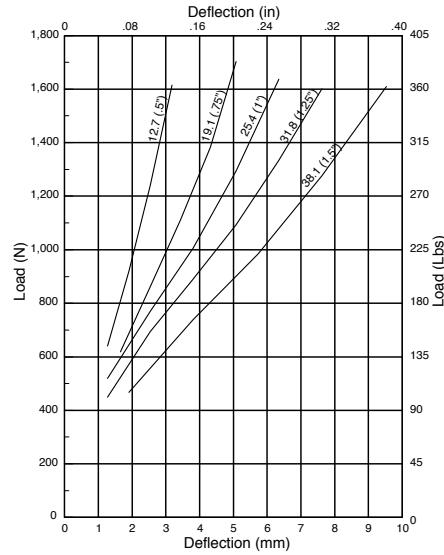


## STOCK URETHANE COMPRESSION SPRINGS Multiple Durometers

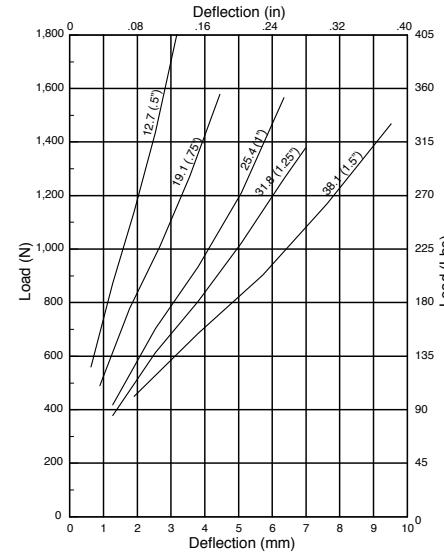
**FIG. 19 P0188-XXXX-90A**



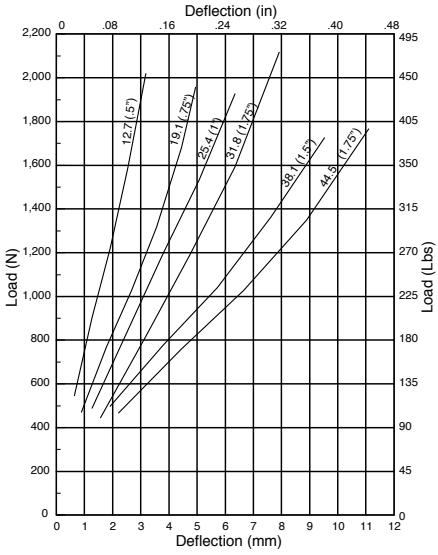
**FIG. 20 P0250-XXXX-90A**



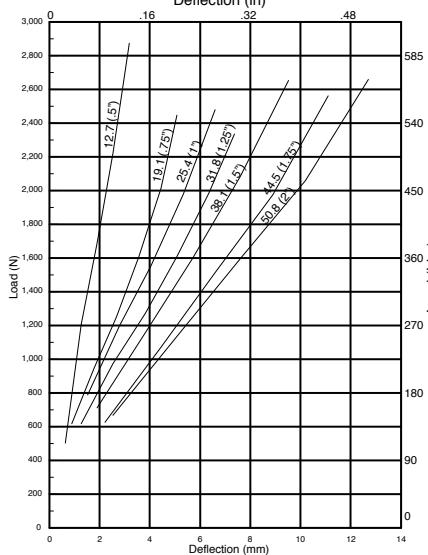
**FIG. 21 P0312-XXXX-90A**



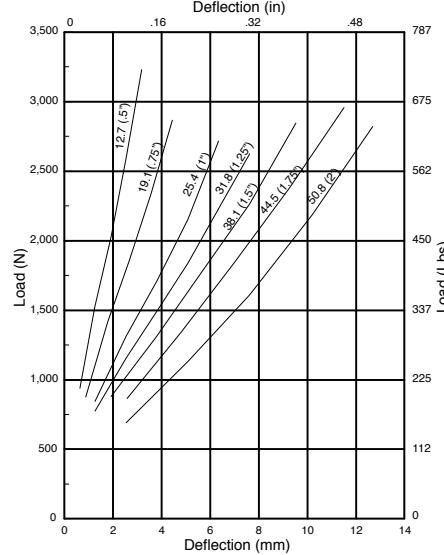
**FIG. 22 P0375-XXXX-90A**



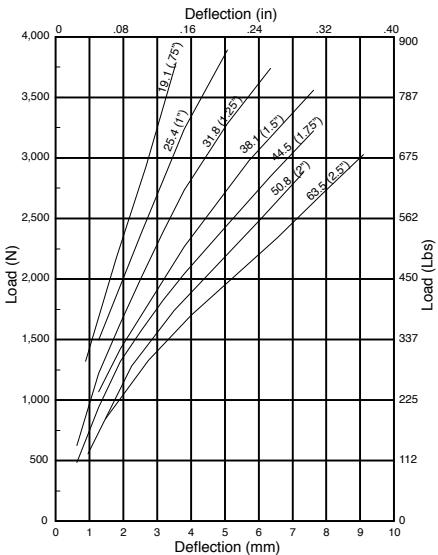
**FIG. 23 P0500-XXXX-90A**



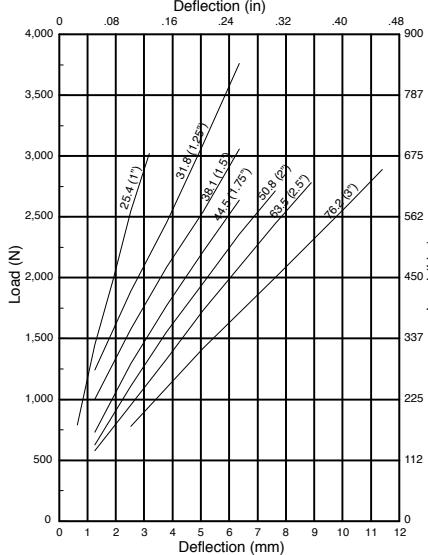
**FIG. 24 P0625-XXXX-90A**



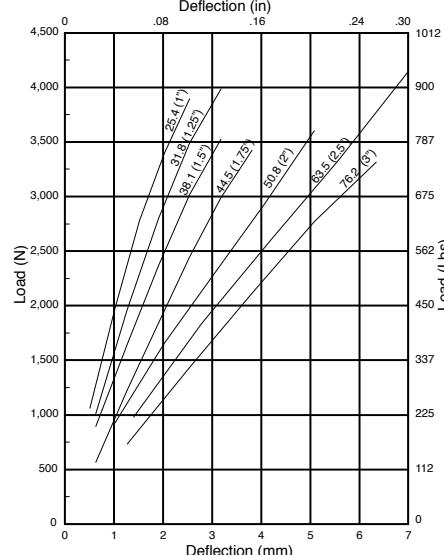
**FIG. 25 P0750-XXXX-90A**



**FIG. 26 P0875-XXXX-90A**



**FIG. 27 P1000-XXXX-90A**



## ALMEN STRIPS

Associated Spring-Raymond's Almen strips and supplies are built for high quality and long service. All of our Almen strips are certified to SAE J442 standard for use in the automotive or aerospace industries, as well as in any shot peening process.

Immediate delivery is available for N and A type strips in 50-count packaging and C type Almen strips in 25-count packages. Bulk packaging is also available.

### Premium Grade Almen Strips (per SAE J442)

Part Number	Strip Type	Thickness (mm)	Flatness* (mm)	Hardness
AS-N-PREM	N	.79 ± .025	±0.025	HRA 72.5-76
AS-A-PREM	A	1.30 ± .025	±0.025	HRC 44-50
AS-C-PREM	C	2.39 ± .025	±0.025	HRC 44-50

\*as measured with Almen #2 gauge

- Material: SAE/AISI 1070 cold rolled steel
- Length: 3.00" ±0.015" (76.2 ±0.38mm)
- Width: 0.745"-0.750" (18.92-19.05mm)

### Almen Strip Holders and Socket Head Cap Screws

Part Number	Product
AS-HOLD-14	Almen strip holder per SAE J442
495029	Socket head cap screws for holder

Our socket head cap screws are 15 percent stronger than the industry standard. In addition, they offer

- 213 ksi (1470 Mpa) minimum tensile strength
- 191 ksi (1317 Mpa) minimum yield strength
- 40 HRC minimum hardness

### Almen Strip Test Gauges

Part Number	Product
AS-GAUGE-1	Almen strip gauge – standard
AS-CALIB-F	Test gauge calibration block – flat
AS-CALIB-C	Test gauge calibration block – curved

## EPROUVETTES ALMEN

Les éprouvettes ALMEN Ressorts SPEC et leurs accessoires sont des produits durables et de haute qualité. Toutes nos éprouvettes ALMEN sont conformes au standard SAE J442 et utilisables dans les industries automobile ou aéronautique ainsi que pour des applications de grenailage.

Les séries N et A sont disponibles sur stock en paquets de 50, la série C en paquets de 25. Des conditionnements de plus grandes quantités sont possibles.

### Eprovettes ALMEN de Qualité Supérieure (selon SAE J442)

Référence	Type d'Eprouvette	Épaisseur (mm)	Planéité*	Dureté
AS-N-PREM	N	.79 ± .025	±0.025	HRA 72.5-76
AS-A-PREM	A	1.30 ± .025	±0.025	HRC 44-50
AS-C-PREM	C	2.39 ± .025	±0.025	HRC 44-50

\*telle que mesurée avec le calibre Almen #2

- Matériau : Acier enroulé à froid SAE/AISI 1070
- Longueur : 76.2 ±0.38mm (3.00" ±0.015")
- Largeur : 18.92 – 19.05mm (0.745" – 0.750")

### Support Pour Eprovettes ALMEN et Vis 6 Pans Creux

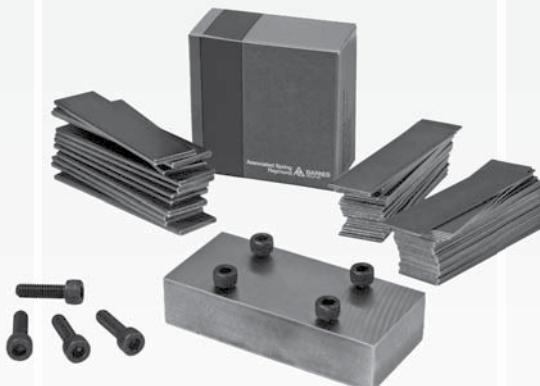
Référence	Description
AS-HOLD-14	Support pour éprouvette ALMEN selon SAE J442
495029	Vis 6 pans creux pour le support

Nos vis 6 pans creux sont 15% plus solides que le standard industriel. De plus, elles offrent

- une résistance à la tension minimum de 1470 MPa (213 ksi)
- une limite d'élasticité minimum de 1317 MPa (191ksi)
- une dureté minimum de 40HRC

### Calibres de Test Pour Eprovettes ALMEN

Référence	Description
AS-GAUGE-1	Jauge Almen – Standard
AS-CALIB-F	Bloc de test de calibration – Plat
AS-CALIB-C	Bloc de test de calibration – Incurvé



## TIRAS ALMEN

Las tiras Almen que ofrece Barnes Group ofrecen un servicio de alta calidad y de larga duración. Todas nuestras tiras Almen están certificadas SAE J442 para su uso en la industria automovilística y aeroespacial, así como en los procesos de granallado.

Podemos suministrarles rápidamente las tiras Almen tipo N y A en paquetes de 50 unidades y las de tipo C en paquetes en paquetes de 25 unidades. También es posible suministrarlas en grandes cantidades.

### Tiras Almen de Primera Calidad ( seg\xf1n SAE J442)

Referencia	Tipo de tira	Grosor (mm)	Llanura*	Dureza
AS-N-PREM	N	.79 ± .025	±0.025	HRA 72.5-76
AS-A-PREM	A	1.30 ± .025	±0.025	HRC 44-50
AS-C-PREM	C	2.39 ± .025	±0.025	HRC 44-50

\*medido con calibrador Almen

- Material: SAE/AISI 1070 cold rolled steel
- Largura: 3.00" ±0.015" (76.2 ±0.38mm)
- Anchura: 0.745"-0.750" (18.92-19.05mm)

### Plataforma y tornillos de sujeción para tiras Almen

Referencia	Producto
AS-HOLD-14	Plataforma sujeción tira Almen SAE J442
495029	Tornillos para sujeción

Nuestros tornillos de sujeción son 15% más fuertes que lo estándar en la industria. Aparte de eso, ofrecen

- 213 ksi (1470 Mpa) mínima fuerza de extensión
- 191 ksi (1317 Mpa) mínima fuerza de producción
- 40 HRC dureza mínima

### Calibradores de tiras Almen

Referencia	Producto
AS-GAUGE-1	Calibrador de tiras Almen – estándar
AS-CALIB-F	Bloque de calibración – plano
AS-CALIB-C	Bloque de calibración – plano

### United Kingdom

**Tel:** (44) 1386 443366  
**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363  
**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542  
**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04  
**E-mail:** info@asraymond.de

## ALMEN-STREIFEN

Die Almen-Streifen und Zubehörartikel von Associated Spring-Raymond zeichnen sich durch eine hohe Qualität und lange Lebensdauer aus. Alle unsere Almen-Streifen sind nach der SAE J442 Norm zur Benutzung in der Automobil- und Luftfahrtindustrie sowohl bei Kugelstrahlprozessen zertifiziert.

Eine sofortige Lieferung ist für Almen-Streifen des Typs N und A in 50-Stück-Packungen und des Typs C in 25-Stück-Packungen möglich. Großpackungen sind ebenfalls erhältlich.

### Almen-Streifen Premiumklasse (nach SAE J442)

Teilenummer	Streifenart	Dicke (mm)	Planheit* (mm)	Härte
AS-N-PREM	N	.79 ± .025	±0.025	HRA 72.5-76
AS-A-PREM	A	1.30 ± .025	±0.025	HRC 44-50
AS-C-PREM	C	2.39 ± .025	±0.025	HRC 44-50

\*mit Almen Messgerät #2 gemessen

- Material: SAE/AISI 1070 kaltgewalzter Stahl
- Länge: 3.00" ± 0.015" (76.2 ± 0.38mm)
- Breite: 0.745"-0.750" (18.92-19.05mm)

### Almen-Streifen-Halter und Inbusschrauben

Teilenummer	Produkt
AS-HOLD-14	Almen-Streifen-Halter nach SAE J442
495029	Inbusschrauben für Halter

Unsere Inbusschrauben sind 15 Prozent starker als der Industriestandard. Darüber hinaus haben sie eine min. Zugefestigkeit von 213 ksi (1470 Mpa), eine min. Streckfestigkeit von 191 ksi (1317 Mpa) und eine Mindesthärte von 40 HRC.

### Almen-Streifen - Testvorrichtungen

Teilenummer	Produkt
AS-GAUGE-1	Almen-Streifen Messvorrichtung – Standard
AS-CALIB-F	Testvorrichtung - Kalibrierungsblock – flach
AS-CALIB-C	Testvorrichtung - Kalibrierungsblock – gewölbt

## ALMEN STRIPS

Le Almen Strips Raymond sono prodotte per l'alta qualità e la lunga durata. Tutte le nostre Almen Strips sono certificate secondo le norme standard SAE J442 per l'utilizzo nell'industria automobilistica e aerospaziale, così come nel processo di pallinatura.

Per il tipo N e A è possibile la consegna immediata in blocchi da 50 pezzi, mentre per il tipo C in blocchi da 25 pezzi. E' anche disponibile l'imballaggio in grandi contenitori.

### Almen Strips Premium (secondo SAE J442)

Codice	Tipo	Spessore (mm)	Uniformità planarità* (mm)	Durezza
AS-N-PREM	N	.79 ± .025	±0.025	HRA 72.5-76
AS-A-PREM	A	1.30 ± .025	±0.025	HRC 44-50
AS-C-PREM	C	2.39 ± .025	±0.025	HRC 44-50

\*come misurato con grado Almen#2

- Materiale: SAE/AISI 1070 acciaio laminato a freddo
- Lunghezza: 3.00" ± 0.015" (76.2 ± 0.38 mm)
- Larghezza: 0.745" - 0.750" (18.92 - 19.05 mm)

### Supporto per Almen strip e viti a testa cava

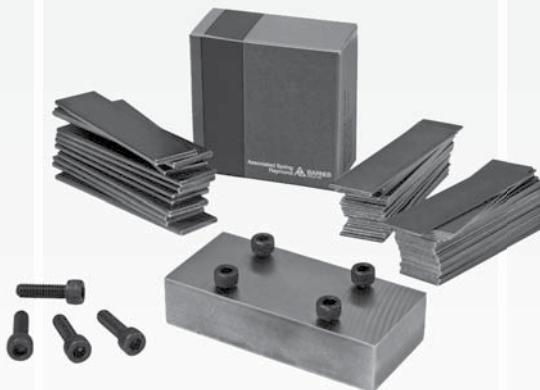
Codice	Prodotto
AS-HOLD-14	Supporto per Almen Strip SAE J442
495029	Vite a testa cava per supporto

Le nostre viti a testa cava sono il 15% più robuste di quelle standard industriali. Inoltre, offrono:

- 213 ksi (1470 Mpa) forza elastica minima
- 191 ksi (1317 Mpa) forza minima di rendimento
- 40 HRC durezza minima

### Almen Strip calibrate per controllo

Codice	Prodotto
AS-GAUGE-1	Almen strip calibrate standard
AS-CALIB-F	Blocchetti calibrati di controllo – piani
AS-CALIB-C	Blocchetti calibrati di controllo – curvati



## FITAS NIVELADORAS

As fitas niveladoras da Raymond e seus acessórios são construídas com qualidade e para terem uma vida longa. Nossas fitas niveladoras são certificadas SAE J442 para uso nas indústrias automobilísticas, aeronáuticas e para tamboreamento de peças.

Entrega imediata para pacotes de 50 peças nos tipos N e A e tipo C em pacotes de 25. Engradados fechados também estão disponíveis.

### Fitas Niveladoras Premium

Numero de catalogo	Tipo de Fita	Espessura (mm)	Nivelamento* (mm)	Dureza
AS-N-PREM	N	.79 ± .025	±0.025	HRA 72.5-76
AS-A-PREM	A	1.30 ± .025	±0.025	HRC 44-50
AS-C-PREM	C	2.39 ± .025	±0.025	HRC 44-50

\*Medida com calibrador numero 2

- Material: SAE/AISI 1070 fita de aço fria
- Comprimento: 3.00" ± 0.015" (76.2 ± 0.38 mm)
- Largura: 0.745" - 0.750" (18.92 - 19.05 mm)

### Fixadores de Fitas Niveladoras com Parafusos Tipo Allen

Numero de catalogo	Produto
AS-HOLD-14	Fixador de fita SAE J442
495029	Parafuso Tipo Allen p/ fixador

Nossos parafusos tipo Allen são 15% mais fortes do padrão. Eles também oferecem:

- 213 ksi (1470 Mpa) tensão mínima
- 191 ksi (1317 Mpa) rendimento mínimo
- 40 HRC dureza mínima

### Calibradore para Fitas Niveladoras

Numero de catalogo	Produto
AS-GAUGE-1	Calibrador Padrão
AS-CALIB-F	Bloco Calibrador Plano
AS-CALIB-C	Bloco Calibrador Curvo

### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asraymond.de

## SPRING PINS

### To DIN 1481 or ISO 8752

A spring pin is a very reliable low cost fastening system, which is particularly suitable for large volume production.

It is used in huge quantities, in countless applications, and in widely ranging industries from automobile production to electronics.

A slotted spring pin is a cylindrical slotted pin of hardened spring steel which is accurately made to a diameter greater than the drilled hole into which it is pressed. It is simply driven in and retained by continuous outward spring pressure throughout the full length of the hole. The purpose of the slot in the pin is to allow compression when inserted in the hole.

The outward spring forces act positively in preventing loosening by vibration. The forces required to dislodge a pin from an assembly are great, and there is little danger of vibration shifting the pin. Due to the flexibility in the spring design, spring pins are excellent in shockload situations, and avoid the problems of solid pins which may fracture or cause damage to the other components of an assembly through their rigidity. Spring pins are very light and exceptionally strong due to the material and heat treatment used.

Apart from the low basic cost, spring pins offer vastly reduced assembly times. Only a plain drilled hole is required to normal drilling tolerances. There is no need for any reaming, threading or counter-boring. The pins are easy to insert, either by hand or by automated assembly. No special skills are required, assembly can be carried out quite safely with unskilled labour. Spring pins can be removed using a driver, however they should preferably be fitted in to a through hole, it is very difficult to remove spring pins from a blind hole.

#### MATERIALS

Carbon Steel – BS1449 CS70 Austempered – Oiled Finish  
Stainless Steel – AISI 302/304

#### KEY TO DIMENSIONS

d = Nominal diameter  
L = Pin Length

## GOUPILLES ELASTIQUE

### Suivant DIN 1481 ou norme ISO 8752

Une goupille élastique est un système de fixation très fiable et de faible coût, particulièrement adapté à la production en grandes quantités.

Ce type de goupille est utilisée en très grandes quantités dans d'innombrables applications, dans des domaines très variés allant de la production automobile à l'électronique.

Une goupille élastique fendue est une goupille cylindrique en acier à ressort trempé, dont le diamètre est supérieur à celui du trou percé dans lequel elle est enfoncee. Elle est simplement enfoncee au marteau et maintenue par la pression élastique vers l'extérieur sur toute la longueur du trou. Le rôle de la fente est de permettre la compression quand la goupille est introduite dans le trou.

Les forces élastiques vers l'extérieur ont une action positive pour prévenir le desserrage pour cause de vibration. Les forces nécessaires pour déloger une goupille d'un assemblage sont grandes et il y a peu de risque que la goupille soit déplacée par vibration. Grâce à la flexibilité de la conception, les goupilles élastiques sont excellentes dans les situations de charges de choc et évitent les problèmes présentés par les goupilles pleines qui peuvent se casser ou endommager les autres composants d'un ensemble en raison de leur rigidité. Les goupilles élastiques sont très légères et sont exceptionnellement résistantes en raison du matériau et du traitement thermique utilisé.

Outre le faible coût de base, les goupilles élastiques permettent de réduire considérablement les temps de montage. Il suffit de percer un trou ordinaire aux tolérances de perçage habituelles, sans alésage, filetage ou contre-alésage. Les goupilles s'introduisent aisément, soit à la main soit par assemblage automatique. Aucune compétence particulière n'est requise et l'assemblage peut être exécuté sans risque par du personnel non spécialisé. Les goupilles élastiques peuvent être enlevées avec un chasse-goupille, mais il est préférable de les installer dans un trou débouchant, car elles sont très difficiles à retirer d'un trou borgne.

#### MATÉRIAUX

Acier au Carbone recuit en Austénitique – BS1449 CS70  
Acier Inoxydable – AISI 302/304

#### INDEX DES MESURES

d = Diamètre nominal  
L = Longueur

## PASADOR MUELLE/RESORTE

### Según DIN 1481 o ISO 8752

Un pasador muelle/resorte es un sistema de sujeción de gran fiabilidad y bajo coste, el cual es especialmente adecuado para volúmenes de producción altos.

Se usan en grandes cantidades, en incontables aplicaciones, y en un amplio abanico de industrias desde la industria fabricante de automóviles hasta la industria electrónica.

Un pasador muelle/resorte con ranura es un pasador cilíndrico con ranura hecho de acero de muelle/resorte templado fabricado con precisión con un diámetro mayor al del agujero taladrado en el que va a ser encajado. Simplemente se encaja en el agujero y se mantiene dentro por su capacidad de expansión de muelle/resorte a lo largo de toda la pared del agujero. El propósito de la ranura en el pasador es la de permitir una compresión a la hora de encajar el travesaño en el agujero.

La capacidad de expansión del muelle/resorte actúa positivamente a la hora de evitar que se salgan debido a las vibraciones. Las fuerzas que se requieren para sacar un pasador de este tipo son muy grandes y se corre el ligero riesgo de descolocar el pasador. Debido a la flexibilidad en el diseño del muelle/resorte, los pasadores muelle/resorte son ideales en aplicaciones de amortiguación, y evitan los problemas de los pasadores macizos que pueden llegar a dañar las piezas en contacto debido a su rigidez intrínseca. Los pasadores muelle son muy ligeros y tremenda fuertes debido al material y tratamientos usados.

A parte del bajo costo estos pasadores ofrecen unos tiempos de montaje muy reducidos. Unicamente se requiere un simple agujero taladrado con las tolerancias normales de un taladro. No hay necesidad de repasar el agujero, hacer una entrada al agujero o roscar el propio agujero. Los pasadores son fáciles de montar con la mano o con cualquier sistema automático. No se necesita ningún tipo de preparación y puede ser llevado a cabo por mano de obra no especializada. Los pasadores se pueden sacar usando un tope, sin embargo, es preferible que se encajen en agujeros pasantes ya que son muy difíciles de extraer de agujeros ciegos.

#### MATERIALES

Acero al carbón – BS1449 CS70 - Austemperizado – Acabado en aceite

Acero inoxidable – AISI 302/304

#### CLAVES DE DIMENSIONES

d = Diámetro nominal  
L = Longitud del pasador



#### United Kingdom

**Tel:** (44) 1386 443366  
**E-mail:** sales@assocspring.co.uk

#### France

**Tel:** (33) 01 30 68 6363  
**E-mail:** info@ressortsspec.com

#### Spain

**Tel:** (34) 945 147542  
**E-mail:** ventas@bgespana.com

#### Germany

**Tel:** (49) 6251 93-3252-04  
**E-mail:** info@asraymond.de

## FEDERSTIFTE

Gemäß DIN 1481 oder ISO 8752

Ein Federstift ist ein sehr zuverlässiges, kostengünstiges Befestigungssystem, welches besonders für die Großserienproduktion geeignet ist.

Federstifte werden in großen Mengen und in zahlreichen Anwendungen in den unterschiedlichsten Industrien von der Autoherstellung bis zur Elektronik eingesetzt.

Ein gekerbter Federstift ist ein zylindrischer Kerbstift aus gehärtetem Federstahl, der akkurat für einen Durchmesser hergestellt wird, welcher größer ist als die Bohrung, in die er eingeführt wird. Der Stift wird einfach in die Öffnung getrieben und durch einen kontinuierlichen Federdruck entlang der gesamten Länge der Öffnung festgehalten. Der Schlitz im Stift hat die Aufgabe, das Zusammendrücken beim Einführen in die Öffnung zu ermöglichen.

Die äußeren Federkräfte verhindern eine durch Schwingungen verursachte Lockerung. Zum Entfernen eines Stiftes aus einer Baugruppe sind große Kräfte erforderlich, und es besteht kein großes Risiko, dass der Stift durch Schwingungen bewegt wird. Auf Grund der Flexibilität im Federdesign eignen sich Federstifte hervorragend für Stoßbelastungssituationen und vermeiden dass Problem fester Stifte, die zerbrechen oder durch ihre Steifigkeit andere Bauteile einer Baugruppe beschädigen können.

Auf Grund der verwendeten Materialien und ihrer Wärmebehandlung sind Federstifte sehr leicht und außergewöhnlich stark. Außer den geringen Grundkosten sorgen Federstifte für erheblich reduzierte Montagezeiten. Es ist nur eine einfache Bohrung und kein Nachbohren, Gewindedreiecken oder Gegenbohren erforderlich. Die Stifte sind leicht einzusetzen, entweder per Hand oder in der automatisierten Montage. Es sind keine Spezialfähigkeiten erforderlich. Die Montage kann sicher von ungeschulten Arbeitskräften ausgeführt werden. Federstifte können mit einem Schraubenzieher entfernt werden. Sie sollten jedoch möglichst in eine Durchgangsbohrung eingesetzt werden, da es sehr schwierig ist, Federstifte aus einer Blindbohrung zu entfernen.

### MATERIALIEN

Kohlenstoffstahl - BS1449 CS70 Ausgetempert - Geöltes Finish

Edelstahl - AISI 302/304

### ABMESSUNGEN

d = Nenndurchmesser

L = Stiftlänge

## SPINE ELASTICHE

a DIN 1481 o ISO 8752

La spina elastica è un sistema di fissaggio molto affidabile e di basso costo, particolarmente adatto alla produzione in grandi quantità.

Viene utilizzato in grandi quantità in innumerevoli applicazioni, in svariati campi che vanno dalla produzione automobilistica a quella elettronica.

La spina elastica con fessura è una spina cilindrica, in acciaio per molle temprato, in cui il diametro è superiore a quello del foro perforato entro cui è infilato. Viene semplicemente infilato col martello e tenuto in posizione dalla pressione elastica verso l'esterno su tutta la lunghezza del foro. Il ruolo della fessura è di permettere la compressione quando il perno viene infilato nel foro.

Le forze elastiche verso l'esterno hanno un'azione positiva per prevenire una fuoriuscita a causa di vibrazioni. Le forze necessarie per estrarre una spina elastica da un assemblaggio sono grandi e vi è scarso pericolo che il perno venga spostato per vibrazione. Grazie alla flessibilità della concezione le spine elastiche sono eccellenti nelle situazioni di carichi di shock ed evitano i problemi che presentano i perni pieni, che a causa della loro rigidità si possono rompere o possono danneggiare gli altri componenti di un montaggio. Le spine elastiche sono molto leggere e sono eccezionalmente resistenti in ragione del materiale e del trattamento termico utilizzato.

Oltre al basso costo di base, le spine elastiche permettono di ridurre considerevolmente i tempi di montaggio. È sufficiente praticare un foro normale alle tolleranze di perforazione abituali, senza alesatura, filettatura o contro alesaggio. Le spine si introducono facilmente, sia a mano che automaticamente. Non è richiesta nessuna competenza particolare e l'assemblaggio può essere condotto senza rischio da personale non specializzato. Le spine elastiche possono essere estratte con un estrattore (caccia - perni) ma è preferibile installarli in un foro con uscita, perché sono molto difficili da estrarre da un foro cieco.

### MATERIALE

Acciaio al carbonio - BS1449 CS70 Austempered - rivestimento lubrificato

Acciaio inossidabile - AISI 302/304

### LEGENDA

d = Diametro nominale

L = Lunghezza spina

## PINOS DE MOLA

Conforme à norma DIN 1481 ou ISO 8752

O pino de mola é um sistema de fixação bastante econômico e confiável. É bem ajustável a um grande numero de produtos.

Desde a indústria automobilística até a indústria eletrônica. Eles têm uma ranhura, são de formato cônico e são feitos em aço.

Eles são feitos com a abertura ligeiramente mais estreita para encaixar nos pinos através de pressão.

A parte externa do pino mola tem uma função ativa positiva evitando a perda por vibração.

Devido à flexibilidade do desenho os pinos de mola são excelentes em situações de impacto, prevenindo o desgaste das peças.

Os pinos de mola são extremamente leves e fortes devido ao material e tratamento térmico.

Alem dos preços econômicos, os pinos de mola proporcionam um tempo de montagem mais curto. Um simples buraco é suficiente

Para a montagem, não precisando nenhum acabamento extra. Eles são fáceis de montar manualmente ou em linha de montagem.

Não requerem nenhum treinamento especial e são bem seguros. A desmontagem também é bastante simples não requerendo nenhuma ferramenta especial.

### MATERIAL

Aço Carbono BS1449 CS70 – Tempera de grau elevado / Oleada

Aço Inox AISI 392/304

### LEGENDA

d = Diâmetro nominal

L = Comprimento do pino



### United Kingdom

**Tel:** (44) 1386 443366

**E-mail:** sales@assocspring.co.uk

### France

**Tel:** (33) 01 30 68 6363

**E-mail:** info@ressortsspec.com

### Spain

**Tel:** (34) 945 147542

**E-mail:** ventas@bgespana.com

### Germany

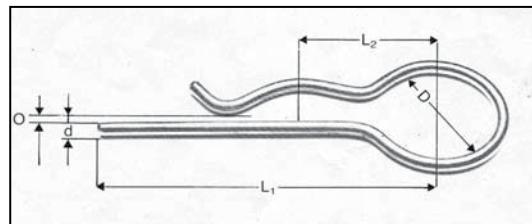
**Tel:** (49) 6251 93-3252-04

**E-mail:** info@asramond.de



## PINS AND RINGS

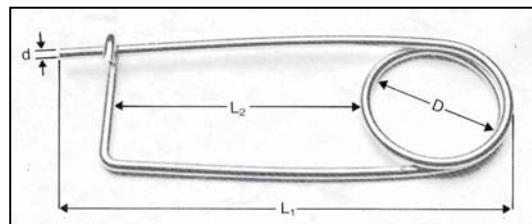
### RETAINING PINS



#### Finish Zinc Plate (closed type)

Part No.	$L_1$	$L_2$	$D$	$d$	$O$	Grip Rod
	mm	mm	mm	mm	mm	mm
89.100	43	18	10	2	0	9 - 14
89.101	45	18	10	2.5	0	9 - 14
89.102	54	23	13	3	0	10 - 16
89.103	75	29	19	4	0	16 - 20
89.104	107	43	27	5	0	20 - 28
89.105	117	50	31	6	0	28 - 40
89.106	145	75	38	7	0	25 - 38

### SAFETY PINS

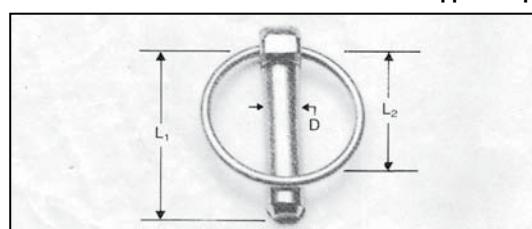


#### Finishes available: Self Finish, Zinc Plate, Stainless Steel

Part No.	$L_1$	$L_2$	$D$	$d$
	mm	mm	mm	mm
89.300	70	42	14	1.63
89.301	76	42	22	2.03
89.302	98	57	24	2.95
89.303	122	63	32	2.95
89.304	140	76	35	3.65
89.305	165	95	38	4.47
89.306	206	127	48	4.88

### LINCH PINS

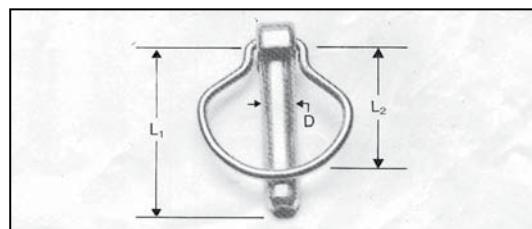
#### Apple Keep



#### Finish Zinc Plate

Part No.	$D$	$L_1$	$L_2$	Normal Size
	mm	mm	mm	mm
89.400	4.5	35	28	4.7
89.401	6	44.5	36.5	6.4
89.402	8	44.5	36.5	7.9
89.403	9	44.5	36.5	9.0
89.404	9.5	44.5	36	9.5
89.405	10.5	44.5	36	10.5
89.406	11	44.5	36	11.1
89.407	11	51	36.5	11.1

#### Pear Keep



#### Finish Zinc Plate

Part No.	$D$	$L_1$	$L_2$	Normal Size
	mm	mm	mm	mm
89.500	6	44.5	36.5	6.4
89.501	8	44.5	36.5	7.9
89.502	9	44.5	36.5	9.0
89.503	9.5	44.5	36.5	9.5
89.504	10.5	44.5	36	10.5
89.505	11	44.5	36	11.1

### SPLIT RINGS



#### Nickel Plated or Bright Self Finish

Part No.	$D_o$		Part No.	$D_o$
	mm			mm
79.022	5.5		79.095	24
79.028	7.0		79.100	25
79.030	8.0		79.112	28
79.037	9.5		79.118	30
79.050	13.0		79.125	32
79.062	16.0		79.150	38
79.075	20.0		79.200	51



1. With respect to goods purchased by Buyer from Seller ("Goods"), no contract exists until Buyer places order for delivery and such order is accepted by Seller's acknowledging receipt of the order, by Seller's commencement of work on the Goods ordered, or by Seller's shipment of the Goods, whichever occurs first. Any acceptance will be limited to the express terms contained on the face hereof. Additional or different terms in Buyer's form or any attempt by Buyer to vary in any degree any of the terms of this quotation shall be deemed material and are objected to and rejected, but this shall not prevent the formation of a contract between Buyer and Seller unless such variances are in the terms of the description, quantity, price or delivery schedule of the goods, and the order shall be deemed accepted by Seller without said additional or different terms.

2. All agreements are contingent upon strikes, accidents and other reasons for delay beyond Seller's control.

3. Where a separate charge is made for specially designed tools and dies, Seller will maintain such tools and dies without further cost to Buyer for the life of such tool or die so long as the part remains active and the design is not changed and Seller will not use such tools and dies for others without Buyer's permission, but Buyer acquires no right to remove any such tools or dies from Seller's factory.

4. Seller warrants to Buyer that the Goods purchased by Buyer from Seller shall be free from defects in material and workmanship. This warranty is the only warranty applicable to the Goods. THERE ARE NO OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH ARE HEREBY DISCLAIMED.

5. All Goods shall be inspected by Buyer when received and Seller shall not be liable for any defect unless notified in writing within 60 days after delivery.

6. Seller's liability for breach of warranty shall be limited solely and exclusively to repairing or replacing, at Seller's option, the defective Goods. In no event shall the liability of Seller for breach of any contractual provision relating to the Goods exceed the purchase price of the Goods quoted herein. In no event shall Seller be liable for any special, incidental or consequential damages arising out of Buyer's use or sale of the Goods or Seller's breach of any contractual provisions relating to the Goods, including but not limited to any loss of profits or production by Buyer. Any action resulting from any breach by Seller must be commenced within one year after the cause of action accrued.

7. Except to the extent caused by Seller's breach of warranty, Buyer shall indemnify and hold harmless Seller, its employees, officers and directors, and their respective successors and assigns, (collectively, "Indemnities") from and against any and all liability, damages, claims, causes of action, losses, costs and expenses (including attorneys' fees) of any kind (collectively, "Damages") arising out of injuries to any person (including death) or damage to any property caused by or related to the Goods or any negligent act or omission of Buyer, its employees or agents. Buyer shall indemnify and hold harmless each of the Indemnities from and against any and all Damages, royalties and license fees arising from or for infringement of any patent by reason of any sale or use of the Goods or the manufacture of the Goods to Buyer's specifications or sample. Upon the tendering of any of the foregoing suits or claims to Buyer, Buyer shall defend the same at Buyer's expense. The foregoing obligations of Buyer shall apply whether Seller or Buyer defends such suits or claim.

8. Seller reserves the right to over and under ship by not more than 10% of specified quantity.

9. Small quantities are considered prototype quantities and cannot be returned since the cost of re-inspecting and handling them is generally higher than the value of the parts. Larger quantities may not be returnable depending on the ability to re-sell these parts within a reasonable time period. Special runs are not returnable. All returns must be authorized and an Authorization Number is required. Please contact our Customer Service. Unauthorized returns will be returned at customer's expense. All authorized returns must be in their original packaging and labelling to insure lot control integrity. Parts cannot be altered or used in any fashion. Parts from separate lots cannot be mixed. A restocking fee will be charged to authorized returns. Additional charges may be required for re-inspection, cleaning and repackaging. Credit for damaged parts will not be issued. All returns will be shipped to the authorized return centre pre-paid by sender. Actual credit issued will be for the quantity of acceptable parts at the original piece price, less the restocking charge, less the original freight and any other charges that are necessary to return the parts to a saleable condition.

The product data reported in this catalogue represents typical values and is not intended to duplicate any specific customers test results. For product-specific AQL's, contact your sales representative, as indicated tolerances may not apply. The catalogue data presented is intended to be used as a guide only. It is not intended to be used to determine the suitability of the product for any specific customer application. Barnes Group strongly suggests that each customer thoroughly test the product to determine the actual suitability of the product in their specific application. The customer is responsible for determining the suitability of products in their applications. For more detailed information about these catalogue products please contact your sales representative.

**Note:** Please contact your local office for Terms of Sale that are applicable to individual countries.

**Note:** Veuillez contacter votre bureau local pour connaître les Conditions de Ventes applicables à votre pays.

**Nota:** Contacte con el distribuidor en su país para conocer las condiciones de venta que le podrían afectar.

**Anmerkung:** Bitte wenden Sie sich an uns für weitere Verkaufbedingungen in unsere Land.

**Nota:** Prego contattare il proprio distributore per le condizioni di vendita in vigore nella zona di competenza.

**Nota:** Por favor contate nosso escritório local para Termos de Vendas que é aplicável ao seu país local.



## NOTES

# Associated Spring RAYMOND



A business of BARNES GROUP INC



CZECH REPUBLIC | DENMARK | FINLAND | FRANCE |  
GERMANY | HUNGARY | ISRAEL | ITALY | NETHERLANDS | POLAND |  
SPAIN | SWEDEN | UNITED KINGDOM

## Engineered Springs / Components



## CloverDome



Associated Spring Raymond  
[www.asraymond.co.uk](http://www.asraymond.co.uk)  
Unit 4  
Grosvenor Business Centre  
Vale Park, Evesham  
Worcs. WR11 1GS  
**Tel:** +44 (0)1386 443366  
**Fax:** +44 (0)1386 446669  
**E-mail:** [sales@assocspring.co.uk](mailto:sales@assocspring.co.uk)  
[www.asraymond.co.uk](http://www.asraymond.co.uk)



Ressorts SPEC  
[www.ressortsspec.com](http://www.ressortsspec.com)  
Bâtiment HERMES 2,  
ZA de Pissaloup  
4 rue Edouard Branly  
78190 TRAPPES  
**Tel:** (33) 01 30 68 6363  
**Fax:** (33) 01 30 68 4050  
**E-mail:** [info@ressortsspec.com](mailto:info@ressortsspec.com)  
[www.ressortsspec.com](http://www.ressortsspec.com)

## Counter-balance Products



## Die Springs / Tool Components



Barnes Group Spain, S.R.L.  
[www.bgespana.com](http://www.bgespana.com)  
La Peña 6 - Pab. 5  
01013 Vitoria-Gasteiz  
**Tel:** (34) 945 147542  
**Fax:** (34) 945 137655  
**E-mail:** [ventas@bgespana.com](mailto:ventas@bgespana.com)  
[www.bgespana.com](http://www.bgespana.com)



Associated Spring Raymond GmbH  
[www.asraymond.de](http://www.asraymond.de)  
Heimrodstraße 10  
64625 Bensheim,  
Germany  
**Tel:** (49) 6251 933 252-04  
**Fax:** (49) 6174 205 188  
**E-mail:** [info@asraymond.de](mailto:info@asraymond.de)  
[www.asraymond.de](http://www.asraymond.de)

