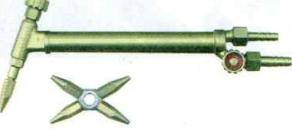
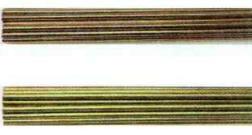
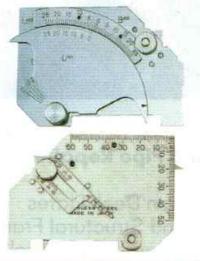


# 85

## Welding Equipment

Gases/Gas Cylinders  P. 85-1 ~ 9	Gas Welding and Cutting Equipment  P. 85-9 ~ 10	Welding Hose and Couplings  P. 85-10 ~ 12
Gas Welding Rods  P. 85-12 ~ 13	Electrodes  P. 85-13 ~ 19	Electric Welding Equipment  P. 85-19 ~ 22
Welder's Chalks  P. 85-22	Welders' Protection Items  P. 85-23 ~ 25	Welding Gauges  P. 85-25

## High Pressure Gases

Gases de Alta Presión 高圧ガス 氧氣

Gases are obtainable packed in cylinders or empty cylinders from a vessel can be refilled for use. The most commonly required gases for marine use are listed below. When ordering, please specify the type of gas required. Charges for cylinder rental or gas refills are applied separately and the guidelines regarding what type of valves are used on the cylinders, how frequently the cylinders must undergo pressure tests, and if cylinders can be exchanged will vary by country and manufacturer.



CODE	Gas		Unit	Standard Cylinder
	Name	Symbol		
85 01 02	Oxygen	O <sub>2</sub>	M <sup>3</sup>	7 M <sup>3</sup>
04	Acetylene	C <sub>2</sub> H <sub>2</sub>	kg	6.8 ~ 7.8 kg
09	HFC-134a	CH <sub>2</sub> FCF <sub>3</sub>	kg	10, 20, 100 kg
10	R-404A	(*)	kg	10, 20, 100 kg
11	R-407C	(**)	kg	10, 20, 100 kg
85 01 13	R-407H	(**)	kg	10, 50 kg
15	R-448A	(***)	kg	10, 50 kg
17	R-449A	(****)	kg	10, 50 kg
12	Propane	C <sub>3</sub> H <sub>8</sub>	kg	10, 20, 50 kg
14	Carbon Dioxide	CO <sub>2</sub>	kg	30 kg
85 01 16	Helium	He	M <sup>3</sup>	7 M <sup>3</sup>
18	Argon	Ar	M <sup>3</sup>	7 M <sup>3</sup>
20	Hydrogen	H <sub>2</sub>	M <sup>3</sup>	7 M <sup>3</sup>
22	Nitrogen	N <sub>2</sub>	M <sup>3</sup>	7 M <sup>3</sup>
24	Ammonia	NH <sub>3</sub>	kg	50 kg

Remark (\*) : R-404A is mixture gas of HFC-125/143a/134a  
 (\*\*) : R-407C/407H is mixture gas of R32/R125/R134a  
 (\*\*\*) : R-448A is mixture gas of HFO-1234yf/1234ze and HFC-32/125/134a  
 (\*\*\*\*) : R-449A is mixture gas of R32/R125/R134a/HFO-1234yf

Note: The refill of an empty cylinder is under strict control by the high pressure gas control safety law of most countries. Consequently, it takes a long time for the refill procedure. To avoid this slow process, cylinder rental systems are also available in certain countries.

### Information regarding the use of refrigerant gases

In accordance with the IMO resolution A. 719 (17) regarding CFCs we would like shipyards and ship owners to take note of the current regulations in place on the design of refrigerant systems and proposals for the future restriction of refrigerant gases.

The resolution states as follows:

1. The use of CFCs whose ozone depleting potential is higher than 5 % of R-11 in installations of fixed refrigeration and air conditioning plants and insulation shall be prohibited on ships of which the keel is laid or which are at a similar stage of construction on or after 6 November, 1992.
2. The use of CFCs in such new installations on other ships shall be prohibited by 6 November, 1992.

In regard to the use of refrigerant gases, CFC refrigerants above grade CFC 11(R-11) has been banned from use from the year 1996. Furthermore, the alternative refrigerant HCFC 22(R-22) has been totally banned in EU since 2015. Starting from 1st January 2020, virgin R-22 will be banned in non-article 5 parties (Montreal Protocol) such as Japan, Australia and USA. The other alternative refrigerants such as R-404A (mixture gas of HFC-125/143a/134a) and R-507 (mixture gas of HFC-125/143a) and R-422D (mixture of R-125/134a/600) will also be banned in EU from 1st January. 2020.

The Montreal Protocol stipulates 100% phaseout of the production of CFCs, which is the most common ozone-depleting refrigerants such as CFC-12, R-502 and HCFC-22, by January 1, 1996.

HFCs are environmentally superior to CFCs because HFC does not contain chlorine. However, due to their environmental impact, even more eco-friendly alternatives are introduced such as HFOs, which has significantly lower global warming potential and ozone-depleting potential.

We also include alternative gases from this edition as environmentally friendly refrigerants which enable to make direct replacement of CFCs.

CFC denotes Chlorofluorocarbon.

HFC denotes Hydrofluorocarbon.

HCFC denotes Hydrochlorofluorocarbon.

HFO denotes Hydrofluoroolefin.

## Refrigerant Gases

### As alternative for CFC Refrigerants

Gas refrigerante como alternativa a refrigerantes a base de CFC

冷凍機ガス 冷冻机制冷气体



Due to the ozone depleting issues, environmentally friendly maritime refrigerant is required for use in various cooling system. Here is the reference of quality assured refrigerants to the highest purity standards (ARI-700), covers wide range of marine refrigeration requirements.

CODE	Name	Unit	Application
85 01 25	Hycool Marine 45	kg	A cost efficient and environmentally friendly secondary refrigerant for use in indirect cooling systems. It is based on the organic salt Potassium Formate. Biodegradable and has neither Ozone Depleting Potential nor Global Warming Potential, Non-flammable and non-toxic, and Wide application range +50 to -45°C, can be used in freezing, cooling and heating applications.
	26 Same, supplied in can (25L)	25 L	
85 01 27	Unicool R-407F	kg	A synthetic HFC refrigerant, used in a variety of maritime refrigeration applications such as high, medium and low temperature applications.
	28 Same, supplied in 12L cylinder	11 kg	
	29 Same, supplied in 56L cylinder	51 kg	
85 01 30	Unicool R-410A	kg	A synthetic HFC refrigerant, used in a variety of maritime refrigeration applications such as high, medium and low temperature applications.
	34 Same, supplied in 12L cylinder	9.5 kg	
	38 Same, supplied in 56L cylinder	45 kg	
85 01 39	Unicool R-417A	kg	A synthetic HFC refrigerant for replacing R-22 in existing refrigeration systems for low, medium and high temperature applications.
	40 Same, supplied in 12L cylinder	11 kg	
	47 Same, supplied in 56L cylinder	51 kg	
85 18 21	Unicool R-448A	kg	A new generation of HFO blend refrigerant, with low GWP and highly energy efficient refrigerant for low and medium temperature applications.
85 18 22	Same, supplied in 12L cylinder	10 kg	
85 18 23	Same, supplied in 56L cylinder	45 kg	
			<b>NOTE: Recommended drop-in retrofit replacement for R-22.</b>
			<b>NOTE: Suitable for new installation and retrofit for R-404a</b>

CODE	Name	Unit	Application
85 18 24	Unicool R-449A	Kg	A new generation of HFO blend refrigerant, with low GWP and highly energy efficient refrigerant for low and medium temperature applications.
85 18 25	Same, supplied in 12L cylinder	10 Kg	
85 18 26	Same, supplied in 56L cylinder	45 Kg	<b>NOTE: Suitable for new installation and retrofit for R-404a</b>
85 18 27	Unicool R-452A	Kg	A new generation of HFO blend refrigerant, with low GWP and highly energy efficient refrigerant for low temperature application with air-cooled condenser.
28	Same, supplied in 12L cylinder	10 Kg	
29	Same, supplied in 56L cylinder	45 Kg	<b>NOTE: Suitable for new installation and retrofit for R-404a</b>
85 18 30	Unicool R-513A	Kg	A new generation of HFO blend refrigerant, with low GWP and highly energy efficient refrigerant for medium temperature applications.
31	Same, supplied in 12L cylinder	11 Kg	
32	Same, supplied in 56L cylinder	50 Kg	<b>NOTE: Suitable for new installation and retrofit for R-404a</b>
85 18 33	Unicool R-407H	Kg	A new generation of HFC blend refrigerant, with low GWP and most suitable for new installations.
34	Same, supplied in 12L cylinder	10 Kg	
35	Same, supplied in 56L cylinder	45 Kg	

Name of Mfr: Wilhelmsen Ships Service

## Seamless High Pressure Gas Cylinders

for Oxygen, Nitrogen, Hydrogen, Helium, etc.

Cilindros sin Costura de Gas de Alta Presión

継目なし高圧ガス容器 无缝高压气瓶

Made of seamless mangan steel complete with valve and cap for use with various gases such as Oxygen(O<sub>2</sub>), Nitrogen(N<sub>2</sub>), Hydrogen(H<sub>2</sub>), Helium(He), etc.  
When ordering, please specify the name of the gas to be filled for safety's sake. Their specifications are as follows:

### How to order: CODE

High pressure gas cylinder, KIND of GAS, GAS CAPACITY

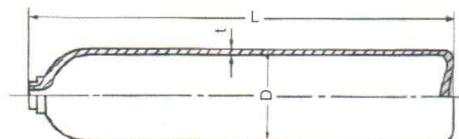
Unit Per Btl.

CODE	85 01 41	85 01 42
Gas Capacity m <sup>3</sup>	7.0	6.0
Water Capacity ltr	46.7	40.0
Service Pressure	150 kgf/cm <sup>2</sup>	
Hydraulic Test Pressure	250 kgf/cm <sup>2</sup>	
Out Diam. mm	232.0	
Nominal Wall Thick mm	6.3	
Overall Length mm	1,370	1,190
Weight kg	53.5	46.5

### High Pressure Gas Cylinders

There are a great variety of compressed gas cylinder standards. To avoid dangerous accidents, most countries have their own strict regulations governing the making, refilling and testing procedures of these high pressure gas cylinders. The table in the next page summarizes the abstract details of the popular cylinders of various countries.

In case of refilling, a certain country may require the certificates of the cylinders.



### 1. American Specifications : DOT 3AA (CTC in Canada)

Ref.No.	Materials	Gas Capacity (ft <sup>3</sup> )	Service Pressure (Psi)	Water Capacity (in <sup>3</sup> )	Outside Diameter (D) mm	Nominal Wall Thickness (t) mm	Overall Length (L) mm	Nominal Weight kg
UA-22	Chromium Molybdenum Steel	220	2,015	2,640	232.0	6.3	1,285	50.0
UA-25		250	2,265	2,640	232.0	6.5	1,290	51.5
UA-30		300	2,400	2,990	235.0	6.8	1,400	59.5
UA-34		340	2,845	2,850	232.0	8.1	1,425	71.0
UB-8	Manganese Steel B	80	2,015	873	177.8	5.5	765	20.5
UB-11		110	2,015	1,318	177.8	5.5	1,110	28.0
UB-12		125	2,265	1,318	177.8	5.5	1,110	28.0
UB-15		150	2,015	1,630	190.7	5.5	1,170	32.5
UB-22		220	2,015	2,680	232.0	6.3	1,300	51.0
UB-23		230	2,015	2,680	232.0	6.3	1,300	51.0
UB-24		240	2,015	2,850	232.0	6.3	1,370	53.5
UB-26		260	2,135	2,850	232.0	6.3	1,370	53.5
UB-25		250	2,265	2,640	232.0	6.5	1,290	51.5
UB-30		300	2,400	2,990	235.0	7.0	1,420	62.0
UB-34		340	2,845	2,850	232.0	8.1	1,425	71.0

### 2. Germany Specifications : DIN 4664 Blatt 7,9

Ref.No.	Materials	Test Pressure (bar)	Water Capacity (liter)	Outside Diameter (D) mm	Nominal Wall Thickness (t) mm	Overall Length (L) mm	Nominal Weight kg
G7-40	Blatt 7 Manganese Steel B (38 Mn6)	250	40.2	232.0	6.5	1,220	54.5
G7-47			46.9	232.0	6.5	1,405	62.0
G7-68			67.5	267.4	7.5	1,535	90.5
G9-40	Blatt 9 Chromium Molybdenum Steel (32 CrMo4)	300	40.0	232.0	5.9	1,200	48.5
G9-50			50.0	232.0	5.9	1,470	58.5

### 3. British Specifications : BS5045 Part 1

Ref.No.	Materials	Water Capacity (liter)	Outside Diameter (D) mm	Nominal Wall Thickness (t) mm	Overall Length (L) mm	Nominal Weight kg
BA-68	Chromium Molybdenum Steel	68	267.4	7.0	1,515	76.0

### 4. Japanese Specifications : JIS B8241

#### For Permanent Gases

Ref.No.	Materials	Service Pressure	Hydraulic Test Pressure	Water Capacity (liter)	Gas Capacity (m³)	Outside Diameter (D) mm	Nominal Wall Thickness (t) mm	Overall Length (L) mm	Nominal Weight kg
JC-7	Chromium Molybdenum Steel	200 kgf/cm²	334 kgf/cm²	35	7.0	216.3	6.2	1,205	43.5
JC-8				40	8.0	216.3	6.2	1,360	48.5
JC-9				45	9.0	216.3	6.2	1,515	53.0
JCT-7				35	7.0	232.0	6.3	1,060	43.0
JCT-8				40	8.0	232.0	6.3	1,190	46.5
JCT-9				45	9.0	232.0	6.3	1,330	52.0
JCT-10				50	10.0	232.0	6.3	1,460	56.5
JHC-10				50	10.0	232.0	7.8	1,500	70.0
JS-6	Manganese Steel B	150 kgf/cm²	250 kgf/cm²	40.0	6.0	232.0	6.3	1,190	46.5
JS-7				46.7	7.0	232.0	6.3	1,370	53.5
JS-10				68.0	10.2	267.4	7.0	1,515	76.0

#### For High Pressure Liquefied Gases: CO<sub>2</sub> (NO<sub>2</sub>, C<sub>2</sub>H<sub>4</sub>)

Ref.No.	Materials	Hydraustatic Test Pressure	Water Capacity (liter)	Gas Capacity (kg)	Outside Diameter (D) mm	Nominal Wall Thickness (t) mm	Overall Length (L) mm	Nominal Weight kg
JL-30	Manganese Steel B	250 kgf/cm²	40.2	30	232.0	6.3	1,190	46.5
JL-35			46.9	35	232.0	6.3	1,370	53.5
JL-50			68.0	50	267.4	7.0	1,515	76.0

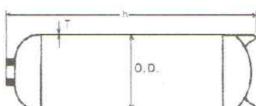
## Acetylene Gas Cylinders

Cilindros de Gas Acetileno

アセチレンガス容器

乙炔气瓶

Made of welded steel with monolithic porous filler (porosity 90-92%) which is ready to fill with dissolved acetylene gas. Complete with valve and cap.



Unit Per Cyl.

CODE	85 01 51	85 01 52	85 01 53
Gas Weight kg	7	4	2
Gas Volume m³	6.3	3.6	1.8
Water Capacity (Ltr)	41	24	12.5
Outside Diam. mm	259	232	220
Wall Thickness mm	4.0	3.2	3.0
Height mm	939	701	432
Weight (kg)			
Net Weight	26.5	16.5	9.0
Porous Filler	9.2	5.3	2.8
Aceton	14.0	8.2	4.3
Saturated Gas	0.5	0.3	0.2
Valve	0.8	0.8	0.8
Total	51.0	31.1	17.1
Filling Pressure Kgf/cm²	15.5	15.5	15.5
Test Pressure Kgf/cm²	50.0	50.0	50.0

## Spanners for Opening & Closing Oxygen / Acetylene Gas Cylinder

Llave para apertura y cierre de bombona de oxígeno/acetileno

酸素・アセチレンボンベ開閉用スパナ

氧气乙炔储气罐开关扳手

Two square sockets for Oxygen cylinder valve and Acetylene cylinder valve in single spanner.



85 01 56 Spanner, opening & closing, for Oxygen/Acetylene gas cylinder

Pc.

## Refrigerant Gas Cylinders

Cilindros de gas refrigerante

フロンガス容器 制冷剂气瓶

Made of welded steel for use with HFC-134a, R-404A, R-407C, R-407H, R-448A or R-449A complete with valve and head cap.



**HFC-134a and R-404A / R-407C / R-407H / R-448A / R-449A**

Nom. Gas Capacity	10 ltr	20 ltr	40 ltr	100 ltr
HFC-134a	10 ltr	21 ltr	41 ltr	107 ltr
R-404A / R-407C / R-407H	10 ltr	20 ltr	-	100 ltr
R-448A/R449A	10 ltr	-	50 ltr	-
Size	HFC-134a	275	220	220
	O.D mm R-404A / R-407C / R-407H	250	220	-
	R-448A / R-449A	229	-	254
	Length mm R-404A / R-407C	271	697	1,247
	R-407H	344	758	-
	R-448A / R-449A	380	810	1,390
Height mm	HFC-134a	454	899	-
	R-404A / R-407C / R-407H	506	-	1,380
	R-448A / R-449A	-	-	-
Total Weight kg	HFC-134a	7	14	24
	R-404A / R-407C	8	13.5	-
	R-407H / R-448A / R-449A	19	-	74
Test Pressure kg/cm²	HFC-134a	31	31	31
	R-404A / R-407C / R-407C	51	51	-
	R-448A / R-449A	51	-	51

**How to order: CODE**

Refrigerant gas cylinder, NAME of GAS, TYPE NO., CAPACITY

Unit Per Cyl.		
CODE	Name of Gas	Capacity kg
85 01 57 58 60	HFC-134a	10
		20
		100
85 01 73 74 65	R-404A	10
		20
		100
85 01 95 96 70	R-407C	10
		20
		100
85 01 13 85 18 01 02	R-407H	10
		20
		50
85 01 15 85 18 03 04	R-448A	Specify weight
		10
		50
85 01 17 85 18 05 06	R-449A	Specify weight
		10
		50

**Non Refillable Refrigerant Gas Cylinders**

Bombonas de gas refrigerante no recargables

再充填不可冷媒ガスボンベ

不可再充装制冷剂气瓶



Portable, easy to use and fully recyclable cylinders for refrigerant gases. Supplied in a protective shipping carton.

**How to order: CODE**

Refrigerant gas cylinder, non refillable, NAME of GAS, TYPE NO., CAPACITY

Unit Per Cyl.		
CODE	Name of Gas	Capacity kg
85 01 78	R-410A	10
85 01 79	R-404A	10
85 01 80	R-407C	11.35
85 18 07	R-407H	10
85 18 08	R-448A	10
85 18 09	R-449A	10

**Fluorocarbon Refrigerant-Recovery Machines**

Máquinas de recuperación de refrigerantes de fluorocarburos

フロン冷媒回收装置 碳氟化合物制冷剂回收机

Fluorocarbon refrigerant recovery machine is necessary device that recovers and extract refrigerants from cooling systems such as refrigerator or air conditioning devices to prevent their release into the environment during maintenance, repairs or disposal processes.  
Here are the units which may require for recovery works.

**Fluorocarbon Refrigerant-Recovery Equipment**

Equipos de recuperación de refrigerantes de fluorocarburos

フロン冷媒回收装置

碳氟化合物制冷剂回收设备

A machine that recovers refrigerants from cooling units, and discharges it to the recovery cylinders.



Unit per Set

CODE	85 18 41	85 18 42
Voltage	100V / 50Hz, 60Hz	220-240V / 50Hz
Recovery Refrigerant	R12, R22, R500, T502, R410A, R32, R404A, R407C, R507A, R134a and FC1, FC3 Series of Fluorocarbon Refrigerant (Flammable Exclusive)	R12, R22, R500, T502, R410A, R32, R404A, R407C, R507A, R134a and FC1, FC3 Series of Fluorocarbon Refrigerant (Flammable Exclusive)
Recovery Method	Gas/Mixture: Refrigerant gas from suction port is compressed and changed to liquid. Liquid: Push-Pull Operation. Liquid is forced to cylinder by pressure.	
Ultimate Vacuum	Cont. Operation: Approx. -0.05 Mpa (-380 mmHg) Auto. Operation: Approx. -0.04 Mpa (-300 mm Hg) *Pressure gauge: Mpa display	
Size / Net Weight	H: 360 x W: 430 x D: 260 mm / 16.8 Kg	
Operating Temperature	0~39°C	
Applicable Cylinder	~90kg (100L) Cylinder with float sensor ~90kg (100L) FC3 charging scale with Weight Limiter	

**Vacuum Pump**

Bomba de vacío 真空ポンプ 真空泵

Used for removing gas from compressor of cooling system or recovery cylinders to create vacuum environment before using fluorocarbon refrigerant-recovery device.



Unit Per Pcs.

CODE	85 18 43	85 18 44
Voltage	100V	220-240V
Motor / RPM	390W / 2,880 r.p.m. (50 Hz) 3,440 r.p.m. (60 Hz)	70W / 2,880 r.p.m.
Air Displacement	60 Hz: 180 L/min. (6.4CFM) 50 Hz: 150 L/min. (5.3CFM)	40 L/min. (1.4XCFM)
Rotor	Two Stage	
Ultimate Vacuum	15 microns	25 microns
Pump Oil Capacity	500 ml	100 ml
Intake Fitting	5/16" (1/2-20 UNF)	
Dimension (mm)	W:130 x D:355 x H:265	W:100 x D:245 x H:160
Weight (kg)	10.9	3.75
Accessories	1/4" Male x 5/16" Female adapter (TA159p-4)	

**Manifold Gauge**

Manómetro マニホールドゲージ 岐管压力表

Ball valve type hybrid manifold gauge is used for measuring refrigerant pressure by two gauges, one for high pressure and the other for low pressure with valves and ports (for gas and for liquid). The saturation temperatures of the liquid and vapor phases of some gases differ greatly even at the same pressure, and the hybrid gauge has a saturation temperature scale for the liquid and vapor phases, making it excellent accuracy for the saturation temperature.



Gauge connection: 1/8" NPT

Hose connection: 5/16" Flare

85 18 45	Manifold gauge for fluorocarbon refrigerant recovery	Pc.
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**Fluorocarbon Recovery Cylinders**

Cilindros de recuperación de fluorcarbón

フルオロカーボン回収用ポンベ 碳氟化合物回收气瓶

Used to recover and store refrigerants during the process of removing them from cooling devices.



85 18 46	Refrigerant Recovery Cylinder 12 ltr (10 kg)	Cyl.
47	Refrigerant Recovery Cylinder 24 ltr (20 kg)	Cyl.

**Nitrogen Gas Cylinders**

Bombonas de nitrógeno 窒素ガスボンベ 氮气瓶

## Specifications

Application	Inerting
Gas capacity mm <sup>3</sup>	9 - 10
Filling pressure bar	196
Gross weight kg	92.7
Overall length mm.	1,664
Outside diameter mm.	230
Valve connection	W24.32 × 1/14M

85 01 77	Nitrogen gas cylinder 9 - 10 m <sup>3</sup>	Cyl.
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**Propane Gas Cylinders**

Bombonas de gas propano

プロパンガスボンベ 丙烷气瓶



Made of welded steel for use with liquefied petroleum gas which is mainly used for fuel.

CODE	85 01 81	85 01 82	85 01 83
Type No.	5L	10L	20L
Gas Capacity kg	5	10	20
Actual Volume ltr	11.8	24	47
Size	Outside Diam. mm	250	310
	Wall Thickness mm	3	3
	Overall Length mm	450	545
Total Weight kg	8.5	12	21
Test Pressure kgf/cm <sup>2</sup>	31	31	31

**Span (Calibration) Gases**

Gases de calibración スパン(校正用)ガス 量程(校准)气体

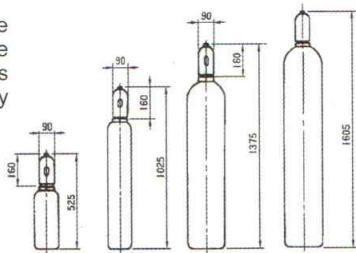
Several kinds of gases are available for calibrating gas analyzers. These gases are called Span Gas or Calibration Gas.

For combustible gas detection, two major methods are widely and commonly used in marine applications, one is the non-dispersive infrared absorption principle (Nitrogen Balance) and the other is the catalytic combustion principle (Air Balance).

The specifications of the gases for use on the calibration of the analyzers utilizing the above two principles are as follows.

No.	Mixing Ratio	Name of Gas Mixed	Main Component
C-0	Zero Gas		
D-0	100%		N <sub>2</sub> (Nitrogen)
C-1	Span Gas		
D-1	Approx. 2%	O <sub>2</sub> (Oxygen)	N <sub>2</sub> (Nitrogen)
D-2	" 3%	CH <sub>4</sub> (Methane)	"
D-3	" 4.3%	"	"
D-4	" 5%	"	"
D-5	" 1.5%	"	Air
D-9	Others ...	Please specify the components and concentration.	

For containing the above gases, there are several gas cylinders and regulators. They are as follows:

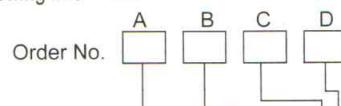


No.	Volume Ltr	Pressure Kgf/cm <sup>2</sup>		Size mm		Weight Kg
		Filling	Test	Length	Dia.	
B-0	3.4	100		525	140	6.0
1	10	150	250	1,025	140	14
2	40	150		1,375	232	50
3	47	150		1,605	232	65

When ordering gases and cylinder (if required), please fill the following column.

**How to order: 85 - 01 - 84**

Span gas, with following information:



(A) With or Without cylinder

0 - Gas only  
1 - Gas with cylinder

(B) Cylinder Volume

B - 0, 1, 2, 3

(C) Use

0 - Zero Gas

1 - Span Gas

(D) Kinds of Gas

D-0, 1, 2, 3, 4, 5, 9

Order No. A B C D means

1 2 1 3

Span gas, 4.3 % CH<sub>4</sub> in N<sub>2</sub> with 40 ltr/cylinder.

## Note:

- In case (A) is 0, the refilling gas cylinder should be attached with the certificate if issued previously.
- The combustible gas balanced by air which is over 30 % of LEL (Lower Explosive Limit) can't be supplied/refilled.

**Span Gases**

Gases de efecto invernadero スパンガス 跨度气体

Span Gas for all types of gas detectors and analyzer. To help comply with standards, various types of calibration gas cylinders are available for your usage.



The most important accessory to any gas detector is a calibration kit, which provides the means to determine if the instrument is working properly. When using gas detection equipment, it is necessary to calibrate the equipment on a regular basis to guarantee accurate results. According to some regulations and standards, one must test the gas detector prior to each use with a suitable test gas.

**Can Specifications**

Type	34L	58L	110L
Height x Diam	280 x 74 mm	360 x 88 mm	360 x 88 mm
Weight in kgs	0.7	0.8	0.8
Material	Aluminium Alloy		
Filling Pressure	500 PSI	500 PSI	1,000 PSI
Usable Gas	34 ltr	58 ltr	110 ltr
Connection	5/8"-18 UNF(C-10)		
Filling Tolerance	5-49 PPM±10%, 50-500 PPM±5%>500 PPM±2%		
Transportation	UN 1956 Class 2		
Mixture	Flammable, non reactive and reactive gases		

**Type of Mixture Gases**

A span gas comes in aluminium alloy cylinder. Please specify kind of gas with capacity of cylinder you request selecting from standard ranges in the following table. If other Mixtures are required, please specify Gas Type and Concentration.

CODE	Description of Gas	Capacity of Cylinder
85 15 12 13 14	0.9% Vol (50%LEL) Iso-Butane (C <sub>4</sub> H <sub>10</sub> ) Balance Air	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 16 17 18	8% Iso-Butane (C <sub>4</sub> H <sub>10</sub> ) Balance Nitrogen (N <sub>2</sub> )	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 20 21 22	99.5% Pure Butane (C <sub>4</sub> H <sub>10</sub> )	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 24 25 26	50 PPM Carbon Monoxide (CO) Balance Air	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 28 29 30	100 PPM Carbon Monoxide (CO) Balance Air	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 32 33 34	250 PPM Carbon Monoxide (CO) Balance Air	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 36 37 38	5% Carbon Dioxide (CO <sub>2</sub> ) Balance Nitrogen (N <sub>2</sub> )	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 79 80 85 16 00	10% Carbon Dioxide (CO <sub>2</sub> ) Balance Nitrogen (N <sub>2</sub> )	in 34 ltr can in 58 ltr can in 110 ltr can

85 15 44 45 59	15% Carbon Dioxide (CO <sub>2</sub> ) Balance Nitrogen (N <sub>2</sub> )	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 44 41 42	25 PPM Hydrogen Sulphide (H <sub>2</sub> S) Balance Nitrogen (N <sub>2</sub> )	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 44 45 46	50 PPM Hydrogen Sulphide (H <sub>2</sub> S) Balance Nitrogen (N <sub>2</sub> )	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 48 49 50	2.5% Vol (50%LEL) Methane (CH <sub>4</sub> ) Balance Air	in 34 ltr can in 58 ltr can in 110 ltr can
85 17 60	1.0% Vol (20%LEL) Methane (CH <sub>4</sub> ) Balance Air	in 110 ltr can
85 17 81	800 PPM Methane (CH <sub>4</sub> ) Balance Air	in 110 ltr can
85 17 82	10% Vol (50%LEL) Methane (CH <sub>4</sub> ) Balance Nitrogen	in 110 ltr can
85 17 83	50% Vol (50%LEL) Methane (CH <sub>4</sub> ) Balance Nitrogen	in 110 ltr can
85 15 52 53 54	99.95% Pure Methane (CH <sub>4</sub> )	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 56 57 58	99.995% Pure Nitrogen (N <sub>2</sub> )	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 60 61 62	2.1% Oxygen (O <sub>2</sub> ) Balance Nitrogen (N <sub>2</sub> )	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 64 65 66	5.5% Oxygen (O <sub>2</sub> ) Balance Nitrogen (N <sub>2</sub> )	in 34 ltr can in 58 ltr can in 110 ltr can
85 17 84	8% Oxygen (O <sub>2</sub> ) Balance Nitrogen (N <sub>2</sub> )	in 110 ltr can
85 17 85	10% Oxygen (O <sub>2</sub> ) Balance Nitrogen (N <sub>2</sub> )	in 110 ltr can
85 17 86	20.9% Oxygen (O <sub>2</sub> ) Balance Nitrogen (N <sub>2</sub> )	in 110 ltr can
85 15 68 69 70	0.7% Vol (50%LEL) Pentane (C <sub>5</sub> H <sub>12</sub> ) Balance Air	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 72 73 74	1.1% Vol (50%LEL) Propane (C <sub>3</sub> H <sub>8</sub> ) Balance Air	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 75	1.1% Propane (C <sub>3</sub> H <sub>8</sub> ) 20 PPM Hydrogen Sulphide (H <sub>2</sub> S) Balance Nitrogen	in 58 ltr can
85 15 87	50% Pure Propane (C <sub>3</sub> H <sub>8</sub> ) Balance Nitrogen	in 110 ltr can
85 15 76 77 78	99.95% Pure Propane (C <sub>3</sub> H <sub>8</sub> )	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 07	100 PPM Isobutylene Balance Air	in 110 ltr can
85 15 08	216 PPM Ethanol Balance Nitrogen 0.038% BRAC Equivalent for Alcohol Meter Test Gas	in 110 ltr can
85 15 09	2% Vol (50% LEL) Hydrogen Balance Air	in 110 ltr can
85 15 88	50 PPM Ammonia (NH <sub>3</sub> ) Balance Nitrogen	in 58 ltr can
85 17 89	5 PPM Chlorine (Cl <sub>2</sub> ) Balance Nitrogen	in 58 ltr can
85 17 90	5 PPM Nitrogen Dioxide (NO <sub>2</sub> ) Balance Nitrogen	in 58 ltr can

(to be continued)

#### 4 Gas Mixtures

Very reactive gas mixture only available in 34, 58, 100 ltr cylinders.

CODE	Description of Gas	Capacity of Cylinder Unit Per Can
85 15 81	2.5% Methane ( $\text{CH}_4$ ), 50 PPM Carbon Monoxide (CO), 25 PPM Hydrogen Sulphide ( $\text{H}_2\text{S}$ ), 12% Oxygen ( $\text{O}_2$ ) Balance Nitrogen ( $\text{N}_2$ )	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 84	2.5% Methane ( $\text{CH}_4$ ), 100 PPM Carbon Monoxide (CO), 25 PPM Hydrogen Sulphide ( $\text{H}_2\text{S}$ ), 20.9% Oxygen ( $\text{O}_2$ ) Balance Nitrogen ( $\text{N}_2$ )	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 87	2.5% Methane ( $\text{CH}_4$ ), 100 PPM Carbon Monoxide (CO), 40 PPM Hydrogen Sulphide ( $\text{H}_2\text{S}$ ), 15% Oxygen ( $\text{O}_2$ ) Balance Nitrogen ( $\text{N}_2$ )	in 34 ltr can in 58 ltr can in 110 ltr can
85 15 90	2.5% Methane ( $\text{CH}_4$ ), 100 PPM Carbon Monoxide (CO), 25 PPM Hydrogen Sulphide ( $\text{H}_2\text{S}$ ), 18% Oxygen ( $\text{O}_2$ ) Balance Nitrogen ( $\text{N}_2$ )	in 34 ltr can in 58 ltr can in 110 ltr can
85 17 91	0.9% (50%LEL) Isobutane, 50 PPM Carbon Monoxide, 25 PPM Hydrogen Sulphide, 12% Oxygen Balance Nitrogen	in 34 ltr can in 58 ltr can
85 15 10	25% LEL Pentane ( $\text{C}_5\text{H}_{12}$ ) 100 PPM Carbon Monoxide, 25 PPM Hydrogen Sulphide, 18% Oxygen Balance Nitrogen	in 34 ltr can in 58 ltr can in 110 ltr can

Name of Mfr. : Atlas Marine Services Pte. Ltd.

#### Regulators and Accessories

Reguladores y accesorios レギュレーターとアクセサリー

調压器和配件

##### Fixed Flow Regulators for 34 ltr, 58 ltr, and 110 ltr

Available for portable detectors with no pump or hand pump, also ideal for fixed head detectors. Flow rate 0.3 litres/minute, 0.5 litres/minute or 1.0 litres/minute.



Unit Per Pcs.

CODE	Flow rate	CODE	Flow rate
85 15 93 94	0.3 ltr/min 0.5 ltr/min	85 15 95	1.0 ltr/min

##### Demand Flow Regulators for 34 ltr, 58 ltr and 110 ltr

Special designed for gas detectors with built-in electric sample pump. Important gas is supplied at "Sample pump" normal working flow rate, hence ensures testing and calibration are similar to true operation conditions.



85 15 96	Regulator, demand flow, for 34 ltr, 58 ltr and 110 ltr	Pcs.
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#### Gas Sample Bags with Clip Valve

Sample bags are available too for use with fixed equipment or pumped instrument.



85 15 99	Gas sample bag with clip valve	Pcs.
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#### Mixtures Gases from Fastcalgas

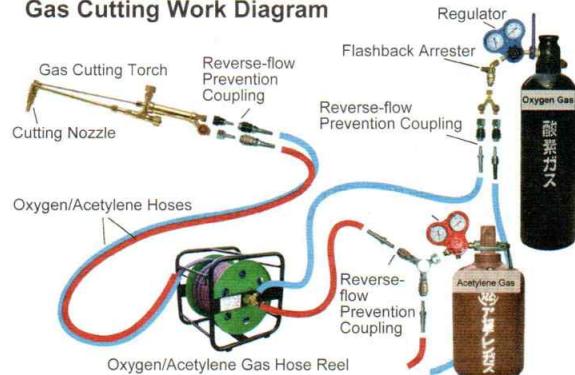
CODE	Gas Description	Fastcalgas No.	Unit Per Btl. Cylinder Size Ltr
<b>Ammonia (NH<sub>3</sub>)</b>			
85 17 01	25 ppm NH <sub>3</sub> /Air	FCG22000	58
<b>Butane (C<sub>4</sub>H<sub>10</sub>)</b>			
85 17 02	0.9% (50% LEL) C <sub>4</sub> H <sub>10</sub> / Air	FCG23000	103
03	0.9% (50% LEL) C <sub>4</sub> H <sub>10</sub> / N <sub>2</sub>	FCG23005	103
04	8% C <sub>4</sub> H <sub>10</sub> / N <sub>2</sub>	FCG23010	34
05	8% C <sub>4</sub> H <sub>10</sub> / N <sub>2</sub>	FCG23015	16
06	8% C <sub>4</sub> H <sub>10</sub> , 13.8% CO <sub>2</sub> /N <sub>2</sub>	FCG23020	34
07	8% C <sub>4</sub> H <sub>10</sub> , 13.8% CO <sub>2</sub> /N <sub>2</sub>	FCG23025	16
<b>Iso-Butane (C<sub>4</sub>H<sub>10</sub>)</b>			
85 17 08	0.9% (50% LEL) i-C <sub>4</sub> H <sub>10</sub> / Air	FCG24000	34
09	0.9% (50% LEL) i-C <sub>4</sub> H <sub>10</sub> / Air	FCG24010	103
10	10% i-C <sub>4</sub> H <sub>10</sub> / N <sub>2</sub>	FCG24005	34
11	10% i-C <sub>4</sub> H <sub>10</sub> / N <sub>2</sub>	FCG24060	18
<b>Carbon Dioxide (CO<sub>2</sub>)</b>			
85 17 12	1% CO <sub>2</sub> /Air	FCG25000	103
13	15% CO <sub>2</sub> /Air	FCG25005	103
14	15% CO <sub>2</sub> /N <sub>2</sub>	FCG25010	103
<b>Carbon Monoxide (CO)</b>			
85 17 15	50 ppm CO/Air	FCG26000	103
16	60 ppm CO/Air	FCG26005	103
17	100 ppm CO/N <sub>2</sub>	FCG26010	34
<b>Ethanol (C<sub>2</sub>H<sub>5</sub>OH)</b>			
85 17 18	191 ppm C <sub>2</sub> H <sub>5</sub> OH/N <sub>2</sub>	FCG33000	34
<b>Hydrogen Sulphide (H<sub>2</sub>S)</b>			
85 17 19	10 ppm H <sub>2</sub> S/N <sub>2</sub>	FCG27000	58
20	25 ppm H <sub>2</sub> S/N <sub>2</sub>	FCG27005	58
21	40 ppm H <sub>2</sub> S/N <sub>2</sub>	FCG27010	58
22	50 ppm H <sub>2</sub> S/N <sub>2</sub>	FCG27015	58
<b>Nitrogen (N<sub>2</sub>)</b>			
85 17 23	Nitrogen (99.99% v/v)	FCG28000	34
24	Nitrogen (99.99% v/v)	FCG28010	103
<b>Oxygen (O<sub>2</sub>)</b>			
85 17 25	2% O <sub>2</sub> /N <sub>2</sub>	FCG29000	103
26	5% O <sub>2</sub> /N <sub>2</sub>	FCG29005	103
27	10% O <sub>2</sub> /N <sub>2</sub>	FCG29010	103
<b>Methane (CH<sub>4</sub>)</b>			
85 17 28	2% (40% LEL) CH <sub>4</sub> /Air	FCG30000	34
29	2% (40% LEL) CH <sub>4</sub> /Air	FCG30110	103
30	2.5% (50% LEL) CH <sub>4</sub> /Air	FCG30005	34
31	2.5% (50% LEL) CH <sub>4</sub> /Air	FCG30125	103
32	1.45% CH <sub>4</sub> , 15% O <sub>2</sub> /N <sub>2</sub>	FCG30010	103
33	2.5% CH <sub>4</sub> , 17% O <sub>2</sub> /N <sub>2</sub>	FCG30015	34
34	2.5% CH <sub>4</sub> , 17% O <sub>2</sub> /N <sub>2</sub>	FCG30135	103
35	50% CH <sub>4</sub> /N <sub>2</sub>	FCG30020	34
<b>Pentane (C<sub>5</sub>H<sub>12</sub>)</b>			
85 17 36	0.75% (50% LEL) C <sub>5</sub> H <sub>12</sub> /Air	FCG31000	103
37	0.75% C <sub>5</sub> H <sub>12</sub> , 15% O <sub>2</sub> /N <sub>2</sub>	FCG31005	34
38	0.75% C <sub>5</sub> H <sub>12</sub> , 15% O <sub>2</sub> /N <sub>2</sub>	FCG31010	103
<b>Propane (C<sub>3</sub>H<sub>8</sub>)</b>			
85 17 39	0.55% (25% LEL) C <sub>3</sub> H <sub>8</sub> /Air	FCG32000	103
40	1.1% (50% LEL) C <sub>3</sub> H <sub>8</sub> /Air	FCG32005	103
<b>Zero Air</b>			
85 17 41	20.8% O <sub>2</sub> /N <sub>2</sub>	FCG29015	103
<b>Regulators</b>			
85 17 42	For use with 34 ltr steel cylinder	FCG00713	-
43	For use with 34 ltr, 58 ltr Aluminium cylinder and 103 ltr steel cylinder	FCG00715	-

#### 4 Gas Mixtures for Calibration from Fastcalgas

Unit Per Btl.

CODE	Composed of				Fastcalgas No.	Cylinder Size Ltr
	Methane (CH <sub>4</sub> )	Hydrogen Sulfide (H <sub>2</sub> S)	Carbon Monoxide (CO)	Oxygen / Nitrogen (O <sub>2</sub> /N <sub>2</sub> )		
85 17 46	1.45%	10 ppm	-	15%	FCG21000	58
47	1.45%	10 ppm	300 ppm	15%	FCG21005	58
48	1.45%	20 ppm	60 ppm	15%	FCG21020	58
49	2.2%	25 ppm	100 ppm	18%	FCG21045	34
50	2.2%	40 ppm	100 ppm	15%	FCG21055	34
85 17 51	2.5%	10 ppm	50 ppm	18%	FCG21010	58
52	2.5%	15 ppm	100 ppm	18%	FCG21015	58
53	2.5%	25 ppm	50 ppm	12%	FCG21030	58
54	2.5%	25 ppm	50 ppm	20.9%	FCG21035	58
55	2.5%	25 ppm	100 ppm	18%	FCG21050	58
85 17 56	2.5%	40 ppm	100 ppm	15%	FCG21060	34
57	Iso-butane (I-C <sub>4</sub> H <sub>10</sub> ) 0.9%	25 ppm	50 ppm	12%	FCG21025	34
58	Propane (C <sub>3</sub> H <sub>8</sub> ) 1.1%	25 ppm	100 ppm	19%	FCG21040	58

#### Gas Cutting Work Diagram



#### Oxygen & Acetylene Gas Cylinder Regulators

Reguladores de Oxígeno y Acetileno

酸素及アセチレン調整器 氧气及乙炔调节器

Single stage with easy to read 60 mm gauges. For general welding and cutting, these regulators feature greater flow and accuracy, more economy, simple repairs and greater safety.

Oxygen regulators have two types of male and female inlet threads.



Oxygen Regulator with Male Thread



Oxygen Regulator with Female Thread



Acetylene Regulator

#### How to order: CODE

Regulator, KIND of GAS, INLET THREAD mm

Unit Per Pcs.

CODE	For	Gauges (kgf/cm <sup>2</sup> )		Delivery Pressure kgf/cm <sup>2</sup>	Flow Capacity Nm <sup>3</sup> /h	Inlet Thread mm
		HP	LP			
85 01 91	Oxygen	250	25	10	72	22.8×14 Male
92	Oxygen	25	25	10	72	22 ×14 Female Clamp
93	Acetylene	25	1.9	0.7	9	

#### Adapters for Gas Cylinder Regulator

Adaptadores para regulador de bombona de gas

ガスシリンダーレギュレーター用アダプタ 气瓶调节器适配器

Adapters are also available to connect flashback arrestors or couplings in case the threads are not matched with gas cylinder regulators. Mainly used for oxygen cylinder regulators.



Nipple



Socket

85 01 90	Nipple for gas regulator, 22.8 x 14mm, male	Pc.
94	Socket for gas regulator, 22 x 14mm, female	

**There are different sizes of Oxygen and Acetylene Hose connecting nipples for the various regulators, cutting and welding torches manufactured in the world, so please pay attention to this matter when ordering.**

## Flashback Arresters for Gas Cylinder Regulators

Supresor de retroceso de llama para reguladores de cilindros de gas  
ガス調整器用逆火防止器 燃气调节阀用回火防止器

To be installed on Oxygen and Acetylene regulators for arresting the flashback.



For Oxygen



For Acetylene

Unit Per Set

CODE	85 03 11	85 03 12	Unit Per Pc.
For	Oxygen	Acetylene	
Model	G-1	G-2	
Flow Rate	25 m <sup>3</sup> /h	2 m <sup>3</sup> /h	
Inlet Thread	M16×1.5 (Right) with nut	M16×1.5(Left) with nut	
Outlet Thread	M16×1.5(Right) plug thread	M16×1.5(Left) plug thread	
Overall Length	90 mm		
Weight	250 grm		

CODE	Model	Welding Thickness Capacity mm	Overall Length mm	Weight grm	Nos. of Nozzle
85 02 01	WT-05	Up to 2.5	250	500	5 pcs.
	02	Up to 0.5	280	350	4 pcs.
	03	1.5 - 6.0	375	530	7 pcs.
	04	0.5 - 45.0	625	780	7 pcs.

There are different sizes of Oxygen and Acetylene Hose connecting nipples for the various regulators, cutting and welding torches manufactured in the world, so please pay attention to this matter when ordering.

## Valves for Gas Outlet Station

Válvulas para equipo de salida de gas

ガス集合装置取出レバーブル 气体集合装置排气阀

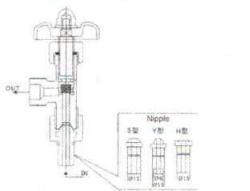
Valves for oxygen and acetylene gas outlet station.



For Oxygen



For Acetylene



Unit Per Pcs.

CODE	Inlet Connection		Outlet Thread Size	Direction of Plug Thread
	Type	Thread		
<b>For Oxygen</b>				
85 05 01	S	M18×1.5	3/4-16 UNF	Right
02			M16×1.5	
85 05 03	Y	PF3/8	3/4-16 UNF	Right
04			M16×1.5	
85 05 05	H	M18×1.5	3/4-16 UNF	Right
06			M16×1.5	
<b>For Acetylene</b>				
85 05 07	S	M18×1.5	3/4-16 UNF	Left
08			M16×1.5	
85 05 09	Y	PF3/8	3/4-16 UNF	Left
10			M16×1.5	
85 05 11	H	M18×1.5	3/4-16 UNF	Left
12			M16×1.5	

## Gas Welding Torches

with Nozzle Set

Sopletes de Soldadura Autógena ガス溶接器 气体焊枪和喷嘴全套

These welding torches, operate on medium or low pressured acetylene gas, are ideal for all welding and heating applications.



WT-05



WT-00



WT-02



WT-04

## Gas Welding Torch Spare Nozzles

Boquillas de Repuesto para Soplete de Soldadura Autógena

ガス溶接用火口 气焊枪备用喷嘴



Various types and sizes of interchangeable spare nozzles for respective models are available.

**How to order: CODE**

Spare nozzle for gas welding torch, NOZZLE NO., for MODEL NO.

Unit Per Pcs.

CODE	Nozzle No.	For Model No.	Thickness of Weldment Capacity mm
85 02 11	25	3	Under 0.5
	50		0.5 - 1.5
	75		1.5 - 2.0
	100		2.0 - 2.5
	150		2.5 - 4.0
85 02 16	50	S	Under 0.5
	70		0.5 - 1.0
	100		0.5 - 1.0
	140		1.0 - 1.5
	200		1.5 - 2.0
85 02 21	200	M	1.5 - 2.0
	225		2.0 - 2.5
	250		2.0 - 2.5
	315		2.5 - 3.5
	400		3.5 - 4.0
	450		4.0 - 5.0
	500		5.0 - 7.0
85 02 28	1	A1	0.5 - 1.0
	2		1.0 - 2.0
	3		2.0 - 3.0
	5		3.0 - 4.0
	7		4.0 - 7.0
85 02 33	10	A2	7 - 15
	13		7 - 15
	16		10 - 20
	20		15 - 25
	25		20 - 30
85 02 38	1,200	L	7 - 15
	1,500		10 - 20
	2,000		15 - 25
	2,500		20 - 30
	3,000		25 - 35
	3,500		40 - 40
	4,000		35 - 45

## Gas Cutting Torches

Sopletes de gas ガス切断器 气体割枪

Standard combination torches which operate on medium or low pressured acetylene gas and are designed for economy safety and convenience.



CT-01



CT-01K



CT-02



CT-02K

Unit Per Set

CODE	Model No.	Angle	Cutting Thickness Capacity mm	Overall Length mm	Weight grm	Nos. of Nozzle
85 02 51 53	CT-01	90°	1 - 30	450	625	3 pcs
	CT-01K	45°	1 - 30	450	650	3 pcs
85 02 52 54	CT-02	90°	1 - 100	500	795	3 pcs
	CT-02K	45°	1 - 100	500	785	3 pcs

There are different sizes of Oxygen and Acetylene Hose connecting nipples for the various regulators, cutting and welding torches manufactured in the world, so please pay attention to this matter when ordering.

## Gas Cutting Torch Spare Nozzles

Boquilla de Repuesto para Soplete de Oxicorte

ガス切断用火口 焊枪喷口

3 numbers of interchangeable spare nozzles for each model are available.



### How to order: CODE

Spare nozzle for gas cutting torch, for MODEL NO., NOZZLE NO.

CODE	For Model No.	Nozzle No.	Cutting Capacity mm	CODE	For Model No.	Nozzle No.	Cutting Capacity mm	Unit Per Pcs.
85 02 61 62 63	1	1	1- 5	85 02 64	2	1	1- 10	
		2	5-15	65		2	10- 50	
		3	15-30	66		3	50-100	

## Gas Welding & Cutting Torches

### With Nozzle Set

Soplete de gas para soldadura y corte

ガス溶接・切断両用器 气焊及气割两用器

For welding and cutting purpose with a single torch.



CTW-M



CTW-A

Unit Per Set

CODE	85 02 71	85 02 72
Model	CTW-M	CTW-A
Welding / Cutting Thickness mm	W: 2 - 6 C : 1 - 30	W: 2.5 - 12 C: 1 - 100
Overall Length mm	490	530
Weight grm	770	1,080
Nos. of Nozzles (Standard accessories)	W : 200/225/250/ 315/400/450/ 500, C : 1/2/3	W : 250/315/400/ 500/630/800/ 1000, C : 1/2/3

## Nozzle Cleaners

Escariador 火口掃除器 喷嘴清通针

For cleaning holes of welding torch nozzles. Made of stainless steel, sizes from 0.5 mm to 1.4 mm, 8 pcs/set.



85 02 80

Nozzle cleaner, 8 pcs/set

Set

## Welders' Gas Lighters

Encendedores de Gas para Soldadura

ガス溶接用ライター 焊枪点火器

Pistol and friction types are available.



Pistol Type



Friction Type

85 02 85 86	Welders' gas lighter, pistol type Welders' gas lighter, friction type	Pc. Pc.
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## Spare Flints for Gas Lighter

Pedernales de Repuesto para encendedor de Gas

ガス溶接ライター用発火石

气体打火机备用火石

Two kinds for use, both pistol type and friction type are available.



For Pistol Type

For Friction Type

CODE	For	Packed in	Unit
85 02 88 89	Pistol Type Friction Type	- 10s	Pc. Pkt

## Rubber Oxygen Hose

### Molded & Braided Construction

Manguera de Goma para Oxigeno 酸素ホース 橡胶氧气软管

For oxygen welding equipment. Lightweight, extremely flexible and practically non-kinkable. Furnished in blue colour to distinguish oxygen lines from acetylene lines.



Unit Per Mtr.

CODE	Nom. Size mm	Actura Size mm		Braid	Working Pressure kgf/cm²	Mtr Per Coil
		I.D.	O.D.			
35 01 16	6	6.5	15.5	2B	15	200
	17	8	16.5	2B	15	200
	18	9	18.0	2B	15	200

## Rubber Acetylene Hose

### Molded & Braided Construction

Manguera de Goma para Acetileno アセチレンホース 橡胶乙炔软管

For acetylene welding equipment. Lightweight, extremely flexible and practically non-kinkable. Furnished in red colour to be distinguished as an acetylene line.



Unit Per Mtr.

CODE	Nom. Size mm	Actura Size mm		Braid	Working Pressure kgf/cm²	Mtr Per Coil
		I.D.	O.D.			
35 01 21	6	6.5	13.5	1B	3	200
	22	8	15.5	1B	3	200
	23	9	16.5	1B	3	200

## Rubber Twin Welding Hose

### Molded & Braided Construction

Manguera Bitubo OX-AC 溶接用ツインホース

橡皮气焊管

One piece, two line welding hose, securely joined together to prevent tangling and increase flexibility. One line is red and the other is blue.



DAIDO S (OXY)

to facilitate the welding operation. Usually supplied in 100 mtr coils. This hose is lightweight and easy to move about, reducing operator fatigue to a minimum.

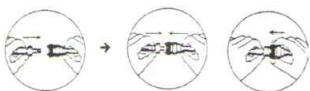
CODE	Nom. Size mm	Actura Size mm				Braid	W/P Kgf/cm <sup>2</sup>	Unit Per Mtr.			
		OX		AC				OX			
		I.D.	O.D.	I.D.	O.D.						
35 01 26	6 x 9	6.8	13.8	9.5	16.3	1	20	5			
27	8 x 8	7.9	14.9	7.9	14.7	1	20	5			
28	8 x 9	7.9	14.9	9.5	16.3	1	20	5			

## Automatic Reverse-flow Prevention Couplings

Acoplos Automáticos Antirretorno

自動逆流防止継手 自动防回流接头（插座）

These couplings are fitted to the outlet pipe, connecting hose, and the welding/cutting machine and outfit, removing possible risks accompanying the gas welding/cutting operation and making preparation and maintenance of the welding/cutting machines easy.



Further, each type is specially designed for oxygen or fuel gas so as to prevent mistakes.

A spring-loaded locking method is used, fitting or removal is a single action, which minimizes hose damage and makes maintenance easy.

### For Hose to Hose Connections

Gas	Size	Socket, Hose End	Plug, Hose End
Oxygen	1/4" Hose End		
		AV-1	AP-1
Acetylene	3/8" Hose End		
		AV-2	AP-2

### For Gauge to Hose Connections

Gas	Size	Socket, Female Thread	Plug, Hose End
Oxygen	M16 x P1.5 & 1/4" Hose End		
		GV-1	AP-1
Acetylene	M16 x P1.5 & 3/8" Hose End		
		GV-2	AP-2

### For Welding Machine/Cutting Machine to Hose Connections

Gas	Size	Socket, Hose End	Plug, Female Thread
Oxygen	1/4" Hose End & M16 x P1.5		
		AV-1	OP-1
Acetylene	3/8" Hose End & M16 x P1.5		
		AV-2	OP-2

**How to order: CODE  
SOCKET or PLUG, MODEL NO.**

CODE	Model	Type	Size	Unit Per Pcs.
85 03 01	AV-1	Socket	1/4" Hose End	OX
	02	Plug	1/4" Hose End	OX
	03	Socket	M16 x P1.5 Female Thread	OX
	04	Plug	M16 x P1.5 Female Thread	OX
85 03 06	AV-2	Socket	3/8" Hose End	AC
	07	Plug	3/8" Hose End	AC
	08	Socket	M16 x P1.5 Female Thread	AC
	09	Plug	M16 x P1.5 Female Thread	AC

## Quick Couplers for Welding Equipment Piping

Acoplamiento Rápido para Tubería del Equipo de Soldadura  
溶断機器配管用クイックカップラー 焊接备用快速联接器

Especifically for welding equipment piping with excellent durability and corrosion resistance. All piping connections from cylinder to torch can be associated with welding equipment by one-touch operations. Body is chrome plated for better corrosion resistance, and plug is hardened for better durability. Oxygen and fuel gas fittings are different sizes and sleeves are given different colours, chrome plating for oxygen and copper plating for fuel gas, to prevent accidental interconnection. No oxygen types (1/4" and 5/16") can be connected to fuel gas types (5/16" and 3/8"). However, respective types of the connection, oxygen plugs and sockets are interchangeable and fuel gas plugs and sockets are interchangeable.

### Specification

Body Material	Socket: Brass (Chrome-plated), Plug: Steel (Chrome-plated)
Size	1/4", 5/16", 3/8"
Working Pressure MPa (kgf/cm <sup>2</sup> )	0.7 (7)
Pressure Resistance MPa (kgf/cm <sup>2</sup> )	1.0 (10)
Packing Material	NBR (Nitrile Butadiene Rubber)
Working Temperature Range	-20°C - +80°C

### Max. Tightening Torque

Product Code	S22PF, S22SF S33PF, S33SF	S22SM	S33SM
Torque N·m (kgf·cm)	12 (122)	9 (92)	1 (112)

### Hose End Plugs and Sockets



Unit Per Pcs.

CODE	Part No.	Usage for	Application	Weight grm
Plugs				
85 03 61	S22PH	Oxygen	1/4", 5/16" hose	17
62	S33PH	Fuel gas	5/16", 3/8" hose	22
Sockets				
85 03 63	S22SH	Oxygen	1/4", 5/16" hose	50
64	S33SH	Fuel gas	5/16", 3/8" hose	73

### Small Diameter Hose End Plugs and Sockets



CODE	Part No.	Usage for	Application	Weight grm	Unit Per Pcs.
<b>Plugs</b>					
85 03 65	S225PH	Oxygen	5mm I.D. hose	12	
66	S335PH	Fuel gas	5mm I.D. hose	15	
<b>Sockets</b>					
85 03 67	S225SH	Oxygen	5mm I.D. hose	54	
68	S335SH	Fuel gas	5mm I.D. hose	65	

### Female Threaded End Plugs and Sockets



Unit Per Pcs.

CODE	Part No.	Usage for	Application	Weight grm	Unit Per Pcs.
<b>Plugs (For Torch Connection)</b>					
85 03 71	S22PF	Oxygen torch	M16 x 1.5	35	
72	S33PF	Fuel gas torch	M16 x 1.5 left	32	
<b>Sockets (For Cylinder Connection)</b>					
85 03 73	S225SH	Oxygen gauge	M16 x 1.5	74	
74	S335SH	Fuel gas gauge	M16 x 1.5 left	97	

### Flared Hose End Plugs and Sockets



Unit Per Pcs.

CODE	Part No.	Usage for	Application	Weight grm	Unit Per Pcs.
<b>Plugs</b>					
85 03 75	S22PN	Oxygen	5mm I.D. x 11mm hose	54	
76	S33PN	Fuel gas	5mm I.D. x 11mm hose	57	
<b>Sockets</b>					
85 03 77	S22SN	Oxygen	5mm I.D. x 11mm hose	74	
78	S33SN	Fuel gas	5mm I.D. x 11mm hose	91	

### Male Threaded End Sockets



Unit Per Pcs.

CODE	Part No.	Usage for	Application	Weight grm	Unit Per Pcs.
<b>Sockets</b>					
85 03 81	S22SM	Oxygen	Rc 1/4 (PT 1/4)	58	
82	S33SM	Fuel gas	Rc 3/8 (PT 3/8)	85	

### Charging Adapters

#### for Refrigerant Gas Cylinder Valve

Adaptadores de recarga para válvula de gas refrigerante

フロンガスバルブ用チャージングアダプター

氟利昂气罐阀用充气器

Valve adapter for refrigerant gas cylinder valve.



Unit Per Pcs.

CODE	Connection to Cylinder	Connection to Hose	For Refrigerant Gas	Unit Per Pcs.
85 03 15 16	W26-14 teeth	1/4 Flare 3/8 Flare	R-22	
85 03 17	W26-14 teeth	1/4 Flare	HFC-134a, R-404A and R-407C	

### Refrigerant Gas Charging Hoses

Magueras para Carga de Gas Refrigerante

フレオングassチャージホース 冷冻气补充软管



Flexible rubber lines with threaded quick coupling for charging refrigerant gas.

Colour coded for easy identification.

Unit Per Lgh.

CODE	Colour	Fitting Size	Length	For Gas
85 03 21 22	Red	1/4"	92 cm 150 cm	R-22
85 03 23 24		3/8"	92 cm 150 cm	
85 03 25 26		1/4"	92 cm 150 cm	
85 03 27 28		3/8"	92 cm 150 cm	
85 03 31 32	Blue	1/4"	92 cm 150 cm	HFC-134a R-404A R-407C
85 03 33 34		3/8"	92 cm 150 cm	
85 03 36 37		1/4"	92 cm 150 cm	
85 03 38 39		1/4"	92 cm 150 cm	
40 41	Yellow	3/8"	92 cm 150 cm	
85 03 42 43		1/4"	92 cm 150 cm	

### Gauge Manifolds

Múltiples con indicadores ゲージマニホールド 歧管压力表

Two way standard manifold for refrigerant gas with bourdon type gauges and hook.



Component:

For R-22	For HFC-134a, R-404A, R-407C
One each Charging hose 92 cm (Red/Yellow/Blue)	One each Charging hose 92 cm (Red/Yellow/Blue)
One each Charging hose 150 cm (Red/Yellow/Blue)	One each Charging hose 150 cm (Red/Yellow/Blue)
One of Pressure gauge -0.1 – 3.5 MPa	One of Pressure gauge -0.1 – 3.8 MPa
One of Compound gauge -0.1 – 1.5 MPa	One of Compound gauge -0.1 – 1.8 MPa

Unit Per Set

CODE	For Refrigerant gas	Connection Port
85 03 45	R-22	
46	HFC-134a, R-404A, R-407C	1/4 Flare

### Gas Welding Rods

Varillas para Soldadura Autógena ガス溶接棒 气焊条

Uncoated gas welding rod of high quality. Each rod is made for a specific use and its quality and uniformity are constantly checked when manufactured.

**How to order: CODE**

Gas welding rod, KIND of MATERIAL, DIAM mm

CODE	Diam. mm	Length mm	CODE	Diam. mm	Length mm	Unit Per Kgs.
<b>Mild Steel</b>						
85 04 01	1.2		85 04 05	3.2		
02	1.6		06	4.0		
03	2.0	1,000	07	5.0		1,000
04	2.6					
<b>Copper and Copper Alloy (Brass)</b>						
85 04 11	1.2		85 04 15	3.2		
12	1.6		16	4.0		
13	2.0	1,000	17	5.0		1,000
14	2.6					
<b>Cast Iron</b>						
85 04 25	4.0	1,000	85 04 27	6.0		1,000
26	5.0					
<b>Silver 18%</b>						
85 04 28	1.6	500	85 04 30	3.2		500
29	2.0					
<b>Silver 30%</b>						
85 04 34	1.6	500	85 04 38	3.2		500
35	2.0					
<b>Silver 50%</b>						
85 04 39	1.6	500	85 04 41	3.2		500
40	2.0					

## Coated Brass Brazing Filler Metal

Varilla para Soldar, Latón Recubierto 被覆黃銅ろう付棒 铜焊条

This is a machine coated, wire drawn brass rod, made from special elements. These coated filler rods have the advantages of low flaming, fine deposits, increased tensile strength, easy and speedy operations.



Characteristic of Deposit Metal

Tensile Strength for All Deposit	36 - 43 kgf/cm <sup>2</sup>
Elongation (7d)	24 - 32%
Impact Strength	5-6 kgf/cm <sup>2</sup>
Hardness	90 - 95 HB
Sticking Strength on Steel	30 - 40 kgf/cm <sup>2</sup>
Sticking Strength on	Equal or up to Mother Metal

### Applications:

Repair of cast iron assemblies, welding of dissimilar metals (steel and iron, copper and brass, iron and copper, etc.) assembly of steel plate and steel sheets.

CODE	Rod Diam. mm	Rod Length mm	Number of rod per Package	Weight Per Package	Unit Per Pkt.
85 04 51	2.0		177		
52	2.6		107		
53	3.0		80		
54	4.0		46		
55	5.0		30		
		1,000		5 Kg	

## Flux Coated Silver Solder

Varilla para Soldar, Plata Recubierta フラックス付銀ろう 银焊条

Flux coated silver brazing type alloy for joining all ferrous and copper metals, stainless steel, nickel and its alloys, steel castings, malleable and cast iron, tungsten carbides, etc. Suitable for most close-fitting joint designs, rapid application with minimum joint preparation. It is cadmium free, has high fluidity with good capillary flow.



Specifications	
Main Component	Ag (30%), Cu, Zn, Sn
Melting Temp. C	620° - 650°
Tensile Strength	60 kg/mm <sup>2</sup>
Hardness	B 95
Wire Length	450 mm
Package	500 grm/pkt

Unit Per Pkt.			
CODE	Diam. mm	Length mm	Weight Per Package
85 04 61	1.6		
62	2.0		
63	2.4		
		450	500 grm

## Welding Fluxes

Fundentes para Soldadura Autógena ガス溶接剤 气焊粉

Several kinds of fluxes are available and the standard ones are listed below. They are all used for gas welding.

CODE	Purpose	Content	Unit Per Can
85 04 81	For Cast Iron Welding	1 kg	
82	For Copper Welding	1 kg	
83	For Brass Welding	1 kg	
85 04 85	For Dissimilar Metal Soldering	1 kg	
85 04 86	For Aluminium Welding	0.1 kg	
87	For Silver Soldering	0.4 kg	

## Electrodes

Electrodos 電気溶接棒 电焊条(低碳钢)

A wide variety of brands from different manufacturers are available. Popular brands are listed below. When ordering, please specify brand and size.



If you wish to order electrodes from a specific manufacturer, please refer to the comparison table listing major international manufacturers and products types on page 85-16 ~ 18.

### How to order: CODE

Electrode, APPLICATION, BRAND, SIZE mm, WEIGHT

## Nittetsu Products

CODE	Brand	Size mm		Kg per Packet	Features	Unit Per Pkt.
		D	L			
<b>For Mild Steel</b>						
85 06 01	A-200	2.6	350	5.0	Ilmenite type electrode for all positions welding of mild steel. Flat and horizontal fillet welding assures extraordinary bead appearance.	
		3.2	350			
		4.0	400			
		4.5	450			
	B-1	5.0	450			
		6.0	450			
85 06 11	G-300	2.6	300	5.0	Ilmenite type electrode for all positions and has good operational characteristics and weldability. Vertical upward welding is especially easy.	
		3.2	400			
		4.0	450			
		4.5	450			
		5.0	450			
		6.0	450			
		7.0	450			
		8.0	450			
85 06 21	NS-03Hi	2.0	300	5.0	Lime-titania type electrode assuring high efficiency in welding complicated structure of thin and medium thick plates. It produces a small amount of fumes and is highly resistant to moisture absorption.	
		2.6	350			
		3.2	350			
		4.0	450			
		5.0	450			
		6.0	450			

(to be continued)

CODE	Brand	Size mm		Kg per Packet	Features	Unit Per Pkt			
		D	L						
85 06 31	S-03Z	2.0	300	5.0	Lime-titania type electrode for all positions, containing a large amount of iron powder in the coating. It can promote efficiency in welding general structures and light gauges.	85 07 51	2.6	300	2.5
32		2.6	350			52	3.2	350	
33		3.2	350			53	4.0	350	
34		4.0	400			54	5.0	350	5.0
35		5.0	450						
36		6.0	450						
85 06 51	S-13Z	2.0	300	5.0	High rutile type electrode which gives beautiful bead appearance with shallow penetration. Arc is calm, spatter is minimal and slag is easy to remove. Vertical downward welding is possible with small diameter electrodes.	85 07 61	2.0	250	2.5
52		2.6	350			62	2.6	300	
53		3.2	350			63	3.2	350	
54		4.0	400			64	4.0	350	
55		5.0	400			65	5.0	350	5.0
56		6.0	450						
85 06 61	FT-51	2.0	250	2.5	High rutile type electrode which gives beautiful bead with shallow penetration. Small diameter electrodes assure easy operation in vertical downward welding. It is especially suitable for weldings sheet steels.	85 07 71	2.0	250	2.5
62		2.6	300			72	2.6	300	
63		3.2	350			73	3.2	350	
64		4.0	400			74	4.0	350	5.0
65		5.0	400			75	5.0	350	
66		6.0	400						
85 06 71	16	2.6	300	5.0	Low hydrogen type electrode for all positions. The deposited metal from this electrode shows higher crack resistance, elongation and ductility than the other electrodes for mild steel.	85 07 91	2.6	300	
72		3.2	400			92	3.2	350	
73		4.0	450			93	4.0	400	5.0
74		5.0	450			94	5.0	400	
75		6.0	450			95	6.0	400	
76		8.0	450						
85 06 81	16V	3.2	400	5.0	Low hydrogen type electrode for vertical downward butt and fillet welding of mild steel. The deposited metal from this electrode shows high crack-resistability as well as excellent mechanical properties.	85 08 01	2.6	300	
82		4.0	450			02	3.2	350	
83		4.5	450			03	4.0	400	5.0
84		5.0	450			04	5.0	400	
85		5.5	450			05	6.0	400	
86		6.0	450						
<b>For High Tensile Strength Steel</b>									
85 07 01	L-55	2.6	300	5.0	Low hydrogen type electrode designed for all positions welding of 50-55 kg/mm <sup>2</sup> high tensile strength steel. The deposited metal contains less hydrogen, and shows high crack resistance as well as excellent mechanical properties. X-ray quality and notch-toughness.	85 07 91	2.6	300	
02		3.2	400			92	3.2	350	
03		4.0	450			93	4.0	400	5.0
04		5.0	450			94	5.0	400	
05		6.0	450			95	6.0	400	
06		7.0	450						
07		8.0	450						
<b>For Weathering Steel</b>									
85 07 21	CT-16Cr	2.6	300	5.0	Low hydrogen type electrode for welding 50 kg/ mm <sup>2</sup> high tensile weathering steel in all positions.	85 08 21	4.0		
22		3.2	350			22	5.0	350	5.0
23		4.0	400			23	6.0		
24		5.0	400						
25		6.0	450						
<b>For Cast Iron</b>									
85 07 31	C-1N	3.2	340	2.0	Graphite type electrode with pure nickel core wire for welding cast iron. Weld metal is not so hard and is easy to machine.	85 08 26	4.0	400	
32		4.0	380			27	5.0	400	5.0
33		5.0	380			28	6.0	450	
85 07 36	C-5N	3.2	350	2.0	Graphite type electrode for welding cast iron. Since Fe-Ni composite wire is used for the core wire, operational characteristics do not change even in high current.	29	7.0	450	
37		4.0	350						
38		5.0	350						
<b>For Stainless Steel</b>									
85 07 41	309-R	2.0	250	2.5	Lime-titania type electrode which gives the deposited metal of 25%Cr-12%Ni.	85 08 31	4.0	350	
42		2.6	300			32	5.0	350	5.0
43		3.2	350			33	6.0		
44		4.0	350						
45		5.0	350						

(to be continued)

85 07 51	309-M-R	2.6	300	2.5	Lime-titania type electrode which gives the deposited metal of 25%Cr-12%Ni-2%Mo. It has excellent crack resistance especially in the welding of dissimilar metals such as stainless steel to mild steel.
52		3.2	350		
53		4.0	350		
54		5.0	350	5.0	
85 07 61	310-R	2.0	250	2.5	Lime-titania type electrode which gives the deposited metal of 25% Cr-20% Ni. The deposited metal has perfect austenite structure and shows better corrosion resistance and oxidation resistance than the one from 25% Cr-12% Ni type electrode.
62		2.6	300		
63		3.2	350		
64		4.0	350		
65		5.0	350	5.0	
85 07 71	316-L-R	2.0	250	2.5	Lime-titania type electrode which gives the deposited metal of 18% Cr-12% Ni-2%MO. It has excellent resistance to intercrystalline corrosion in the as-welded condition.
72		2.6	300		
73		3.2	350		
74		4.0	350	5.0	
75		5.0	350		
<b>For Heat Resistant Steel</b>					
85 07 91	N-OS	2.6	300		Low hydrogen type 0.5% Mo electrode for welding C - Mo steel to be used in temperatures up to 500oC.
92		3.2	350		
93		4.0	400	5.0	
94		5.0	400		
95		6.0	400		
85 08 01	N-1S	2.6	300		Low hydrogen type 1.25% Cr-0.5% Mo electrode for welding 1-1.5%Cr-0.5% Mo steel to be used in high temperatures around 550oC.
02		3.2	350		
03		4.0	400	5.0	
04		5.0	400		
05		6.0	400		
85 08 11	N-2S	2.6	300		Low hydrogen type 2.25% Cr-1% Mo electrode for welding 2.25% Cr-1% Mo steel to be used in high temperatures around 600oC.
12		3.2	350		
13		4.0	400	5.0	
14		5.0	400		
15		6.0	400		
<b>For Hardfacing</b>					
85 08 21	H-Mcr	4.0			Low hydrogen type electrode for building up and hardsurfacing of steel parts subjected to high temperature abrasion and heavy impact abrasion.
22		5.0	350	5.0	
23		6.0			
85 08 26	H-350C	4.0	400		Low hydrogen type electrode for building up and hardsurfacing of steel parts subjected to light metal-to-metal abrasion.
27		5.0	400	5.0	
28		6.0	450		
29		7.0	450		
85 08 31	H-13M	4.0			Low hydrogen type electrode for building up and hardsurfacing of steel parts subjected to abrasion accompanied with severe impact.
32		5.0	400	5.0	
33		6.0			
<b>For Nickel, Nickel-Alloys and Nickel-Alloy Steels</b>					
85 08 36	Yawata Weld 182AC	2.6	300	2.5	Excellent crack-resistance due to much amount of Mn content in the deposited metal makes the electrode suitable for welding of extremely thick plates and for hardfacing of plates for use in nuclear power plants,etc.
37		3.2	300		
38		4.0	350		
39		5.0	350	5.0	

**Kobe Steel Products (Shinko)**

Unit Per Pkt

CODE	Brand	Size mm D L	Kg per Packet	Features
<b>For Mild Steel (Shielded Metal Arc Welding)</b>				
85 13 01		2.0 300	2.0	Low fume type electrode for welding of mild steel used for vehicles, light gauge structures and buildings.
02	Familiark	2.6 350		
03	Z-44	3.2 350	5.0	
04		4.0 450		
<b>For All-position Welding of General Structures</b>				
85 13 05		2.6 350		Ilmenite type covered electrode for butt or fillet welding in all positions for thin or thicker plate(1.6 to 20mm).
06	B-10	3.2 350	5.0	
07		4.0 400		
<b>For All-position Welding of Heavy-duty Structures</b>				
85 13 11		2.6 350		Ilmenite type covered electrode for butt or fillet welding in all positions for thin- or thicker plate(1.6 to 20mm).
12	B-14	3.2 400	5.0	
13		4.0 450		
85 13 15		2.6 350		Ilmenite type covered electrode. Structural steels with heavy sections up to about 25mm can be welded.
16	B-17	3.2 350	5.0	
17		4.0 400		
<b>For Welding of Steel Sheets and Light Structures</b>				
85 13 21		2.0 300	2.0	
22	B-33	2.6 350		High titania type covered electrode, suitable for in flat or horizontal fillet welding.
23		3.2 350	5.0	
24		4.0 400		
85 13 25		1.6 250	2.0	
26	RB-26	2.0 300		High titania type covered electrode, suitable for vertical downward welding with the diameters up to 5.0mm.
27		2.6 350	5.0	
28		3.2 350		
29		4.0 400		
<b>For Welding of Heavy-duty Structures and Heavy Plates</b>				
85 13 31		2.0 300	2.0	
32	LB-26	2.6 350		Low hydrogen type covered electrode containing iron powder. The welding in all positions can be easily done.
33		3.2 350	5.0	
34		4.0 400		
<b>For Vertical Downward Welding</b>				
85 13 35	LB	3.2 400	5.0	
36	-26V	4.0 450		Low hydrogen type covered electrode for use in vertical downward position for ships.
<b>For Welding of 50kgf/mm<sup>2</sup> High Tensile Steel</b>				
85 13 41		2.6 350		
42	LB-52	3.2 350	5.0	Most widely used low hydrogen type covered electrode for all-position welding.
43		4.0 400		
<b>For Welding of General Mild Steel</b>				
85 13 52		2.6 350		
53	TB-24	3.2 350	5.0	Lime-titania type electrode, and excellent in all-position welding, particularly in vertical and overhead positions.
54		4.0 400		
<b>For Welding of Mild Steel</b>				
85 13 55	TBI	2.6 350		
56	-24	3.2 350	5.0	Iron powder lime-titania type electrode for mild steel.
57		4.0 400		
<b>For Welding of Cast Iron</b>				
85 13 61	CIA-1	3.2 300	2.0	Covered electrode with graphite type coating flux and pure nickel core rod.
62		4.0 350		
85 13 65	CIA-2	2.6 300	2.0	Covered electrode with graphite type coating flux and 55% Ni-Fe alloy core rod.
66		3.2 300		
67		4.0 350		
<b>For Stainless Steel (SUS-304)</b>				
85 13 71		2.0 250	2.0	Lime-titania type electrodes, especially excellent with better crack resistibility.
72	NC-38	2.6 300		
73		3.2 350	5.0	
74		4.0 350		

(to be continued)

**For Stainless Steel (SUS-309S)**

85 13 75		2.0	250	2.0	Lime-titania type electrodes, providing good corrosion resistibility and good heat resistibility.
76	NC-39	2.6	300		
77		3.2	350	5.0	
78		4.0	350		

**For Stainless Steel (SUS-310S)**

85 13 82		2.6	250	2.0	Excellent in heat resistance, corrosion resistance and mechanical properties due to stable full-austenitic microstructure.
83	NC-30	3.2	300	5.0	
84		4.0	350		

**For Stainless Steel (SUS-316L)**

85 13 85		2.0	250	2.0	Lime-titania type electrodes and the intergranular corrosion resistibility is superior due to lower carbon content.
86	NC-36L	2.6	300	5.0	
87		3.2	350		
88		4.0	350		

**For Welding of 1.25%Cr-0.5%Mo Steel**

85 13 91		2.6	300	5.0	Low hydrogen type electrodes for all-position welding and the alloy elements are supplied from the core rod.
92	CMA	3.2	350		
93	-96	4.0	400		

**For Mild Steel and 50 kgf/mm<sup>2</sup> HT Steel (Tig Welding)**

85 14 01		1.6		5.0	For welding of mild steel, 50 kgf/mm <sup>2</sup> high tensile steel, and aluminium-killed steel for low temperature use.
02	TG	2.0			
03	-S50	2.4	1,000	5.0	

**For Stainless Steel (Tig Welding)**

85 14 05		1.6		5.0	For welding of 18%Cr-8%Ni stainless steel (SUS-304).
06	TGS	2.0	1,000	5.0	
07	-308	2.4			
08		3.2			

**Atlantic Products**

Unit Per Pkt

CODE	Brand	Size mm D L	Kg per Packet	Features
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**For Mild Steel**

85 16 01	CHE	2.5	300	5 kg/pkt	Titanium calcium carbon steel electrode, alternating current /direct-current, can be used to weld common carbon steel structure and low-intensity alloy steel.
02	422	3.2	350		
03		4.0	350		

85 16 05	CHE	2.5	300	5 kg/pkt	Low Hydro-potassium coating electrode, with good plasticity, toughness and crack resistance, can be used to weld carbon steel and low-intensity alloy steel, marine steel (grade A, B, D, E), main structures of cars, buildings and bridges.
06	506	3.2	350		
07		4.0	400		
08		5.0	400		
09		5.8	400		

**For 50 kgf/mm<sup>2</sup> High Tensile Strength Steel**

85 16 11	CHE	2.5	300	5 kg/pkt	Iron powder low hydro-potassium coating electrode, alternating current / direct-current, with good plasticity, toughness and crack resistance, can be used to weld carbon steel and low-intensity alloy steel, important structures in marine steel (grade A, B, D, E).
12	508	3.2	350		
13		4.0	400		
14		5.0	400		

(to be continued)

CODE	Brand	Size mm		Kg per Packet	Features	Unit Per Pkt
		D	L			
<b>For Atmospheric Corrosion Resisting Steel</b>						
85 16 15	CHE	3.2	350	5 kg/pkt	Ultra-low Hydro-potassium coating low-intensity alloy steel electrode, alternating current / direct-current, can be used to weld important production platforms, ships and high pressure vessels in carbon steel and low alloy steel.	
16	506	4.0	400			
17	NilH	5.0	400			
<b>For Cast Steel</b>						
85 16 21	CHC	2.5	290	1 kg/pkt	Pure nickel core welding-wire graphite coating cast iron electrode, alternating current / direct-current, can be used to weld thin cast iron units such as cylinder heads, engine bearer gear cases.	
22	308	3.2	340			
23		4.0	340			
85 16 25	CHC	2.5	290	1 kg/pkt	Ferro-nickel core welding-wire strong reducing property graphite coating cast iron electrode, with high strength, good plasticity and low coefficient of linear expansion, can be used weld high strength cast irons such as cylinders, engine bearers, gears.	
26	408	3.2	340			
27		4.0	340			
<b>For Stainless Steel</b>						
85 16 31	CHS	2.0	300	2 kg/pkt	Titanium calcium stainless steel electrode, containing molybdenum, with good corrosion resistance, crack resistance, resistance to oxidation, alternating current/direct-current, can be used to weld s.s. containers.	
32		2.5	300			
33		3.2	350			
34		4.0	400			
35		5.0	400			
85 16 36	CHS	2.0	250	2 kg/pkt	Titanium calcium austenitic stainless steel electrode, has good resistance to oxidation in 900-1,100°C high temperature, alternating current / direct-current, can be used to weld resist heat stainless steel.	
37		2.5	250			
38		3.2	300			
39		4.0	350			
40		5.0	350			
85 16 41	(CHS 022R)	2.0	300	2 kg/pkt	Titanium calcium ultra-low carbon stainless steel electrode, carbon content≤0.04%, with good corrosion resistance, crack resistance, heat resistance, alternating current /direct-current, can be used to weld area , synthetic fibre and stainless steel.	
42		2.5	300			
43		3.2	350			
44		4.0	400			
45		5.0	400			
85 16 46	CHH	2.5	300	5 kg/pkt	Iron powder Low Hydro-potassium low alloy electrode, alternating current/direct-current, can be used to weld low alloy steel in 1% chromium and 0.5% molybdenum below 510°C.	
47		3.2	350			
48		4.0	400			
49		5.0	400			
<b>For Hardfacing</b>						
85 16 51	CHS	4.0	400	2 kg/pkt	Titanium calcium stainless steel electrode, containing 40% iron, alternating current/direct-current, can be used to weld high carbon steel, tool steel and heterogeneity metal.	
52	29.9	5.0	400			

(to be continued)

**For Nickel, Nickel-alloy and Nickel-alloy Steel**

85 16 55	CHN	3.2	300	2 kg/pkt	Low Hydr-Ni70Cr15 heat resisting alloy electrode, containing a little manganese niobium alloy element, having good crack resistance, reversed polarity direct current, can be use to weld nickel-base alloy, heterogeneity steel.
56	337	4.0	350		

**Storage Containers for Welding Rod**Recipientes para guardar varillas para soldadura  
溶接棒用筒型コンテナ 焊条保管筒

A waterproof yellow coloured storage containers for welding rods of 350 mm or 450 mm with carrying strap. A diamond shape to prevent the canister from rolling off a work surface. The cap is sealed with a pressure fitted O-ring to prevent intrusion of moisture and contaminants.

Unit Per Pk.

CODE	Rod Length mm	CODE	Rod Length mm
85 16 57	350	85 16 58	450

**Ovens for Welding Rod**Hornos para varillas para soldadura  
溶接棒乾燥用オーブン 焊条烘干箱

A portable ovens ensure electrodes remain moisture-free in the field and meet welding code requirements. The ovens include a thermostat to adjust oven temperature in line with electrode requirements. The Type 5 is available with wheels and a pull handle or with carry handles.

- Storage capacity for 14" or 18" electrodes.
- Rod elevator for quick removal of electrodes.
- Adjustable thermostat provides temperature (from 38-149°C) control in the field.
- Safety Yellow colour increases field visibility.
- New 120/240V dual volt heating elements.

## Standards :

EN60335-1:1994 (A1 and A2 and A11 through A16 included)  
EN60335-2-45:96; I EC60335-1,A2:99 (EN60335-1,A2:00)  
EN55014-1/02.97+A1/1997+A2/1999

EN61000-3-2/04.95+A104.98+A14/2000

EN61000-3-3/01.95

Protection class I - IPX 0

Unit Per Set

CODE	Type	Storage Capacity
85 16 59	2	10 kg
60	5	25 kg

**Electrode Conversion Table**

Products from a few manufacturers are listed in the next page for your reference. If there is some question as to what types are most suitable, please ask for further information or brochures from the local manufacturers when ordering.

When ordering electrodes, the following information will be required:

1. The composition on the metals to be connected.
2. The type of joints being welded.
3. The position of welding.
4. The type of welding power source available.
5. The requirements of the welded joint, strength, appearance, corrosion resistance, the way the weld assembly will be used.
6. The types and, to some extent, the sizes of electrodes.
7. CODE NO.
8. Type
9. Manufacturer's name and product type.
10. Required quantity in kg.

CODE	Type	Wilhelmsen Ships Service (Norway)	Drew Marine (U.S.A)	Marichem-Marigases (Greece)	Shinko (Japan)	Nittetsu (Japan)	Atlantic (China)
<b>For Mild Steel (For All Positions)</b>							
85 09 01	Ilmenite	GPO-302N (AWS A5.1: E6013) EN-ISO 2560-A: E38ORC11 DNV-GL:2 LR:2 BV:2 ABS:2	AMERARC EO (Note: this is a E6012 electrode not 6013, and the Wilhelmsen GPO is the same)-	MGPO (AWS: E6013 (DIN: E4321R3 EN: E35AR12	<b>85 13 05 - 07</b> B-10(JIS Z-3211 E4319) (AWS A5.1 E6019)	<b>85 06 01</b> A-200(JIS Z-3211 E4319) (AWS A5.1 E6019)	<b>85 16 01 - 03</b> CHE422
					<b>85 13 11 - 13</b> B-14(JIS Z-3211 E4319) (AWS A5.1 E6019)	<b>85 06 02 - 06</b> B-1(JIS Z-3211 E4319) (AWS A5.1 E6019)	-
					<b>85 13 15 - 17</b> B-17(JIS Z-3211 E4319)	<b>85 06 11 - 18</b> G-300(JIS Z-3211 E4319) (AWS A5.1 E6019)	-
85 09 05	High Rutile	GPO-302N (AWS A5.1: E6013) EN-ISO 2560-A: E38ORC11 DNV-GL:2 LR:2 BV:2 ABS:2	AMERARC ER PLUS (AWS A5.1 E6013) (DIN E51 21 RR3) (ISO E51 2 RR32) (BS E213)	MGPO (AWS: E6013 (DIN: E4321R3 EN: E35AR12	<b>85 13 21 - 24</b> B-33(JIS Z-3211 E4313) (AWS A5.1 E6013)	<b>85 06 51 - 56</b> S-13Z(JIS Z-3211 E4313) (AWS A5.1 E6013)	-
			Note: we do not use ER Plus any longer		<b>85 13 25 - 29</b> RB-26(JIS Z-3211 E4313) (AWS A5.1 E6013)	<b>85 06 61 - 66</b> FT-51(JIS Z-3211 E4313) (AWS A5.1 E6013)	-
85 09 11	Low Hydrogen	LH-314N (AWS E-7018) EN-ISO 2560-A: E42 4 B 42 H5 DNV-GL: 3YH5 LR: 3YH5 BV: 3, 3YH5 ABS: 3YH5, 3Y	Amerarc EO	MSPECIAL (AWS: E7016) (DIN: E5143 B (R) 10) (EN: E38 B12 H10)	<b>85 13 31 - 34</b> LB-26(JIS Z-3211 E4316) (AWS A5.1 E7016)	<b>85 06 71 - 76</b> Nittetsu-16 (JIS Z-3211 E4316U) (AWS A5.1 E7016)	<b>85 16 05 - 09</b> CHE506
<b>For 50 kgf/cm<sup>2</sup> High Tensile Strength Steel</b>							
85 09 15	Low Hydrogen and All Positions	LH-314N (AWS E-7018) EN-ISO 2560-A: E42 4 B 42 H5 DNV-GL: 3YH5 LR: 3YH5 BV: 3, 3YH5 ABS: 3YH5, 3Y	AMERARC LH PLUS (AWS A5.1 E7018-1) (DIN E51 43B10) (ISO E51 4B 120 26H) (BS E614HJ)	MLH (AWS: E7018) (DIN: E51 55 B10) (EN: E42 6 B42 H10)	<b>85 13 41 - 43</b> LB-52 (JIS Z-3211 E4916) (AWS A5.1 E7016)	<b>85 07 01 - 07</b> L-55 (JIS Z-3211 E4916U) (AWS A5.1 E7016)	<b>85 16 11 - 14</b> CHE508
			Note: we do not use LH Plus any longer				
<b>For Atmospheric Corrosion Resisting Steel</b>							
85 09 21	Low Hydrogen and All Positions	LHR-320N (AWS A5.5: E-8018-G) EN-ISO2560-A: E46 5 Z B 32 DNV-GL: 3YH10 LR: 3YH15 BV: 3YH10 ABS: 3YH10	-	MLHR-	LB-W52B (JIS Z-3214 E49J16-NCC A U H15)	<b>85 07 21 - 25</b> CT-16Cr (AWS A5.5 E7016G)	<b>85 16 15 - 17</b> CHE506NiLH
<b>For Low Temperature Service Steel</b>							
85 09 25	Low Hydrogen	LHL-319N (AWS A5.5: E-8018-C1) EN-ISO 2560-A: E46 6 2 Ni B 32 H5 DNV:5Y46H5 LR:5Y42H5 BV:5Y 40M H5ABS:3Y400H5	AMERARC LV PLUS (AWS E-7048) (DIN E51 54 B9) (ISO E51 5B56H10) (BS E51 55B 110 16H)	MLHL (AWS: E8018-C1) (DIN: E SY42 87 2 Ni B H5) (EN: E46 6 2Ni B 42 H5)	NB-1 (JIS Z-3211 E5516-GAP) (AWS A5.5 E8016G)	-	-

CODE	Type	Wilhelmsen Ships Service (Norway)	Drew Marine (U.S.A)	Marichem- Mariagues (Greece)	Shinko (Japan)	Nittetsu (Japan)	Atlantic (China)
<b>For Cast Steel</b>							
85 09 31		NICKEL-333 (AWS A5.15: E Ni-CL)  NIFE-334N (AWS A5.15: E NiFe CL-A)	AMERARC NI99 (AWS A5.15:ENi-Cl) (DIN Eni-BG1)  AMERARC NI60 (AWS A5.15:Eni-Cl) (DIN ENiFe BG-1)	MINICKEL (AWS: E Ni-CL) (DIN: E Ni BG 22)  CIA-1 (JIS Z-3252 EC Ni-Cl) (AWS A5.15 ENi-Cl)  85 13 65 - 67 CIA-2 (JIS Z-3252 EC Nife-Cl) (AWS A5.15 ENiFe- Cl)	85 13 61 - 62 CIA-1 (JIS Z-3252 EC Ni-Cl) (AWS A5.15 ENi-Cl)  85 13 65 - 67 CIA-2 (JIS Z-3252 EC Nife-Cl) (AWS A5.15 ENiFe- Cl)	85 07 31 - 33 C-IN (AWS A5.15 ENi-Cl)	85 16 21 - 23 CHC308  85 16 25 - 27 CHC408
<b>For Stainless Steel</b>							
85 09 35	22% Cr -12%Ni	23/14-322N (AWS A5.4 E309Mol-17) EN-ISO 3581-A: E 23 12 2 LR 32 DNV:VL309Mo LR:S/CMn BV:309Mo ABS: SS/CMn	AMERARC SSMO (AWS E309 Mo-16) (DIN E22143n CR26)	MSSM 23/14V (AWS: E309Mo-16) (DIN: E 2313 2 LR 23) (EN: E23 12 2 LR 12)	85 13 75 - 78 NC-39 (JIS Z-3221 ES309-16) (AWS A5.4 E309- 16)	85 07 41 - 45 309-R (JIS Z-3221 ES309-16) (AWS A5.4 E309-16)	85 16 31 - 35 CHS312
85 09 41	25%Cr -20%Ni	TENSILE-328N (30% Cr - 10.5%Ni) (AWS A5.5: E 312-17) (EN-ISO 3581-A: E 29 9 R 32) (EN 14700: E Fe 11)	AMERARC TE (29% Cr - 10% Ni) (AWS A5.4 E312-16) (DIN E29 9 MPR 36 170)	MTENOSILE**	85 13 82 - 84 NC-30 (JIS Z-3221 ES310-16) (AWS A5.4 E310-16)	85 07 61 - 65 310-R (AWS A5.4 E310-16)	85 16 36 - 40 CHS402
<b>For Stainless Steel</b>							
85 09 45	18% Cr- 12% Ni- 2% Mo	18/8-321N (AWS-A5.4 E316L-17) EN-ISO 3581-A: E 19 12 3 LR 12) DNV-GL:V316L LR:316L BV: 316L ABS: E 316L 17	AMERARC ST (19% Cr - 12% Ni - 2.3% Mo) (AWS A5.4 E316L-16) (DIN E19 12 3n CR26)	MSSM 18/8V (AWS: E316L-16) (DIN: E19123LR26) (EN: E19.12.3LR32)	85 13 85 - 88 NC-36L (JIS Z-3221 ES316L-16) (AWS A5.4 E316L- 16)	85 07 71 - 75 316 L.R (JIS Z-3221 ES316L-16) (AWS A5.4 E316L-16)	85 16 41 - 45 CHS022 (022R)
<b>For Heat Resisting Steel (Low Hydrogen Type)</b>							
85 09 51	1.25% Cr- 0.05%Mo	LHT-318N (AWS A5.5: E 8018-B2) (EN 1599: E CrMo 1B 42 H5) DNV-GL: H5 BV:1%Cr 0.5%Mo, H5 ABS: SR	AMERARC CRMO (AWS A5.5 E8018-B2)	MLHT (AWS: E8018-B2) (DIN E CrMo1B20)	85 13 91 - 93 CMA-96 (JIS Z-3223 E5516-1CM) (AWS A5.5 E8016-B2)	85 08 01 - 05 N-1S (AWS A5.5 E8016-B2)	85 16 46 - 49 CHH308
85 09 55	5%Cr-0.5% Mo	-	-	-	CM-5 (JIS Z-3223 E5516-5CM) (AWS A5.5E8016-B6)	N-55 (AWS A5.5 E8016-B6)	-
<b>For Hardfacing</b>							
85 09 61		TENSILE-328N IMAPCT-329S WEARMAX-327	AMERARC HF38 AMERARC HF60	MTENSILE (AWS E312-16) (DIN: E 29 9 R 26) (EN: E 29 9 R 12)	HF-350 (JIS Z-3251 DF 2A-400-B)	85 08 26 - 29 H-350C	85 16 51 - 52 CHS29.9
<b>For Nickel, Nickel-Alloy and Nickel-Alloy Steel</b>							
85 09 65		EXATON Ni60 (AWS A5.11: ENiCrMo-3) (EN ISO 14172: E Ni 6625 (NiCr22Mo9Nb)	-	-	NIC-703D (JIS Z-3224 ENi6182) (AWS A5.11 ENiCrFe-3)	85 08 36 - 39 Yamata Weld 182AC (AWS A5.11 ENiCrFe-3)	85 16 55 - 56 CHN337

Remark: When ordering the products which are not from Shinko, Nittetsu or Atlantic, please use the code number 85 09 --, which are specified in the left column.

## Gouging Electrodes

Electrodos para ahuecar 溝掘り用溶接棒 刨槽用焊条  
Made of carbon and have a copper coating. The gouging electrodes are available in a variety of shapes and diameters to meet the various applications.  
Power source 380V, DC, compactness 1.57; max. humidity < 0.4%.



### Direct Current Pointed Gouging Electrodes

CODE	Size (mm/inch)		Unit Per Pc.	
	mm	inch	Ampere	
85 09 66	4	x 305	5/32" x 12"	150 - 200
67	5	x 305	3/16" x 12"	200 - 250
68	6.3	x 305	1/4" x 12"	250 - 300
69	8	x 305	5/16" x 12"	350 - 400
70	10	x 305	3/8" x 12"	400 - 450
85 09 71	13	x 305	1/2" x 12"	600 - 700
72	13	x 355	1/2" x 14"	600 - 700

### Direct Current

### Jointed Gouging Electrodes

For intensive applications jointed electrodes are available. These can be put into each other to increase the duty cycle.



Unit Per Pc.

CODE	Size (mm/inch)		Unit Per Pc.	
	mm	inch	Ampere	
85 09 73	8	x 355	5/16" x 14"	450
74	10	x 355	3/8" x 14"	500
75	11	x 355	7/16" x 14"	600
76	13	x 355	1/2" x 14"	750
77	15	x 355	5/8" x 14"	1,000
85 09 78	19	x 355	3/4" x 14"	1,300
79	10	x 430	3/8" x 17"	550
80	13	x 430	1/2" x 17"	750
81	16	x 430	5/8" x 17"	1,000
82	19	x 430	3/4" x 17"	1,300

### Direct Current

### Flat Gouging Electrodes



85 09 83	Electrode, DC, flat gouging, 5 x 15 x 305 mm, 300-400 amp.	Pc.
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## Gouging Torches

Antorchas para ahuecar くり抜き用トーチ 刨槽用焊枪  
The airflow can be regulated on the torch. The adjustable nozzle and the use of high quality materials ensure optimal electric safety and efficiency and maximum airflow. The mono cable can be mounted easily to the torch and the power source. Recommended air pressure is 7 bar.



Unit Per Pc.

CODE	Ampere	Max. Electrode
85 09 84	600	10 mm (3/8")
85	1,600	19 mm (3/4")

## Monocables for Gouging Torch

Monocables para antorchas de ahuecar  
くり抜き用トーチ用ケーブル  
刨槽焊枪用电缆



Gouging with the support of a monocable is a very efficient and handy way to operate. Both the power and the air are guided through one cable, which allows the gouger to work. Length: 2.35 mtr.

CODE	Ampere	Cable Size	Unit Per Lgh.
85 09 86	600	35 mm <sup>2</sup>	
87	1,600	95 mm <sup>2</sup>	

## Gouging Torch & Monocable Sets

Conjunto de antorcha para ahuecar y monocable  
くり抜き用トーチ & ケーブル一体型セット  
刨槽焊枪及电缆一体型组件



Complete sets allow you to start gouging immediately and saves the costs of putting the set together. Total length 2.5 mtr.

CODE	Ampere	Cable Size	Unit Per Lgh.
85 09 88	600	35 mm <sup>2</sup>	
89	1,600	95 mm <sup>2</sup>	

## Welding Cables

### Butyle Rubber Sheathed

### 1,000V or less-Single Conductor

Cables para Soldadura 溶接用電線 焊接电缆



Welding cable for general use. Cloth or paper wrapped wire sealed in rubber sheath.

CODE	mm <sup>2</sup>	Strand O.D. mm	Cable O.D. mm	Cable Construction mm	Unit Per Mtr.
79 41 01	22	7.0	11.8	0.45 x 20 x 7	0.31
02	38	9.1	14.5	0.45 x 34 x 7	0.50
03	60	11.7	17.5	0.45 x 20 x 19	0.75
04	100	15.2	21.8	0.45 x 34 x 19	1.23
05	150	18.7	25.9	0.45 x 34 x 27	1.71
79 41 06	200	21.2	29.0	0.45 x 34 x 37	2.30

## Welding Cable Connectors

Conectores para Cable de Soldadura

溶接用電線コネクター 焊接电缆接头



Brass bar with interior and exterior covered in watertight rubber. Specially designed for welding cable connections.

CODE	Ampere	Applicable Cable Size mm	Overall Length mm	Weight grm
79 47 61	300A	38 ~ 50	250	300
62	500A	60 ~ 80	295	510
63	750A	100 ~ 125	275	750
64	1,000A	150 ~ 200	300	950

## Electrode Holders

Pinza Portaelectrodo 電気溶接棒ホルダー 焊条夹持

### Closed Head

Cabeza cerrada 差込式ホルダー 插入支架



A high quality closed head electrode holder with optimal insulation and powerful grip on the electrodes. Also be used for overhead welding, and electrodes can be inserted in various manners. Standards : EN 60974-11.

CODE	Amp	Electrode Size mm	Connection	Cable mm <sup>2</sup>
85 10 24	300	1.6 - 6.3	1 screw M12	25-70
25	400	2.5 - 8.0	1 screw 9/16"	25-95
26	500	2.5 - 8.0	1 screw 9/16"	25-95
27	600	2.5 - 8.0	2 screws 9/16"	25-95

### Open Crocodile Type Head (Grip Type)

Cabeza abierta tipo cocodrilo  
(Tipo de agarre)

压着式ホルダー 开放式鳄鱼头(握把型)



An open crocodile type head electrode holder with many and firm electrode holding insert positions for wide range of welding applications.

Standard: EN 60974-11.

CODE	Amp	Electrode Size mm	Connection	Unit Per Pcs
85 10 31	200	2.0 - 5.0	-	
32	300	2.0 - 6.3	1 screw M12	25-70
33	400	2.5 - 8.0	2 screw 9/16"	25-95
34	500	2.5 - 8.0	2 screws 9/16"	25-95

### Screw-on Closed Head

Cabeza cerrada atornillable

ねじ込み式ホルダー 螺纹支架



A screw-on closed head electrode holder with extreme tight grip on the electrode, wide range of applications and optimal electric safety (class A for Progress 400).

Standards: EN 60974-11.

CODE	Amp	Electrode Size mm	Connection	Unit Per Pcs
85 10 28	400	1.6 - 6.3	1 screw 9/16"	25-95
29	600	1.6 - 8.0	1 screw 9/16"	25-95

### Turnable Head

Cabezal giratorio

回転式ホルダー 旋转支架



A high quality and simple electrode holder with a turnable head. The slim and smooth appearance allows for welding in the most confined areas. The extreme tight grip on the electrode, the wide range of applications and the optimal electric safety (class A for Victory 400).

Standards: EN 60974-11

CODE	Amp	Electrode Size mm	Connection	Unit Per Pcs
85 10 30	400	1.6 - 6.3	1 screw 9/16"	25-95
36	600	1.6 - 8.0	1 screw 9/16"	25-95

### Electrode Holders

#### Integrated with Welding Cable

Portaelectrodos integrados con cable de soldadura

溶接ケーブル付き溶接棒ホルダー

附带焊接电缆的焊夹



A closed head type electrode holder 300amp connected with welding cable. Welding cable neoprene HO-1/N2-D.

CODE	Plug	Cable	Length mtr	Unit Per Pcs
85 10 37	SK 25 - 13 mm	25 mm <sup>2</sup>	5	
38	SK 50 - 13 mm	50 mm <sup>2</sup>	10	
39	SK 70 - 13 mm	70 mm <sup>2</sup>	10	
40	SK M25 - 9 mm	25 mm <sup>2</sup>	5	

### Earthing Clamps

#### For arc welding use

Pinza Masa Soldadura

電気溶接機用アースクリップ 接地夹头



### Screw-on Type

Screw-on type made of high quality raw materials and components. Excellent cable connection and high quality yellow copper result in an efficient use of power.  
Standards: EN 60974-13.

85 10 45	Earth clamp, screw-on type, with rubber, 600 amp, cable 35-95 mm <sup>2</sup> , jaw width 42 mm	Pcs.
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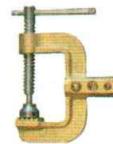


### Spring Type (Grip Type)

The curved shape of earth clamp ensures optimal contact with the workpiece.

Standards: EN 60974-13.

CODE	Amp	Jaw Width mm	Unit Per Pcs
85 10 46	250	70	
41	300	25	
42	300	35	
47	350	70	
48	500	70	
85 10 49	600	70	



### C-clamp Screw Type

C-clamp for extreme applications till 1,000 ampere. With allen screw connection.

Standards: EN 60974-13.

CODE	Amp	Jaw Width mm	Unit Per Pcs
85 10 43	500	70	
50	800	85	
44	1,000	80	



### Magnetic Type

Magnetic on 3 sides. Insulated cable connection by means of plastic handle.

With allen key cable connection.

Standards: EN 60974-13.

CODE	Amp	CODE	Amp	Unit Per Pcs
85 10 52	200	85 10 54	600	
53	400			



### Earth Clamps

#### Integrated with Welding Cable

Abrasaderas de contacto a tierra integradas con cable de soldadura

溶接ケーブル付きアースクリップ

附带焊接电缆的接地夹

A spring type earth clamp connected with welding cable. Welding cable neoprene HO-1/N2-D.

CODE	Clamp	Plug	Cable	Length mtr	Unit Per Pcs
85 10 55	Spring (Grip) Type	SK 50 - 13 mm	35 mm <sup>2</sup>	5	
56		SKM25 - 9 mm	25 mm <sup>2</sup>	5	
57		SK 50 - 13 mm	50 mm <sup>2</sup>	5	

## Arc Welders

Grupo Soldadura de Arco 電気溶接機 电弧焊接机

Shielded metal arc welding (Stick electrode welding) is most broadly used in shipboard maintenance and repair welding.

In welding two pieces of metal together, an electric arc is established at the end of the coated electrode and the base metal in the joint.



When the electric arc is struck between the tip of the electrode and the work piece (Base metal), molten droplets from the electrode are transferred to and mixed with the molten metal in the joint. As the arc progresses along the joint the molten weld metal cools and solidifies forming a strong, integral bond in the joint.

Arc welder converts shipboard power – usually 220, 380 or 440 volts, alternating currents (AC) to an output in the form of AC (Transformer) or DC (Rectifier) current.

Typical welding currents may range from 30 to 400 amperes at voltage of 22 to 32 volts.

Most electrodes used for shipboard maintenance welding operate at less than 200 amperes. So a current output of 400 amperes will suffice for most carbon arc applications.

The output AC/DC type will be more flexible and better suited to a wide range of conditions.

Please specify the following points when ordering:

1. Type of welder required;
  - 1) Transformer (AC)
  - 2) Rectifier (DC)
  - 3) Transformer/Rectifier (AC/DC)
2. Main supply: Voltage and Frequency
3. Maximum output capacity: Current amperes

85 10 51	Arc welder, type of welder _____, many supply _____, max. output capacity _____	Set
----------	---	-----

## Portable Arc Welders

Soldadoras de arco portátiles

ポータブル直流アーケ溶接機

便携式弧焊机



Super lightweight and compact inverter DC arc welder. Power correction circuit decreases the input/output conversion loss and minimizes the input current. Accurate output current setting with digital display, and stable output with digital control. Available in 110V/220V type.

CODE	85 10 73	85 10 74
Rated Input Voltage	1-110V(1-100V)	1-220V(1-200V)
Rated Input Current	1-110V-36A (1-100V-40A)	1-220V-32A (1-200V-35A)

(to be continued)

Rated Frequency	50 / 60 Hz	
Rated Input Power	1-110V-3.6KW 1-100V-3.9KW	1-220V-6.4KW 1-200V-6.4KW
Rated Output Current	100V/125A	200V/200A
Rated Non-load Voltage	66V	
Service Factor	60%	
Welding Rod Diameter	100V / MAX Φ2.6	200V / MAX Φ4.0
Electric Shock Preventive Device	Available (with ON/OFF switch)	
Input Cord	4.0 sq x 2.5 m	
Dimensions	L420 x W135 x H250 mm	
Weight	7 kg	
Accessories	Cable Joint (for main unit) Welding Cable with Electrode Holder (male) Welding Cable with Earthing Clamp (male)	

## Tig Welders

Soldadores TIG TIG 溶接機 TIG 焊接机



Tig (Tungsten Inert Gas) welding is an arc welding process that uses a non-consumable tungsten electrode to produce the arc, and is used for critical weld joints, welding metals, such as aluminium, stainless steel, copper, brass, titanium, nickel, even two dissimilar metals, other than common steel, and where precise, small welds are needed.

Tig welding requires a shielding gas to protect the weld area from the air (typically pure Argon gas), and utilizes a constant current welding power supply to generate an electric arc between the tungsten electrode and the workpiece, using the resultant heat to create the weld. The pulse function is used for giving a more stable arc than not pulsing. This allows for welding thinner metals and high heat conductive metals without burning through.

Unit Per Set		
CODE	85 10 75	
Model	300P	
Pulse Function	With Pulse	
Input Voltage	1 phase/200 volt	
TIG Arc Activation System	High frequency	
Rated Input Voltage	TIG	28.8 kVA (12.9 kW)
	Manual Weld	23.8 kVA (15.1 kW)
Rated Frequency	50/60 Hz	
Duty Cycle	40%	
Maximum Open Circuit Voltage	78 volt	
Starting Voltage (DC TIG)	100 volt	
DC Output Current	TIG	5 – 300 amp
	Manual Weld	20 – 300 amp
AC Output Current	TIG	20 – 300 amp
	Manual Weld	20 – 300 amp
Rated Load Voltage	TIG	22 volt
	Manual Weld	32 volt
Pulse TIG Function	Pulse Time Period	-
	Base Time period	0.03 – 1.2 sec. 0.05 – 2.5 sec.
Dimension (W x D x H)	460 x 663 x 859 mm	
Weight	161 kg	

## Plasma Cutting Machines

Máquinas de corte por plasma

プラズマ切断機 等离子切割机

The plasma cutting process, as the most cost-effective method of cutting a range of materials, is especially recommended for steel, stainless steel, aluminium or other alloys those are electrically conductive, not easily cut by conventional oxy-acetylene process. The combined effect of a high intensity arc and a hot, high velocity plasma gas results in a very clean, high speed cut including piercing, beveling and gouging.

Please specify if air compressor built-in model is required, when ordering.



Max. Pull Force	35 kg	80 kg
Size mm	110 × 95 × 29	153 × 130 × 35
Weight grm	700	1,400

### Mini Handy Set

The handy, take-along magnets in a convenient 6-pack. Large centre holes for easier handling. Two riveted holes for linking magnets together. Useful in light duty applications. For 30°, 45°, 60° and 90° angles.



Type: MS346AK

Size : 60 × 50 × 15 mm

85 10 66	Magnet, handy mini, 6's/pack Type : MS346AK	Pkt
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### Adjustable Angle

The magnet will make positioning easier, and safer to use, and hold all angles between 25° - 275°. Hold flat and round work pieces.



Max. pull force : 40 kg

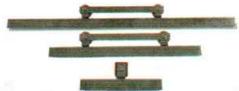
Size : 115 × 190 × 38 mm

Weight : 2.4 kg

85 10 67	Magnet, metal holding, adjustable angle, Max. pull force 40 kg	Pc.
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## Welders Guide Scales

Básculas guía para soldadores 溶接用ガイドスケール 焊接指南秤



A special guiding tool for gas welding and cutting work, guiding to move the torch in a straight line while maintaining nozzle height. High performance permanent magnet holds the guide scale firmly onto the steel plate. Made of stainless steel and available in 3 different sizes.

Unit Per Pcs.

CODE	Length (mm)	Width (mm)	Height (mm)	Magnet
85 10 68	250	83	46	1
69	500	83	46	2
70	800	83	46	2

## Welding Screens with Frame

Pantallas de soldadura con bastidores

溶接用遮蔽ついたて 焊接防护屏



180 × 80 cm welding screen with frame. Available in orange or green screen colour.

The frame comes with wheels.

Standards: DIN EN 1598:2002-04

Unit Per Pcs.

CODE	Colour	CODE	Colour
85 10 71	Orange	85 10 72	Green

## Welders' Chalks

Tiza de Soldador 石筆 石笔



A cut alabaster used for marking cutting lines and angles on welding materials. 3 different shaped chalks are available.

(to be continued)

85 11 01	Welders' chalk, round bar 100's	Box
02	Welders' chalk, square bar 100's	Box
03	Welders' chalk, rectangular bar 50's	Box

## Welders' Goggles

Gafas Protectoras de Soldador 溶接用遮光眼镜 焊接用遮光镜  
For use in gas welding. One size fits all.



Flip-up



Contour-mould

Unit Per Pr.

Code	Type	Lens Diam.	Remark
85 11 11	Flip-up	45	-
12	Contour-mould	50	w/Side Ventilation

## Safety Spectacles

### Anti-scratch & Anti-fog

Gafas protectoras, antirayaduras y antivaho

きず防止・くもり防止安全作業用メガネ

防雾防刮擦安全防护眼镜

Available in white and IR (Infrared) colour 5. Lens made from a single piece of polycarbonate which fits almost all contours of the face. Curved model, ergonomic design with adjustable arms. Comfortable glasses with a high protection factor. Weight: 34 grams

Standard: EN166:2001 FT, EN 175



Unit Per Pr.

CODE	85 11 13	85 11 14
Lens Colour	Clear	IR shade 5

## Safety Spectacles

### with Interchangeable Lenses

Gafas protectoras con lentes intercambiables

レンズ交換式安全作業用メガネ

可换镜片安全防护眼镜



Safety spectacles with different interchangeable lenses, supplied as a set. Set consists of: glasses frame, lenses: white/smoke/amber, clip cord, lens cloth and storage case. Lenses and frame made from reinforced polycarbonate. Lightweight and very comfortable frame with soft rubbers on the arms. Also comes with rubber nose pads that prevent the glasses from slipping off. Fits all contours of the head and face. Weight: 27 grams.

Standards: EN166:2001 FT

85 11 15	Spectacle, safety, with interchangeable lenses	Set
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## Welding Helmets

Casco para soldar 溶接用ヘルメット 电焊帽

Helmet with headgear for general welding use. Made of fibre glass, lightweight, and heat-resistant.



85 11 16	Welding helmet with headgear	Pc.
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## Arc Flash Protective Visors for Electricians

Visera protectora contra descargas de arco eléctrico para electricistas  
電気溶接火花防災面 电焊火花防护面罩

V-Gard Electrician's Visors provide reliable protection from arc flash effects: high temperature, flying debris and powerful radiation. They are certified to the highest European arc flash protection levels by the standards GS-ET-29 [class 2, 7 kA] and EN166 [8]. The impact and splash resistance is certified to EN 166 [B & 3].



Made from a patented injection molded blend of dyes and nano particles in a polycarbonate matrix. They absorb the arc energy layer by layer. This blend of dyes makes the visor look light green but offers the highest visual light transmission available in GS-ET-29 [VLT Class 0] providing maximum light transmittance and color recognition. As moldings they are optically correct, which ensure the best vision and reduced eye fatigue.

Two versions are available:

- Compatible with helmet mounted earmuffs.
- With extended ear protective shape, covering the ears.

Both feature an anti-fog coating for a clear view in challenging situations.

85 11 17	Visor, arc flash protective, compatible with helmet mounted earmuffs	Pc.
85 11 18	Visor, arc flash protective, with extended ear protective shape, covering the ears	

Name of Mfr.: MSA The Safety Company

## Electrician Kits Premium

### EN166 & GS-ET-29 class 2 (7 kA)

Kits de electricista Premium

電気工事キット・プレミアム 高级电工工具包

Ideal set for applications requiring arc flash protection, especially in confined spaces.

- Helmet, V-Gard 520 white with Fas-Trac III ratchet suspension, replaceable.
- Foam sweatband (EN 397 440 V AC and EN 50365, Part of visor testing GS-ET-29 Class 2).
- V-Gard frame (EN 166: 389 BT; Part of visor testing GS-ET-29 Class 2).
- Electrician visor Premium – V-Gard arc flash visor compatible with earmuffs, retractable chin guard (EN166 & GS-ET-29 Class 2, EN166 2C-1.2 1 B 8 - 2 - 0 3).

CODE	Description	Part No.
85 11 19	Premium Electrician Kit, EN166 & GS-ET-29 class 2	GV919-0029000-000

Name of Mfr.: MSA The Safety Company

## Handshields

Pantallas de mano para Soldar

溶接用ハンドシールド 焊工用手持面罩



Handle Inside



Handle Outside

For general welding use; also for inspectors and occasional use. Made of fibre glass. Inside or outside handles are available.

85 11 21	Handshield, handle inside type	Pc.
22	Handshield, handle outside type	Pc.

## Spare Lens/Plates/Glasses

Recombi de Lentes/Láminas/Cristales

溶接ゴーグル・ヘルメット用替レンズ

备用镜头 / 板 / 镜片

Spare glass for goggle, helmet and shield of the above. Various shades and sizes are available. When ordering, please specify lens or plate No. and size.



Shade Table

Shade No.	Standard Visible Ray Filter %	Application
4,5,6,7	5.18-0.27	For Gas Welding, Low amperage Arc Welding
8,9	0.100-0.037	For Arc Welding amperage up to 100A
10,11,12	0.0139 - 0.0019	For Arc Welding amperage over 100A up to 300A
13,14	0.00072 - 0.00027	For Arc Welding amperage 300A up to 500A

### How to order: CODE

Spare lens, TYPE of LENS, SIZE mm, COLOUR, TONE, for GAS or ARC WELDING

CODE	Lens Type	Size mm	Colour	Tone or Shade	Unit Per Pcs.	
					For	Arc Welding
85 11 41	Oblong Plage	105x50x3	Dark Green	No. 8		
				No. 9		
				No. 10		
				No. 11		
		105x50x2	Clear	No. 12		
85 11 46				-		

## Automatic Light-Shielding Plates for welding

Placas automáticas de protección contra la luz para soldadura

溶接用自動遮光プレート

用于焊接的自动遮光板

An automatic light-shielding plates for welding that protects the eyes from arc light during welding. A sensor detects the arc light and automatically shades the eyes. Compatible with welding helmet, hand shields, semi-automatic welding, TIG welding.



Unit per Pcs.				
CODE	Size mm (W x H x D)	Shade	Reaction Speed	Return Speed
85 11 47	108 x 51 x 5.5	No. 10	1/2000 (sec)	0.2 (sec)

## Welding Jackets and Trousers

### Flame Retardant

Chaquetas y pantalones ignífugos para soldar

難燃性溶接作業着

阻燃焊接工作服



A welding jacket made of lava brown leather with flame retardant impregnated thread, fully stitched with strong and heat-resistant Kevlar

Jackets: With collar and large innerpocket. Fastens left over right side with snap-fasteners. Fastening is reinforced with velcro overlap fasteners.

Trousers: The respective welding trousers are supplied complete with belt.

CODE	Size	CODE	Size
<b>Jackets</b>			
85 11 51	M	85 11 53	XL
52	L	54	XXL
<b>Trousers w/belt</b>			
85 11 55	M	85 11 57	XL
56	L	58	XXL

## Welders' Gloves

Calibres de Cordones de Soldadura (Galgas)

溶接用手袋 焊缝尺寸检查用样板

For gas and arc welding. Made of tanned heat resistant leather with gauntlet cuff. Two, three and five finger types are available.



Two Fingers



Three Fingers



Five Fingers

CODE	85 11 61	85 11 62	85 11 63
Type	2 Fingers	3 Fingers	5 Fingers

## Welders' Protective Clothing

Ropa de Protección Soldador 溶接用革製保護具 焊工用保护衣服

Made of chrome leather. Worn for protection when welding.



Sleeves



Apron



Leggings

CODE	Description	Size mm	Unit
85 11 66	Sleeves	210 x 530	Pr.
67	Apron	550 x 1,000	Pc.
68	Leggings	260 x 220	Pr.

## Anti Spatter Sprays

Pulverizadores antisalpicaduras  
金属粒付着防止スプレー 防止金属颗粒粘着喷雾剂

Prevents welding spatters from sticking to the welding torch or to the workpiece. Contains no harmful or flammable detergents. Offers the perfect solution to stainless steel.

- Resistant up to 1,500°C.
- Ideal for welding torches and automatic machines.



85 11 76 Anti spatter spray, 500 ml

Can

## Water-Based Weld Anti-Spatters

Soldadura de base acuosa antisalpicaduras  
水性溶接はね防止剤 水焊防飞溅剂

A water-based spatter release agent which gives exceptional results without the use of harmful solvents, silicones or mineral oils.



85 11 77 Weld anti-spatter, water based  
CRC Ambersil, Bioweld, 400 ml

Tin

## Aluminium Backing Tapes

Cintas para embalar de aluminio

アルミニウムパッキングテープ 铝箔胶带

An aluminium backing tape with fiberglass center



Benefits:

- Reduces setup time.
- Eliminates/minimizes need for back purging.
- Reduces post-weld grinding.
- Cuts down on post-weld clean up.
- Increases weld productivity, reduces costs.
- Heat resistant (Adhesive 260°C, Aluminium tape 593°C, Fiberglass strip 550°C).
- For application up to 500/600 Amps.

Unit Per Rls.

CODE	85 11 78	85 11 79
Width × Length	63 mm × 12.5 mtr 2.5" × 41'	102 mm × 12.5 mtr 4" × 41'
Width Weld Backing Tape	28.5 mm 1-1/8"	38 mm 1-1/2"

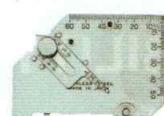
## Welding Gauges

Calibres de Cordones de Soldadura (Galgas) 溶接ゲージ 焊接量具

Stainless steel made. Long life use, rust and corrosion resistant. Multi purpose welding gauge for measuring the height of bead, round bar diameter, plate thickness, under cut depth, etc.



Front Side



Reverse Side

85 11 80 Welding gauge, stainless steel

Pc.

## Thermomelt Temperature Sticks

Barras indicadoras de temperatura Thermomelt  
温度チェックマークー 温度测试笔



A fast, simple and accurate method to determine an indicated temperature by means of melting stick as soon as reached the required temperature. Available in a range from 50 °C to 700 °C. Low temperatures are used to see whether machinery has the right temperature, higher temperatures are used for welding and pre-heating etc.

Unit Per Pcs.							
CODE	Temp.	CODE	Temp.	CODE	Temp.	CODE	Temp.
85 11 81	50°C	85 11 86	175°C	85 11 91	300°C	85 11 96	525°C
82	75°C	87	200°C	92	350°C	97	550°C
83	100°C	88	225°C	93	400°C	98	600°C
84	125°C	89	250°C	94	450°C	99	650°C
85	150°C	90	275°C	95	500°C	85 12 00	700°C

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