

Urethane Belt Program



Urethane Timing Belts and Pulleys

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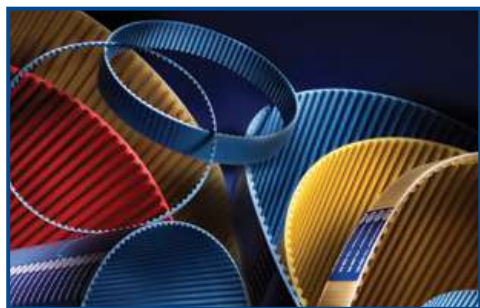
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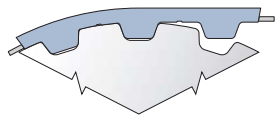
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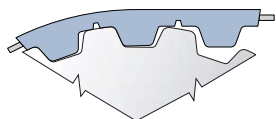


Industrial Tooth Pitch Comparison



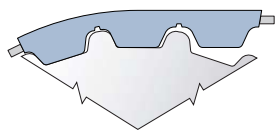
Imperial Pitch Belts - XL, L, H, XH

This classic trapezoidal pitch is the original timing belt tooth design. This tooth pitch is commonly used for **conveying applications**. The tooth profile is fairly low and has a large surface area at the tip of the tooth providing good support on sliding conveyor surfaces.



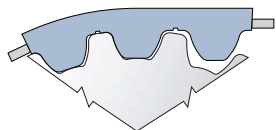
T Pitch Belts - T2.5, T5, T10, T20

These metric trapezoidal pitches are similar to imperial pitches, also commonly used for **conveying applications**, yet have a slightly deeper tooth engagement than imperial profiles. The tooth meshing is more reliable. However, backlash can be slightly greater.



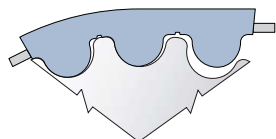
AT Pitch Belts - AT5, AT10, AT20

This pitch was developed to enable higher load carrying capacity combined with low backlash. The stronger and stiffer tooth makes these belts ideal for **linear positioning and motion control**, but may require larger pulley diameters.



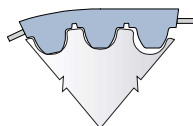
STD Pitch Belts - STD5, STD8

This tooth pitch provides superior load distribution, low backlash, and **reduced wear and noise** characteristics. It is an excellent profile for **linear positioning** and **power transmission** applications.



HTD Pitch Belts - HTD5, HTD8, HTD14

This rounded tooth pitch is similar to STD, and is also an excellent profile for **linear and rotary positioning** and **power transmission** applications, yet has deeper tooth engagement. Note that the HTD pitch may exhibit slight increases in noise and wear.



GMT3

This modified profile is available in widths 10" to 18". It is appropriate for non "knife edge" applications as the minimum pulley diameter is 0.75".

Linear Belt Specifications

Refer to these product notes in reviewing the Linear Belt Specifications pages that follow

Calculating Belt Weight

Imperial Units

Belt Weight = (Specific Belt Wt, lbf/ft/in) x (Belt Length, ft) x (Belt Width, in)

e.g. 200 ft of H600, Steel Cord

Belt Weight = 79 lbs = (0.066 lbf/ft/in) x (200 ft) x (6 in)

Metric Units

Belt Weight = (Specific Belt Wt, kgf/m/cm) x (Belt Length, m) x (Belt Width, cm)

e.g. 100 meters of 150T10, Steel Cord

Belt Weight = 111 kg = (0.074kgf/m/cm) x (100 m) x (15 cm)

Service Temperature Range

–5° C to 70° C (23° F to 158° F)

Hardness

92 Shore A - Standard PU, 85 Shore A - FDA Compliant PU

Coefficient of Friction

Urethane vs. UHMWPE (dry)

Urethane vs. Steel (dry)	0.5 to 0.7
Urethane vs. Aluminum (dry)	0.5 to 0.6
Urethane vs. UHMWPE (dry)	0.2 to 0.4
Nylon vs. Steel (dry)	0.2 to 0.4
Nylon vs. UHMWPE (dry)	0.1 to 0.3

- Most belts are available with Nylon Fabric on either or both sides.
For Nylon on the tooth side, specify "NT"
For Nylon on the back side, specify "NB"
For Nylon on both sides, specify "NTB"
Note: Nylon on tooth side is NOT available on HTD5 Steel or Kevlar in widths greater than 50 mm.
- Belting produced to specific length tolerance is available upon request.
- Many linear positioning applications require belts of a specific length tolerance, or a "minus pitch tolerance." Gates Mectrol can produce belts to specific minus tolerances. Consult a Gates Mectrol Applications Engineer to determine the proper length tolerance calculation.

Linear Belt Specifications

			XL	L	H	XH	T5	AT5	ATL5	T10
Pitch (Imperial and Metric)			.200"	.375"	.500"	.875"	5 mm	5 mm	5 mm	10 mm
Ultimate Tensile Strength per Inch or 25 mm Belt Width	Steel	lbf/in	759	1474	1605	3204	759	1602	2369	1605
		N/25 mm	3375	6555	7140	14250	3375	7125	10540	7140
	Kevlar	lbf/in	1882	1727	1818	3639	1200	1877	N/A	1818
		N/25 mm	8370	7682	8085	16185	5332	8350	N/A	8085
	Stainless Steel	lbf/in	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		N/25 mm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	High Flex	lbf/in	N/A	N/A	2369	N/A	N/A	N/A	N/A	2369
		N/25 mm	N/A	N/A	10540	N/A	N/A	N/A	N/A	10540
Max. Allowable Belt Tension per Inch or 25 mm Belt Width	Steel	Open Ended	lbf/in	192	371	436	854	189	396	526
		Ended	N/25 mm	853	1652	1939	3801	840	1761	2340
		Welded	lbf/in	96	186	218	427	94	198	214
			N/25 mm	427	826	970	1900	420	880	954
	Kevlar	Open Ended	lbf/in	209	276	243	400	180	272	N/A
		Ended	N/25 mm	930	1229	1081	1778	801	1210	N/A
		Welded	lbf/in	157	207	182	300	140	204	N/A
			N/25 mm	698	922	810	1334	687	908	N/A
	Stainless Steel	Open Ended	lbf/in	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Ended	N/25 mm	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Welded	lbf/in	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			N/25 mm	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	High Flex	Open Ended	lbf/in	N/A	N/A	534	N/A	N/A	N/A	N/A
		Ended	N/25 mm	N/A	N/A	2377	N/A	N/A	N/A	N/A
		Welded	lbf/in	N/A	N/A	267	N/A	N/A	N/A	N/A
			N/25 mm	N/A	N/A	1189	N/A	N/A	N/A	N/A
Allowable Effective Tension for Belt Teeth (15 and more teeth in mesh)			lbf/in	180	360	441	879	200	290	380
			N/25 mm	800	1600	1960	3910	890	1290	1690
Specific Belt Weight	Steel	lbf/ft/in	0.036	0.059	0.066	0.180	0.037	0.055	0.062	0.074
		kgf/m/cm	0.021	0.035	0.039	0.105	0.022	0.032	0.036	0.043
	Kevlar	lbf/ft/in	0.033	0.052	0.055	0.155	0.033	0.046	N/A	0.062
		kgf/m/cm	0.019	0.030	0.032	0.091	0.020	0.027	N/A	0.036
	Stainless Steel	lbf/ft/in	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		kgf/m/cm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	High Flex	lbf/ft/in	N/A	N/A	0.072	N/A	N/A	N/A	N/A	0.079
		kgf/m/cm	N/A	N/A	0.042	N/A	N/A	N/A	N/A	0.046
Specific Belt Stiffness (Open Ended)	Steel	lbf/in	47950	92800	109000	213600	47950	100500	133600	109000
		N/mm	8400	16255	19085	37410	8400	17605	23400	19085
	Kevlar	lbf/in	52250	69100	60700	100000	52250	69100	N/A	60700
		N/mm	9155	12100	10635	17500	9155	12100	N/A	10635
	Stainless Steel	lbf/in	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		N/mm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	High Flex	lbf/in	N/A	N/A	133600	N/A	N/A	N/A	N/A	133600
		N/mm	N/A	N/A	23400	N/A	N/A	N/A	N/A	23400
Min. No. of Pulley Teeth	Steel and Kevlar		10	10	14	18	10	15	15	14
	Stainless Steel		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	High Flex		N/A	N/A	12	N/A	N/A	N/A	N/A	12
Min. Pitch Diameter (Inch or mm)	Steel and Kevlar	inch or mm	.64"	1.19"	2.23"	5.01"	16 mm	24 mm	24 mm	45 mm
	Stainless Steel	mm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	High Flex	inch or mm	N/A	N/A	1.91"	N/A	N/A	N/A	N/A	38 mm
Min. Diameter of Tensioning Idler Running on Back of Belt	Steel and Kevlar	in/mm	1.125"/30 mm	2.375"/60 mm	3.125"/80 mm	5.875"/150 mm	1.125"/30 mm	2.375"/60 mm	2.375"/60 mm	3.125"/80 mm
	Stainless Steel	in/mm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	High Flex	in/mm	N/A	N/A	2.375"/60 mm	N/A	N/A	N/A	N/A	2.375"/60 mm
Available in FDA Compliant Construction (85 Shore A Urethane)			Yes	Yes	Yes		Yes			Yes
Standard Colors (N=Natural, W=White)			N	N	N,W	N	N,W	W	W	N,W

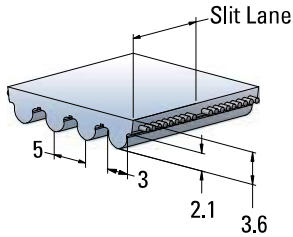
The specifications listed are based on Gates Mectrol's experience. However, our specifications and data do NOT cover all possible belt drive conditions. It is the responsibility of the belt drive system designer to ensure Gates Mectrol's belts are appropriate for a given system and application. The provided data is representative of our in-house experience and does not necessarily match product performance in industrial use.

AT10	ATL10	T20	AT20	ATL20	HTD5	HTD8	HTDL8	HTD14	HTDL14	STD5	STD8
10 mm	10 mm	20 mm	20 mm	20 mm	5 mm	8 mm	8 mm	14 mm	14 mm	5 mm	8 mm
3204	5445	3204	5445	7913	2369	3204	5445	4667	7848	2369	3204
14250	24220	14250	24220	35200	10540	14250	24220	20760	34909	10540	14250
3639	N/A	3639	4900	N/A	1818	3639	4900	4200	N/A	1818	3639
16185	N/A	16185	21798	N/A	8085	16185	21798	18684	N/A	8085	16185
2403	N/A	2403	N/A	N/A	N/A	2403	N/A	N/A	N/A	N/A	N/A
10687	N/A	10687	N/A	N/A	N/A	10687	N/A	N/A	N/A	N/A	N/A
N/A	6059	N/A	N/A	N/A	N/A	2917	6059	5193	N/A	N/A	2917
N/A	26950	N/A	N/A	N/A	N/A	12975	26950	23100	N/A	N/A	12975
841	1317	841	1317	1732	526	841	1317	1159	1718	526	841
3741	5860	3741	5860	7705	2340	3741	5860	5156	7641	2340	3741
421	421	421	659	N/A	263	421	N/A	580	N/A	263	421
1870	1870	1870	2930	N/A	1170	1870	N/A	2578	N/A	1170	1870
393	N/A	393	393	N/A	239	393	393	341	N/A	239	393
1750	N/A	1750	1750	N/A	1063	1750	1750	1515	N/A	1063	1750
295	N/A	295	295	N/A	179	295	N/A	255	N/A	179	295
1312	N/A	1312	1312	N/A	797	1312	N/A	1136	N/A	797	1312
631	N/A	631	N/A	N/A	N/A	631	N/A	N/A	N/A	N/A	N/A
2805	N/A	2805	N/A	N/A	N/A	2805	N/A	N/A	N/A	N/A	N/A
315	N/A	315	N/A	N/A	N/A	315	N/A	N/A	N/A	N/A	N/A
1402	N/A	1402	N/A	N/A	N/A	1402	N/A	N/A	N/A	N/A	N/A
N/A	11420	N/A	N/A	N/A	N/A	777	1142	1005	N/A	N/A	777
N/A	5079	N/A	N/A	N/A	N/A	3456	5079	4470	N/A	N/A	3456
N/A	421	N/A	N/A	N/A	N/A	388	N/A	502	N/A	N/A	164
N/A	1871	N/A	N/A	N/A	N/A	1728	N/A	2235	N/A	N/A	728
580	580	710	1221	1221	229	420	420	771	771	220	409
2580	2580	3160	5430	5430	1020	1870	1870	3430	3430	980	1820
0.096	0.114	0.125	0.169	0.185	0.07	0.101	0.135	0.182	0.21	0.067	0.087
0.056	0.067	0.073	0.099	0.108	0.041	0.059	0.079	0.107	0.123	0.039	0.051
0.071	N/A	0.101	0.124	N/A	0.05	0.08	0.077	0.143	N/A	0.05	0.074
0.042	N/A	0.059	0.073	N/A	0.029	0.047	0.045	0.084	N/A	0.029	0.043
0.096	N/A	0.125	N/A	N/A	N/A	0.101	N/A	N/A	N/A	N/A	N/A
0.056	N/A	0.073	N/A	N/A	N/A	0.059	N/A	N/A	N/A	N/A	N/A
N/A	0.118	N/A	N/A	N/A	N/A	0.113	0.141	0.191	N/A	N/A	0.956
N/A	0.069	N/A	N/A	N/A	N/A	0.066	0.083	0.112	N/A	N/A	0.056
213600	334600	213600	334600	440000	133600	213600	334588	294400	440000	133600	213600
37410	58600	37410	58600	77050	23400	37410	58600	51560	77050	23400	37410
100000	N/A	100000	100000	N/A	60700	100000	99920	86500	N/A	60700	100000
17500	N/A	17500	17500	N/A	10635	17500	17500	15150	N/A	10635	17500
160212	N/A	160212	N/A	N/A	N/A	160212	N/A	N/A	N/A	N/A	N/A
28057	N/A	28057	N/A	N/A	N/A	28057	N/A	N/A	N/A	N/A	N/A
N/A	290000	N/A	N/A	N/A	N/A	197327	289996	255199	N/A	N/A	197330
N/A	50790	N/A	N/A	N/A	N/A	34560	50790	44695	N/A	N/A	34560
15	25	15	18	30	14	20	32	28	43	14	20
20	N/A	20	N/A	N/A	N/A	25	N/A	N/A	N/A	N/A	N/A
N/A	20	N/A	N/A	N/A	N/A	16	25	23	N/A	N/A	16
48 mm	80 mm	96 mm	115 mm	191 mm	22 mm	51 mm	81 mm	125 mm	191 mm	22 mm	51 mm
64 mm	N/A	127 mm	N/A	N/A	N/A	64 mm	N/A	N/A	N/A	N/A	N/A
N/A	64 mm	N/A	N/A	N/A	N/A	41 mm	64 mm	102 mm	N/A	N/A	41 mm
4.75"/120 mm	5.875"/150 mm	4.75"/120 mm	7.125"/180 mm	9.875"/250 mm	2.375"/60 mm	4.75"/120 mm	6.00"/150 mm	7.875"/200 mm	9.875"/250 mm	2.375"/60 mm	4.75"/120 mm
6.25"/160 mm	N/A	6.25"/160 mm	N/A	N/A	N/A	6.00"/150 mm	N/A	N/A	N/A	N/A	N/A
N/A	5.125"/130 mm	N/A	N/A	N/A	N/A	4.00"/100 mm	5.125"/130 mm	6.25"/160 mm	N/A	N/A	4.00"/100 mm
W	W	N,W	W	W	W	W	W	W	W	W	W

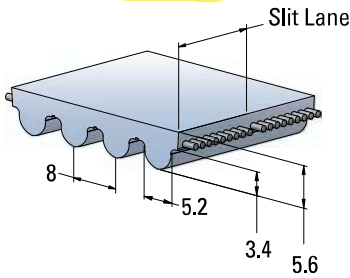
Gates Mectrol cannot assume any liability concerning the suitability and process ability of our products. We also cannot assume liability for process results, damages or consequential damages associated with the use of our products. Note, ultimate tensile strengths are listed for references purposes only. Ultimate tensile strength values listed above are a theoretical calculation based on average cord strength and may not represent actual tensile test results.

HTD® and STD Pitch Belts

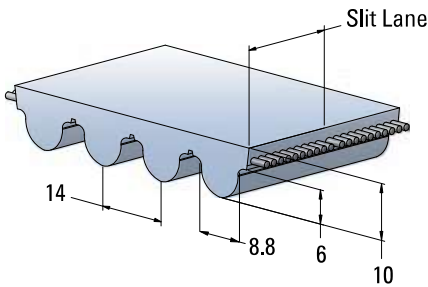
HTD5 5 mm Pitch



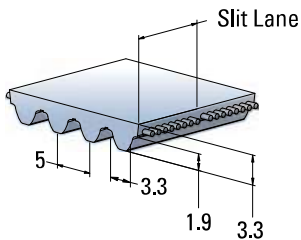
HTD8 8 mm Pitch



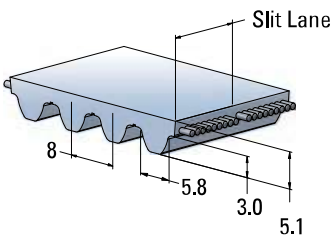
HTD14, HTDL14 14 mm Pitch



STD5 5 mm Pitch



STD8 8 mm Pitch



		HTD5	HTD8, HTDL8, HTD8-HF	HTD14, HTDL14-HF	HTDL14	STD5	STD8, STD8-HF
Min. Welded Belt Length	mm	450	456	1000	N/A	450	456
Standard Roll Lengths	meters	100	100	50	50	100	100
Standard Slitting Lanes	mm	25	25	55	N/A	25	20, 30
Available Slitting Lanes	mm	10, 12, 15, 16	10, 20	85	N/A	10, 15	25

All roll lengths are $\pm 1\%$.

Standard Widths

mm	HTD5	HTD8, HTDL8, HTD8-HF	HTD14, HTDL14, HTD14-HF	STD5	STD8
5	X			X	
10	X	X		X	X
15	X	X		X	X
20		X			X
25	X	X	X	X	X
30		X			X
40			X		
50	X	X		X	X
55			X		
85	X	X	X		X
100	X	X	X		X
115			X		
150	X	X			X
170		X*	X		
200		X*			

All belts are available in any width between the minimum and maximum listed width.

* This width is available in Kevlar only.

Width Tolerances

Width	HTD5	HTD8, HTDL8, HTD8-HF	HTD14, HTDL14, HTD14-HF	STD5	STD8
Up to 50 mm	± 0.5 mm	± 0.75 mm	± 1.0 mm	± 0.5 mm	± 0.75 mm
> 50-100 mm	± 0.75 mm	± 1.0 mm	± 1.5 mm	N/A	± 1.0 mm
> 100-150 mm	± 0.75 mm	± 1.0 mm	± 2.0 mm	N/A	N/A
> 150-170 mm	N/A	± 2.0 mm	± 2.0 mm	N/A	N/A
> 170 mm	N/A	± 2.0 mm	N/A	N/A	N/A

To Order HTD and STD Pitch Belts

25 HTD5M 1000 () ()

Insert "NT" for Nylon Teeth, "NB" for Nylon Back, "NTB" for Nylon on Both Sides

Insert "K" if specifying Kevlar

Length: 1000 mm

Pitch: HTD5 (5 mm)

Width: 25 mm

Pulley Overview

Gates Mectrol manufactures a complementary line of timing pulleys. While industry standards do exist for most pulley groove geometries, each manufacturer has its own interpretation of those standards. For the longest belt life and quietest operation, it is recommended that the timing belts and pulleys be single-sourced so that the components are matched. Recognizing that any project may have different pulley style requirements, Gates Mectrol offers a Custom Pulley Program, which allows for additional features as needed.

In addition to pulley alternatives, Gates Mectrol offers a Clamp Plate Program to match any project needs.

Custom Pulley Program

This program is designed to meet your made-to-print custom pulley requirements.

- Unlimited design freedom
- Three raw material choices:
aluminum, steel or stainless steel

Clamp Plates

Gates Mectrol offers a clamp plate program for standard and custom requirements.



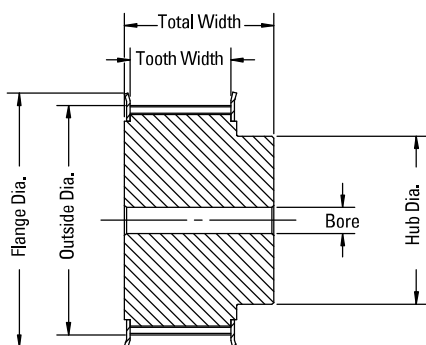
Custom Pulley Program

Pulleys can be customized to fit specific applications. Below are the options available:

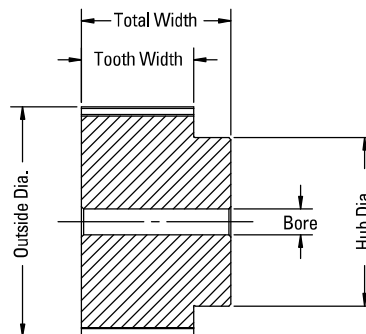
Material	Flanges	Coatings	Optional Pitches
<ul style="list-style-type: none"> Aluminum Steel Stainless steel 	<ul style="list-style-type: none"> Zinc plated steel Stainless steel (for stainless steel pulleys) 	<ul style="list-style-type: none"> Clear anodize Black anodize Clear hardcoat Black oxide Electroless nickel 	<p>Most pitches can be supplied as zero backlash</p> <ul style="list-style-type: none"> Typically used for precise positioning applications only

Pulley Types

2F – Two Flanges



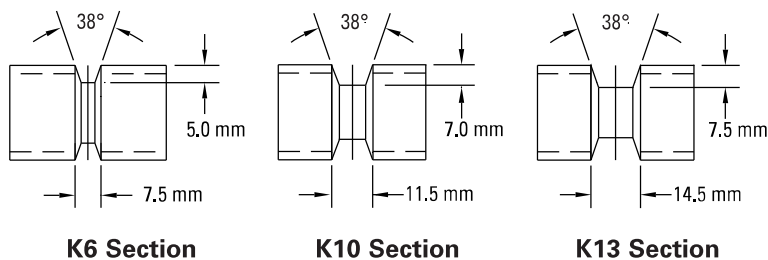
0F – No Flanges



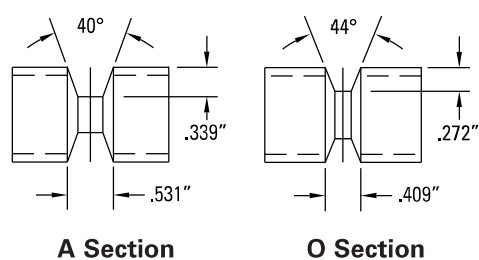
V-Guides

For wider belts, and larger pulleys without flanges, one of the following V-guides is recommended for improved tracking:

For Metric Pitch Belts

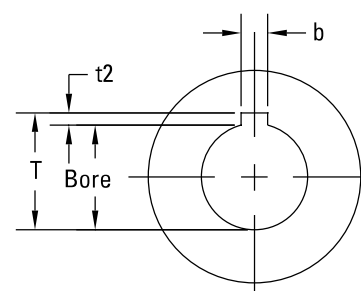
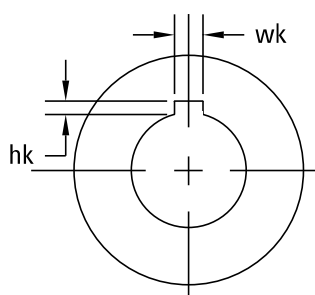


For Imperial Pitch Belts



Custom Pulley Program

Standard Keyway Dimensions and Tolerances



Imperial Shaft Diameter

Over	Up to and Including	Width wk	Tolerance wk	Depth hk	Tolerance hk
	0.438	0.094		0.047	+0.015 -0.000
0.438	0.563	0.125	+0.0030	0.063	
0.563	0.875	0.188	-0.0000	0.094	
0.875	1.250	0.250		0.125	
1.250	1.375	0.313	+0.0035	0.156	
1.375	1.750	0.375	-0.0000	0.188	
1.750	2.250	0.500		0.250	
2.250	2.750	0.625		0.313	
2.750	3.250	0.750	+0.0040	0.375	
3.250	3.750	0.875	-0.0000	0.438	
3.750	4.500	1.000		0.500	
4.500	5.500	1.125	+0.0050	0.625	
5.500	6.500	1.500	-0.0000	0.750	

Metric Shaft Diameter

Over	Up to and Including	Width b	Tolerance on b	*Depth t2	Tolerance t2
6	8	2	+0.060	1.0	+0.1 -0
8	10	3	+0.020	1.4	
10	12	4	+0.078	1.8	
12	17	5	+0.030	2.3	
17	22	6		2.8	
22	30	8	+0.098	3.3	+0.2 -0
30	38	10	+0.040	3.3	
38	44	12		3.3	
44	50	14	+0.120	3.8	
50	58	16	+0.050	4.3	
58	65	18		4.4	
65	75	20		4.9	
75	85	22	+0.149	5.4	
85	95	25	+0.065	5.4	
95	110	28		6.4	
110	130	32		7.4	+0.3 -0
130	150	36	+0.180	8.4	
150	170	40	+0.080	9.4	

* Metric keyway depths are specified from the bottom of the keyway to a line tangent to the bore at the keyway centerline.
 $T = \text{Bore Diameter} + t_2$

USA

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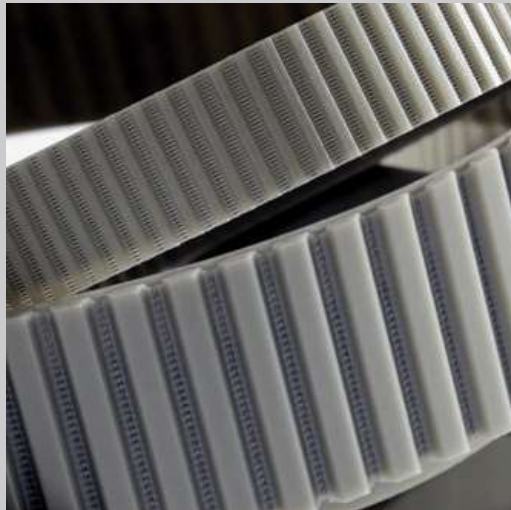
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