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Couplings
Universal Joints
Shaft Collars
Washers
Bushings
Pulleys
Timing Belts
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BOSTON GEAR®

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Please see page 157 for the terms and conditions of this program.

UPC INDUSTRIAL CODE NUMBER — 781711

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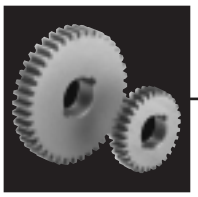
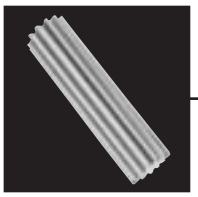
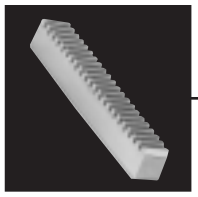
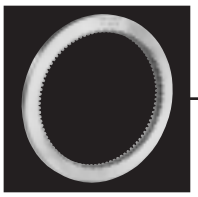
Gear Selection

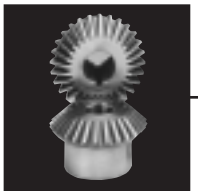
Stock Gears

Spur Gears

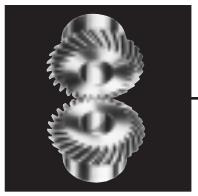



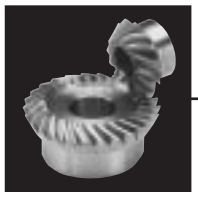




Helical Gears

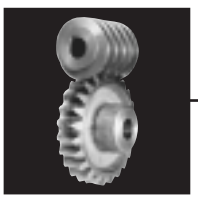



Miter and Bevel Gears





Worms and Worm Gears

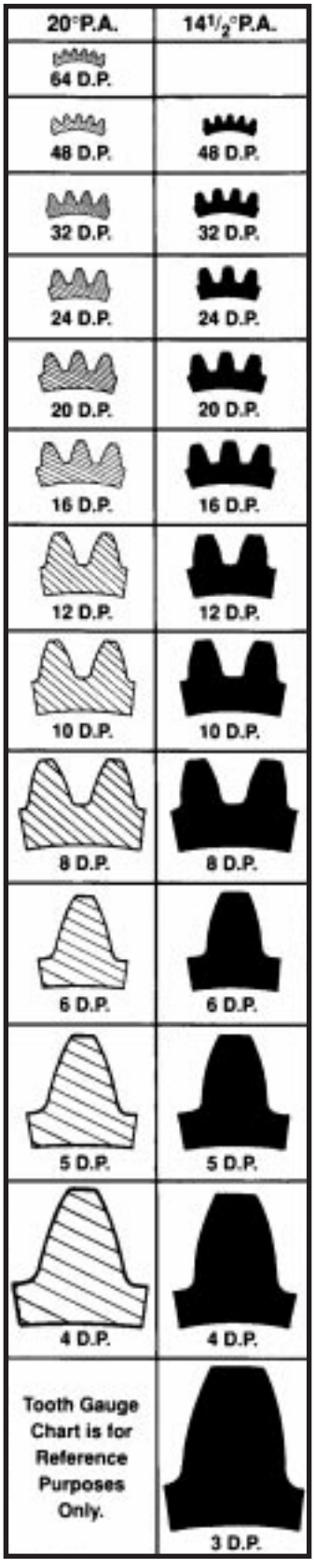


Description	Application	Pressure Angle (PA)		Material	
Pinions and Gears	Parallel Shafts	14-1/2° 20° 14-1/2° 20°		Brass Brass Steel Delrin	
Pinions and Gears	Parallel Shafts	14-1/2° 14-1/2° 20°		Non-Metallic Steel, Iron Steel, Iron	
Change Gears	Parallel Shafts	14-1/2°		Steel, Iron	
Stem Pinions	Parallel Shafts	14-1/2°		Steel	
Drawn Pinion Wire	Parallel Shafts	14-1/2°		Brass Steel	
Rack	Use with Spur Gears	14-1/2° 14-1/2° 14-1/2° 20° 20°		Nylon Brass Steel Brass Steel	
Internal Gears	Parallel Shafts	14-1/2° 20°		Brass Brass	
Helical Gears	Parallel and 90° Non-Intersecting Shafts	14-1/2°		Steel Bronze	
Straight Miter Gears	90° Intersecting Shafts	20°		Nylon Brass Steel Iron	
Spiral Miter Gears	90° Intersecting Shafts	20°		Steel	
Straight Bevel Gears	90° Intersecting Shafts	20°		Brass Steel Iron	
Spiral Bevel Gears	90° Intersecting Shafts	20°		Steel	
		(PA)	Thread	Worm	Gear
Worms/ Worm Gears	90° Non-Intersecting Shafts	14-1/2°	Single	Acetal Nylon	Acetal Minlon Bronze
Worms/ Worm Gears	90° Non-Intersecting Shafts	14-1/2° 20° 25°	Single Double Quad	Steel	Bronze
Worms/ Worm Gears	90° Non-Intersecting Shafts	14-1/2° 20° 25°	Single Double Quad	Steel	Iron

Reference Guide

Diametrical Pitch	Pitch Diameter	Face Width	Gear Catalog Reference Pages		
			Selection Procedure	Horsepower and Torque Ratings	Catalog Number Selection
48DP – 16DP 64DP – 24DP 32DP – 24DP 48DP – 24DP	.208" – 5.000" .250" – 6.000" .500" – 6.000" .375" – 2.500"	.062" – .313" .125" – .250" .187" – .250" .125" – .250"	37 37 37 37	38 – 40 – 38 –	6 – 9 25 – 30 7 – 8 25 – 30
16DP – 8DP 20DP – 3DP 20DP – 5DP	1.000" – 3.500" .750" – 36.000" .600" – 36.000"	.500" – 1.250" .500" – 3.000" .500" – 2.500"	37 37 37	40 – 43 39 – 45 46 – 50	10 – 12 8 – 15 30 – 34
20DP – 8DP	1.000" – 12.500"	.375" – 1.250"	37	39 – 43	16 – 20
20DP – 6DP	.287" – 1.750"	1.125" – 3.000"	37	39 – 44	21
48DP – 24DP 48DP – 24DP	.125" – .667" .125" – .667"	48" Lengths 48" Lengths	37 37	38 38	22 22
48DP – 24DP 48DP – 16DP 48DP – 3DP 64DP – 24DP 20DP – 4DP	.104" – .208" .104" – .438" .104" – 1.167" .109" – .208" .450" – 1.750"	.125" – .250" .125" – .312" .125" – 3.000" .125" – .250" .500" – 3.500"	37 37 37 37 37	38 38 – 40 38 – 45 – 46 – 50	23 23 23 35 35
48DP – 16DP 64DP – 24DP	1.000" – 6.000" 1.000" – 6.000"	.125" – .312" .125" – .250"	37 37	38 –	24 36
24TDP – 6TDP 8TDP – 6TDP	.333" – 6.000" 1.000" – 6.000"	.250" – 1.250" .750" – 1.250"	54 54	55 – 56 56	52 – 53 53
48DP – 16DP 48DP – 24DP 48DP – 4DP 8DP – 4DP	.312" – 2.000" .312" – 1.500" .375" – 7.000" 3.500" – 8.000"	.070" – .390" .080" – .230" .080" – 1.430" .750" – 1.333"	67 67 67 67	68 68 68 – 69 68 – 69	58 – 59 58 58 – 60 60
18DP – 5DP	1.000" – 5.000"	.220" – 1.150"	67	71	61
48DP – 24DP 20DP – 6DP 16DP – 4DP	.250" – 2.000" .500" – 6.000" 1.000" – 9.000"	.090" – .260" .180" – 1.070" .420" – 1.400"	67 67 67	70 70 70	62 62 – 65 63 – 65
30DP – 8DP	.430" – 4.250"	.140" –.710"	67	71	66
48DP – 32DP 24DP 48DP – 24DP	Worm: .333" to 1.500" Gear: .417" to 4.167"	Worm: .562" to .812" Gear: .156" to .219"	84	–	74 – 76
48DP – 4DP	.333" to 3.000"	.417" to 6.000"	.562" to 5.250"	.156" to 1.500"	84	85 – 86	74 – 82
16DP – 3DP	.625" to 4.000"	1.250" to 18.000"	1.000" to 5.250"	.312" to 2.000"	84	85 – 86	77 – 83

Tooth Gauge



SHAFT ACCESSORIES SELECTION/REFERENCE GUIDE

COUPLINGS

INSERT (3 JAW)

FC Type – Pg. 91–92

SPIDER RING

BF Type – Pg. 93

SHEAR

BG Type – Pg. 94

CLAMP

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MULTI-JAW

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RIGID

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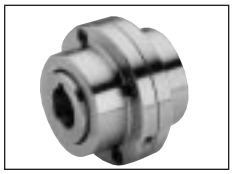
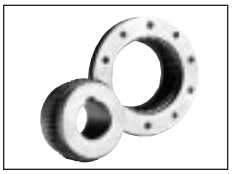
COMPLETE COUPLING



GC Type – Page 98

HALF COUPLING



GH Type – Page 98

UNIVERSAL JOINTS

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J Type – Pages 103 – 104

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MOLDED WITH SLIDE EXTENSION

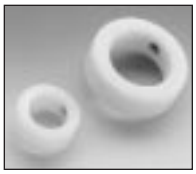
JPE Type – Page 109

COLLARS

SETSCREW

SC Type – Page 111

WASHDOWN DUTY



NSC Type – Page 112

CLAMPING-THREADED

CSC Type – Page 113

CLAMPING – 1 PIECE

CS Type – Page 114

CLAMPING – 2 PIECE

2SC Type – Page 115

WASHDOWN DUTY

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WASHERS

HARDENED STEEL WASHERS

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BUSHINGS

SOFT STEEL BUSHINGS

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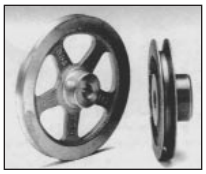
PULLEYS

GROOVED



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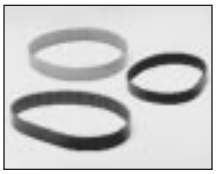
MINIATURE TIMING BELTS & PULLEYS

TIMING BELTS



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PULLEYS

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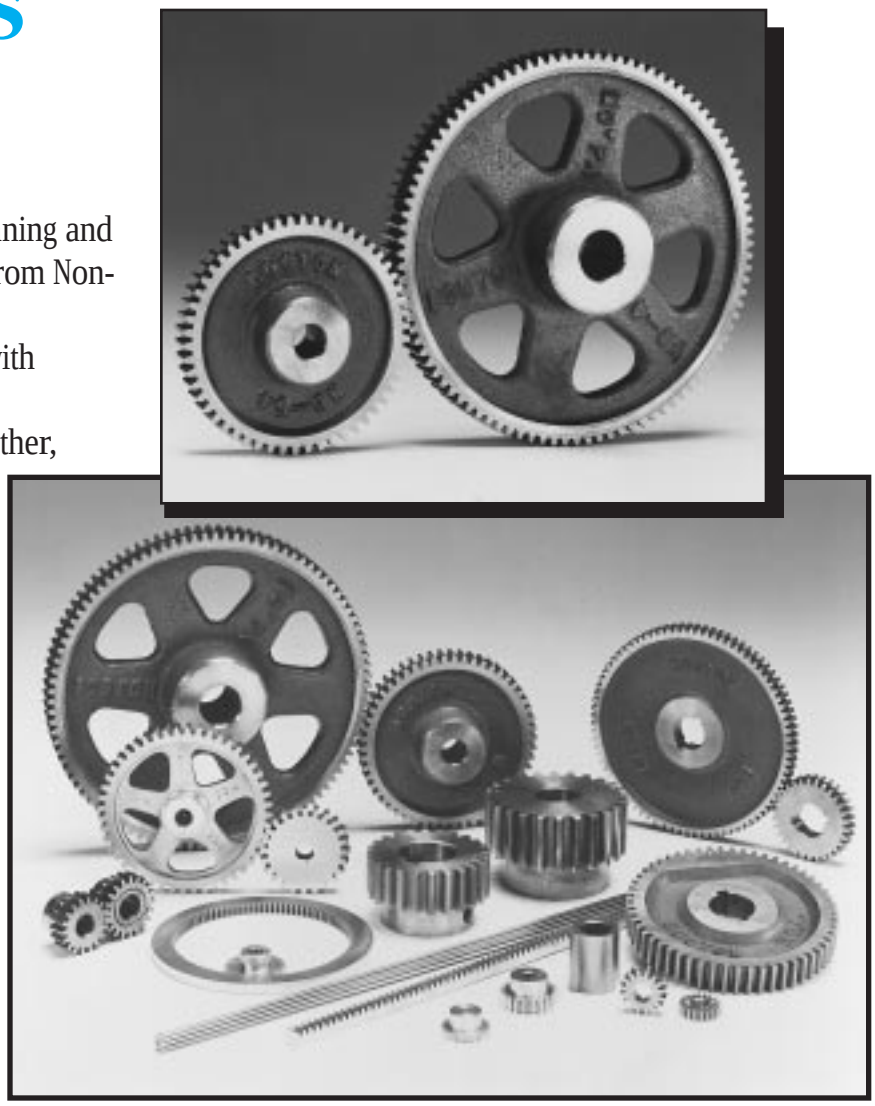
SPUR GEARS

- Parallel Shaft Applications
- Reliability from Steel, Cast Iron and Brass
- More Cost Effective, Quieter Running and Corrosion-Resistant Operation from Non-Metallic Options
- Higher Load Carrying Capacity with 20° PA (Pressure Angle)
- Higher Contact Ratio for a Smoother, Quieter Operation with 14-1/2° PA



Selections From Stock

- Pinions and Gears (Steel, Cast Iron, Brass, Non-Metallic)
- Change Gears (Steel or Cast Iron)
- Stem Pinions (Steel)
- Drawn Pinion Wire (Brass, Steel)
- Rack (Brass, Steel, Nylon)
- Internal (Brass)
- Diametral Pitch 64 DP to 3 DP
- Pitch Diameter .208" to 36.000"
- Diametral Pitch System Standardized on Stock Gears
- 14-1/2° and 20° Pressure Angles

Boston spur gears are designed to transmit motion and power between parallel shafts. Configurations include spur, rack, pinion wire, stem pinions and internal gears; most with a selection of bores, keyways and set screws. Fine-pitch gears are available in plastic, brass, stainless steel and steel. Heavier pitch spurs are available in steel and cast iron. Styles include plain, web, web with lightening holes or spoked. Change gears have consecutive numbers of teeth for a variety of ratios.

Boston Gear manufactures both 14-1/2° and 20°PA, involute, full depth system gears. While 20°PA is generally recognized as having higher load carrying capacity, 14-1/2°PA gears have extensive use. The lower pressure angle results in less change in backlash due to center distance variation and concentricity errors. It also provides a higher contact ratio and consequent smoother, quieter operation provided that the undercut of the teeth is not present.

HELICAL GEARS

- Parallel and 90° Non-Intersecting Shaft Applications
- Improved Tooth Strength
- Greater Load Carrying Capacity
- Increased Contact Ratio
- Smoother Operating Characteristics

Selections From Stock

- Helicals, 45° Helix Angle
- Transverse Diametral Pitch (TDP) System
- Hardened Steel (24 TDP – 6 TDP)
- Bronze (8 TDP – 6 TDP)
- Pitch Diameter .333" to 6.000"
- 14-1/2° Pressure Angle

Boston helical gears are stocked both right and left hand, made with a 45° helix angle. They are designed to transmit motion and power between non-intersecting shafts which are positioned either parallel (opposing hand) or at 90° to each other (same hand). Because these gears are top-hobbed, there is extremely close concentricity between the pitch diameter and the outside diameter.

Helical gears offer additional benefits relative to Spur Gears, those being:

- *Improved tooth strength due to the elongated helical wrap-around.*
- *Increased contact ratio due to the axial tooth overlap.*
- *Helical Gears tend to have greater load carrying capacity than Spur Gears of similar size.*
- *Because of the above, smoother operating characteristics are apparent.*

All Boston Helicals are cut to the Transverse Diametral Pitch System, resulting in a higher Normal Diametral Pitch Number.

IS YOUR BEST SOURCE . . .

MITER AND BEVEL GEARS

- 90° Intersecting Shaft Applications
- Coniflex® Tooth Form for Increased Life and Smoother, Quieter Operation
- Spiral Miter and Bevel for Higher Speed, Greater Torque Load, and Quieter Operating Applications
- Miter Gears for 1:1 Ratio Applications
- Bevel Gears for 1.5:1 to 6:1 Ratio Applications
- Soft Bores for Customized Alterations

Selections from Stock

- Straight Miter Gears
  - Nylon (48 DP – 16 DP)
  - Brass (48 DP – 24 DP)
  - Steel (48 DP – 4 DP)
  - Iron (8 DP – 4 DP)
- Spiral Miter Gears (35° Spiral Angle)
  - Steel (18 DP – 5 DP)
- Straight Bevel Gears
  - Brass (48 DP – 24 DP)
  - Steel (20 DP – 6 DP)
  - Iron (16 DP – 4 DP)
- Spiral Bevel Gears (35° Spiral Angle)
  - Steel (30 DP – 8 DP)
- Diametral Pitch – 48 DP to 4 DP
- Pitch Diameter – 0.250" to 9.000"
- 20° Pressure Angle
- Hardened or Unhardened Teeth (Steel)
- Made in Accordance with AGMA Specifications for the Basic Tooth Form

Boston miter and bevel gears are designed for transmission of motion and power between intersecting shafts positioned at a right angle. Straight tooth miter and bevel gears are cut with a generated tooth form having a localized lengthwise tooth bearing known as the "Coniflex"® tooth form. The superiority of these gears over straight bevels with full length tooth bearing lies in the control of tooth contact. The localization of contact permits minor adjustment of the gears in assembly and allows for some displacement due to deflection under operating loads, without concentration of the load on the end of the tooth. This results in increased life and quieter operation.

Spiral tooth form miter and bevel gears are suited for higher speed and larger torque applications.

WORMS AND WORM GEARS

- 90° Non-Intersecting Shaft Applications
- Smoothest, Quietest Form of Gearing
- High Ratio Speed Reduction
- Minimal Space Requirements
- Resistance to Back Driving with Some Ratios
- Increased Efficiency with Lower Ratios

Selections from Stock

- Worms
  - Acetal (48 DP – 24 DP)
  - Steel (48 DP – 3 DP)
- Worm Gears
  - Acetal (48 DP – 24 DP)
  - Bronze (48 DP – 4 DP)
  - Cast Iron (16 DP – 3 DP)
- Pressure Angle
  - 14-1/2°, 20°, 25°
- Thread
  - Single, Double, Quadruple
- Diametral Pitch – 48 DP to 3 DP
- Center Distances – 0.375" to 11.000"

Boston Gear worms and worm gears provide an effective answer for such power transmission applications as high-ratio speed reduction, limited space, right-angle shafts and non-intersecting shafts. When properly applied, they are the smoothest and quietest form of gearing. Steel worms and cast iron or bronze worm gears having throated teeth are available in single or multiple threads, 48 to 3 diametral pitch or up to 85" pitch diameter. Acetal worms and worm gears are available in 48, 32 and 24 diametral pitches.

The efficiency of a worm gear drive depends on the lead angle and number of starts on the worm. The angle generally decreases with increasing ratio and worm pitch diameter. For increased efficiency the ratio should be kept low.

The Boston Gear Story

21st Century Innovation Built on Our Second Century of Quality, Service, Value, and Performance

Started in 1877 as a machine shop making gear cutting machines, Boston Gear has led the growth of the power transmission industry for more than a century. In its early years, Boston Gear introduced the concepts of gear standardization and stock gears—innovations of enormous benefit to power transmission system designers, specifiers and users.

Today, Boston Gear manufactures open gearing in our modern state-of-the-art manufacturing facility in Charlotte, North Carolina.

We continue to improve product quality and manufacturing efficiencies with implementation of programs including Gear Cell Manufacturing, CAD/CAM Design and Manufacturing, CNC/DNC Programming, and Computer Aided Production and Inventory Control.

In addition, Boston Gear provides the widest range of integrated motion control products from one source.

The convenience of this single-source capability is yours when you buy Boston Gear.

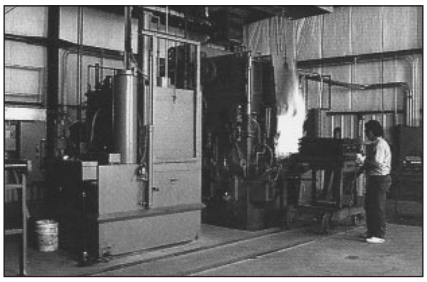
Manufacturing Excellence

Boston Gear manufactures more than 20,000 products in-house at facilities in Louisburg and Charlotte, North Carolina; Florence, Kentucky; and York, Pennsylvania. We utilize cell technology, efficient plant and work center layouts, and operator teams. This approach optimizes production flow, encourages a sense of responsibility and pride of workmanship, and enables consistently high-quality output.

Computerized production control provides close supervision over scheduling and resource planning, allowing the flexibility to fit your requirements smoothly into the master schedule. Other dedicated computer controls within the production department govern the ordering and delivery functions to keep operations lean and efficient.

Engineering Services

The Boston Gear Engineering Group can satisfy your technical needs through skillful application of standard products or development of custom designs. Creating specials if we are unable to satisfy your needs from our stock catalog items or stock altered items is an important aspect of customer service. Support is provided by R&D personnel who use microprocessor-controlled equipment to collect and monitor data on materials and product performance. In-house heat treating facilities enable us to harden gear teeth while maintaining a soft bore for future correct sizing as determined by the specific application.



Computer-Aided-Design (CAD) systems help Boston Gear engineers create new approaches to broad industrial challenges or specific customer needs. Computer simulation and testing at critical stages ensure that their designs are practical.

Via our participation in BostSpec® by Autodesk, Boston Gear offers over 80,000 product drawings digitized in industry standard AutoCAD .DWG and .DXF format. This CD-ROM provides seamless interface with current versions of AutoCAD, AutoCAD LT, and other CAD programs saving hours of valuable computer drawing, selection and engineering specification time.

Customer Service

Service is our first priority at Boston Gear. We provide service and support through a network of the finest authorized distributors backed by Boston Gear field sales and customer service inside sales personnel.

National Service Centers and distributors are linked by a sophisticated computer communication system which provides product availability, and product customization to meet your motion control needs.

You get up-to-the-minute information on product availability, order entry, delivery dates and prices. You'll save time and be assured that your order is filled and on its way.

Stock Availability

Boston Gear utilizes our Florence, Kentucky Central Distribution Center to inventory and ship all catalog products. This facility is supplemented by satellite warehouses in Norwalk, California; Mississauga, Ontario; and Mexico City, Mexico. In keeping with our intent to be the most responsive supplier in the power transmission industry, Boston Gear will ship any in stock product the same day it's ordered, up to 8p.m. EST.

Quality Assurance

Our Quality Policy

That the people of Boston Gear will provide all products and services at a quality level that meets or exceeds the expectations and the requirements of our customers.

Boston Gear products are subject to an in-house Total Quality Awareness System to ensure that quality requirements are met while productivity is improved. The objective: make the product correctly the first time – all the time. In operation, our people audit production processes, isolate problem causes, then implement corrective action to maintain and improve quality throughout the production run. Our Quality Policy is your assurance that Total Quality Awareness is working.

BOSTON GEAR® PROUDLY MADE IN THE USA QUALITY – VALUE – TRADITION

AGMA

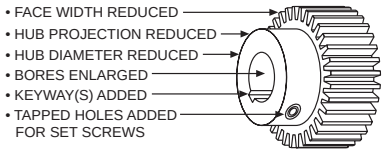
Power Transmission Distributors Association

Industrial Distributors

Stock Product Alterations

Boston Gear provides customization services for open gears and rack with 24-hour turnaround. Our machine shop operations in our Florence facility for product rework and modification include:

- Reduce faces and OD's
- Rebore, shorten or remove hubs
- Add keyways and set screws
- Machine to special tolerances
- Drill and tap
- Stamp parts with customer's P/N



Keyways and bores available in common metric sizes.

Why It Pays To Buy Boston Gear

With over a century of experience, Boston Gear has built an unmatched store of knowledge and expertise in the design, manufacture and improvement of power transmission products. This unique capability has been made more accessible and cost-effective with the thoughtful application of the latest in state-of-the-art computer technology.

Choose from a vast array of stock products described in the Boston Gear Product Catalogs, or work with Boston Gear engineers to find an economical solution to your special requirements. Either way, you're assured of efficient, on-time order fulfillment to meet your productivity demands.

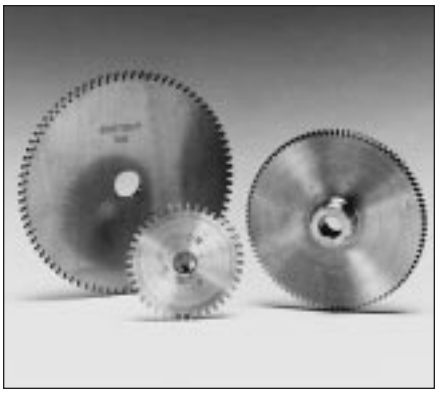
For the best in quality, service, value and performance, it pays to buy Boston Gear – The Market Leader and Innovator in Selected Motion Control Products and Information Related Services!

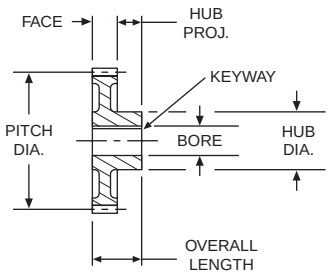
SPUR GEARS

SECTION CONTENTS

48 AND 32 DIAMETRAL PITCH
BRASS

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)





STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32

48 D.P. 32 D.P.

REFERENCE PAGES

Alterations — 152
Lubrication — 152
Materials — 153

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

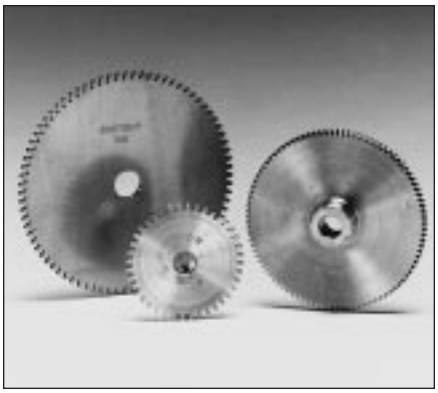
No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code
48 DIAMETRAL PITCH					**Face = .125" Outside Dia. = Pitch Dia. + .042" Overall Length = .125" + Hub Proj.**		
BRASS							
10	.208	.0935	–	–		G127	09322
12	.250					G129	09324
14	.292					G130	09326
15	.312	.125	–	–		G131	09328
16	.333					G132	09330
18	.375					G133	09332
20	.417					G134	09334
22	.458					G135	09336
24	.500					G136	09338
26	.542					G137	09340
32	.667	.1875	–	–	A	G138	09342
36	.750					G139	09344
40	.833					G140	09346
44	.917					G141	09348
48	1.000					G142	09350
54	1.125					G143	09352
60	1.250					G144	09354
66	1.375	.250	.50	.25		G145	09356
72	1.500					G146	09358
84	1.750					G147	09360
96	2.000					G148	09362
100	2.083					G154	09364
120	2.500	.3125	.62	.31	D	G149	09366
144	3.000					G150	09368
192	4.000					G151	09370
32 DIAMETRAL PITCH					**Face = .062" Outside Dia. = Pitch Dia. + .062"**		
BRASS							
10	.312	.125	–	–		G96	09234
14	.438					G98	09238
16	.500					G99	09240
20	.625					G101	09244
24	.750	.1875	–	–		G102	09246
28	.875					G103	09248
32	1.000				A	G104	09250
40	1.250	.250	–	–		G105	09252
48	1.500					G106	09254
64	2.000					G110	09256
80	2.500	.3125	–	–		G111	09258
96	3.000					G112	09260
112	3.500					G113	09262
128	4.000	.375	–	–		G114	09264
Face = .188"							
8	.250					G159	09266
10	.312					G161	09268
12	.375	.125	–	–		G163	09270
14	.438					G165	09272
15	.469					G166	09274
16	.500					G167	09276
18	.562					G168	09278
20	.625					G169	09280
22	.688	.1875	–	–	A	G170	09282
24	.750					G171	09284
26	.812					G172	09286
28	.875					G173	09288
30	.938					G174	09290
32	1.000					G175	09292
36	1.125					G176	09294
40	1.250	.250	–	–		G177	09296
44	1.375					G178	09298
48	1.500					G179	09300
52	1.625					G180	09302
56	1.750	.3125	–	–		G181	09304

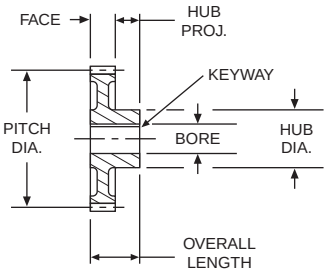
(continued next page)

SPUR GEARS

32 AND 24 DIAMETRAL PITCH
BRASS AND STEEL

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)





STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32

32 D.P. **24 D.P.**

REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 38
Lubrication — 152
Materials — 153
Selection Procedure — 37

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

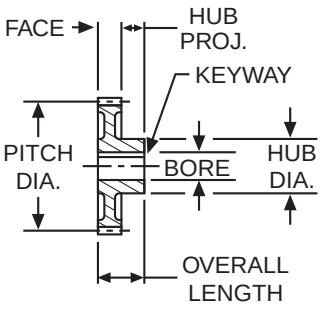
No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code	With Setscrew Catalog Number	With Setscrew Item Code
32 DIAMETRAL PITCH						**Face = .188" Outside Dia. = Pitch Dia. + .062" Overall Length = .187" + Hub Proj.**			
BRASS									
64	2.000	.3125	.62	.25	B	G182	09306	–	–
72	2.250			.31	C	G183	09308	–	–
80	2.500				D	G184	09310	–	–
96	3.000					G185	09312	–	–
112	3.500					G186	09314	–	–
128	4.000		.75			G187	09316	–	–
STEEL									
16	.500	.1875	–	–		S3216	09572	–	–
20	.625	.250	–	–		S3220	09574	–	–
22	.688					S3222	09576	–	–
24	.750	.3125	–	–		S3224	09578	–	–
28	.875	.375	–	–		S3228	09580	–	–
32	1.000	.3125				S3232	09582	–	–
40	1.250	.375	–	–		S3240	09584	–	–
48	1.500					S3248	09586	–	–
56	1.750					S3256	09588	–	–
64	2.000					S3264	09590	–	–
80	2.500					S3280	09592	–	–
96	3.000					S3296	09594	–	–
16	.500	.1875	.39	.31		–	–	H3216	09536
18	.562		.45			–	–	H3218	09538
20	.625	.250	.52	.31	A	–	–	H3220	09540
22	.688		.58			–	–	H3222	09542
24	.750	.3125	.64	.312		–	–	H3224	09544
26	.812		.70			–	–	H3226	09546
28	.875		.75			–	–	H3228	09548
30	.938		.75			–	–	H3230	09550
32	1.000		.75	.38		–	–	H3232	09552
40	1.250	.375	.88	.38		–	–	H3240	09554
48	1.500					–	–	H3248	09556
56	1.750		1.00	.38		–	–	H3256	09558
64	2.000					–	–	H3264	09560
80	2.500		1.12	.38		–	–	H3280	09562
96	3.000		1.25	.50		–	–	H3296	09564
128	4.000		1.88	.50		–	–	H32128	09566
160	5.000		2.12	.50		–	–	H32160	09568
192	6.000		2.12	.50		–	–	H32192	09570
24 DIAMETRAL PITCH						**Face = .250" Outside Dia. = Pitch Dia. + .083" Overall Length = .250" + Hub Proj.**			
BRASS									
12	.500	.1875	.38	.25	A	G254	09202	–	–
16	.667		.50			G256	09204	–	–
18	.750		.50			G257	09206	–	–
24	1.000	.250	.62	.25		G258	09208	–	–
30	1.250					G259	09210	–	–
36	1.500					G261	09212	–	–
42	1.750	.3125	.62	.25	B	G263	09214	–	–
48	2.000		.69	.31		G264	09216	–	–
54	2.250				C	G265	09218	–	–
60	2.500					G266	09220	–	–
66	2.750				D	G267	09222	–	–
72	3.000	.375	.75	.31		G268	09224	–	–
84	3.500		.75	.31		G269	09226	–	–
96	4.000		.75	.31		G270	09228	–	–
120	5.000		.88	.38		G272	09230	–	–
144	6.000		.88	.38		G274	09232	–	–

(continued next page)

SPUR GEARS

24 AND 20 DIAMETRAL PITCH STEEL

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)



STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32

24 D.P. 20 D.P.

REFERENCE PAGES

*Special Pitch Diameter, used for calculating Center Distance only, not Ratio.

†H2412 & H2414 have #35 (.110) drilled hole through one wall, no keyway.
H2415 has one setscrew, no keyway.

NA-5/16" bore has #35 (.110) drilled hole through one wall, no keyway.

NA-3/8" and 1/2" bores have one setscrew, no keyway.

NA-5/8" & 3/4" bores have standard keyway at 90° to setscrew. See Page 153.

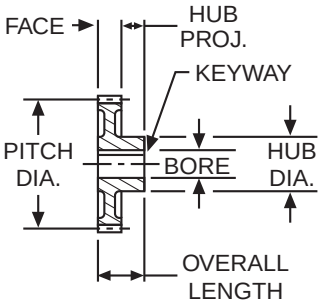
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code	With Keyway & Setscrew† Catalog Number	With Keyway & Setscrew† Item Code
24 DIAMETRAL PITCH						**Face = .250" Outside Dia. = Pitch Dia. + .083" Overall Length = .250" + Hub Proj.**			
STEEL									
12	.500	.250	–	–		S2412	09630	–	–
15	.625		–	–		S2415	09632	–	–
16	.667	.3125	–	–		S2416	09634	–	–
18	.750		–	–		S2418	09636	–	–
21	.875	.375	–	–		S2421	09638	–	–
24	1.000	.500	–	–		S2424	09640	–	–
30	1.250					S2430	09642	–	–
36	1.500					S2436	09644	–	–
42	1.750					S2442	09646	–	–
48	2.000					S2448	09648	–	–
60	2.500					S2460	09650	–	–
72	3.000					S2472	09652	–	–
12	.500	.250	.36	.31	A	–	–	H2412	09596
14	.583		.46			–	–	H2414	09598
15	.625		.50			–	–	H2415	09600
16	.667	.3125	.54	.31		–	–	H2416	09602
18	.750		.62			–	–	H2418	09604
20	.833		.70			–	–	H2420	09606
21	.875	.375	.74	.31		–	–	H2421	09608
24	1.000		.87	.38		–	–	H2424	09610
30	1.250		1.00			–	–	H2430	09612
36	1.500		1.12			–	–	H2436	09614
42	1.750		1.12			–	–	H2442	09616
48	2.000		1.25			–	–	H2448	09618
60	2.500		1.25			–	–	H2460	09620
72	3.000	.500	1.38	.50		–	–	H2472	09622
96	4.000		2.00			–	–	H2496	09624
120	5.000		2.25			–	–	H24120	09626
144	6.000		2.25			–	–	H24144	09628
20 DIAMETRAL PITCH						**Face = .375" Outside Dia. = Pitch Dia. + .100" Overall Length = .375" + Hub Proj.**			
STEEL									
11	.600*	.3125	.46	.38	B	NA11B	09662	NA11B-5/16	46000
12	.600		.46			NA12B	09664	NA12B-5/16	46001
13	.650		.50			NA13B	09666	NA13B-5/16	46002
14	.700		.56			NA14B	09668	NA14B-5/16	46003
15	.750	.375	.60	.38		NA15B	09670	NA15B-3/8	46004
16	.800		.66			NA16B	09672	NA16B-3/8	46005
18	.900		.74			NA18B	09674	NA18B-3/8	46006
20	1.000	.375 .500	.84	.38		NA20B –	09676 –	NA20B-3/8 NA20B-1/2	46007 46008
22	1.100	.375 .500	.82	.38		NA22B –	09678 –	NA22B-3/8 NA22B-1/2	46009 46010
24	1.200	.375 .500	.92	.38		NA24 –	09680 –	NA24-3/8 NA24-1/2	46011 46012
25	1.250	.375 .500	.97	.38		NA25B –	09682 –	NA25B-3/8 NA25B-1/2	46013 46014
28	1.400	.375 .500	1.12	.38		NA28B –	09684 –	NA28B-3/8 NA28B-1/2	46015 46016
30	1.500	.375 .500	1.22	.38		NA30B –	09686 –	NA30B-3/8 NA30B-1/2	46017 46018
32	1.600	.375 .500	1.32	.50		NA32 –	09688 –	NA32-3/8 NA32-1/2	46019 46020
35	1.750	.375 .500	1.47	.50		NA35 –	09690 –	NA35-3/8 NA35-1/2	46021 46022
36	1.800	.375 .500	1.52	.50		NA36 –	09692 –	NA36-3/8 NA36-1/2	46023 46024
40	2.000	.375 .500 .625 .750	1.72	.50		NA40 – – –	09694 – – –	NA40-3/8 NA40-1/2 NA40-5/8 NA40-3/4	46025 46026 46027 46028
48	2.400	.375	1.33	.50		NA48A	10208	–	–
50	2.500		1.42			NA50A	10210	–	–
60	3.000		1.92			NA60A	10212	–	–
64	3.200		2.12			NA64A	10214	–	–

SPUR GEARS

20 AND 16 DIAMETRAL PITCH
CAST IRON, BRASS AND STEEL

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)



STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32

REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 39, 40
Lubrication — 152
Materials — 153
Selection Procedure — 37

*Special Pitch Diameter, used for calculating Center Distance only, not Ratio.

†3/8" and 1/2" bores have one setscrew, no keyway.

5/8" bore and larger have standard keyway at 90° to setscrew. See Page 153.

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

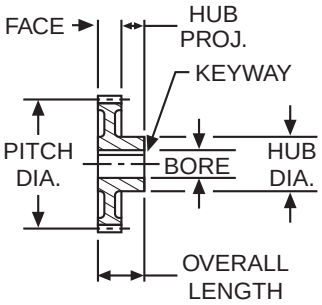
No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code	With Keyway and Setscrew† Catalog Number	With Keyway and Setscrew† Item Code
20 DIAMETRAL PITCH						**Face = .375" Outside Dia. = Pitch Dia. + .100" Overall Length = .375" + Hub Proj.**			
CAST IRON									
70	3.500	.375	1.25	.50	B	NA70	10216	–	–
72	3.600					NA72	10218	–	–
80	4.000	.500	1.25	.50		NA80	10220	–	–
84	4.200					NA84	10222	–	–
90	4.500				C	NA90	10224	–	–
96	4.800					NA96	10226	–	–
100	5.000				D	NA100	10228	–	–
112	5.600	.500	1.50	.50		NA112	10230	–	–
120	6.000					NA120	10232	–	–
140	7.000					NA140	10234	–	–
144	7.200					NA144	10236	–	–
160	8.000			.62		NA160	10238	–	–
180	9.000					NA180	10240	–	–
200	10.000		1.75			NA200B	10242	–	–
16 DIAMETRAL PITCH						**Face = .313" Outside Dia. = Pitch Dia. + .125" Overall Length = Face + Hub Proj.**			
BRASS									
8	.500	.1875	–	–	A	G226	09168	–	–
9	.563					G227	09170	–	–
10	.625	.250	–	–		G228	09172	–	–
12	.750					G229	09174	–	–
14	.875					G230	09176	–	–
16	1.000					G231	09178	–	–
18	1.125					G232	09180	–	–
20	1.250					G233	09182	–	–
24	1.500	.3125	.75	.31		G235	09184	–	–
28	1.750					G236	09186	–	–
32	2.000				B	G237	09188	–	–
40	2.500					G238	09190	–	–
48	3.000					G239	09192	–	–
56	3.500	.375	.88	.38	D	G240	09194	–	–
64	4.000		1.00			G241	09196	–	–
80	5.000		1.00			G242	09198	–	–
STEEL						**Face = .500"**			
11	.750*	.375	.56	.44	A	NB11B	09704	NB11B-3/8	46029
12	.750		.56			NB12B	09706	NB12B-3/8	46030
13	.813		.63			NB13B	09708	NB13B-3/8	46031
14	.875		.69			NB14B	09710	NB14B-3/8	46032
15	.938	.500	.75	.44		NB15B	09712	NB15B-1/2	46033
16	1.000		.81			NB16B	09714	NB16B-1/2	46034
18	1.125		.94			NB18B	09716	NB18B-1/2	46035
20	1.250	.500	.96	.44		NB20B	09718	NB20B-1/2	46036
		.625				–	–	NB20B-5/8	46037
22	1.375	.500	1.08	.44		NB22B	09720	NB22B-1/2	46038
		.625				–	–	NB22B-5/8	46039
24	1.500	.500	1.20	.44		NB24B	09722	NB24B-1/2	46040
		.625				–	–	NB24B-5/8	46041
		.750				–	–	NB24B-3/4	46042
26	1.625	.500	1.33	.44		NB26B	09724	NB26B-1/2	46043
		.625				–	–	NB26B-5/8	46044
		.750				–	–	NB26B-3/4	40645
28	1.750	.500	1.45	.50		NB28B	09726	NB28B-1/2	46046
		.625				–	–	NB28B-5/8	46047
		.750				–	–	NB28B-3/4	46048
		.875				–	–	NB28B-7/8	46049
30	1.875	.500	1.58	.50		NB30B	09728	NB30B-1/2	46050
		.625				–	–	NB30B-5/8	46051
		.750				–	–	NB30B-3/4	46052
		.875				–	–	NB30B-7/8	46053
		1.000				–	–	NB30B-1	46054

(continued next page)

SPUR GEARS

16 AND 12 DIAMETRAL PITCH
STEEL, NON-METALLIC AND CAST IRON

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)



STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32

REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 40, 41
Lubrication — 152
Materials — 153
Selection Procedure — 37

*Special Pitch Diameter, used for calculating Center Distance only, not Ratio.

†1/2" bore has one setscrew, no keyway.

5/8" bore and larger have standard keyway at 90° to setscrew. See Page 153.

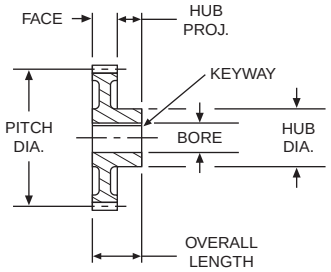
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code	With Keyway and Setscrew† Catalog Number	With Keyway and Setscrew† Item Code
16 DIAMETRAL PITCH						**Face = .500" Outside Dia. = Pitch Dia. + .125" Overall Length = .500" + Hub Proj.**			
STEEL									
32	2.000	.500	1.70	.50	A	NB32	09730	NB32-1/2	46055
		.625				–	–	NB32-5/8	46056
		.750				–	–	NB32-3/4	46057
		.875				–	–	NB32-7/8	46058
		1.000				–	–	NB32-1	46059
36	2.250	.500	1.95	.50		NB36	09732	–	–
40	2.500		1.69			NB40A	10244	–	–
48	3.000		2.19			NB48A	10246	–	–
NON-METALLIC									
16	1.000	.375	.81	.50	A	QBH16	09014	–	–
20	1.250		1.06			QBH20	09018	–	–
24	1.500	.500	1.31	.50		QBH24	09022	–	–
32	2.000		1.81	.50		QBH32	09024	–	–
40	2.500		–	–		QB40	09000	–	–
48	3.000		–	–		QB48	09002	–	–
64	4.000		–	–		QB64	09006	–	–
CAST IRON									
54	3.375	.500	1.25	.50	B	NB54	10248	–	–
56	3.500		1.25	.50		NB56	10250	–	–
60	3.750		1.38	.62		NB60	10252	–	–
64	4.000	.625	1.38	.62	C	NB64	10254	–	–
72	4.500		1.38			NB72	10256	–	–
80	5.000		1.50			NB80	10258	–	–
84	5.250		1.50			NB84	10260	–	–
96	6.000		1.50		D	NB96	10262	–	–
112	7.000		1.50			NB112	10264	–	–
120	7.500		1.50			NB120	10266	–	–
128	8.000		1.50			NB128	10268	–	–
144	9.000	.625	1.75	.75		NB144	10270	–	–
160	10.000		1.75			NB160B	10272	–	–
192	12.000		2.00			NB192B	10274	–	–
12 DIAMETRAL PITCH						**Face = .750" Outside Dia. = Pitch Dia. + .167" Overall Length = .750" + Hub Proj.**			
STEEL									
11	1.000*	.500	.75	.50	A	ND11B	09744	ND11B-1/2	46060
12	1.000		.75			ND12B	09746	ND12B-1/2	46061
13	1.083		.83			ND13B	09748	ND13B-1/2	46062
14	1.167		.92			ND14B	09750	ND14B-1/2	46063
15	1.250	.625	1.00	.50		ND15B	09752	ND15B-5/8	46064
16	1.333		.99			ND16B	09754	ND16B-5/8	46065
18	1.500		1.15			ND18B	09756	ND18B-5/8	46066
20	1.667	.625	1.32	.50		ND20B	09758	ND20B-5/8	46067
		.750				–	–	ND20B-3/4	46068
21	1.750	.625	1.40	.50		ND21B	09760	ND21B-5/8	46069
		.750				–	–	ND21B-3/4	46070
		.875				–	–	ND21B-7/8	46071
22	1.833	.625	1.49	.50		ND22B	09762	ND22B-5/8	46072
		.750				–	–	ND22B-3/4	46073
		.875				–	–	ND22B-7/8	46074
		1.000				–	–	ND22B-1	46075
24	2.000	.625	1.65	.50		ND24B	09764	ND24B-5/8	46076
		.750				–	–	ND24B-3/4	46077
		.875				–	–	ND24B-7/8	46078
		1.000				–	–	ND24B-1	46079
30	2.500	.625	2.15	.62		ND30	09766	–	–
32	2.667		1.92			ND32A	10276	–	–
36	3.000		2.25			ND36A	10278	–	–
40	3.333		2.34			ND40A	10280	–	–
42	3.500		2.50			ND42A	10282	–	–

SPUR GEARS

12 AND 10 DIAMETRAL PITCH
NON-METALLIC, CAST IRON, AND STEEL

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)



STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32

REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 41, 42
Lubrication — 152
Materials — 153
Selection Procedure — 37

∗Special Pitch Diameter, used for calculating Center Distance only, not Ratio.

†All gears have standard keyway at 90° to setscrew. See Page 153.

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

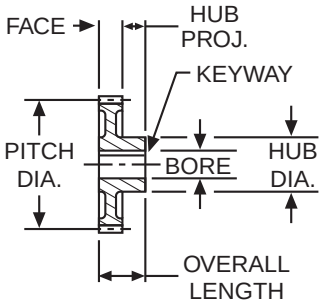
No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code	With Keyway and Setscrew† Catalog Number	With Keyway and Setscrew† Item Code
12 DIAMETRAL PITCH						**Face = .750" Outside Dia. = Pitch Dia. + .167" Overall Length = .750" + Hub Proj.**			
NON-METALLIC									
15	1.250	.500	1.00	.50	A	QDH15	09038	–	–
18	1.500		1.25			QDH18	09042	–	–
21	1.750		1.50			QDH21	09046	–	–
24	2.000	.625	1.75	.50		QDH24	09050	–	–
30	2.500		2.25	.50		QDH30	09052	–	–
36	3.000		–	–		QD36	09026	–	–
48	4.000		–	–		QD48	09030	–	–
60	5.000	.750	–	–		QD60	09034	–	–
CAST-IRON									
48	4.000	.750	1.75	.75	C	ND48	10284	–	–
54	4.500					ND54	10286	–	–
60	5.000					ND60	10288	–	–
64	5.333				D	ND64	10290	–	–
72	6.000					ND72	10292	–	–
84	7.000					ND84	10294	–	–
96	8.000	.750	2.00	.75		ND96	10296	–	–
108	9.000					ND108	10298	–	–
112	9.333					ND112	10300	–	–
120	10.000	.875	2.00	1.00		ND120	10302	–	–
144	12.000					ND144	10304	–	–
168	14.000					ND168	10306	–	–
10 DIAMETRAL PITCH						**Face = 1.000" Outside Dia. = Pitch Dia. + .200" Overall Length = 1.000" + Hub Proj.**			
STEEL									
11	1.200*	.625	.92	.62	A	NF11B	09778	NF11B-5/8	46080
12	1.200		.92			NF12B	09780	NF12B-5/8	46081
14	1.400		1.02			NF14B	09782	NF14B-5/8	46082
15	1.500	.750	1.12	.62		NF15B	09784	NF15B-3/4	46083
16	1.600		1.22			NF16B	09786	NF16B-3/4	46084
18	1.800	.750	1.42	.62		NF18B	09788	NF18B-3/4	46085
		.875				–	–	NF18B-7/8	46086
20	2.000	.750	1.62	.62		NF20B	09790	NF20B-3/4	46087
		.875				–	–	NF20B-7/8	46088
		1.000				–	–	NF20B-1	46089
24	2.400	.750	2.02	.62		NF24B	09792	NF24B-3/4	46090
		.875				–	–	NF24B-7/8	46091
		1.000				–	–	NF24B-1	46092
25	2.500	.750	2.12	.62		NF25	09794	–	–
28	2.800	.750	1.81	.88		NF28A	10310	–	–
30	3.000		2.02			NF30A	10312	–	–
32	3.200		2.22			NF32A	10314	–	–
35	3.500		2.52			NF35A	10316	–	–
36	3.600		2.61			NF36A	10318	–	–
NON-METALLIC									
15	1.500	.625	1.20	.62	A	QFH15	09062	–	–
18	1.800		1.50			QFH18	09066	–	–
20	2.000	.750	1.70	.62		QFH20	09068	–	–
25	2.500		2.20			QFH25	09070	–	–
30	3.000		2.70			QFH30	09072	–	–

(continued next page)

SPUR GEARS

10 AND 8 DIAMETRAL PITCH
CAST IRON, STEEL AND NON-METALLIC

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)



STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32

10 D.P. 8 D.P.

REFERENCE PAGES

*Special Pitch Diameter, used for calculating Center Distance only, not Ratio.

†All gears have standard keyway, at 90° to setscrew. See Page 153.

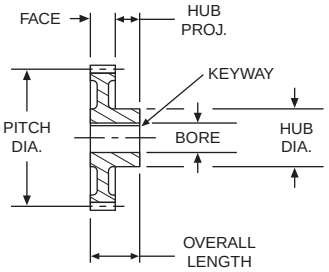
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code	With Keyway and Setscrew† Catalog Number	With Keyway and Setscrew† Item Code
10 DIAMETRAL PITCH						**Face = 1.000" Outside Dia. = Pitch Dia. + .200" Overall Length = 1.000" + Hub Proj.**			
CAST IRON									
40	4.000	.875	2.12	.88	B	NF40	10320	–	–
42	4.200					NF42	10322	–	–
45	4.500					NF45	10324	–	–
48	4.800					NF48	10326	–	–
50	5.000					NF50	10328	–	–
54	5.400				C	NF54	10330	–	–
55	5.500				D	NF55	10332	–	–
60	6.000					NF60	10334	–	–
64	6.400					NF64	10336	–	–
70	7.000					NF70	10338	–	–
72	7.200					NF72	10340	–	–
80	8.000					NF80	10342	–	–
84	8.400		2.25			NF84	10344	–	–
90	9.000					NF90	10346	–	–
96	9.600					NF96	10348	–	–
100	10.000	1.00	2.25	.88		NF100	10350	–	–
110	11.000		2.50	1.00		NF110	10352	–	–
120	12.000					NF120	10356	–	–
140	14.000					NF140	10358	–	–
144	14.400					NF144	10360	–	–
160	16.000					NF160	10362	–	–
180	18.000		2.75			NF180	10364	–	–
8 DIAMETRAL PITCH						**Face = 1.250" Outside Dia. = Pitch Dia. + .250" Overall Length = 1.250" + Hub Proj.**			
STEEL									
11	1.500*	.750	1.12	.75	A	NH11B	09806	NH11B-3/4	46093
12	1.500		1.12			NH12B	09808	NH12B-3/4	46094
14	1.750		1.31			NH14B	09810	NH14B-3/4	46095
15	1.875	.875	1.43	.75		NH15B	09812	NH15B-7/8	46096
16	2.000	.875	1.56	.75		NH16B	09814	NH16B-7/8	46097
						–	–	NH16B-1	46098
18	2.250	.875	1.81	.75		NH18B	09816	NH18B-7/8	46099
		1.000				–	–	NH18B-1	46100
		1.125				–	–	NH18B-1-1/8	46101
20	2.500	.875	2.06	.75		NH20B	09818	NH20B-7/8	46102
		1.000				–	–	NH20B-1	46103
		1.125				–	–	NH20B-1-1/8	46104
22	2.750	.875	2.31	.75		NH22B	09820	NH22B-7/8	46105
		1.000				–	–	NH22B-1	46106
		1.125				–	–	NH22B-1-1/8	46107
24	3.000	.875	2.06	.88		NH24A	10368	–	–
28	3.500		2.56			NH28A	10370	–	–
30	3.750		2.75			NH30A	10372	–	–
32	4.000	1.000	3.00	.88		NH32A	10374	–	–
NON-METALLIC									
16	2.000	.750	1.62	.75	A	QHH16	09082	–	–
18	2.250		1.88			QHH18	09084	–	–
20	2.500	.875	2.12	.75		QHH20	09086	–	–
24	3.000		2.62			QHH24	09088	–	–
28	3.500		3.12			QHH28	09090	–	–

SPUR GEARS

8 AND 6 DIAMETRAL PITCH
CAST IRON AND STEEL

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)



ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code	With Keyway and Setscrew† Catalog Number	With Keyway and Setscrew† Item Code
8 DIAMETRAL PITCH						**Face = 1.250" Outside Dia. = Pitch Dia. + .250" Overall Length = 1.250" + Hub Proj.**			
CAST IRON									
36	4.500	1.000	2.50	1.00	B	NH36	10376	–	–
40	5.000					NH40	10378	–	–
42	5.250					NH42	10380	–	–
44	5.500					NH44	10382	–	–
48	6.000					NH48	10384	–	–
54	6.750				C	NH54	10386	–	–
56	7.000				D	NH56	10388	–	–
60	7.500					NH60	10390	–	–
64	8.000					NH64	10392	–	–
72	9.000					NH72	10394	–	–
80	10.000	1.125	3.00	1.12		NH80	10396	–	–
84	10.500					NH84	10398	–	–
88	11.000					NH88	10400	–	–
96	12.000					NH96	10402	–	–
112	14.000					NH112	10404	–	–
120	15.000					NH120	10406	–	–
128	16.000					NH128	10408	–	–
144	18.000					NH144	10410	–	–
160	20.000	1.125	3.25	1.25		NH160-B	10412	–	–
6 DIAMETRAL PITCH						**Face = 1.500" Outside Dia. = Pitch Dia + .333" Overall Length = 1.500" + Hub Proj.**			
STEEL									
11	2.000*	1.000	1.46	.88	A	NJ11B	09830	NJ11B-1	46108
12	2.000					NJ12B	09832	NJ12B-1	46109
14	2.333	1.000	1.79	.88		NJ14B	09834	NJ14B-1	46110
		1.125				–	–	NJ14B-1-1/8	46111
15	2.500	1.000	1.96	.88		NJ15B	09836	NJ15B-1	46112
		1.125				–	–	NJ15B-1-1/8	46113
		1.1875				–	–	NJ15B-1-3/16	46114
		1.250				–	–	NJ15B-1-1/4	46115
16	2.667	1.000	2.13	.88		NJ16B	09838	NJ16B-1	46116
		1.125				–	–	NJ16B-1-1/8	46117
		1.1875				–	–	NJ16B-1-3/16	46118
		1.250				–	–	NJ16B-1-1/4	46119
18	3.000	1.000	2.46	.88		NJ18B	09840	NJ18B-1	46120
		1.125				–	–	NJ18B-1-1/8	46121
		1.1875				–	–	NJ18B-1-3/16	46122
		1.250				–	–	NJ18B-1-1/4	46123
20	3.333	1.000	2.79	.88		NJ20	09842	NJ20-1	46124
		1.125				–	–	NJ20-1-1/8	46125
		1.1875				–	–	NJ20-1-3/16	46126
		1.250				–	–	NJ20-1-1/4	46127
21	3.500	1.000	2.96	.88		NJ21B	09844	–	–
24	4.000	1.125	3.00	.88		NJ24A	10414	–	–
27	4.500		3.50			NJ27A	10416	–	–
30	5.000		4.00			NJ30A	10418	–	–

(continued next page)

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32

8 D.P. **6 D.P.**

REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 43, 44
Lubrication — 152
Materials — 153
Selection Procedure — 37

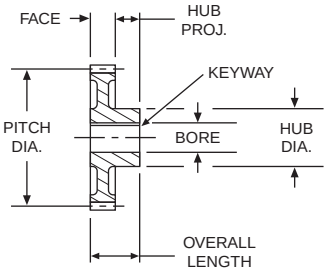
*Special Pitch Diameter, used for calculating Center Distance only, not Ratio.

†All gears have standard keyway, at 90° to setscrew. See Page 153.

SPUR GEARS

6 AND 5 DIAMETRAL PITCH
CAST IRON AND STEEL

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)



STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32

6 D.P. 5 D.P.

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code
6 DIAMETRAL PITCH						**Face = 1.500″ Outside Dia. = Pitch Dia + .333″ Overall Length = 1.500″ + Hub Proj.**	
CAST IRON							
32	5.333	1.125	2.50	1.00	B	NJ32	10420
33	5.500					NJ33	10422
36	6.000					NJ36	10424
40	6.667				C	NJ40	10426
42	7.000					NJ42	10428
48	8.000					NJ48	10430
54	9.000					NJ54	10432
60	10.000	1.250	3.00	1.25	D	NJ60	10434
64	10.667					NJ64	10436
66	11.000					NJ66	10438
72	12.000					NJ72	10440
84	14.000		3.25			NJ84	10442
96	16.000					NJ96	10444
108	18.000					NJ108	10446
120	20.000		3.50	1.50		NJ120B	10448
144	24.000		3.75			NJ144B	10452
5 DIAMETRAL PITCH						**Face = 1.750" Outside Dia. = Pitch Dia. + .400" Overall Length = 1.750" + Hub Proj.**	
STEEL							
11	2.400*	1.0625	1.78	.88	A	NK11B	09846
12	2.400		1.78			NK12B	09848
14	2.800		2.18			NK14B	09850
15	3.000		2.38			NK15B	09852
16	3.200		2.58			NK16B	09854
18	3.600		2.98			NK18B	09856
20	4.000		3.38			NK20B	09858
CAST IRON							
24	4.800	1.0625	3.00	1.25	A	NK24B	10454
25	5.000				B	NK25B	10456
30	6.000					NK30B	10458
35	7.000	1.1875	3.00	1.25		NK35B	10460
40	8.000					NK40B	10462
45	9.000					NK45B	10464
50	10.000	1.1875	3.50	1.25	D	NK50B	10466
55	11.000					NK55B	10468
60	12.000					NK60B	10470
70	14.000					NK70B	10472
80	16.000					NK80B	10474
100	20.000	1.3125	3.75	1.50		NK100B	10478

*Special Pitch Diameter, used for calculating Center Distance only, not Ratio.

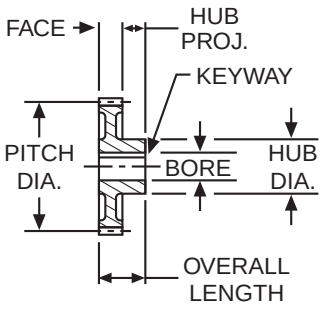
REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 44
Lubrication — 152
Materials — 153
Selection Procedure — 37

SPUR GEARS

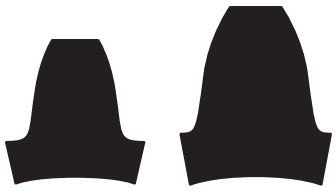
4 AND 3 DIAMETRAL PITCH
STEEL AND CAST IRON

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)



STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32



REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 44, 45
Lubrication — 152
Materials — 153
Selection Procedure — 37

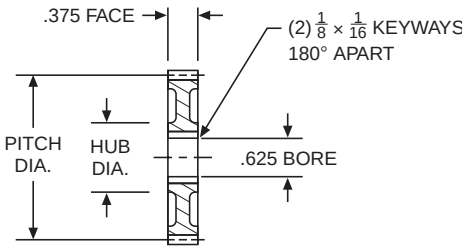
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Item Code
4 DIAMETRAL PITCH						**Face = 2.000" Outside Dia. = Pitch Dia. + .500" Overall Length = 2.000" + Hub Proj.**	
STEEL							
11	3.000*	1.125	2.27	.88	A	NL11B	09860
12	3.000		2.27			NL12B	09862
14	3.500		2.77			NL14B	09864
15	3.750		3.02			NL15B	09866
16	4.000		3.27			NL16B	09868
18	4.500		3.77			NL18B	09870
20	5.000		4.27			NL20B	09872
22	5.500		4.77			NL22B	09874
CAST IRON							
24	6.000	1.125	3.50	1.50	A	NL24B	10484
28	7.000	1.250			B	NL28B	10486
30	7.500					NL30	10488
32	8.000					NL32B	10490
36	9.000					NL36B	10492
40	10.000		4.00		C	NL40B	10494
42	10.500					NL42	10496
44	11.000					NL44B	10498
48	12.000				D	NL48B	10500
54	13.500					NL54	10502
56	14.000					NL56B	10504
60	15.000					NL60	10506
64	16.000					NL64B	10508
72	18.000					NL72B	10510
80	20.000	1.375	4.50	1.50		NL80B	10512
84	21.000					NL84	10514
88	22.000			1.75		NL88B	10516
96	24.000					NL96B	10518
3 DIAMETRAL PITCH						**Face = 3.000" Outside Dia. = Pitch Dia. + .667" Overall Length = Face + Hub Proj.**	
STEEL							
11	4.000*	1.3125	–	–	A	NO11B†	09876
12	4.000					NO12B†	09878
14	4.667					NO14B	09880
15	5.000					NO15B	09882
16	5.333					NO16B	09884
18	6.000					NO18B	09886
20	6.667					NO20	09888
21	7.000					NO21B	09890
CAST IRON							
24	8.000	1.4375	4.50	1.25	B	NO24B	10524
30	10.000		5.25			NO30B	10526
36	12.000			1.75		NO36B	10528
42	14.000				C	NO42	10530
48	16.000	1.5625	5.25	1.75	D	NO48B	10532
54	18.000					NO54	10534
60	20.000					NO60B	10536
72	24.000	1.6875	5.50	1.75		NO72B	10538
84	28.000		5.75			NO84B	10540
96	32.000	1.9375	5.75	1.75		NO96B	10542
108	36.000					NO108B	10544

*Special Pitch Diameter, used for calculating Center Distance only, not Ratio.
†NO11B and NO12B have 4" Face.

20 DIAMETRAL PITCH
STEEL AND CAST IRON

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)



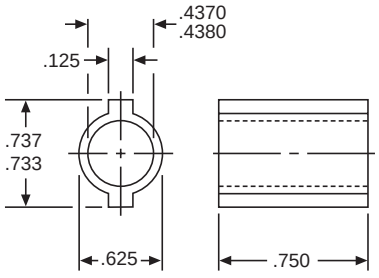
20 D.P.

REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 39
Lubrication — 152
Materials — 153
Selection Procedure — 37

COMPOUND STEEL BUSHINGS

These steel bushings have 2 keys, 180° apart and fit bores of GA series change gears with a slip fit. They are used to mount two gears on one shaft (or stud) and drive one from the other.



ORDER BY CATALOG NUMBER OR ITEM CODE

CATALOG NO.	ITEM CODE
GAB20A	18500

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

20 DIAMETRAL PITCH — Outside Dia. = Pitch Dia. +.100"

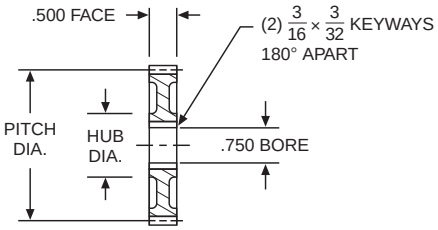
No. of Teeth	Pitch Dia.	Hub Dia.	Catalog Number	Item Code
STEEL				
20	1.000		GA20	10038
21	1.050		GA21	10040
22	1.100		GA22	10042
23	1.150		GA23	10044
24	1.200		GA24	10046
25	1.250		GA25	10048
26	1.300		GA26	10050
27	1.350		GA27	10052
28	1.400		GA28	10054
29	1.450		GA29	10056
30	1.500		GA30	10058
31	1.550		GA31	10060
32	1.600		GA32	10062
33	1.650		GA33	10064
34	1.700	–	GA34	10066
35	1.750		GA35	10068
36	1.800		GA36	10070
37	1.850		GA37	10072
38	1.900		GA38	10074
39	1.950		GA39	10076
40	2.000		GA40	10078
41	2.050		GA41	10080
42	2.100		GA42	10082
43	2.150		GA43	10084
44	2.200		GA44	10086
45	2.250		GA45	10088
46	2.300		GA46	10090
47	2.350		GA47	10092
48	2.400		GA48	10094
49	2.450		GA49	10096
50	2.500		GA50	10098
CAST IRON				
51	2.550		GA51B	10802
52	2.600		GA52B	10804
53	2.650		GA53B	10806
54	2.700		GA54B	10808
55	2.750		GA55B	10810
56	2.800		GA56B	10812
57	2.850		GA57B	10814
58	2.900	1.38	GA58B	10816
59	2.950		GA59B	10818
60	3.000		GA60B	10820
61	3.050		GA61B	10822
62	3.100		GA62B	10824
63	3.150		GA63B	10826
64	3.200		GA64B	10828
65	3.250		GA65B	10830
66	3.300		GA66B	10832
67	3.350	1.56	GA67B	10834
68	3.400		GA68B	10836
69	3.450		GA69B	10838
70	3.500		GA70B	10840

No. of Teeth	Pitch Dia.	Hub Dia.	Catalog Number	Item Code
CAST IRON				
71	3.550		GA71B	10842
72	3.600		GA72B	10844
73	3.650		GA73B	10846
74	3.700		GA74B	10848
75	3.750	1.56	GA75B	10850
76	3.800		GA76B	10852
77	3.850		GA77B	10854
78	3.900		GA78B	10856
79	3.950		GA79B	10858
80	4.000		GA80B	10860
81	4.050		GA81B	10862
82	4.100		GA82B	10864
83	4.150		GA83B	10866
84	4.200		GA84B	10868
85	4.250		GA85B	10870
86	4.300		GA86B	10872
87	4.350		GA87B	10874
88	4.400		GA88B	10876
89	4.450		GA89B	10878
90	4.500		GA90B	10880
91	4.550		GA91B	10882
92	4.600		GA92B	10884
93	4.650		GA93B	10886
94	4.700		GA94B	10888
95	4.750		GA95B	10890
96	4.800		GA96B	10892
97	4.850		GA97B	10894
98	4.900	1.69	GA98B	10896
99	4.950		GA99B	10898
100	5.000		GA100B	10900
101	5.050		GA101B	10902
102	5.100		GA102B	10904
103	5.150		GA103B	10906
104	5.200		GA104B	10908
105	5.250		GA105B	10910
106	5.300		GA106B	10912
107	5.350		GA107B	10914
108	5.400		GA108B	10916
109	5.450		GA109B	10918
110	5.500		GA110B	10920
111	5.550		GA111B	10922
112	5.600		GA112B	10924
113	5.650		GA113B	10926
114	5.700		GA114B	10928
115	5.750		GA115B	10930
116	5.800		GA116B	10932
117	5.850		GA117B	10934
118	5.900		GA118B	10936
119	5.950		GA119B	10938
120	6.000		GA120B	10940

Style See Page 153	20 – 50 Teeth – A 51 – 78 Teeth – B 79 – 120 Teeth – C

16 DIAMETRAL PITCH
STEEL AND CAST IRON

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)



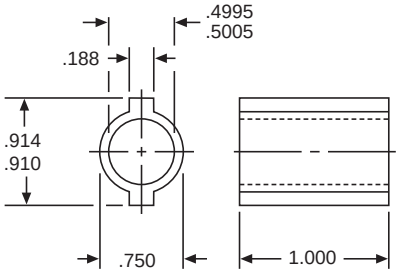
16 D.P.

REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 40
Lubrication — 152
Materials — 153
Selection Procedure — 37

COMPOUND STEEL BUSHINGS

These steel bushings have 2 keys, 180° apart and fit bores of GB series change gears with a slip fit. They are used to mount two gears on one shaft (or stud) and drive one from the other.



ORDER BY CATALOG NUMBER OR ITEM CODE

CATALOG NO.	ITEM CODE
GBB16A	18502

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

16 DIAMETRAL PITCH — **Outside Dia. = Pitch Dia. +.125"**

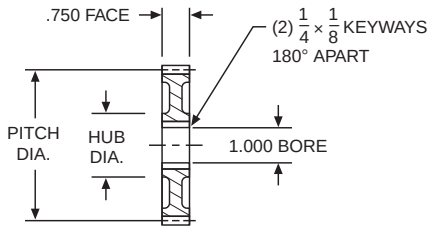
No. of Teeth	Pitch Dia.	Hub Dia.	Catalog Number	Item Code
STEEL				
20	1.250	–	GB20	10100
21	1.313		GB21	10102
22	1.375		GB22	10104
23	1.438		GB23	10106
24	1.500		GB24	10108
25	1.563		GB25	10110
26	1.625		GB26	10112
27	1.688		GB27	10114
28	1.750		GB28	10116
29	1.813		GB29	10118
30	1.875		GB30	10120
31	1.938		GB31	10122
32	2.000		GB32	10124
33	2.063		GB33	10126
34	2.125		GB34	10128
35	2.188		GB35	10130
36	2.250		GB36	10132
37	2.313		GB37	10134
38	2.375		GB38	10136
39	2.438		GB39	10138
40	2.500		GB40	10140
CAST IRON				
41	2.563	1.56	GB41B	10942
42	2.625		GB42B	10944
43	2.688		GB43B	10946
44	2.750		GB44B	10948
45	2.913		GB45B	10950
46	2.875		GB46B	10952
47	2.938		GB47B	10954
48	3.000		GB48B	10956
49	3.063		GB49B	10958
50	3.125		GB50B	10960
51	3.188	1.81	GB51B	10962
52	3.250		GB52B	10964
53	3.313		GB53B	10966
54	3.375		GB54B	10968
55	3.438		GB55B	10970
56	3.500		GB56B	10972
57	3.563		GB57B	10974
58	3.625		GB58B	10976
59	3.688		GB59B	10978
60	3.750		GB60B	10980
61	3.813		GB61B	10982
62	3.875		GB62B	10984
63	3.938		GB63B	10986
64	4.000		GB64B	10988
65	4.063		GB65B	10990
66	4.125		GB66B	10992
67	4.188		GB67B	10994
68	4.250		GB68B	10996
69	4.313		GB69B	10998
70	4.375		GB70B	11000
71	4.438		GB71B	11002
72	4.500		GB72B	11004
73	4.563		GB73B	11006
74	4.625		GB74B	11008
75	4.688		GB75B	11010

No. of Teeth	Pitch Dia.	Hub Dia.	Catalog Number	Item Code
CAST IRON				
76	4.750	1.81	GB76B	11012
77	4.813		GB77B	11014
78	4.875		GB78B	11016
79	4.938		GB79B	11018
80	5.000		GB80B	11020
81	5.063		GB81B	11022
82	5.125		GB82A	11024
83	5.188		GB83A	11026
84	5.250		GB84A	11028
85	5.313		GB85A	11030
86	5.375		GB86A	11032
87	5.438		GB87A	11034
88	5.500		GB88A	11036
89	5.563		GB89A	11038
90	5.625		GB90A	11040
91	5.688		GB91A	11042
92	5.750		GB92A	11044
93	5.813		GB93A	11046
94	5.875		GB94A	11048
95	5.938		GB95A	11050
96	6.000		GB96A	11052
97	6.063		GB97A	11054
98	6.125		GB98A	11056
99	6.188		GB99A	11058
100	6.250		GB100A	11060
101	6.313		GB101A	11062
102	6.375		GB102A	11064
103	6.438		GB103A	11066
104	6.500		GB104A	11068
105	6.563		GB105A	11070
106	6.625		GB106A	11072
107	6.688		GB107A	11074
108	6.750		GB108A	11076
109	6.913		GB109A	11078
110	6.975		GB110A	11080
111	6.938		GB111A	11082
112	7.000		GB112A	11084
113	7.063		GB113A	11086
114	7.125		GB114A	11088
115	7.188		GB115A	11090
116	7.250		GB116A	11092
117	7.313		GB117A	11094
118	7.375		GB118A	11096
119	7.438		GB119A	11098
120	7.500		GB120A	11100
121	7.563		GB121A	11102
122	7.625		GB122A	11104
123	7.688		GB123A	11106
124	7.750		GB124A	11108
125	7.813		GB125A	11110
126	7.875		GB126A	11112
127	7.938		GB127A	11114
128	8.000		GB128A	11116

Style See Page 153	
	20 – 40 Teeth – A 41 – 79 Teeth – B 80 – 128 Teeth – C

12 DIAMETRAL PITCH
STEEL AND CAST IRON

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)



12 D.P.

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Hub Dia.	Catalog Number	Item Code
12 DIAMETRAL PITCH				**Outside Dia. = Pitch Dia. +.167"**
STEEL				
20	1.667	–	GD20	10142
21	1.750		GD21	10144
22	1.833		GD22	10146
23	1.917		GD23	10148
24	2.000		GD24	10150
25	2.083		GD25	10152
26	2.167		GD26	10154
27	2.250		GD27	10156
28	2.333		GD28	10158
29	2.417		GD29	10160
30	2.500		GD30	10162
31	2.583		GD31	10164
32	2.667		GD32	10166
33	2.750		GD33	10168
34	2.833		GD34	10170
35	2.971		GD35	10172
36	3.000		GD36	10174
CAST IRON				
37	3.083	1.76	GD37A	11118
38	3.167		GD38A	11120
39	3.250		GD39A	11122
40	3.333		GD40A	11124
41	3.417		GD41A	11126
42	3.500		GD42A	11128
43	3.583		GD43A	11130
44	3.667		GD44A	11132
45	3.750		GD45A	11134
46	3.833		GD46A	11136
47	3.917		GD47A	11138
48	4.000		GD48A	11140
49	4.083	2.19	GD49A	11142
50	4.167		GD50A	11144
51	4.250		GD51A	11146
52	4.333		GD52A	11148
53	4.417		GD53A	11150
54	4.500		GD54A	11152
55	4.583		GD55A	11154
56	4.667		GD56A	11156
57	4.750		GD57A	11158
58	4.833		GD58A	11160
59	4.917		GD59A	11162
60	5.000		GD60A	11164
61	5.083		GD61A	11166
62	5.167		GD62A	11168
63	5.250		GD63A	11170
64	5.333		GD64A	11172
65	5.417		GD65A	11174
66	5.500		GD66A	11176
67	5.583		GD67A	11178
68	5.667		GD68A	11180
69	5.750		GD69A	11182
70	5.833		GD70A	11184
71	5.917		GD71A	11186
72	6.000		GD72A	11188
73	6.083		GD73A	11190
74	6.167		GD74A	11192

No. of Teeth	Pitch Dia.	Hub Dia.	Catalog Number	Item Code
CAST IRON				
75	6.250	2.19	GD75A	11194
76	6.333		GD76A	11196
77	6.417		GD77A	11198
78	6.500		GD78A	11200
79	6.583		GD79A	11202
80	6.667		GD80A	11204
81	6.750		GD81A	11206
82	6.833		GD82A	11208
83	6.917		GD83A	11210
84	7.000		GD84A	11212
85	7.083	2.44	GD85A	11214
86	7.167		GD86A	11216
87	7.250		GD87A	11218
88	7.333		GD88A	11220
89	7.417		GD89A	11222
90	7.500		GD90A	11224
91	7.583		GD91A	11226
92	7.667		GD92A	11228
93	7.750		GD93A	11230
94	7.833		GD94A	11232
95	7.917		GD95A	11234
96	8.000		GD96A	11236
97	8.083		GD97A	11238
98	8.167		GD98A	11240
99	8.250		GD99A	11242
100	8.333		GD100A	11244
101	8.417		GD101A	11246
102	8.500		GD102A	11248
103	8.583		GD103A	11250
104	8.667		GD104A	11252
105	8.750		GD105A	11254
106	8.833		GD106A	11256
107	8.917		GD107A	11258
108	9.000		GD108A	11260
109	9.083		GD109A	11262
110	9.167		GD110A	11264
111	9.250		GD111A	11266
112	9.333		GD112A	11268
113	9.417		GD113A	11270
114	9.500		GD114A	11272
115	9.583		GD115A	11274
116	9.667		GD116A	11276
117	9.750		GD117A	11278
118	9.833		GD118A	11280
119	9.917		GD119A	11282
120	10.000		GD120A	11284

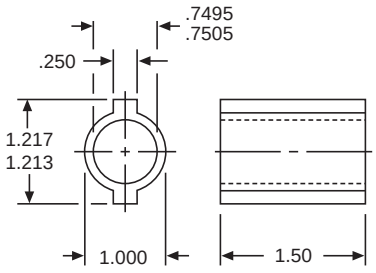
Style	
See Page 153	20 – 36 Teeth – A 37 – 60 Teeth – B 61 – 120 Teeth – C

REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 41
Lubrication — 152
Materials — 153
Selection Procedure — 37

COMPOUND STEEL BUSHINGS

These steel bushings have 2 keys, 180° apart and fit bores of GD series change gears with a slip fit. They are used to mount two gears on one shaft (or stud) and drive one from the other.

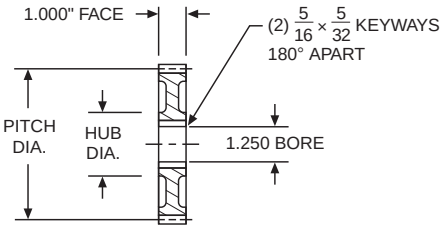


ORDER BY CATALOG NUMBER OR ITEM CODE

CATALOG NO.	ITEM CODE
GDB12A	18504

10 DIAMETRAL PITCH
STEEL AND CAST IRON

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)



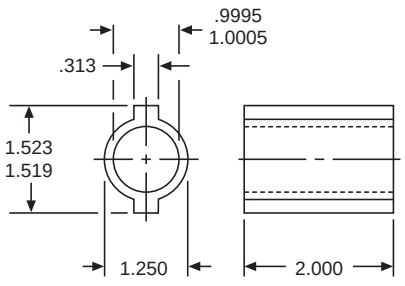
10 D.P.

REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 42
Lubrication — 152
Materials — 153
Selection Procedure — 37

COMPOUND STEEL BUSHINGS

These steel bushings have 2 keys, 180° apart and fit bores of GF series change gears with a slip fit. They are used to mount two gears on one shaft (or stud) and drive one from the other.



ORDER BY CATALOG NUMBER OR ITEM CODE

CATALOG NO.	ITEM CODE
GFB10A	18506

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

10 DIAMETRAL PITCH — **Outside Dia. = Pitch Dia. +.200"**

No. of Teeth	Pitch Dia.	Hub Dia.	Catalog Number	Item Code
STEEL				
20	2.000	–	GF20	10176
21	2.100		GF21	10178
22	2.200		GF22	10180
23	2.300		GF23	10182
24	2.400		GF24	10184
25	2.500		GF25	10186
26	2.600		GF26	10188
27	2.700		GF27	10190
28	2.800		GF28	10192
29	2.900		GF29	10194
30	3.000		GF30	10196
CAST IRON				
31	3.100	1.94	GF31B	11286
32	3.200		GF32B	11288
33	3.300		GF33B	11290
34	3.400		GF34B	11292
35	3.500		GF35B	11294
36	3.600		GF36B	11296
37	3.700		GF37B	11298
38	3.800		GF38B	11300
39	3.900		GF39B	11302
40	4.000		GF40B	11304
41	4.100		GF41B	11306
42	4.200	2.68	GF42B	11308
43	4.300		GF43B	11310
44	4.400		GF44B	11312
45	4.500		GF45B	11314
46	4.600		GF46B	11316
47	4.700		GF47B	11318
48	4.800		GF48B	11320
49	4.900		GF49B	11322
50	5.000		GF50B	11324
51	5.100		GF51B	11326
52	5.200	3.12	GF52A	11328
53	5.300		GF53A	11330
54	5.400		GF54A	11332
55	5.500		GF55A	11334
56	5.600		GF56A	11336
57	5.700		GF57A	11338
58	5.800		GF58A	11340
59	5.900		GF59A	11342
60	6.000		GF60A	11344

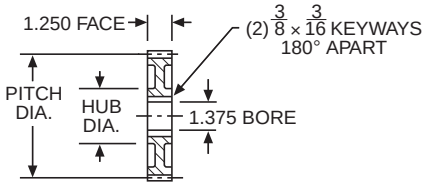
No. of Teeth	Pitch Dia.	Hub Dia.	Catalog Number	Item Code
CAST IRON				
61	6.100	3.12	GF61A	11346
62	6.200		GF62A	11348
63	6.300		GF63A	11350
64	6.400		GF64A	11352
65	6.500		GF65A	11354
66	6.600		GF66A	11356
67	6.700		GF67A	11358
68	6.800		GF68A	11360
69	6.900		GF69A	11362
70	7.000		GF70A	11364
71	7.100		GF71A	11366
72	7.200		GF72A	11368
73	7.300		GF73A	11370
74	7.400		GF74A	11372
75	7.500		GF75A	11374
76	7.600		GF76A	11376
77	7.700		GF77A	11378
78	7.800		GF78A	11380
79	7.900		GF79A	11382
80	8.000		GF80A	11384
81	8.100		GF81A	11386
82	8.200		GF82A	11388
83	8.300		GF83A	11390
84	8.400		GF84A	11392
85	8.500		GF85A	11394
86	8.600		GF86A	11396
87	8.700		GF87A	11398
88	8.800		GF88A	11400
89	8.900		GF89A	11402
90	9.000		GF90A	11404
91	9.100		GF91A	11406
92	9.200		GF92A	11408
93	9.300		GF93A	11410
94	9.400		GF94A	11412
95	9.500		GF95A	11414
96	9.600		GF96A	11416
97	9.700		GF97A	11418
98	9.800		GF98A	11420
99	9.900		GF99A	11422
100	10.000		GF100A	11424

Style See Page 153	
	20 – 30 Teeth – A 31 – 66 Teeth – B 67 – 100 Teeth – C

CHANGE GEARS

8 DIAMETRAL PITCH
STEEL AND CAST IRON

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)



8 D.P.

REFERENCE PAGES

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ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

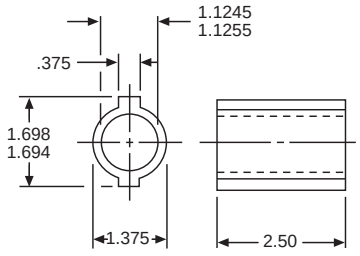
No. of Teeth	Pitch Dia.	Hub Dia.	Catalog Number	Item Code
8 DIAMETRAL PITCH				**Outside Dia. = Pitch Dia. +.250"**
STEEL				
20	2.500	–	GH20	10198
21	2.625	–	GH21	10200
22	2.750	–	GH22	10202
23	2.875	–	GH23	10204
24	3.000	–	GH24	10206
CAST IRON				
25	3.125	2.06	GH25B	11426
26	3.250		GH26B	11428
27	3.375		GH27B	11430
28	3.500		GH28B	11432
29	3.625		GH29B	11434
30	3.750		GH30B	11436
31	3.875		GH31B	11438
32	4.000		GH32B	11440
33	4.125		GH33B	11442
34	4.250		GH34B	11444
35	4.375		GH35B	11446
36	4.500	2.69	GH36B	11448
37	4.625		GH37B	11450
38	4.750		GH38B	11452
39	4.875		GH39B	11454
40	5.000		GH40B	11456
41	5.125		GH41A	11458
42	5.250		GH42A	11460
43	5.375		GH43A	11462
44	5.500		GH44A	11464
45	5.625		GH45A	11466
46	5.750		GH46A	11468
47	5.875		GH47A	11470
48	6.000		GH48A	11472
49	6.125		GH49A	11474
50	6.250	3.12	GH50A	11476
51	6.375		GH51A	11478
52	6.500		GH52A	11480
53	6.625		GH53A	11482
54	6.750		GH54A	11484
55	6.875		GH55A	11486
56	7.000		GH56A	11488
57	7.125		GH57A	11490
58	7.250	3.25	GH58A	11492
59	7.375		GH59A	11494
60	7.500		GH60A	11496

No. of Teeth	Pitch Dia.	Hub Dia.	Catalog Number	Item Code
CAST IRON				
61	7.625	3.25	GH61A	11498
62	7.750		GH62A	11500
63	7.875		GH63A	11502
64	8.000		GH64A	11504
65	8.125		GH65A	11506
66	8.250		GH66A	11508
67	8.375		GH67A	11510
68	8.500		GH68A	11512
69	8.625		GH69A	11514
70	8.750		GH70A	11516
71	8.875		GH71A	11518
72	9.000		GH72A	11520
73	9.125		GH73A	11522
74	9.250		GH74A	11524
75	9.375		GH75A	11526
76	9.500		GH76A	11528
77	9.625		GH77A	11530
78	9.750		GH78A	11532
79	9.875		GH79A	11534
80	10.000	3.75	GH80A	11536
81	10.125		GH81A	11538
82	10.250		GH82A	11540
83	10.375		GH83A	11542
84	10.500		GH84A	11544
85	10.625		GH85A	11546
86	10.750		GH86A	11548
87	10.875		GH87A	11550
88	11.000		GH88A	11552
89	11.125		GH89A	11554
90	11.250		GH90A	11556
91	11.375		GH91A	11558
92	11.500		GH92A	11560
93	11.625		GH93A	11562
94	11.750		GH94A	11564
95	11.875		GH95A	11566
96	12.000		GH96A	11568
97	12.125		GH97A	11570
98	12.250		GH98A	11572
99	12.375		GH99A	11574
100	12.500		GH100A	11576

Style See Page 153	
	20 – 24 Teeth – A
	25 – 57 Teeth – B
	58 – 68 Teeth – C
	69 – 100 Teeth – D

COMPOUND STEEL BUSHINGS

These steel bushings have 2 keys, 180° apart and fit bores of GH series change gears with a slip fit. They are used to mount two gears on one shaft (or stud) and drive one from the other.



ORDER BY CATALOG NUMBER OR ITEM CODE

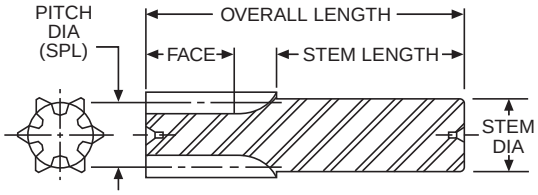
CATALOG NO.	ITEM CODE
GHB8A	18508

STEM PINIONS

20 THROUGH 6 DIAMETRAL PITCH STEEL

14½° PRESSURE ANGLE

(Will not operate with 20° spurs)



Boston Gear Stem Pinions feature small numbers of teeth cut integral on a steel shaft. Undercutting of the teeth is minimized by the use of special enlarged Pitch Diameters. When run with standard stock spur gears, they provide high ratios not normally found in spur gear drives. They are not intended to be operated with each other, with internal gears or with 11 tooth pinions, but will run satisfactorily with all other standard 14½° Pressure Angle spur gears.

STANDARD TOLERANCES

DIMENSION		TOLERANCE
STEM DIA.	All	+.0000 – .0015

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.*	Stem Dia.	Stem Length	Overall Length	Catalog Number	Item Code
20 DIAMETRAL PITCH						**FACE = 1.125"**
5	.287	.375	2.875	4.500	NAR5	09654
6	.335	.375	2.875	4.500	NAR6	09656
8	.430	.500	3.375	5.000	NAR8	09658
10	.525	.625	3.375	5.000	NAR10	09660
16 DIAMETRAL PITCH						**FACE = 1.375"**
5	.359	.4375	3.125	5.000	NBR5	09696
6	.419	.500	3.125	5.000	NBR6	09698
8	.537	.625	3.375	5.250	NBR8	09700
10	.656	.750	3.375	5.250	NBR10	09702
12 DIAMETRAL PITCH						**FACE = 2.000"**
5	.479	.625	4.375	7.250	NDR5	09734
6	.558	.625	4.375	7.250	NDR6	09736
7	.637	.750	4.375	7.250	NDR7	09738
8	.716	.875	4.375	7.250	NDR8	09740
10	.875	1.000	4.375	7.250	NDR10	09742
10 DIAMETRAL PITCH						**FACE = 2.250"**
5	.575	.750	4.375	7.500	NFR5	09768
6	.670	.750	4.375	7.500	NFR6	09770
7	.765	.875	4.375	7.500	NFR7	09772
8	.860	1.000	4.375	7.500	NFR8	09774
10	1.050	1.125	4.375	7.500	NFR10	09776
8 DIAMETRAL PITCH						**FACE = 2.500"**
5	.718	.875	4.375	7.750	NHR5	09796
6	.837	1.000	4.375	7.750	NHR6	09798
7	.956	1.125	4.375	7.750	NHR7	09800
8	1.075	1.125	4.375	7.750	NHR8	09802
10	1.312	1.500	4.375	7.750	NHR10	09804
6 DIAMETRAL PITCH						**FACE = 3.000"**
5	.958	1.250	4.375	8.500	NJR5	09822
6	1.116	1.375	4.375	8.500	NJR6	09824
8	1.433	1.625	5.000	9.000	NJR8	09826
10	1.750	2.000	5.375	9.500	NJR10	09828

*Used for calculating Center Distance, not ratio.

DRAWN PINION WIRE

48, 32 AND 24 DIAMETRAL PITCH BRASS AND STEEL

14½° PRESSURE ANGLE

(Will not operate with 20° spurs)

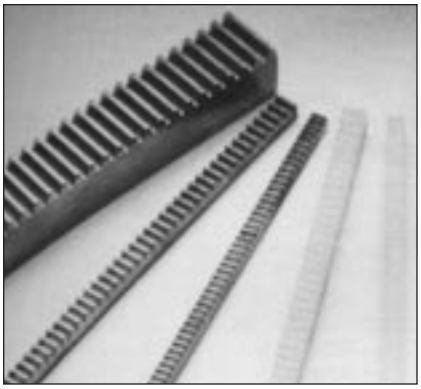
Drawn Pinion Wire, teeth not generated. All Pinion Wire is stocked in 4 foot pieces. Other lengths can be furnished on special order. Price on application.

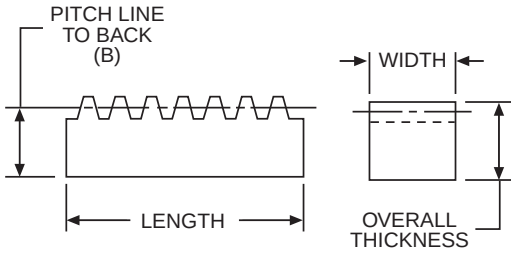
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Catalog Number	Item Code
48 DIAMETRAL PITCH			
BRASS			
6	.125	G24	36900
8	.167	G25	36902
9	.188	G26	36904
10	.208	G27	36906
12	.250	G29	36908
14	.292	G30	36910
15	.312	G31	36912
16	.333	G32	36914
18	.375	G33	36916
STEEL			
6	.125	GS24	36954
8	.167	GS25	36956
9	.188	GS26	36958
10	.208	GS27	36960
12	.250	GS29	36962
14	.292	GS30	36964
15	.312	GS31	36966
16	.333	GS32	36968
18	.375	GS33	36970
32 DIAMETRAL PITCH			
BRASS			
6	.188	G39	36918
8	.250	G40	36920
9	.281	G41	36922
10	.312	G42	36924
11	.344	G43	36926
12	.375	G44	36928
14	.438	G45	36930
15	.469	G46	36932
16	.500	G47	36934
STEEL			
6	.188	GS39	36972
8	.250	GS40	36974
9	.281	GS41	36976
10	.312	GS42	36978
11	.344	GS43	36980
12	.375	GS44	36982
14	.438	GS45	36984
15	.469	GS46	36986
16	.500	GS47	36988
24 DIAMETRAL PITCH			
BRASS			
6	.250	G54	36936
9	.375	G56	36940
10	.417	G57	36942
12	.500	G59	36946
14	.583	G60	36948
15	.625	G61	36950
16	.667	G62	36952
STEEL			
6	.250	GS54	36990
8	.333	GS55	36992
9	.375	GS56	36994
10	.417	GS57	36996
11	.458	GS58	36998
12	.500	GS59	37000
14	.583	GS60	37002
15	.625	GS61	37004
16	.667	GS62	37006

48 THROUGH 3 DIAMETRAL PITCH
NYLON, BRASS AND STEEL

14½° PRESSURE ANGLE
(Will not operate with 20° spurs)



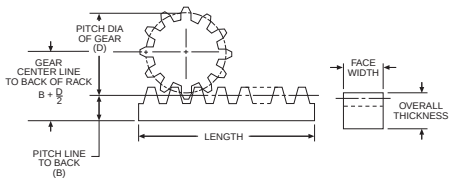


STANDARD TOLERANCES‡

DIMENSION		TOLERANCE
LENGTH†	All	+ 1.00 – .000
FACE WIDTH	1/8 – 3/4	+ .000 – .002
	1 – 1-1/2	+ .000 – .003
	1-3/4 – 2	+ .000 – .004
	3	+ .000 – .006

†Ends not machined. Tolerance allows for cutting and matching. Nylon Rack is molded in proper lengths to permit end to end butting without interruption of tooth spacing.

‡Brass and steel only.



REFERENCE PAGES

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ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Overall Thickness	Pitch Line to Back (B)	Nominal Length (Feet)	Mating Spur Gear Page #	Nylon Catalog Number	Nylon Item Code	Brass Catalog Number	Brass Item Code	Steel Catalog Number	Steel Item Code
48 DIAMETRAL PITCH								**FACE WIDTH = .125"**	
.125	.104	1	6	GP586-1	53899	–	–	–	–
		2		–	–	G586-2	12724	L501-2	12726
32 DIAMETRAL PITCH								**FACE WIDTH = .188"**	
.188	.156	1	6,7	GP583-1	53900	–	–	–	–
		2		–	–	G583-2	12720	L503-2	12728
		4		–	–	G583-4	12722	L503-4	12730
24 DIAMETRAL PITCH								**FACE WIDTH = .250"**	
.250	.208	1	7,8	GP579-1	53901	–	–	–	–
		2		–	–	G579-2	12716	L505-2	12732
		4		–	–	G579-4	12718	L505-4	12734
20 DIAMETRAL PITCH								**FACE WIDTH = .375"**	
.375	.325	2	8,9	–	–	–	–	L509-2	12736
		4		–	–	–	–	L509-4	12738
		6		–	–	–	–	L509-6	12740
16 DIAMETRAL PITCH								***FACE WIDTH = .313"**	
.312	.250	2	9,10	–	–	G576-2	12712	L510-2	12742
		4		–	–	G576-4	12714	L510-4	12744
.500	.438	4		–	–	–	–	L512-4	12746
		6		–	–	–	–	L512-6	12748
12 DIAMETRAL PITCH								**FACE WIDTH = .750"**	
.500	.417	4	10,11	–	–	–	–	L514-4	12750
		6		–	–	–	–	L514-6	12752
.750	.667	4		–	–	–	–	L515-4	12754
		6		–	–	–	–	L515-6	12756
10 DIAMETRAL PITCH								**FACE WIDTH = 1.000"**	
.625	.525	4	11,12	–	–	–	–	L516-4	37324
		6		–	–	–	–	L516-6	37326
1.000	.900	4		–	–	–	–	L517-4	37328
		6		–	–	–	–	L517-6	37330
8 DIAMETRAL PITCH								**FACE WIDTH = 1.250"**	
.750	.625	4	12,13	–	–	–	–	L518-4	37332
		6		–	–	–	–	L518-6	37334
1.250	1.125	4		–	–	–	–	L519-4	37336
		6		–	–	–	–	L519-6	37338
6 DIAMETRAL PITCH								**FACE WIDTH = 1.500"**	
1.000	.833	4	13,14	–	–	–	–	L520-4	37340
		6		–	–	–	–	L520-6	37342
1.500	1.333	4		–	–	–	–	L521-4	37344
		6		–	–	–	–	L521-6	37346
5 DIAMETRAL PITCH								**FACE WIDTH = 1.750"**	
1.250	1.050	4	14	–	–	–	–	L522-4	37348
		6		–	–	–	–	L522-6	37350
4 DIAMETRAL PITCH								**FACE WIDTH = 2.000"**	
1.500	1.250	4	15	–	–	–	–	L523-4	37352
		6		–	–	–	–	L523-6	37354
3 DIAMETRAL PITCH								**FACE WIDTH = 3.000"**	
1.500	1.167	4	15	–	–	–	–	L524-4	37356
		6		–	–	–	–	L524-6	37358

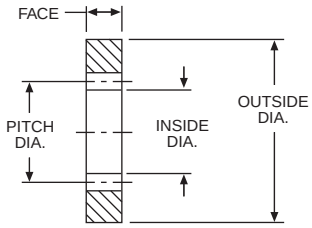
*Face Width of L512-4 and L512-6 = 1/2".

INTERNAL GEARS

48 THROUGH 16 DIAMETRAL PITCH BRASS

14½° PRESSURE ANGLE

(Will not operate with 20° spurs)

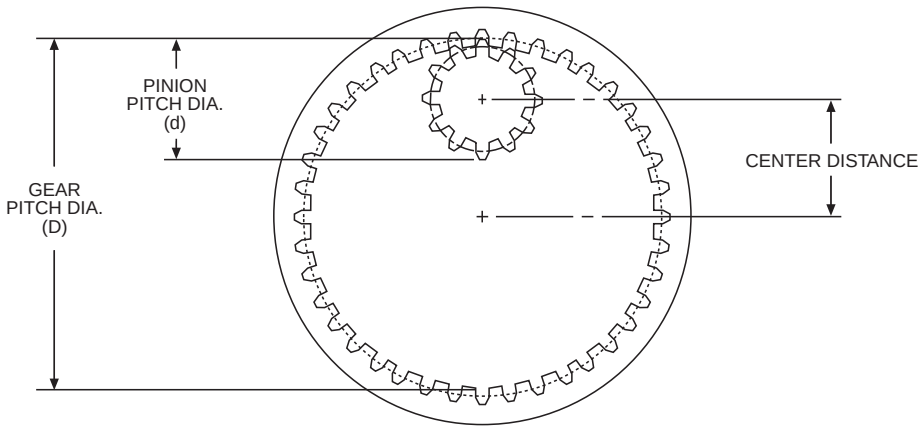


ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	O.D.	I.D.	Catalog Number	Item Code
48 DIAMETRAL PITCH					**FACE = .125"**
48	1.000	1.500	.986	G632	12066
72	1.500	2.000	1.486	G633	12068
96	2.000	2.750	1.986	G635	12070
144	3.000	3.750	2.986	G637	12072
32 DIAMETRAL PITCH					**FACE = .188"**
48	1.500	2.000	1.480	G664	12056
64	2.000	2.750	1.980	G666	12058
96	3.000	3.750	2.980	G668	12060
128	4.000	4.750	3.980	G669	12062
192	6.000	6.750	5.980	G670	12064
24 DIAMETRAL PITCH					**FACE = .250"**
36	1.500	2.250	1.474	G675	12046
48	2.000	2.750	1.974	G677	12048
72	3.000	3.750	2.974	G679	12050
96	4.000	4.750	3.974	G680	12052
144	6.000	6.750	5.974	G681	12054
16 DIAMETRAL PITCH					**FACE = .313"**
32	2.000	2.750	1.962	G689	12038
48	3.000	3.750	2.962	G691	12040
64	4.000	4.750	3.962	G692	12042
96	6.000	6.750	5.962	G693	12044

STANDARD TOLERANCES

DIMENSION			TOLERANCE
I.D.	48 Pitch	All	+.004 – .000
	32 Pitch	All	+.005 – .000
	24 Pitch	All	+.006 – .000
	16 Pitch	All	+.008 – .000
O.D.	All		+.001 + .003



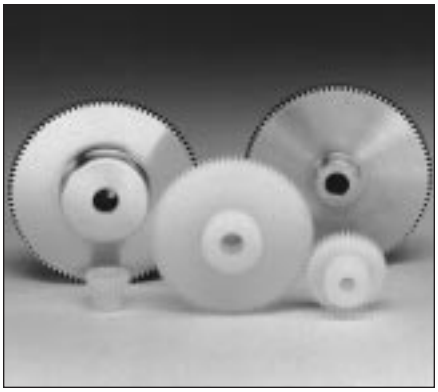
$$\text{CENTER DISTANCE} = \frac{D - d}{2}$$

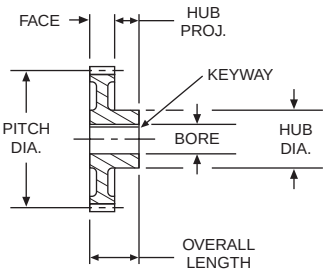
NOTE: The difference in tooth numbers between Gear and Pinion should not be less than 15.

64 AND 48 DIAMETRAL PITCH DELRIN AND BRASS

20° PRESSURE ANGLE

(Will not operate with 14½° spurs)





48 D.P.

64 D.P.

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32

REFERENCE PAGES

Alterations — 152
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Materials — 153

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

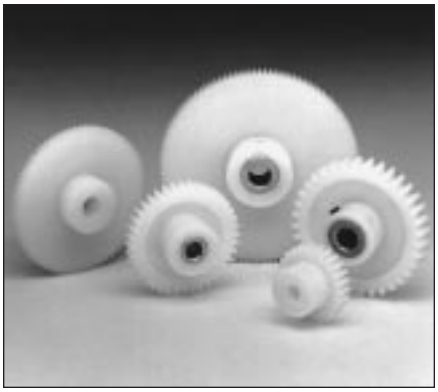
No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code
64 DIAMETRAL PITCH						**Face = .125" Outside Dia. = Pitch Dia. + .033" Overall Length = .125" + Hub Proj.**	
			BRASS				
16	.250	.125	.19	.19		Y6416	09482
18	.281		.22			Y6418	09484
20	.312		.25			Y6420	09486
24	.375		.28			Y6424	09488
28	.438		.34			Y6428	09490
32	.500	.1875	.38	.25	A	Y6432	09492
36	.562		.44			Y6436	09494
40	.625		.44			Y6440	09496
44	.688		.50			Y6444	09498
48	.750		.50			Y6448	09500
52	.812		.56			Y6452	09502
56	.875		.56			Y6456	09504
60	.938		.62			Y6460	09506
64	1.000	.250	.62	.25		Y6464	09508
72	1.125		.69			Y6472	09510
80	1.250		.69			Y6480	09512
88	1.375		.75			Y6488	09514
96	1.500		.75			Y6496	09516
112	1.750		.81			Y64112	09518
128	2.000		.88			Y64128	09520
144	2.250	.3125	.75	.31	C	Y64144	09522
160	2.500		.75			Y64160	09524
192	3.000		.88			Y64192	09526
48 DIAMETRAL PITCH						**Face = .125" Outside Dia. = Pitch Dia. + .042" Overall Length = .125" + Hub Proj.**	
			MOLDED DELRIN				
18	.375	.1562	.31	.25	A	YP4818	53902
19	.396					YP4819	53903
20	.417		.34			YP4820	53904
21	.438					YP4821	53905
22	.458		.38			YP4822	53906
23	.479					YP4823	53907
24	.500		.41			YP4824	53908
25	.521					YP4825	53909
26	.542		.45			YP4826	53910
27	.562					YP4827	53911
28	.583		.48			YP4828	53912
29	.604					YP4829	53913
30	.625		.50			YP4830	53914
31	.646	.1875	.55	.25		YP4831	53915
32	.667					YP4832	53916
33	.688					YP4833	53917
34	.708					YP4834	53918
35	.729					YP4835	53919
36	.750					YP4836	53920
37	.771					YP4837	53921
38	.792					YP4838	53922
39	.813					YP4839	53923
40	.833					YP4840	53924
42	.875					YP4842	53925

(continued next page)

SPUR GEARS

48 DIAMETRAL PITCH
DELRIN

20° PRESSURE ANGLE
(Will not operate with 14½° spurs)



ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew† Catalog Number	Without Keyway or Setscrew† Item Code
48 DIAMETRAL PITCH					**Face = .125" Outside Dia. = Pitch Dia. + .042" Overall Length = .125" + Hub Proj.**		
MOLDED DELRIN							
44	.917	.188	.55	.25	B	YP4844	53926
45	.938					YP4845	53927
48	1.000	.250	.61			YP4848	53928
52	1.083					YP4852	53929
54	1.125					YP4854	53930
56	1.168					YP4856	53931
60	1.250					YP4860	53932
64	1.333					YP4864	53933
66	1.375					YP4866	53934
72	1.500					YP4872	53935
80	1.667					YP4880	53936
84	1.750					YP4884	53937
96	2.000					YP4896	53938
100	2.083					YP48100	53939
108	2.250					YP48108	53940
120	2.500					YP48120	53941
MOLDED DELRIN WITH BRASS INSERTS							
18	.375	.125	.31	.25	A	YPB4818	53942
19	.396					YPB4819	53943
20	.417		.34			YPB4820	53944
21	.438					YPB4821	53945
22	.458		.38			YPB4822	53946
23	.479					YPB4823	53947
24	.500		.40			YPB4824	53948
25	.521					YPB4825	53949
26	.542	.188	.45			YPB4826	53950
27	.562					YPB4827	53951
28	.583		.48			YPB4828	53952
29	.604					YPB4829	53953
30	.625		.50			YPB4830	53954
31	.646		.55			YPB4831	53955
32	.667					YPB4832	53956
33	.688					YPB4833	53957
34	.708					YPB4834	53958
35	.729					YPB4835	53959
36	.750					YPB4836	53960
37	.771					YPB4837	53961
38	.792					YPB4838	53962
39	.813					YPB4839	53963
40	.833					YPB4840	53964
42	.875					YPB4842	53965
44	.917					YPB4844	53966
45	.938					YPB4845	53967
48	1.000	.250	.61		B	YPB4848	53968
52	1.083					YPB4852	53969
54	1.125					YPB4854	53970
56	1.168					YPB4856	53971
60	1.250					YPB4860	53972
64	1.333					YPB4864	53973
66	1.375					YPB4866	53974
72	1.500					YPB4872	53975
80	1.667					YPB4880	53976
84	1.750					YPB4884	53977
96	2.000					YPB4896	53978
100	2.083					YPB48100	53979
108	2.250					YPB48108	53980
120	2.500					YPB48120	53981

(continued next page)

STANDARD TOLERANCES*

DIMENSION		TOLERANCE
BORE	All	+.001 – .000

*Gears with Brass Inserts only.

48 D.P.

REFERENCE PAGES

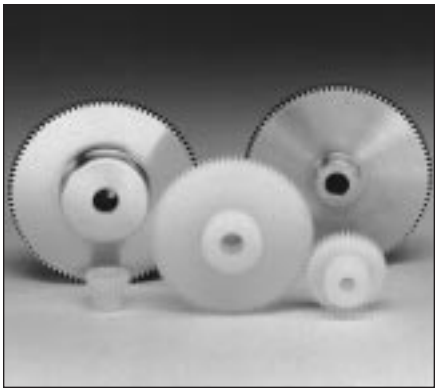
Alterations — 152
Materials — 153

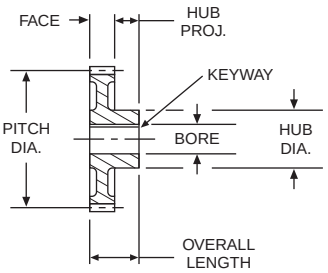
†All YPB gears have setscrews.

SPUR GEARS

48 AND 32 DIAMETRAL PITCH
DELRIN AND BRASS

20° PRESSURE ANGLE
(Will not operate with 14½° spurs)





STANDARD TOLERANCES*

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32

*Brass only.

48 D.P.

32 D.P.

REFERENCE PAGES

Alterations — 152
Lubrication — 152
Materials — 153

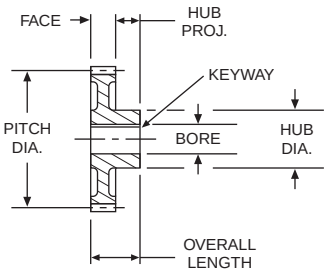
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code
48 DIAMETRAL PITCH						**Face = .125" Outside Dia. = Pitch Dia. + .042" Overall Length = .125" + Hub Proj.**	
BRASS							
12	.250	.125	.18	.19		Y4812	09444
15	.312		.22			Y4815	09446
18	.375		.28			Y4818	09448
21	.438		.35			Y4821	09450
24	.500	.1875	.38	.25		Y4824	09452
27	.562		.44			Y4827	09454
30	.625		.44			Y4830	09456
36	.750		.50		A	Y4836	09458
42	.875		.57			Y4842	09460
48	1.000	.250	.63	.25		Y4848	09462
54	1.125		.69			Y4854	09464
60	1.250		.69			Y4860	09466
66	1.375		.75			Y4866	09468
72	1.500		.75			Y4872	09470
84	1.750		.82			Y4884	09472
96	2.000		.88			Y4896	09474
120	2.500	.3125	.75	.31	C	Y48120	09476
144	3.000		.88			Y48144	09478
192	4.000		1.00			Y48192	09480
32 DIAMETRAL PITCH						**Face = .188" Outside Dia. = Pitch Dia. + .062" Overall Length = .188" + Hub Proj.**	
MOLDED DELRIN							
12	.375	.1562	.28	.31		YP3212	53982
14	.438		.31			YP3214	53983
15	.469		.31			YP3215	53984
16	.500		.34			YP3216	53985
18	.562					YP3218	53986
20	.625	.1875	.47	.31	A	YP3220	53987
22	.688		.50			YP3222	53988
24	.750					YP3224	53989
26	.812		.56			YP3226	53990
28	.875		.50			YP3228	53991
30	.938		.56			YP3230	53992
32	1.000	.250	.63	.31		YP3232	53993
34	1.062		.61			YP3234	53994
36	1.125					YP3236	53995
38	1.187					YP3238	53996
40	1.250					YP3240	53997
42	1.312					YP3242	53998
44	1.375					YP3244	53999
48	1.500		.63		B	YP3248	54000
52	1.625	.3125	.67	.31		YP3252	54001
56	1.750					YP3256	54002
64	2.000					YP3264	54003
72	2.250		.81			YP3272	54004
80	2.500					YP3280	54005
96	3.000					YP3296	54006

(continued next page)

32 DIAMETRAL PITCH
DELRIN AND BRASS

20° PRESSURE ANGLE
(Will not operate with 14½° spurs)



32 D.P.

STANDARD TOLERANCES

DIMENSION		TOLERANCE
Brass		
BORE	All	± .0005
HUB. DIA.	All	± 1/32
Delrin with Brass Inserts		
BORE	All	+ .001 – .000

REFERENCE PAGES

Alterations — 152
Lubrication — 152
Materials — 153

†All YPB gears have setscrew and spot drill.

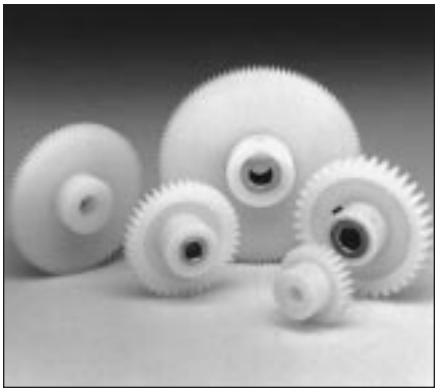
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew† Catalog Number	Item Code
32 DIAMETRAL PITCH					**Face = .188" Outside Dia. = Pitch Dia. + .062" Overall Length = .188" + Hub Proj.**		
MOLDED DELRIN with BRASS INSERTS							
12	.375	.125	.28	.31	A	YPB3212	54007
14	.438		.31			YPB3214	54008
15	.469		.31			YPB3215	54009
16	.500		.34			YPB3216	54010
18	.562		.34			YPB3218	54011
20	.625	.1875	.47			YPB3220	54012
22	.688		.50			YPB3222	54013
24	.750		.50			YPB3224	54014
26	.812		.56			YPB3226	54015
28	.875		.50			YPB3228	54016
30	.938		.56			YPB3230	54017
32	1.000	.250	.63		B	YPB3232	54018
34	1.062		.61			YPB3234	54019
36	1.125		.61			YPB3236	54020
38	1.187		.61			YPB3238	54021
40	1.250		.61			YPB3240	54022
42	1.312		.61			YPB3242	54023
44	1.375		.61			YPB3244	54024
48	1.500		.63			YPB3248	54025
52	1.625	.3125	.67			YPB3252	54026
56	1.750		.67			YPB3256	54027
64	2.000		.67			YPB3264	54028
72	2.250		.81			YPB3272	54029
80	2.500		.81			YPB3280	54030
96	3.000		.81			YPB3296	54031
BRASS							
12	.375	.125	.28	.25	A	Y3212	09406
14	.438		.34			Y3214	09408
16	.500	.1875	.40	.25		Y3216	09410
18	.562		.43			Y3218	09412
20	.625		.47			Y3220	09414
24	.750		.53			Y3224	09416
28	.875		.59			Y3228	09418
32	1.000	.250	.66	.25		Y3232	09420
36	1.125		.72			Y3236	09422
40	1.250		.72			Y3240	09424
48	1.500		.78			Y3248	09426
56	1.750	.3125	.84	.25		Y3256	09428
64	2.000		.90			Y3264	09430
72	2.250		.88	.31	C	Y3272	09432
80	2.500		.88			Y3280	09434
96	3.000		1.00			Y3296	09436
112	3.500		1.00			Y32112	09438
128	4.000		1.00			Y32128	09440
160	5.000		1.00			Y32160	09442

SPUR GEARS

24 DIAMETRAL PITCH
DELRIN

20° PRESSURE ANGLE
(Will not operate with 14½° spurs)



ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew† Catalog Number	Without Keyway or Setscrew† Item Code
24 DIAMETRAL PITCH					**Face = .250" Outside Dia. = Pitch Dia. + .083" Overall Length = .250" + Hub Proj.**		
MOLDED DELRIN							
12	.500	.188	.38	.31	A	YP2412	54032
14	.583		.44			YP2414	54033
15	.625		.48			YP2415	54034
16	.667					YP2416	54035
17	.709					YP2417	54036
18	.750					YP2418	54037
19	.791					YP2419	54038
20	.833		.55			YP2420	54039
21	.875					YP2421	54040
22	.917					YP2422	54041
23	.959					YP2423	54042
24	1.000	.250	.63			YP2424	54043
25	1.041		.61			YP2425	54044
26	1.083		.63			YP2426	54045
27	1.125					YP2427	54046
28	1.167					YP2428	54047
30	1.250					YP2430	54048
32	1.333		.61			YP2432	54049
33	1.375					YP2433	54050
34	1.416					YP2434	54051
36	1.500		.63			YP2436	54052
39	1.625	.313	.67		B	YP2439	54053
40	1.666					YP2440	54054
42	1.750					YP2442	54055
44	1.833					YP2444	54056
45	1.875					YP2445	54057
48	2.000					YP2448	54058
50	2.083					YP2450	54059
52	2.166					YP2452	54060
54	2.250					YP2454	54061
56	2.333					YP2456	54062
60	2.500					YP2460	54063
MOLDED DELRIN WITH BRASS INSERTS							
12	.500	.188	.38	.31	A	YPB2412	54064
14	.583		.44			YPB2414	54065
15	.625		.48			YPB2415	54066
16	.667					YPB2416	54067
17	.709					YPB2417	54068
18	.750					YPB2418	54069
19	.791					YPB2419	54070
20	.833		.55			YPB2420	54071
21	.875					YPB2421	54072
22	.917					YPB2422	54073
23	.959					YPB2423	54074
24	1.000	.250	.63			YPB2424	54075
25	1.041		.61			YPB2425	54076
26	1.083		.63			YPB2426	54077
27	1.125					YPB2427	54078
28	1.167					YPB2428	54079
30	1.250					YPB2430	54080
32	1.333		.61		B	YPB2432	54081
33	1.375					YPB2433	54082
34	1.416					YPB2434	54083
36	1.500		.63			YPB2436	54084
39	1.625	.313	.67			YPB2439	54085
40	1.666					YPB2440	54086
42	1.750					YPB2442	54087

(continued next page)

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	+.001 – .000

*Gears with Brass Inserts only.

24 D.P.

REFERENCE PAGES

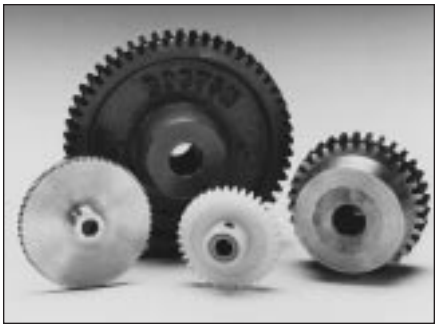
Alterations — 152
Materials — 153

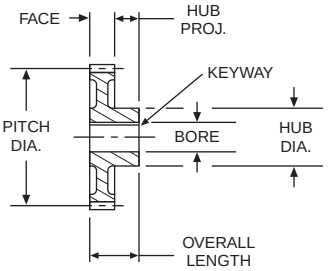
†All YPB gears have setscrew and spot drill.

SPUR GEARS

24 AND 20 DIAMETRAL PITCH
DELRIN, BRASS, STEEL AND CAST IRON

20° PRESSURE ANGLE
(Will not operate with 14½° spurs)





STANDARD TOLERANCES

DIMENSION		TOLERANCE
Brass, Steel and Cast Iron		
BORE	All	± .0005
HUB. DIA.	All	± 1/32
Delrin with Brass Inserts		
BORE	All	+ .001 – .000

24 D.P.

20 D.P.

REFERENCE PAGES

†YPB gears have one setscrew, no keyway.

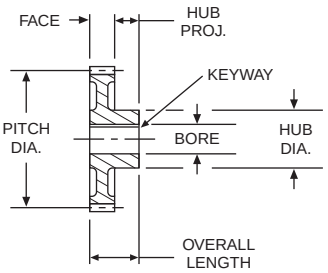
*5/16" bore have #35 (.110) drilled hole through one wall, no keyway.
3/8" bore have one setscrew. No keyway.
1/2" bore and larger have standard keyway at 90° to setscrew.
See Page 153.

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code	With Keyway and Setscrew† Catalog Number	With Keyway and Setscrew† Item Code
24 DIAMETRAL PITCH						**Face = .250" Outside Dia. = Pitch Dia. + .083" Overall Length = .250" + Hub Proj.**			
MOLDED DELRIN WITH BRASS INSERTS									
44	1.833	.3125	.67	.31	B	YPB2444	54088	–	–
45	1.875					YPB2445	54089	–	–
48	2.000					YPB2448	54090	–	–
50	2.083					YPB2450	54091	–	–
52	2.166					YPB2452	54092	–	–
54	2.250					YPB2454	54093	–	–
56	2.333					YPB2456	54094	–	–
60	2.500					YPB2460	54095	–	–
BRASS									
12	.500	.1875	.38	.25	A	Y2412	09372	–	–
15	.625		.50			Y2415	09374	–	–
18	.750		.54			Y2418	09376	–	–
21	.875		.60			Y2421	09378	–	–
24	1.000	.250	.66	.25		Y2424	09380	–	–
27	1.125		.73			Y2427	09382	–	–
30	1.250		.73			Y2430	09384	–	–
36	1.500		.79			Y2436	09386	–	–
42	1.750	.3125	.86	.25		Y2442	09388	–	–
48	2.000		.92	.31		Y2448	09390	–	–
54	2.250		.88		C	Y2454	09392	–	–
60	2.500		.88			Y2460	09394	–	–
72	3.000	.375	1.00	.31		Y2472	09396	–	–
84	3.500					Y2484	09398	–	–
96	4.000					Y2496	09400	–	–
120	5.000			.38		Y24120	09402	–	–
144	6.000					Y24144	09404	–	–
20 DIAMETRAL PITCH						**Face = .500" Outside Dia. = Pitch Dia. + .100" Overall Length = .500" + Hub Proj.**			
STEEL									
12	.600	.3125	.46	.44	A	YA12	09892	YA12-5/16*	46128
14	.700		.56			YA14	09894	YA14-5/16*	46129
15	.750	.375	.60	.44		YA15	09896	YA15-3/8*	46130
16	.800		.66			YA16	09898	YA16-3/8*	46131
18	.900		.74			YA18	09900	YA18-3/8*	46132
20	1.000	.500	.84	.44		YA20	09902	YA20-1/2*	46133
24	1.200		.92			YA24	09914	YA24-1/2*	46134
25	1.250		.97			YA25	09904	YA25-1/2*	46135
30	1.500		1.22			YA30	09906	YA30-1/2*	46136
35	1.750		1.47	.50		YA35	09908	YA35-1/2*	46137
40	2.000	.500	1.72	.50		YA40	09910	YA40-1/2*	46138
		.625				–	–	YA40-5/8*	46139
		.750				–	–	YA40-3/4*	46140
45	2.250	.500	1.97	.50		YA45	09912	–	–
50	2.500		1.62			YA50A	10548	–	–
60	3.000		2.12			YA60A	10550	–	–
70	3.500		2.38			YA70A	10552	–	–
CAST IRON									
80	4.000	.625	1.38	.62	C	YA80	10554	–	–
84	4.200				B	YA84	10556	–	–
90	4.500				C	YA90	10558	–	–
100	5.000	.625	1.50	.62		YA100	10560	–	–
120	6.000					YA120	10562	–	–
140	7.000				D	YA140	10564	–	–
160	8.000					YA160	10566	–	–
180	9.000	.625	1.75	.75		YA180	10568	–	–
200	10.000					YA200	10570	–	–

16 AND 12 DIAMETRAL PITCH
STEEL AND CAST IRON

20° PRESSURE ANGLE
(Will not operate with 14½° spurs)



16 D.P.

12 D.P.

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32

REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 46, 47
Lubrication — 152
Materials — 153
Selection Procedure — 37

†3/8" bore have one setscrew.
No keyway.

YB15-1/2 and larger have standard keyway at 90° to setscrew.
See page 153.

*YD12-1/2 has one setscrew.
No keyway.

‡YD13-5/8 has one setscrew.
No keyway.

YD14-5/8 bore and larger have standard keyway at 90° to setscrew.

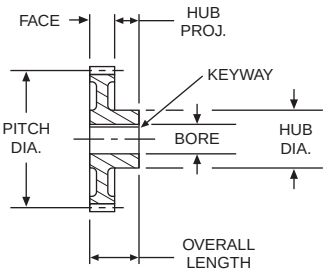
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code	With Keyway and Setscrew† Catalog Number	With Keyway and Setscrew† Item Code
16 DIAMETRAL PITCH						**Face = .750" Outside Dia. = Pitch Dia. + .125" Overall Length = .750" + Hub Proj.**			
STEEL									
12	.750	.375	.56	.50	A	YB12	09916	YB12-3/8	46141
14	.875		.69			YB14	09918	YB14-3/8	46142
15	.938	.375	.75	.50		YB15	09920	YB15-3/8	45991
		.500				–	–	YB15-1/2	46143
16	1.000	.500	.81	.50		YB16	09922	YB16-1/2	46144
18	1.125		.94			YB18	09924	YB18-1/2	46145
20	1.250	.625	1.05	.50		YB20	09926	YB20-5/8	46146
24	1.500	.625	1.20	.50		YB24	09928	YB24-5/8	46147
		.750				–	–	YB24-3/4	46148
28	1.750	.625	1.45	.50		YB28	09930	YB28-5/8	46149
		.750				–	–	YB28-3/4	46150
30	1.875	.625	1.58	.50		YB30	09932	YB30-5/8	46151
		.750				–	–	YB30-3/4	46152
		.875				–	–	YB30-7/8	46153
32	2.000	.625	1.70	.50		YB32	09934	YB32-5/8	46154
		.750				–	–	YB32-3/4	46155
		.875				–	–	YB32-7/8	46156
		1.000				–	–	YB32-1	46157
36	2.250	.625	1.95	.50		YB36	09936	–	–
40	2.500		2.20	.62		YB40	09938	–	–
48	3.000		2.00			YB48A	10572	–	–
56	3.500		2.50			YB56A	10574	–	–
60	3.750		2.75			YB60A	10576	–	–
64	4.000	.750	2.88	.75		YB64A	10578	–	–
72	4.500		3.38			YB72A	10580	–	–
80	5.000		3.88			YB80A	10582	–	–
CAST IRON									
96	6.000	.750	1.75	.75	D	YB96	10584	–	–
128	8.000		2.00			YB128	10588	–	–
144	9.000		2.00			YB144	10590	–	–
160	10.000	.875	2.00	.75		YB160	10592	–	–
192	12.000			1.00		YB192	10594	–	–
12 DIAMETRAL PITCH						**Face = 1.000" Outside Dia. = Pitch Dia. + .167" Overall Length = 1.000" + Hub Proj.**			
STEEL									
12	1.000	.500	.75	.62	A	YD12	09940	YD12-1/2*	46158
13	1.083	.625	.83	.62		YD13	09942	YD13-5/8‡	46159
14	1.167		.92			YD14	09944	YD14-5/8	46160
15	1.250		.99			YD15	09946	YD15-5/8	46161
16	1.333		1.07			YD16	09948	YD16-5/8	46162
18	1.500	.750	1.24	.62		YD18	09950	YD18-3/4	46163
20	1.667		1.32			YD20	09952	YD20-3/4	46164
21	1.750	.750	1.40	.62		YD21	09954	YD21-3/4	46165
		.875				–	–	YD21-7/8	46166
24	2.000	.750	1.65	.62		YD24	09956	YD24-3/4	46167
		.875				–	–	YD24-7/8	46168
		1.000				–	–	YD24-1	46169
28	2.333	.750	1.99	.62		YD28	09958	YD28-3/4	46170
		.875				–	–	YD28-7/8	46171
		1.000				–	–	YD28-1	46172
30	2.500	.750	2.15	.62		YD30	09960	–	–
36	3.000		1.94	.88		YD36A	10596	–	–
42	3.500		2.44			YD42A	10598	–	–
48	4.000	.875	2.88	.88		YD48A	10600	–	–
54	4.500		3.38			YD54A	10602	–	–

SPUR GEARS

12 AND 10 DIAMETRAL PITCH
CAST IRON AND STEEL

20° PRESSURE ANGLE
(Will not operate with 14½° spurs)



12 D.P. **10 D.P.**

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code	With Keyway and Setscrew† Catalog Number	With Keyway and Setscrew† Item Code
12 DIAMETRAL PITCH						**Face = 1.000" Outside Dia. = Pitch Dia. + .166" Overall Length = 1.000" + Hub Proj.**			
CAST IRON									
60	5.000	.875	2.12	.88	B	YD60	10604	–	–
66	5.500					YD66	10606	–	–
72	6.000					YD72	10608	–	–
84	7.000					YD84	10610	–	–
96	8.000					YD96	10612	–	–
108	9.000		2.25			YD108	10614	–	–
120	10.000	1.000	2.25	.88	D	YD120	10616	–	–
132	11.000		2.50	1.00		YD132	10618	–	–
144	12.000					YD144	10620	–	–
168	14.000					YD168	10622	–	–
192	16.000					YD192	10624	–	–
216	18.000		2.75			YD216	10626	–	–
10 DIAMETRAL PITCH						**Face = 1.250" Outside Dia. = Pitch Dia. + .200" Overall Length = 1.250" + Hub Proj.**			
STEEL									
12	1.200	.625	.92	.62	A	YF12	09962	YF12-5/8	46173
14	1.400		1.12			YF14	09964	YF14-5/8	46174
15	1.500	.750	1.22	.62		YF15	09966	YF15-3/4	46175
16	1.600		1.32			YF16	09968	YF16-3/4	46176
18	1.800	.750 .875	1.42	.62		YF18 –	09970 –	YF18-3/4 YF18-7/8	46177 46178
20	2.000	.875 1.000	1.62	.62		YF20 –	09972 –	YF20-7/8 YF20-1	46179 46180
24	2.400	.875 1.000	2.02	.62		YF24 –	09974 –	YF24-7/8 YF24-1	46181 46182
25	2.500	.875 1.000	2.12	.62		YF25 –	09976 –	YF25-7/8 YF25-1	46183 46184
28	2.800	.875 1.000	2.42	.62		YF28 –	09978 –	YF28-7/8 YF28-1	46185 46186
30	3.000	.875	2.00	.88		YF30A	10630	–	–
35	3.500		2.50			YF35A	10632	–	–
40	4.000	1.000	2.95	.88		YF40A	10634	–	–
45	4.500		3.45			YF45A	10636	–	–
48	4.800		3.75			YF48A	10638	–	–
50	5.000		3.95			YF50A	10640	–	–
CAST IRON									
55	5.500	1.000	2.50	1.00	B	YF55	10642	–	–
60	6.000					YF60	10644	–	–
70	7.000				D	YF70	10646	–	–
80	8.000					YF80	10648	–	–
90	9.000					YF90	10650	–	–
100	10.000	1.125	3.00	1.12		YF100	10652	–	–
120	12.000					YF120	10656	–	–
140	14.000					YF140	10658	–	–
160	16.000					YF160	10660	–	–
200	20.000		3.25	1.25		YF200B	10664	–	–

†All gears have standard keyway at 90° to setscrew. See Page 153.

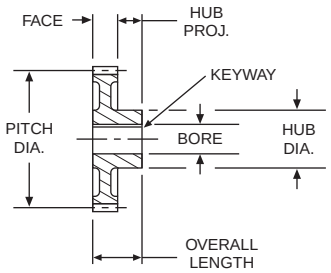
REFERENCE PAGES

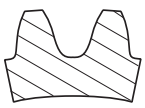
Alterations — 152
Horsepower Ratings — 47, 48
Lubrication — 152
Materials — 153
Selection Procedure — 37

SPUR GEARS

8 AND 6 DIAMETRAL PITCH
STEEL AND CAST IRON

20° PRESSURE ANGLE
(Will not operate with 14½° spurs)





8 D.P.

6 D.P.

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code	With Keyway and Setscrew† Catalog Number	With Keyway and Setscrew† Item Code
8 DIAMETRAL PITCH						**Face = 1.500" Outside Dia. = Pitch Dia. + .250" Overall Length = 1.500" + Hub Proj.**			
STEEL									
12	1.500	.750	1.12	.75	A	YH12	09980	YH12-3/4	46187
14	1.750		1.31			YH14	09982	YH14-3/4	46188
15	1.875	.750	1.43	.75		YH15	09984	YH15-3/4	46189
		.875				–	–	YH15-7/8	46190
16	2.000	.875	1.56	.88		YH16	09986	YH16-7/8	46191
		1.000				–	–	YH16-1	46192
18	2.250	.875	1.81	.88		YH18	09988	YH18-7/8	46193
		1.000				–	–	YH18-1	46194
		1.125				–	–	YH18-1-1/8	46195
20	2.500	.875	2.06	.88		YH20	09990	YH20-7/8	46196
		1.000				–	–	YH20-1	46197
		1.125				–	–	YH20-1-1/8	46198
22	2.750	.875	2.31	.88		YH22	09992	YH22-7/8	46199
		1.000				–	–	YH22-1	46200
		1.125				–	–	YH22-1-1/8	46201
24	3.000	.875	2.56	.88		YH24	09994	YH24-7/8	46202
		1.000				–	–	YH24-1	46203
		1.125				–	–	YH24-1-1/8	46204
28	3.500	.875	3.06	.88		YH28	09996	–	–
32	4.000	1.000	3.00	.88		YH32C	10666	–	–
36	4.500		3.50			YH36C	10668	–	–
CAST IRON									
40	5.000	1.000	2.50	1.00	B	YH40B	10670	–	–
44	5.500					YH44B	10672	–	–
48	6.000					YH48B	10674	–	–
56	7.000				C	YH56B	10676	–	–
60	7.500					YH60	10678	–	–
64	8.000				D	YH64B	10680	–	–
72	9.000					YH72B	10682	–	–
80	10.000	1.125	3.00	1.25		YH80B	10684	–	–
88	11.000					YH88B	10686	–	–
96	12.000					YH96B	10688	–	–
112	14.000		3.25			YH112B	10690	–	–
120	15.000					YH120	10692	–	–
128	16.000					YH128B	10694	–	–
6 DIAMETRAL PITCH						**Face = 2.000" Outside Dia. = Pitch Dia. + .333" Overall Length = 2.000" + Hub Proj.**			
STEEL									
12	2.000	1.000	1.46	.88	A	YJ12	09998	YJ12-1	46205
14	2.333	1.000	1.79	.88		YJ14	10000	YJ14-1	46206
		1.125				–	–	YJ14-1-1/8	46207
15	2.500	1.000	1.96	.88		YJ15	10002	YJ15-1	46208
		1.125				–	–	YJ15-1-1/8	46209
		1.1875				–	–	YJ15-1-3/16	46210
		1.250				–	–	YJ15-1-1/4	46211

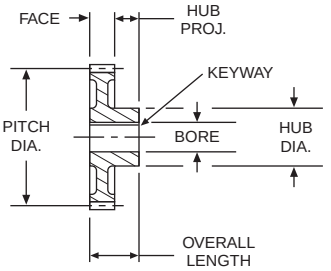
†All gears have standard keyway at 90° to setscrew. See Page 153.

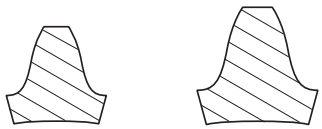
REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 48, 49
Lubrication — 152
Materials — 153
Selection Procedure — 37

6 AND 5 DIAMETRAL PITCH
STEEL AND CAST IRON

20° PRESSURE ANGLE
(Will not operate with 14½° spurs)





6 D.P. 5 D.P.

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
HUB DIA.	All	±1/32

REFERENCE PAGES

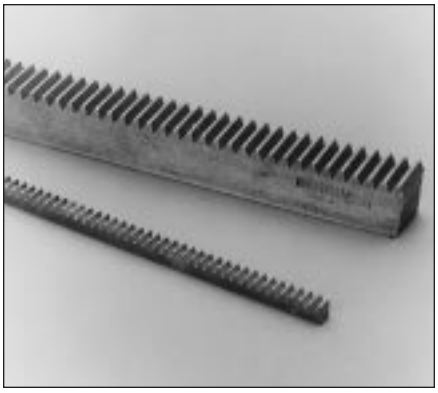
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

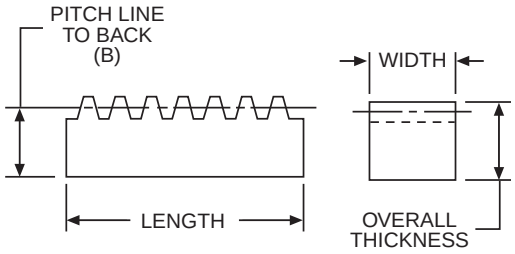
No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	Without Keyway or Setscrew Catalog Number	Without Keyway or Setscrew Item Code	With Keyway and Setscrew† Catalog Number	With Keyway and Setscrew† Item Code
6 DIAMETRAL PITCH						Face = 2.000" Outside Dia. = Pitch Dia. + .333" Overall Length = 2.000" + Hub Proj.			
STEEL									
16	2.667	1.000	2.13	.88	A	YJ16	10004	YJ16-1	46212
		1.125				–	–	YJ16-1-1/8	46213
		1.1875				–	–	YJ16-1-3/16	46214
		1.250				–	–	YJ16-1-1/4	46215
18	3.000	1.000	2.46	.88		YJ18	10006	YJ18-1	46216
		1.125				–	–	YJ18-1-1/8	46217
		1.1875				–	–	YJ18-1-3/16	46218
		1.250				–	–	YJ18-1-1/4	46219
21	3.500	1.000	2.96	.88		YJ21	10008	YJ21-1	46220
		1.125				–	–	YJ21-1-1/8	46221
		1.1875				–	–	YJ21-1-3/16	46222
		1.250				–	–	YJ21-1-1/4	46223
24	4.000	1.125	3.00	.88		YJ24A	10704	–	–
27	4.500		3.50			YJ27A	10706	–	–
30	5.000		4.00			YJ30C	10708	–	–
CAST IRON									
33	5.500	1.125	3.00	1.50	B	YJ33B	10710	–	–
36	6.000		3.50		A	YJ36B	10712	–	–
42	7.000	1.250	3.50	1.50	B	YJ42B	10714	–	–
48	8.000					YJ48B	10716	–	–
54	9.000					YJ54B	10718	–	–
60	10.000	1.250	4.00	1.50	C	YJ60B	10720	–	–
66	11.000					YJ66B	10722	–	–
72	12.000				D	YJ72B	10724	–	–
84	14.000					YJ84B	10726	–	–
96	16.000					YJ96B	10728	–	–
108	18.000					YJ108B	10730	–	–
120	20.000	1.375	4.50	1.50		YJ120B	10732	–	–
5 DIAMETRAL PITCH						Face = 2.500" Outside Dia. = Pitch Dia. + .400" Overall Length = 2.500" + Hub Proj.			
STEEL									
12	2.400	1.125	1.78	.88	A	YK12	10010	–	–
14	2.800		2.18			YK14	10012	–	–
15	3.000		2.38			YK15	10014	–	–
16	3.200		2.58			YK16	10016	–	–
18	3.600		2.98			YK18	10018	–	–
20	4.000		3.38			YK20	10020	–	–
CAST IRON									
24	4.800	1.125	3.75	1.25	A	YK24	10738	–	–
25	5.000					YK25B	10740	–	–
28	5.600					YK28	10742	–	–
30	6.000					YK30B	10744	–	–
35	7.000	1.250	3.75	1.25	B	YK35B	10746	–	–
40	8.000					YK40B	10748	–	–
45	9.000					YK45B	10750	–	–
50	10.000		4.00		C	YK50	10752	–	–
60	12.000	1.375	4.38	1.50		YK60	10754	–	–
70	14.000				D	YK70B	10756	–	–
80	16.000					YK80B	10758	–	–
100	20.000	1.500	4.75	1.75		YK100	10762	–	–
110	22.000					YK110	10764	–	–
120	24.000		5.00			YK120	10766	–	–
140	28.000	1.625	5.00	2.00		YK140B	10768	–	–
160	32.000		5.00			YK160B	10770	–	–
180	36.000		5.50			YK180B	10772	–	–

†All gears have standard keyway at 90° to setscrew.
See Page 153.

64 THROUGH 4 DIAMETRAL PITCH
BRASS AND STEEL

20° PRESSURE ANGLE
(Will not operate with 14½° spurs)

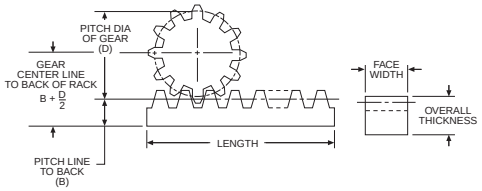




STANDARD TOLERANCES

DIMENSION		TOLERANCE
LENGTH †	All	+1.000 – .000
FACE WIDTH	1/8 – 3/4	+.000 – .002
	1 – 1-1/2	+.000 – .003
	2 – 2-1/2	+.000 – .004
	3-1/2	+.000 – .006

†Ends not machined. Tolerance allows for cutting and matching.



REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 138
Lubrication — 152
Materials — 153

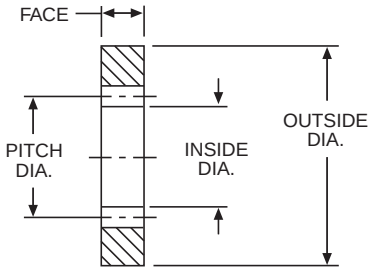
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Overall Thickness	Pitch Line to Back (B)	Nominal Length (Feet)	Mating Spur Gear Page No.	Steel		Brass	
				Catalog Number	Item Code	Catalog Number	Item Code
64 DIAMETRAL PITCH						**FACE WIDTH - .125”**	
.125	.109	2	25	–	–	Y64-2	12710
48 DIAMETRAL PITCH						**FACE WIDTH - .125”**	
.125	.104	2	25 – 27	–	–	Y48-2	12708
32 DIAMETRAL PITCH						**FACE WIDTH - .188”**	
.188	.156	2 4	27 – 28	– –	– –	Y32-2 Y32-4	12704 12706
24 DIAMETRAL PITCH						**FACE WIDTH - .250”**	
.250	.208	2 4	29 – 30	– –	– –	Y24-2 Y24-4	12700 12702
20 DIAMETRAL PITCH						**FACE WIDTH - .500”**	
.500	.450	4 6	30	L2020-4 L2020-6	12758 12760	– –	– –
16 DIAMETRAL PITCH						**FACE WIDTH - .750”**	
.750	.688	4 6	31	L2016-4 L2016-6	12762 12764	– –	– –
12 DIAMETRAL PITCH						**FACE WIDTH - 1.000”**	
1.000	.917	4 6	31 – 32	L2012-4 L2012-6	37320 37322	– –	– –
10 DIAMETRAL PITCH						**FACE WIDTH - 1.250”**	
1.250	1.150	4 6	32	L2010-4 L2010-6	37316 37318	– –	– –
8 DIAMETRAL PITCH						**FACE WIDTH - 1.500”**	
1.500	1.375	4 6	33	L208-4 L208-6	37312 37314	– –	– –
6 DIAMETRAL PITCH						**FACE WIDTH - 2.000”**	
1.500	1.333	4 6	33 – 34	L206-4 L206-6	37308 37310	– –	– –
5 DIAMETRAL PITCH						**FACE WIDTH - 2.500”**	
1.500	1.300	4 6	34	L205-4 L205-6	37304 37306	– –	– –
4 DIAMETRAL PITCH						**FACE WIDTH - 3.500”**	
2.000	1.750	4 6	–	L204-4 L204-6	37300 37302	– –	– –

INTERNAL GEARS

64 THROUGH 24 DIAMETRAL PITCH
BRASS

20° PRESSURE ANGLE
(Will not operate with 14½° spurs)



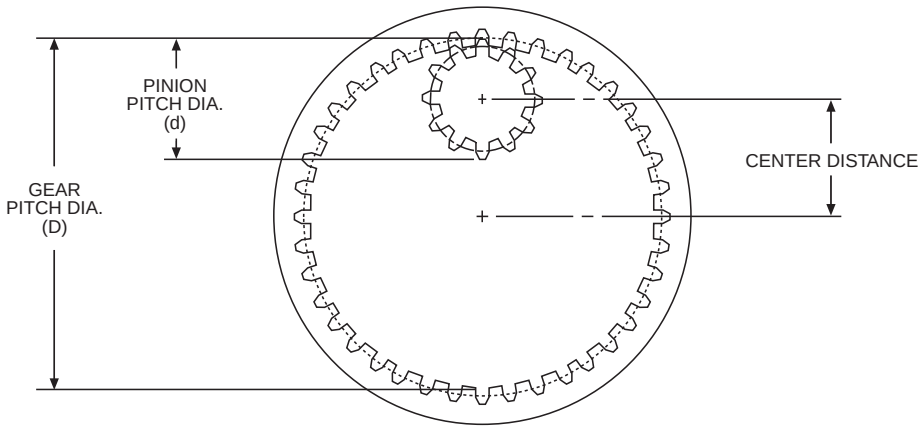
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	O.D.	I.D.	Catalog Number	Item Code
64 DIAMETRAL PITCH					**FACE WIDTH - .125”**
64	1.000	1.500	.980	YI6464	12030
96	1.500	2.000	1.480	YI6496	12032
128	2.000	2.750	1.980	YI64128	12034
192	3.000	3.750	2.980	YI64192	12036
48 DIAMETRAL PITCH					**FACE WIDTH - .125”**
48	1.000	1.500	.974	YI4848	12020
72	1.500	2.000	1.474	YI4872	12022
96	2.000	2.750	1.974	YI4896	12024
144	3.000	3.750	2.974	YI48144	12026
192	4.000	4.750	3.974	YI48192	12028
32 DIAMETRAL PITCH					**FACE WIDTH - .188”**
48	1.500	2.000	1.461	YI3248	12010
64	2.000	2.750	1.961	YI3264	12012
96	3.000	3.750	2.961	YI3296	12014
128	4.000	4.750	3.961	YI32128	12016
192	6.000	6.750	5.961	YI32192	12018
24 DIAMETRAL PITCH					**FACE WIDTH - .250”**
36	1.500	2.250	1.450	YI2436	12000
48	2.000	2.750	1.950	YI2448	12002
72	3.000	3.750	2.950	YI2472	12004
96	4.000	4.750	3.950	YI2496	12006
144	6.000	6.750	5.950	YI24144	12008

NOTE: The difference in tooth numbers between Gear and Pinion should not be less than 12.

STANDARD TOLERANCES

DIMENSION			TOLERANCE
I.D.	64 Pitch	All	+.004 – .000
	48 Pitch	All	+.005 – .000
	32 Pitch	All	+.006 – .000
	24 Pitch	All	+.008 – .000
O.D.	All		+.001 + .003



$$\text{CENTER DISTANCE} = \frac{D - d}{2}$$

SPUR GEARS

Boston spur gears are designed to transmit motion or power between parallel shafts. Configurations include spur, rack, pinion wire, stem pinions and internal gears; most with a selection of bores, keyways and setscrews. Styles include plain, web, web with lightening holes or spoked. Change gears have consecutive numbers of teeth for reduction uses.

Boston fine-pitch spur gears are available in Delrin and Brass. Configurations include spur, rack, pinion wire and internal gears; most with a selection of bores, keyways, and setscrews. Styles include plain, web with lightening holes or spoked.

SELECTION PROCEDURE

1. Determine service factor.
   a. Using application Classification Chart, pages 155, 156, determine service factor or
   b. With knowledge of operating conditions and load classification, select service factor from Table 1 below.

Design HP = Application Load X Service Factor (Table 1)

3. Select spur gear pinion with horsepower capacity equal to (or greater than) design horsepower determined in Step 2. 14½° Pressure Angle Spur Gears—Page 38 to Page 45. 20° Pressure Angle Spur Gears— Page 46 to Page 50.
4. Select a driven spur gear with a catalog rating equal to or greater than the horsepower determined in Step 2. All ratings are predicated on gears properly lubricated and maintained.

SELECTION HINTS

A. Select pinion having pitch diameter at least twice the shaft diameter.

B. Pinion number of teeth should be greater than 16 for 14½°PA and 13 for 20°PA to avoid excessive undercutting.

C. For tooth numbers or RPMs not on Chart, interpolation of horsepower is adequate.

D. Pitchline velocities above 1000 FPM are not recommended for metallic spur gears. The Selection Chart reflects this in the lack of ratings for larger numbers of teeth at higher RPM's. Ratings to the right of heavy line are not recommended, as suggested maximum velocity is exceeded, and should be used for interpolation purposes only.

TABLE 1

Service Factor	Operating Conditions
.8	Uniform — not more than 15 minutes in 2 hours.
1.0	Moderate Shock — not more than 15 minutes in 2 hours. Uniform — not more than 10 hours per day.
1.25	Moderate Shock — not more than 10 hours per day. Uniform — more than 10 hours per day.
1.50	Heavy Shock — not more than 15 minutes in 2 hours. Moderate Shock — more than 10 hours per day.
1.75	Heavy Shock — not more than 10 hours per day.
2.0	Heavy Shock — more than 10 hours per day.

Heavy shock loads and/or severe wear conditions may require the use of higher service factors. Consultation with factory is recommended in these applications.

APPROXIMATE HORSEPOWER AND TORQUE* RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)

32 DIAMETRAL PITCH STEEL — 14½° PRESSURE ANGLE — 3/16" FACE — REFERENCE PAGE 7.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
16	.003	7.4	.01	7.3	.01	7.3	.02	7.1	.03	7.0	.06	6.6	.09	6.3	.11	5.9	.15	5.4	.24	4.2
18	.003	8.9	.01	8.8	.01	8.7	.03	8.5	.04	8.3	.07	7.8	.10	7.3	.13	6.9	.18	6.1	.27	4.7
20	.004	10.2	.01	10.2	.02	10.1	.03	9.8	.05	9.6	.08	8.9	.12	8.3	.15	7.8	.20	6.9	.30	5.2
22	.005	11.7	.01	11.6	.02	11.4	.04	11.1	.05	10.8	.09	9.9	.13	9.3	.16	8.7	.22	7.6	.32	5.7
24	.01	13.0	.01	12.9	.02	12.7	.04	12.3	.06	11.9	.10	10.9	.14	10.1	.18	9.4	.24	8.3	.34	6.0
26	.01	14.5	.01	14.4	.02	14.1	.04	13.7	.06	13.3	.12	12.0	.16	11.1	.20	10.2	.26	8.9	.37	6.4
28	.01	15.9	.01	15.1	.02	15.5	.05	14.9	.07	14.5	.12	13.1	.17	12.0	.21	11.0	.27	9.5	.39	6.8
30	.01	17.3	.01	17.0	.03	16.7	.05	16.1	.07	15.5	.13	13.9	.18	12.7	.22	11.7	.29	10.0	.40	7
32	.01	18.9	.01	18.7	.03	18.3	.06	17.6	.08	16.9	.14	15.2	.20	13.7	.24	12.6	.31	10.7	.43	7.4
40	.01	24.5	.02	24.2	.04	23.6	.07	22.4	.10	21.3	.18	18.7	.24	16.7	.29	15	.36	12.5	.48	8.4
48	.01	29.9	.02	29.4	.05	28.5	.09	26.8	.12	25.4	.21	21.8	.27	19.1	.32	17	.40	13.9	.52	9
56	.01	35.7	.03	35	.05	33.8	.10	31.5	.14	29.6	.24	24.9	.31	21.6	.36	18.9	.44	15.3	.55	9.7
64	.02	41.4	.03	40.6	.06	38.9	.11	36	.16	33.5	.26	27.8	.34	23.7	.39	20.7	.47	16.5	.58	10.2
80	.02	52.4	.04	51	.08	48.5	.14	44.2	.19	40.6	.31	32.5	.39	27.2	.44	23.3	.52	18.2		
96	.02	62.6	.05	60.6	.09	57.1	.16	51.2	.22	46.4	.34	36.2	.42	29.6	.48	25.1	.55	19.2		
128	.03	83.9	.06	80.6	.12	74.6	.21	64.9	.27	57.5	.41	42.7	.49	34	.54	28.3				
160	.04	106	.08	101	.15	92.1	.25	78.2	.32	67.8	.46	48.6	.54	37.9						
192	.05	126	.09	119	.17	107	.28	88.4	.36	75.4	.50	52.4	.57	40.1						

24 DIAMETRAL PITCH STEEL — 14½° PRESSURE ANGLE — 1/4" FACE — REFERENCE PAGE 8.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
12	.004	10.9	.01	10.8	.02	10.7	.03	10.5	.05	10.3	.09	9.7	.13	9.2	.17	8.7	.22	7.9	.35	6.1
14	.01	14.2	.01	14.1	.02	13.9	.04	13.6	.06	13.3	.12	12.4	.17	11.6	.21	10.9	.28	9.8	.43	7.5
15	.01	15.8	.01	15.7	.02	15.5	.05	15.1	.07	14.7	.13	13.7	.18	12.8	.23	12	.31	10.7	.46	8
16	.01	17.5	.01	17.4	.03	17.2	.05	16.7	.08	16.2	.14	15	.20	14	.25	13.1	.33	11.6	.49	8.6
18	.01	20.9	.02	20.7	.03	20.4	.06	19.8	.09	19.2	.17	17.6	.23	16.3	.29	15.1	.38	13.3	.55	9.7
20	.01	24.3	.02	24.1	.04	23.7	.07	22.9	.11	22.1	.19	20.1	.26	18.5	.33	17.1	.42	14.8	.61	10.6
21	.01	26.1	.02	25.8	.04	25.4	.08	24.5	.11	23.6	.20	21.4	.28	19.6	.34	18.1	.45	15.6	.63	11
24	.01	30.7	.02	30.4	.05	29.7	.09	28.5	.13	27.5	.23	24.6	.32	22.3	.39	20.4	.50	17.4	.69	12
30	.02	40.7	.03	40.2	.06	39.2	.12	37.2	.17	35.5	.30	31.1	.40	27.7	.48	24.9	.60	20.8	.80	13.9
36	.02	51.2	.04	50.4	.08	48.8	.15	46	.21	43.5	.36	37.3	.47	32.7	.55	29.1	.68	23.9	.89	15.5
42	.02	60.7	.05	59.6	.09	59.5	.17	53.6	.24	50.3	.40	42.4	.52	36.6	.61	32.3	.74	26	.94	16.5
48	.03	70.4	.05	68.9	.11	66.2	.19	61.3	.27	57	.45	47.2	.58	40.3	.67	35.1	.80	28	.99	17.4
60	.04	90	.07	87.7	.13	83.3	.24	75.9	.33	69.6	.53	55.9	.67	46.6	.76	40	.89	31.2		
72	.04	109	.08	106	.16	99.8	.28	89.5	.39	81	.60	63.2	.74	51.8	.84	43.9	.96	33.6		
96	.06	147	.11	141	.21	130	.36	113	.48	100	.71	74.7	.85	59.5	.94	49.5				
120	.07	185	.14	175	.25	159	.43	135	.56	118	.80	84.3	.94	65.7	1.07	56.4				
144	.09	219	.16	207	.29	185	.49	153	.62	131	.86	90.8	.99	69.6						

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

NOTE: Ratings to right of heavy line are not recommended, as pitch line velocity exceeds 1000 feet per minute.
They should be used for interpolation purposes only.

*Torque Ratings (Lb. Ins.).

APPROXIMATE HORSEPOWER AND TORQUE* RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)

20 DIAMETRAL PITCH STEEL — 14½° PRESSURE ANGLE — 3/8" FACE — REFERENCE PAGE 8.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
11	.01	21.6	.02	21.4	.03	21.2	.07	20.7	.10	20.2	.18	18.9	.25	17.8	.32	16.8	.43	15.1	.66	11.6
12	.01	23.5	.02	23.4	.04	23	.07	22.5	.10	21.9	.19	20.5	.27	19.2	.34	18	.46	16.1	.70	12.2
13	.01	26.9	.02	26.8	.04	26.4	.08	25.7	.12	25	.22	23.2	.31	21.6	.39	20.3	.51	17.9	.77	13.4
14	.01	30.7	.02	30.5	.05	30	.09	29.1	.13	28.3	.25	26.1	.35	24.2	.43	22.6	.57	20	.84	14.7
15	.01	34.2	.03	33.9	.05	33.4	.10	32.3	.15	31.4	.27	28.8	.38	26.6	.47	24.7	.62	21.7	.90	15.8
16	.02	37.8	.03	37.5	.06	36.8	.11	35.7	.16	34.5	.30	31.6	.41	29	.51	26.9	.67	23.4	.97	16.9
18	.02	45.1	.04	44.7	.07	43.8	.13	42.3	.19	40.8	.35	36.9	.48	33.7	.59	31	.76	26.7	1.08	18.9
20	.02	52.4	.04	51.9	.08	50.8	.15	48.7	.22	46.9	.40	42	.54	38	.66	34.8	.85	29.7	1.18	20.6
22	.02	59.5	.05	58.8	.09	57.5	.17	54.9	.25	52.7	.45	46.8	.60	42	.73	38.2	.92	32.3	1.26	22.1
24	.03	66.3	.05	65.4	.10	63.8	.19	60.8	.28	58	.49	51.1	.65	45.6	.78	41.2	.99	34.6	1.33	23.3
25	.03	70.5	.06	69.5	.11	67.7	.20	64.4	.29	61.4	.51	53.8	.68	47.9	.82	43.1	1.03	36	1.38	24
28	.03	81.2	.06	80	.12	77.7	.23	73.4	.33	69.7	.57	60.3	.76	53.2	.91	47.5	1.12	39.2	1.47	25.7
30	.03	87.8	.07	86.4	.13	83.7	.25	78.9	.36	74.6	.61	64	.80	56.1	.95	50	1.17	40.9	1.52	26.6
32	.04	96.3	.08	94.7	.15	91.6	.27	86	.39	81	.66	69.1	.86	60.2	1.02	53.3	1.24	43.4	1.59	27.8
35	.04	107	.08	105	.16	101	.30	94.7	.42	88.9	.71	74.9	.92	64.7	1.09	57	1.31	46	1.66	29.1
36	.04	110	.09	108	.17	104	.31	97.1	.43	91	.73	76.4	.94	65.8	1.10	57.8	1.33	46.5	1.68	29.3
40	.05	124	.10	122	.19	117	.34	108	.48	101	.79	83.5	1.02	71.2	1.18	62.1	1.41	49.4	1.75	30.7
48	.06	151	.12	148	.22	141	.41	128	.56	118	.91	95.4	1.14	80	1.31	69.8	1.54	53.8		
50	.06	158	.12	154	.23	146	.42	133	.58	122	.93	98	1.17	81.7	1.34	70.1	1.56	54.6		
60	.08	193	.15	187	.28	176	.50	158	.68	143	1.06	112	1.31	91.6	1.48	77.6	1.70	59.5		
64	.08	209	.16	203	.30	190	.54	169	.73	153	1.12	118	1.37	96	1.54	80.9				

20 DIAMETRAL PITCH CAST IRON — 14½° PRESSURE ANGLE — 3/8" FACE — REFERENCE PAGE 9.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
70	.05	137	.10	132	.20	123	.35	109	.46	97.5	.71	74.2	.86	60	.96	50.2				
72	.06	140	.11	136	.20	126	.35	111	.47	99.4	.72	75.3	.87	60.6	.97	50.7				
80	.06	158	.12	152	.22	141	.39	123	.52	108	.77	80.7	.92	64.3	1.02	53.4				
84	.07	166	.13	159	.23	147	.40	127	.53	112	.79	82.7	.94	65.5	1.03	54.3				
90	.07	177	.13	169	.25	155	.42	133	.56	117	.81	85.4	.96	67.2						
96	.07	189	.14	180	.26	164	.44	140	.58	122	.84	87.9	.98	68.8						
100	.08	196	.15	186	.27	170	.46	144	.59	125	.85	89.5	1.00	69.7						
112	.09	222	.17	210	.30	189	.50	158	.65	136	.91	95.5	1.05	73.6						
120	.09	237	.18	223	.32	200	.53	166	.67	141	.93	98.1	1.07	75.1						
140	.11	273	.20	255	.36	225	.58	183	.73	153	.99	104								
144	.11	281	.21	262	.37	230	.59	186	.74	156	1.00	105								
160	.13	317	.23	294	.41	256	.64	203	.80	168	1.06	111								
180	.14	353	.26	324	.44	278	.69	217	.85	178	1.10	115								
200	.15	388	.28	354	.48	300	.73	230	.89	187	1.13	119								

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

NOTE: Ratings to right of heavy line are not recommended, as pitch line velocity exceeds 1000 feet per minute.
They should be used for interpolation purposes only.

*Torque Ratings (Lb. Ins.).

SPUR GEARS

APPROXIMATE HORSEPOWER AND TORQUE RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)*

16 DIAMETRAL PITCH STEEL — 14½° PRESSURE ANGLE — 1/2" FACE — REFERENCE PAGE 9 & 10.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
11	.02	44.9	.04	44.5	.07	43.9	.14	42.7	.20	41.5	.36	38.3	.51	35.6	.63	33.2	.84	29.4	1.24	21.7
12	.02	48.9	.04	48.5	.08	47.8	.15	46.3	.21	44.9	.39	41.2	.54	38.1	.67	35.4	.89	31	1.29	22.6
13	.02	56.1	.04	55.6	.09	54.7	.17	52.9	.24	51.2	.44	46.7	.61	42.9	.76	39.7	.99	34.6	1.42	24.9
14	.03	63.8	.05	63.2	.10	62	.19	59.8	.28	57.8	.50	52.4	.68	47.9	.84	44.2	1.09	38.2	1.55	27.1
15	.03	71.1	.06	70.3	.11	68.9	.21	66.4	.30	63.9	.55	57.6	.75	52.5	.92	48.1	1.18	41.3	1.66	29
16	.03	78.7	.06	77.8	.12	76.2	.23	73.1	.33	70.3	.60	63	.82	57.1	.99	52.2	1.27	44.5	1.77	30.9
18	.04	93.8	.07	99.6	.14	90.5	.27	86.5	.39	82.8	.70	73.4	.94	65.9	1.14	59.8	1.44	50.4	1.96	34.3
20	.04	109	.09	107	.17	105	.32	99	.45	94.9	.79	83.2	1.06	74.1	1.27	66.7	1.59	55.7	2.13	37.2
22	.05	124	.10	122	.19	118	.36	112	.51	106	.88	92.3	1.16	81.5	1.39	72.9	1.72	60.3	2.27	39.7
24	.05	138	.11	135	.21	131	.39	124	.56	117	.96	100	1.26	88	1.49	78.3	1.83	64.2	2.38	41.7
26	.06	154	.12	151	.23	146	.43	137	.61	129	1.04	110	1.36	95.4	1.61	84.4	1.96	68.6	2.51	43.9
28	.07	168	.13	165	.25	160	.47	149	.66	140	1.12	118	1.45	102	1.71	89.6	2.06	72.3	2.62	45.8
30	.07	182	.14	179	.27	172	.51	160	.71	149	1.19	125	1.53	107	1.79	93.8	2.15	75.1	2.69	47.1
32	.08	200	.16	196	.30	188	.55	174	.77	162	1.28	134	1.63	114	1.90	99.7	2.27	79.4	2.81	49.3
36	.09	228	.18	223	.34	213	.62	196	.86	181	1.40	147	1.77	124	2.05	107	2.42	84.6		
40	.10	258	.20	251	.38	239	.69	217	.95	200	1.52	160	1.91	134	2.18	115	2.55	89.4		
48	.12	314	.24	304	.45	286	.81	257	1.11	232	1.73	181	2.12	149	2.40	126	2.76	96.5		

16 DIAMETRAL PITCH CAST IRON — 14½° PRESSURE ANGLE — 1/2" FACE — REFERENCE PAGE 10.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
54	.09	217	.17	209	.31	196	.55	173	.74	156	1.13	119	1.38	96.6	1.54	81.1				
56	.09	224	.17	216	.32	202	.57	178	.76	160	1.16	121	1.40	98.1	1.57	82.2				
60	.10	239	.18	231	.34	214	.60	188	.80	167	1.20	126	1.44	100	1.60	84.2				
64	.10	260	.20	249	.37	231	.64	201	.85	178	1.26	132	1.50	105	1.67	87.5				
72	.12	290	.22	277	.40	255	.69	219	.91	192	1.33	140	1.57	110						
80	.13	327	.25	311	.45	283	.76	240	.99	208	1.42	149	1.66	116						
84	.14	342	.26	325	.47	294	.79	248	1.02	214	1.45	152	1.69	118						
96	.15	388	.29	365	.52	327	.86	271	1.10	231	1.53	161	1.76	123						
112	.18	455	.34	425	.60	376	.97	304	1.22	256	1.65	173								
120	.19	486	.36	452	.63	396	1.01	318	1.26	265	1.69	177								
128	.20	516	.38	477	.66	415	1.05	330	1.30	274	1.72	181								
144	.23	574	.42	527	.72	453	1.12	353	1.38	289	1.79	188								
160	.26	648	.47	590	.79	500	1.22	384	1.48	311	1.89	198								
192	.307	762	.54	683	.90	566	1.34	421	1.60	335										

16 DIAMETRAL PITCH NON-METALLIC — 14½° PRESSURE ANGLE — 1/2" FACE — REFERENCE PAGE 10.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
16							.06	19	.09	19	.15	16	.20	14	.25	13	.32	11	.56	9
20							.09	28	.12	30	.20	21	.26	18	.32	17	.42	15	.69	12
24							.11	34	.15	31	.24	25	.31	22	.38	20	.50	17	.82	14
32							.14	44	.19	40	.31	32	.40	28	.49	26	.65	23	1.12	20
40							.18	57	.24	50	.38	40	.49	34	.62	32	.82	29	1.41	25
48							.21	63	.28	58	.44	46	.60	40	.72	37	.96	33	1.65	29
64							.26	82	.34	71	.54	57	.72	50	.88	46	1.20	42		

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

NOTE: 1. Ratings to right of heavy line are not recommended, as pitch line velocity exceeds 1000 feet per minute.
They should be used for interpolation purposes only.
2. Non-metallic gears are most commonly used for the driving pinion of a pair of gears, with mating gear made of Cast Iron or Steel, where pitch line velocities exceed 1000 FPM and are not subjected to shock loads.

*Torque Ratings (Lb. Ins.).

SPUR GEARS

APPROXIMATE HORSEPOWER AND TORQUE RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)*

12 DIAMETRAL PITCH STEEL — 14½° PRESSURE ANGLE — 3/4" FACE — REFERENCE PAGE 10.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
11	.05	119	.09	118	.18	116	.35	112	.51	108	.93	97	1.27	88.6	1.55	81.5	2.00	70	2.82	49.4
12	.05	130	.10	129	.20	126	.38	120	.55	116	.99	104	1.35	94.4	1.64	86.3	2.10	73.6	2.92	51.1
13	.06	149	.12	147	.23	144	.44	138	.63	132	1.12	118	1.51	106	1.83	96.3	2.33	81.6	3.19	55.9
14	.07	169	.13	167	.26	163	.49	156	.71	149	1.25	131	1.68	118	2.03	107	2.56	89.6	3.46	60.6
15	.07	189	.15	186	.29	181	.55	172	.78	164	1.37	144	1.83	128	2.20	116	2.76	96.6	3.69	64.6
16	.08	209	.16	206	.32	200	.60	190	.86	180	1.50	157	1.99	139	2.38	125	2.96	103	3.91	68.5
18	.10	249	.19	245	.38	237	.71	224	1.01	242	1.73	182	2.28	159	2.70	142	3.32	116	4.31	75.4
20	.11	289	.23	284	.44	274	.82	257	1.15	215	1.95	205	2.54	178	2.99	157	3.64	127	4.65	81.4
21	.12	310	.24	304	.47	293	.87	274	1.22	257	2.06	216	2.67	187	3.14	164	3.80	133	4.81	84.3
22	.13	328	.26	322	.49	310	.92	288	1.28	270	2.15	226	2.78	195	3.25	171	3.92	137	4.93	86.2
24	.14	365	.28	357	.54	343	1.01	317	1.41	296	2.33	245	2.98	209	3.47	182	4.14	145	5.14	90
30	.19	483	.37	470	.71	447	1.29	407	1.78	373	2.85	299	3.57	250	4.09	215	4.78	167		
32	.21	529	.41	514	.77	488	1.40	442	1.92	403	3.05	320	3.80	266	4.32	227	5.02	176		
36	.24	605	.46	586	.88	552	1.57	495	2.13	448	3.33	349	4.09	286	4.62	243	5.31	186		
40	.27	682	.52	659	.98	617	1.74	547	2.34	492	3.59	377	4.37	306	4.90	257				
42	.28	715	.55	689	1.02	644	1.80	568	2.42	509	3.69	387	4.46	312	4.99	262				

12 DIAMETRAL PITCH CAST IRON — 14½° PRESSURE ANGLE — 3/4" FACE — REFERENCE PAGE 11.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
48	.20	497	.38	477	.70	441	1.22	384	1.62	340	2.41	253	2.88	201	3.19	167				
54	.23	571	.43	545	.79	500	1.36	430	1.79	377	2.62	275	3.09	216	3.40	178				
60	.25	631	.48	600	.87	546	1.47	463	1.91	402	2.74	288	3.21	224						
64	.27	683	.51	647	.93	586	1.56	493	2.02	425	2.87	301	3.33	233						
72	.30	762	.57	718	1.02	644	1.69	533	2.17	455	3.01	316	3.46	242						
84	.36	896	.66	837	1.17	739	1.90	598	2.40	503	3.24	340								
96	.40	1014	.74	938	1.30	817	2.06	649	2.56	538	3.39	356								
108	.46	1148	.84	1054	1.44	906	2.24	706	2.76	579	3.58	376								
112	.47	1187	.86	1087	1.47	929	2.29	720	2.80	588	3.62	379								
120	.50	1264	.91	1150	1.55	975	2.37	748	2.89	607	3.69	387								
144	.59	1487	1.06	1333	1.75	1103	2.61	821	3.11	654	3.86	406								
168	.69	1745	1.22	1541	1.98	1248	2.87	905	3.38	710										

12 DIAMETRAL PITCH NON-METALLIC — 14½° PRESSURE ANGLE — 3/4" FACE — REFERENCE PAGE 11.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
15							.13	41	.20	42	.34	36	.45	31	.56	29	.72	25	1.15	20
18							.19	60	.26	54	.43	45	.56	39	.68	36	.90	31	1.44	25
21							.23	72	.31	65	.50	52	.66	46	.81	42	1.06	37	1.80	31
24							.27	85	.36	76	.58	60	.76	53	.92	48	1.22	42	2.07	36
30							.34	107	.44	92	.73	76	.95	66	1.14	60	1.56	54	2.64	46
36							.40	126	.52	109	.82	86	1.13	79	1.36	71	1.83	64	3.18	56
48							.51	161	.66	138	1.05	110	1.39	97	1.70	89	2.33	81		
60							.60	189	.80	168	1.29	135	1.72	120	2.13	112	2.95	103		

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

NOTE: 1. Ratings to right of heavy line are not recommended, as pitch line velocity exceeds 1000 feet per minute.
They should be used for interpolation purposes only.
2. Non-metallic gears are most commonly used for the driving pinion of a pair of gears, with mating gear made of Cast Iron or Steel, where pitch line velocities exceed 1000 FPM and are not subjected to shock loads.

*Torque Ratings (Lb. Ins.).

SPUR GEARS

APPROXIMATE HORSEPOWER AND TORQUE RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)*

10 DIAMETRAL PITCH STEEL — 14½° PRESSURE ANGLE — 1" FACE — REFERENCE PAGE 11.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
11	.09	229	.18	226	.35	221	.67	211	.96	202	1.71	179	2.31	162	2.80	147	3.55	124	4.85	85
12	.10	249	.20	246	.38	240	.73	229	1.04	218	1.83	192	2.45	172	2.95	155	3.71	130	5.00	88
14	.13	325	.25	320	.49	311	.93	294	1.33	279	2.30	241	3.04	213	3.62	190	4.49	157	5.89	103
15	.14	362	.28	356	.55	345	1.03	325	1.46	307	2.51	264	3.30	231	3.92	206	4.82	169	6.25	109
16	.16	400	.31	393	.60	381	1.13	357	1.60	337	2.73	287	3.57	250	4.22	221	5.15	180	6.62	116
18	.19	447	.37	468	.72	451	1.33	420	1.87	394	3.15	330	4.07	285	4.76	250	5.75	201	7.25	127
20	.22	553	.43	542	.83	520	1.53	481	2.13	448	3.53	371	4.52	317	5.26	276	6.28	220	7.79	136
24	.28	698	.54	681	1.03	648	1.88	592	2.59	545	4.19	440	5.26	369	6.04	317	7.09	248		
25	.29	742	.57	722	1.09	687	1.98	625	2.73	574	4.38	460	5.49	384	6.28	330	7.34	257		
28	.34	854	.66	829	1.24	784	2.24	707	3.06	644	4.83	507	5.98	419	6.79	357	7.85	275		
30	.37	922	.71	893	1.34	842	2.39	754	3.25	683	5.07	533	6.24	437	7.05	370	8.10	283		
32	.40	1010	.78	977	1.46	917	2.59	817	3.51	737	5.41	569	6.61	463	7.44	391				
35	.45	1123	.86	1083	1.60	1011	2.83	893	3.80	799	5.79	608	7.01	491	7.83	411				
36	.46	1153	.88	1111	1.64	1036	2.89	912	3.88	815	5.87	617	7.09	496	7.91	415				

10 DIAMETRAL PITCH CAST IRON — 14½° PRESSURE ANGLE — 1" FACE — REFERENCE PAGE 12.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
40	.31	780	.59	749	1.10	693	1.92	603	2.54	534	3.79	398	4.52	317	5.01	263				
42	.32	818	.62	783	1.15	722	1.99	626	2.63	552	3.88	407	4.61	323	5.09	267				
45	.35	889	.67	850	1.24	780	2.13	670	2.79	587	4.08	428	4.81	337						
48	.38	946	.71	901	1.31	823	2.23	701	2.91	611	4.20	441	4.92	345						
50	.39	983	.74	935	1.35	851	2.29	722	2.98	626	4.27	449	4.99	350						
54	.43	1083	.82	1029	1.48	931	2.48	782	3.21	674	4.53	476	5.26	368						
55	.44	1105	.83	1046	1.50	945	2.51	791	3.24	681	4.57	480	5.29	371						
60	.48	1199	.90	1130	1.61	1013	2.66	839	3.41	716	4.73	497	5.43	381						
64	.51	1297	.97	1217	1.72	1084	2.82	890	3.59	755	4.93	518								
70	.56	1410	1.04	1316	1.84	1162	2.99	942	3.77	792	5.10	535								
72	.57	1447	1.07	1349	1.88	1187	3.04	958	3.82	803	5.15	541								
80	.64	1623	1.19	1502	2.07	1308	3.30	1039	4.10	861	5.43	570								
84	.67	1697	1.24	1565	2.15	1355	3.39	1069	4.10	882	5.51	579								
90	.72	1807	1.32	1659	2.26	1425	3.53	1111	4.34	911	5.63	591								
96	.76	1916	1.39	1750	2.37	1492	3.65	1152	4.46	938	5.73	602								
100	.79	1988	1.44	1810	2.44	1535	3.74	1177	4.54	955	5.80	609								
110	.87	2203	1.58	1990	2.64	1667	3.99	1258	4.81	1011	6.05	636								
120	.94	2380	1.69	2133	2.80	1766	4.17	1314	4.98	1047	6.18	650								
140	1.08	2724	1.91	2405	3.09	1949	4.48	1413	5.27	1108										
144	1.11	2791	1.95	2457	3.15	1983	4.54	1430	5.33	1119										
160	1.24	3132	2.16	2727	3.44	2166	4.87	1535	5.66	1188										
180	1.37	3459	2.36	2971	3.68	2318	5.11	1609	5.87	1233										

10 DIAMETRAL PITCH NON-METALLIC — 14½° PRESSURE ANGLE — 1" FACE — REFERENCE PAGE 11.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
15							.27	85	.38	80	.63	66	.83	58	1.00	52	1.31	46	2.08	36
18							.33	104	.47	99	.78	82	1.02	71	1.24	65	1.63	57	2.60	45
20							.40	126	.54	113	.88	92	1.15	80	1.39	73	1.85	65	3.12	55
25							.51	161	.67	140	1.09	114	1.42	99	1.73	90	2.32	81	4.00	70
30							.62	195	.81	170	1.29	135	1.69	118	2.07	109	2.80	98	4.89	86

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

NOTE: 1. Ratings to right of heavy line are not recommended, as pitch line velocity exceeds 1000 feet per minute.
They should be used for interpolation purposes only.
2. Non-metallic gears are most commonly used for the driving pinion of a pair of gears, with mating gear made of Cast Iron or Steel, where pitch line velocities exceed 1000 FPM and are not subjected to shock loads.

*Torque Ratings (Lb. Ins.).

APPROXIMATE HORSEPOWER AND TORQUE* RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)

8 DIAMETRAL PITCH STEEL — 14½° PRESSURE ANGLE — 1-1/4" FACE — REFERENCE PAGE 12.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
11	.18	446	.35	439	.68	427	1.28	404	1.82	383	3.16	332	4.19	294	5.00	263	6.21	217	8.17	143
12	.19	485	.38	478	.73	463	1.38	436	1.96	412	3.37	354	4.43	310	5.26	276	6.47	226	8.39	147
14	.25	632	.49	620	.95	599	1.77	559	2.49	524	4.21	442	5.45	382	6.40	336	7.75	271	9.81	172
15	.28	703	.55	690	1.05	664	1.96	617	2.74	576	4.58	481	5.90	413	6.89	362	8.29	290	10.39	182
16	.31	778	.60	762	1.16	731	2.15	677	3.00	630	4.97	522	6.36	445	7.39	388	8.83	309	10.96	192
18	.37	927	.72	905	1.37	865	2.52	794	3.49	734	5.69	598	7.20	504	8.30	436	9.80	343		
20	.43	1075	.83	1047	1.58	996	2.88	907	3.96	832	6.35	667	7.96	557	9.10	478	10.64	372		
22	.48	1219	.94	1184	1.78	1121	3.21	1012	4.39	923	6.95	730	8.62	603	9.79	514	11.34	397		
24	.54	1355	1.04	1313	1.96	1237	3.52	1109	4.78	1004	7.46	783	9.17	642	10.36	544	11.90	417		
28	.66	1655	1.27	1596	2.37	1490	4.18	1316	5.61	1178	8.53	896	10.33	723	11.54	606				
30	.71	1786	1.36	1718	2.53	1598	4.44	1400	5.93	1247	8.93	938	10.73	752	11.94	627				
32	.78	1957	1.49	1878	2.76	1738	4.80	1513	6.38	1340	9.49	997	11.34	794	12.56	660				

8 DIAMETRAL PITCH CAST IRON — 14½° PRESSURE ANGLE — 1-1/4" FACE — REFERENCE PAGE 13.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
36	.53	1339	1.01	1279	1.86	1174	3.20	1009	4.21	884	6.14	645	7.25	507						
40	.60	1508	1.14	1434	2.07	1305	3.51	1107	4.57	961	6.55	688	7.66	536						
42	.63	1579	1.19	1498	2.16	1358	3.63	1145	4.71	989	6.69	703	7.78	545						
44	.67	1681	1.26	1591	2.28	1437	3.82	1204	4.93	1036	6.95	730	8.05	564						
48	.72	1824	1.36	1719	2.44	1540	4.05	1275	5.18	1088	7.19	756	8.27	579						
54	.83	2092	1.55	1958	2.75	1735	4.48	1413	5.67	1192	7.72	811								
56	.86	2164	1.60	2021	2.83	1784	4.59	1446	5.78	1215	7.83	822								
60	.92	2307	1.70	2145	2.98	1880	4.79	1508	5.99	1259	8.01	842								
64	.99	2492	1.83	2307	3.19	2008	5.06	1595	6.30	1323	8.33	875								
72	1.10	2775	2.02	2548	3.47	2188	5.42	1707	6.66	1399	8.64	908								
80	1.23	3107	2.24	2828	3.81	2398	5.84	1839	7.10	1492	9.06	952								
84	1.29	3246	2.34	2943	3.94	2481	5.99	1887	7.25	1523	9.18	965								
88	1.34	3384	2.42	3056	4.06	2561	6.13	1933	7.39	1553	9.30	976								
96	1.45	3656	2.60	3277	4.31	2713	6.41	2019	7.65	1608	9.50	998								
112	1.69	4256	2.98	3757	4.83	3045	7.01	2207	8.24	1731										
120	1.79	4517	3.14	3960	5.04	3176	7.22	2275	8.44	1773										
128	1.89	4773	3.30	4155	5.24	3300	7.42	2339	8.62	1811										
144	2.09	5272	3.59	4528	5.60	3532	7.78	2452												
160	2.33	5868	3.95	4980	6.07	3828	8.28	2610												

8 DIAMETRAL PITCH NON-METALLIC — 14½° PRESSURE ANGLE — 1-1/4" FACE — REFERENCE PAGE 12.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
16							.56	176	.76	160	1.23	129	1.61	112	1.96	103	2.60	91	4.39	77
18							.61	192	.88	185	1.41	148	1.84	129	2.25	118	3.00	105	4.71	82
20							.74	233	.99	208	1.59	167	2.08	146	2.54	133	3.40	119	5.84	102
24							.90	283	1.19	250	1.90	200	2.50	175	3.06	160	4.13	144	7.22	126
28							1.06	334	1.38	290	2.20	231	2.91	204	3.57	187	4.86	170		

6 DIAMETRAL PITCH STEEL — 14½° PRESSURE ANGLE — 1-1/2" FACE — REFERENCE PAGE 13.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
11	.38	946	.74	928	1.42	893	2.64	832	3.70	778	6.20	652	8.01	561	9.37	492	11.29	395	14.19	249
12	.41	1030	.80	1008	1.54	968	2.84	896	3.97	834	6.57	691	8.41	589	9.78	514	11.69	409	14.51	254
14	.53	1340	1.04	1308	1.98	1247	3.62	1142	5.01	1053	8.12	853	10.24	717	11.77	618	13.85	485		
15	.59	1491	1.15	1452	2.19	1381	3.99	1257	5.49	1154	8.81	925	11.03	773	12.62	663	14.75	517		
16	.65	1648	1.27	1603	2.41	1519	4.37	1376	5.98	1257	9.51	999	11.83	828	13.47	708	15.65	548		
18	.78	1962	1.51	1902	2.84	1792	5.10	1606	6.92	1455	10.80	1135	13.28	930	15.00	788	17.23	603		
20	.90	2273	1.74	2196	3.26	2057	5.79	1825	7.81	1640	11.97	1258	14.57	1020	16.33	858				
21	.97	2436	1.86	2349	3.48	2194	6.15	1937	8.25	1734	12.56	1319	15.20	1065	16.99	892				
24	1.13	2860	2.18	2745	4.03	2541	7.02	2212	9.32	1958	13.87	1457	16.57	1160	18.35	964				
27	1.32	3335	2.53	3186	4.64	2924	7.97	2512	10.48	2201	15.29	1606	18.05	1264						
30	1.49	3761	2.84	3576	5.17	3255	8.76	2761	11.41	2396	16.35	1717	19.10	1338						

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

NOTE: Ratings to right of heavy line are not recommended, as pitch line velocity exceeds 1000 feet per minute. They should be used for interpolation purposes only.

*Torque Ratings (Lb. Ins.).

SPUR GEARS

APPROXIMATE HORSEPOWER AND TORQUE* RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)

6 DIAMETRAL PITCH CAST IRON — 14½° PRESSURE ANGLE — 1-1/2" FACE — REFERENCE PAGE 14.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
32	.98	2470	1.86	2341	3.36	2120	5.66	1783	7.32	1539	10.38	1090	12.06	844						
33	1.01	2543	1.91	2406	3.45	2173	5.78	1821	7.46	1567	10.51	1104								
36	1.12	2813	2.10	2650	3.77	2375	6.24	1967	7.99	1678	11.09	1165								
40	1.25	3163	2.35	2962	4.17	2628	6.80	2144	8.62	1811	11.76	1235								
42	1.31	3310	2.45	3090	4.33	2728	7.02	2211	8.85	1858	11.97	1257								
48	1.51	3814	2.80	3530	4.88	3073	7.75	2441	9.64	2025	12.75	1339								
54	1.73	4364	3.18	4005	5.46	3440	8.52	2683	10.47	2199	13.59	1427								
60	1.90	4801	3.47	4371	5.88	3706	9.02	2842	10.97	2305	14.00	1471								
64	2.05	5177	3.72	4688	6.26	3944	9.50	2993	11.48	2411	14.50	1523								
66	2.11	5322	3.81	4807	6.39	4027	9.65	3040	11.62	2442	14.62	1536								
72	2.28	5750	4.09	5153	6.77	4267	10.08	3175	12.03	2528	14.94	1569								
84	2.66	6695	4.69	5912	7.60	4790	11.02	3473	12.96	2724										
96	2.98	7510	5.19	6538	8.24	5193	11.68	3680	13.56	2849										
108	3.35	8436	5.75	7246	8.97	5652	12.45	3924	14.31	3006										
120	3.65	9205	6.19	7806	9.50	5987	12.96	4083												
144	4.23	10664	7.01	8831	10.43	6571	13.79	4347												

5 DIAMETRAL PITCH STEEL — 14½° PRESSURE ANGLE — 1-3/4" FACE — REFERENCE PAGE 14.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
11	.63	1583	1.23	1546	2.35	1479	4.31	1360	5.99	1258	9.79	1028	12.41	869	14.33	753	16.96	594		
12	.68	1723	1.33	1680	2.54	1600	4.64	1462	6.40	1345	10.33	1085	12.99	910	14.91	783	17.49	613		
14	.89	2241	1.73	2176	3.26	2057	5.89	1855	8.04	1689	12.68	1332	15.70	1099	17.82	936	20.60	721		
15	.99	2491	1.92	2415	3.61	2275	6.47	2039	8.79	1847	13.71	1441	16.86	1181	19.05	1000	21.88	766		
16	1.09	2754	2.11	2664	3.97	2501	7.07	2227	9.56	2008	14.76	1550	18.03	1262	20.27	1065				
18	1.30	3275	2.50	3156	4.67	2942	8.22	2590	11.01	2313	16.68	1752	20.13	1410	22.46	1179				
20	1.50	3793	2.89	3640	5.35	3370	9.31	2934	12.36	2597	18.40	1933	21.98	1539	24.34	1279				

5 DIAMETRAL PITCH CAST IRON — 14½° PRESSURE ANGLE — 1-3/4" FACE — REFERENCE PAGE 14.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
24	1.13	2859	2.16	2723	3.95	2487	6.73	2120	8.79	1847	12.69	1333	14.88	1042						
25	1.20	3034	2.29	2885	4.17	2626	7.07	2227	9.20	1933	13.19	1385	15.41	1079						
30	1.49	3752	2.80	3534	5.03	3168	8.32	2623	10.66	2238	14.80	1554	17.00	1191						
35	1.80	4548	3.37	4246	5.95	3749	9.64	3038	12.15	2554	16.44	1727								
40	2.08	5242	3.85	4852	6.70	4224	10.65	3356	13.25	2783	17.53	1841								
45	2.36	5947	4.33	5459	7.44	4689	11.60	3657	14.27	2997	18.52	1945								
50	2.60	6543	4.73	5956	8.01	5051	12.29	3874	14.95	3142	19.08	2005								
55	2.90	7321	5.25	6612	8.79	5539	13.27	4182	15.99	3359	20.11	2112								
60	3.14	7910	5.62	7089	9.31	5870	13.86	4368	16.56	3478	20.55	2159								
70	3.65	9213	6.45	8135	10.46	6592	15.16	4779	17.84	3748										
80	4.17	10514	7.26	9153	11.54	7270	16.35	5152	18.99	3989										
100	5.03	12671	8.52	10745	13.08	8241	17.84	5620												

4 DIAMETRAL PITCH STEEL — 14½° PRESSURE ANGLE — 2" FACE — REFERENCE PAGE 15.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
11	1.11	2810	2.17	2730	4.10	2584	7.41	2334	10.13	2128	16.01	1682	19.86	1391	22.57	1185	26.14	915		
12	1.21	3057	2.35	2963	4.43	2792	7.94	2502	10.79	2266	16.83	1768	20.69	1449	23.37	1228	26.85	940		
14	1.58	3971	3.04	3831	5.67	3577	10.02	3158	13.46	2827	20.48	2151	24.79	1736	27.70	1455				
15	1.75	4414	3.37	4247	6.26	3948	10.98	3461	14.67	3081	22.06	2318	26.52	1857	29.50	1550				
16	1.93	4876	3.71	4680	6.87	4332	11.97	3772	15.90	3339	23.66	2485	28.26	1979	31.30	1644				
18	2.30	5794	4.39	5535	8.06	5080	13.85	4364	18.20	3824	26.56	2790	31.35	2196						
20	2.66	6703	5.06	6373	9.21	5802	15.61	4920	20.33	4271	29.13	3060	34.04	2384						
22	3.01	7579	5.69	7173	10.28	6478	17.22	5427	22.23	4670	31.33	3291	36.29	2541						

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.
NOTE: Ratings to right of heavy line are not recommended, as pitch line velocity exceeds 1000 feet per minute.
They should be used for interpolation purposes only.
*Torque Ratings (Lb. Ins.).

SPUR GEARS

APPROXIMATE HORSEPOWER AND TORQUE RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)*

4 DIAMETRAL PITCH CAST IRON — 14½° PRESSURE ANGLE — 2" FACE — REFERENCE PAGE 15.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
24	2.00	5042	3.77	4750	6.75	4257	11.19	3525	14.32	3008	19.88	2089	22.84	1600						
28	2.43	6129	4.54	5723	8.02	5053	12.99	4094	16.38	3441	22.16	2328								
30	2.62	6599	4.87	6135	8.53	5378	13.69	4314	17.14	3601	22.92	2408								
32	2.86	7211	5.30	6675	9.22	5811	14.65	4616	18.22	3829	24.11	2534								
36	3.25	8187	5.96	7514	10.24	6454	15.98	5034	19.64	4126	25.49	2677								
40	3.64	9177	6.63	8354	11.24	7085	17.24	5433	20.97	4406	26.77	2812								
42	3.80	9588	6.90	8694	11.63	7328	17.69	5575	21.42	4499	27.12	2849								
44	4.04	10181	7.29	9195	12.22	7703	18.46	5816	22.24	4672	27.97	2938								
48	4.36	10999	7.82	9858	12.95	8163	19.28	6074	23.02	4837	28.58	3002								
54	4.97	12530	8.81	11104	14.35	9045	20.94	6598	24.72	5193										
56	5.13	12933	9.06	11419	14.68	9253	21.29	6708	25.04	5261										
60	5.44	13727	9.55	12034	15.32	9652	21.94	6915	25.65	5388										
64	5.86	14763	10.20	12852	16.20	10209	22.95	7233	26.66	5601										
72	6.47	16305	11.11	14005	17.33	10923	24.07	7585	27.65	5810										
80	7.18	18101	12.18	15350	18.68	11772	25.48	8029												
84	7.47	18838	12.60	15877	19.17	12079	25.93	8170												
88	7.76	19561	13.00	16387	19.63	12372	26.35	8304												
96	8.32	20970	13.78	17365	20.50	12922	27.13	8548												

3 DIAMETRAL PITCH STEEL — 14½° PRESSURE ANGLE — 3" FACE — REFERENCE PAGE 15.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
11	2.94	7421	5.67	7146	10.56	6652	18.55	5846	24.82	5213	37.47	3936	45.15	3162	50.30	2642				
12	3.20	8067	6.14	7743	11.37	7167	19.80	6239	26.30	5524	39.14	4111	46.74	3273	51.78	2719				
14	4.15	10462	7.92	9979	14.49	9134	24.79	7812	32.48	6824	47.09	4947	55.40	3880						
15	4.61	11618	8.76	11046	15.96	10056	27.06	8528	35.24	7403	50.49	5304	59.01	4132						
16	5.09	12825	9.64	12156	17.47	11008	29.38	9259	38.03	7989	53.89	5661	62.60	4383						
18	6.03	15214	11.37	14333	20.38	12845	33.75	10637	43.20	9076	60.00	6303	68.93	4827						
20	6.97	17570	13.05	16454	23.16	14599	37.80	11913	47.89	10062	65.33	6863								
21	7.46	18795	13.92	17549	24.59	15495	39.84	12556	50.24	10554	67.96	7139								

3 DIAMETRAL PITCH CAST IRON — 14½° PRESSURE ANGLE — 3" FACE — REFERENCE PAGE 15.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
24	5.23	13175	9.67	12195	16.84	10617	26.76	8433	33.30	6995	44.05	4627								
30	6.81	17164	12.40	15626	21.03	13251	32.25	10162	39.23	8241	50.07	5259								
36	8.41	21199	15.07	18998	24.96	15732	37.15	11707	44.37	9322	55.08	5786								
42	9.81	24721	17.32	21828	28.06	17687	40.69	12822	47.87	10056										
48	11.20	28241	19.50	24586	30.99	19530	43.91	13838	51.00	10715										
54	12.71	32043	21.83	27523	34.06	21466	47.30	14906	54.35	11417										
60	13.87	34965	23.52	29651	36.08	22740	49.22	15509												
72	16.35	41223	27.08	34136	40.30	25402	53.32	16803												
84	18.76	47293	30.40	38322	44.08	27782	56.87	17923												
96	20.75	52300	32.96	41545	46.71	29437	59.02	18597												
108	22.99	57968	35.87	45212	49.81	31395	61.84	19486												

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

NOTE: Ratings to right of heavy line are not recommended, as pitch line velocity exceeds 1000 feet per minute.
They should be used for interpolation purposes only.

*Torque Ratings (Lb. Ins.).

SPUR GEARS

APPROXIMATE HORSEPOWER AND TORQUE RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)*

20 DIAMETRAL PITCH STEEL — 20° PRESSURE ANGLE — 1/2" FACE — REFERENCE PAGE 30.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
12	.01	36.5	.03	36.3	.06	35.8	.11	34.9	.16	34.1	.30	31.8	.42	29.7	.53	28.0	.71	25.0	1.08	18.9
14	.02	48.0	.04	47.7	.07	46.9	.14	45.6	.21	44.3	.39	40.9	.54	37.9	.67	35.4	.89	31.2	1.32	23.0
15	.02	53.8	.04	53.3	.08	52.5	.16	50.9	.23	49.3	.43	45.3	.60	41.9	.74	38.9	.97	34.1	1.42	24.9
16	.02	58.6	.05	58.1	.09	57.1	.18	55.2	.25	53.5	.46	48.8	.64	44.9	.79	41.6	1.04	36.3	1.49	26.2
18	.03	68.6	.05	67.9	.11	66.7	.20	64.2	.29	62.0	.53	56.1	.73	51.2	.90	47.1	1.16	40.6	1.64	28.7
20	.03	79.2	.06	78.4	.12	76.8	.23	73.7	.34	70.8	.60	63.5	.82	57.5	1.00	52.6	1.28	44.9	1.78	31.2
24	.04	99.5	.08	98.3	.15	95.8	.29	91.3	.41	87.1	.73	76.7	.98	68.5	1.18	61.9	1.48	51.9	2.00	34.9
25	.04	105	.08	103	.16	101	.30	95.6	.43	91.1	.76	79.9	1.02	71.1	1.22	64.1	1.53	53.5	2.04	35.8
30	.05	132	.10	130	.20	126	.38	119	.53	112	.92	96.4	1.21	84.5	1.43	75.2	1.76	61.6	2.28	40.0
35	.07	165	.13	162	.25	156	.46	145	.65	136	1.09	115	1.42	99.4	1.67	87.5	2.02	70.6	2.55	44.7
40	.08	194	.15	190	.29	182	.53	168	.75	157	1.24	130	1.58	111	1.84	96.6	2.20	77.0	2.73	47.8
45	.09	224	.17	219	.33	209	.61	192	.84	177	1.38	145	1.74	122	2.01	105	2.37	83.0		
50	.10	248	.19	242	.37	230	.66	210	.92	192	1.47	154	1.84	129	2.10	111	2.46	86.1		
60	.12	306	.24	296	.44	279	.79	250	1.08	227	1.68	177	2.07	145	2.34	123	2.69	94.0		
70	.14	365	.28	352	.52	329	.92	291	1.24	260	1.88	198	2.28	160	2.55	134				

20 DIAMETRAL PITCH CAST IRON — 20° PRESSURE ANGLE — 1/2" FACE — REFERENCE PAGE 30 & 34.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
80	.10	256	.20	246	.36	228	.63	198	.84	176	1.24	131	1.49	104	1.65	86.5				
84	.11	269	.20	257	.38	237	.65	206	.86	181	1.27	134	1.51	106	1.67	87.8				
90	.11	287	.22	274	.40	252	.69	216	.90	189	1.32	138	1.55	109	1.71	89.7				
100	.13	317	.24	302	.44	275	.74	233	.96	202	1.38	145	1.61	113	1.76	92.4				
120	.15	387	.29	365	.52	327	.86	271	1.10	231	1.53	161	1.76	123						
140	.18	447	.33	418	.59	369	.95	299	1.20	251	1.62	170	1.83	128						
160	.21	520	.38	481	.66	419	1.06	333	1.31	276	1.74	183								
180	.23	579	.42	532	.72	457	1.13	356	1.39	292	1.80	189								
200	.25	637	.46	580	.78	492	1.20	377	1.46	306	1.86	195								

16 DIAMETRAL PITCH STEEL — 20° PRESSURE ANGLE — 3/4" FACE — REFERENCE PAGE 31.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
12	.03	85.5	.07	84.7	.13	83.4	.26	80.9	.37	78.4	.69	72.0	.95	66.5	1.18	61.8	1.55	54.2	2.26	39.5
14	.04	112	.09	111	.17	109	.33	105	.48	102	.88	92.2	1.20	84.4	1.48	77.7	1.92	67.2	2.73	47.7
15	.05	126	.10	124	.19	122	.37	117	.54	113	.97	102	1.33	92.8	1.62	85.2	2.09	73.1	2.93	51.3
16	.05	136	.11	135	.21	133	.40	127	.58	122	1.04	110	1.42	99.4	1.73	90.8	2.21	77.5	3.07	53.8
18	.06	160	.13	158	.25	155	.47	148	.67	142	1.19	125	1.61	113	1.94	102	2.46	86.2	3.35	58.6
20	.07	185	.14	183	.28	178	.54	169	.77	161	1.35	141	1.80	126	2.16	113	2.70	94.7	3.62	63.3
24	.09	233	.18	229	.35	222	.66	209	.94	198	1.62	170	2.12	149	2.52	132	3.10	108	4.02	70.4
28	.11	283	.22	278	.43	268	.79	250	1.12	235	1.88	198	2.44	171	2.87	151	3.47	122	4.40	77.0
30	.12	308	.24	302	.46	291	.86	270	1.20	253	2.01	211	2.59	181	3.02	159	3.63	127	4.55	79.7
32	.13	340	.26	333	.51	320	.94	296	1.31	275	2.17	228	2.78	195	3.23	170	3.86	135	4.79	83.9
36	.16	395	.31	385	.58	368	1.07	338	1.49	312	2.42	254	3.06	215	3.53	186	4.17	146	5.09	89.1
40	.18	452	.35	440	.66	418	1.21	381	1.66	349	2.67	280	3.34	234	3.82	201	4.47	156	5.37	94.1
48	.22	556	.43	539	.81	508	1.44	455	1.96	412	3.06	322	3.76	264	4.25	223	4.88	171		
56	.26	665	.51	642	.95	599	1.68	529	2.25	474	3.43	360	4.15	291	4.64	244				
60	.28	711	.54	684	1.01	636	1.77	557	2.36	496	3.55	373	4.27	299	4.75	250				
64	.31	779	.59	748	1.10	692	1.91	602	2.54	533	3.78	397	4.51	316	5.00	263				
72	.35	872	.66	833	1.21	764	2.08	656	2.74	575	4.00	420	4.72	330						
80	.39	991	.75	943	1.36	858	2.31	728	3.01	632	4.31	653	5.04	353						

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

NOTE: Ratings to right of heavy line are not recommended, as pitch line velocity exceeds 1000 feet per minute.
They should be used for interpolation purposes only.

*Torque Ratings (Lb. Ins.).

SPUR GEARS

APPROXIMATE HORSEPOWER AND TORQUE RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)*

16 DIAMETRAL PITCH CAST IRON — 20° PRESSURE ANGLE — 3/4" FACE — REFERENCE PAGE 31.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
96	.28	707	.53	666	.95	597	1.57	494	2.01	421	2.79	293	3.20	224						
128	.38	949	.70	879	1.21	765	1.93	608	2.40	504	3.17	333	3.56	249						
144	.42	1057	.77	970	1.32	833	2.06	650	2.54	533	3.29	346								
160	.47	1195	.86	1088	1.46	923	2.25	707	2.73	574	3.49	366								
192	.56	1406	1.00	1260	1.66	1044	2.46	777	2.94	618	3.65	384								

12 DIAMETRAL PITCH STEEL — 20° PRESSURE ANGLE — 1" FACE — REFERENCE PAGE 31.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
12	.08	202	.16	200	.31	196	.60	188	.86	181	1.54	162	2.09	147	2.55	134	3.27	114	4.53	79.4
13	.09	233	.18	230	.36	225	.68	215	.98	206	1.75	183	2.36	165	2.86	150	3.63	127	4.97	87.1
14	.11	265	.21	262	.41	256	.77	244	1.11	233	1.96	206	2.63	184	3.18	167	4.00	140	5.42	94.8
15	.12	297	.23	293	.45	285	.86	271	1.23	259	2.16	227	2.88	202	3.46	182	4.34	152	5.80	102
16	.13	323	.25	319	.49	310	.93	294	1.33	279	2.31	243	3.07	215	3.68	193	4.58	160	6.05	106
18	.15	379	.30	373	.57	361	1.08	340	1.53	322	2.63	276	3.46	242	4.10	215	5.04	177	6.55	115
20	.17	437	.34	429	.66	415	1.23	389	1.74	365	2.95	310	3.84	269	4.52	238	5.50	193	7.02	123
21	.19	468	.36	459	.70	443	1.31	413	1.84	388	3.11	327	4.03	282	4.73	249	5.73	201	7.26	127
24	.22	548	.43	537	.82	515	1.51	477	2.11	444	3.50	368	4.48	314	5.21	274	6.22	218	7.72	135
28	.26	667	.52	651	.99	621	1.80	568	2.49	524	4.04	425	5.10	357	5.86	308	6.89	241		
30	.29	720	.56	707	1.07	673	1.94	612	2.68	562	4.29	451	5.37	376	6.15	323	7.19	252		
36	.37	928	.71	899	1.34	847	2.41	759	3.27	688	5.11	537	6.28	440	7.09	373	8.15	285		
42	.44	1112	.85	1073	1.59	1001	2.81	884	3.77	792	5.73	602	6.94	486	7.76	407				
48	.52	1304	.99	1252	1.84	1159	3.20	1009	4.25	893	6.33	665	7.56	529	8.37	440				
54	.60	1505	1.14	1437	2.09	1319	3.60	1133	4.73	993	6.90	724	8.14	570						

12 DIAMETRAL PITCH CAST IRON — 20° PRESSURE ANGLE — 1" FACE — REFERENCE PAGE 32.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
60	.40	998	.75	949	1.37	864	2.32	733	3.03	636	4.34	456	5.07	355						
66	.45	1125	.84	1064	1.53	961	2.56	805	3.30	693	4.65	488	5.38	377						
72	.48	1221	.91	1150	1.64	1031	2.71	853	3.47	728	4.81	506	5.53	387						
84	.58	1450	1.07	1354	1.90	1196	3.07	969	3.88	814	5.24	551								
96	.65	1641	1.21	1519	2.10	1322	3.33	1050	4.15	871	5.49	576								
108	.75	1879	1.37	1725	2.35	1482	3.67	1156	4.51	947	5.85	615								
120	.82	2068	1.49	1882	2.53	1596	3.88	1224	4.73	993	6.03	634								
132	.89	2252	1.61	2034	2.70	1704	4.08	1287	4.92	1033	6.19	650								
144	.97	2433	1.73	2181	2.87	1806	4.26	1344	5.09	1070	6.32	664								
168	1.13	2861	2.00	2526	3.25	2047	4.71	1484	5.54	1164										
192	1.27	3209	2.22	2794	3.52	2219	4.99	1573	5.80	1218										
216	1.41	3545	2.42	3045	3.77	2375	5.23	1649	6.01	1263										

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

NOTE: Ratings to right of heavy line are not recommended, as pitch line velocity exceeds 1000 feet per minute.
They should be used for interpolation purposes only.

*Torque Ratings (Lb. Ins.).

SPUR GEARS

APPROXIMATE HORSEPOWER AND TORQUE RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)*

10 DIAMETRAL PITCH STEEL — 20° PRESSURE ANGLE — 1-1/4" FACE — REFERENCE PAGE 32.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
12	.14	363	.28	358	.55	349	1.06	333	1.51	318	2.66	280	3.57	250	4.30	226	5.40	189	7.27	127
14	.19	477	.37	469	.72	456	1.37	431	1.95	409	3.37	354	4.46	312	5.31	279	6.58	230	8.63	151
15	.21	533	.42	525	.81	509	1.52	479	2.16	453	3.70	389	4.87	341	5.78	303	7.10	249	9.22	161
16	.23	580	.45	571	.88	552	1.64	518	2.32	488	3.96	416	5.18	363	6.12	321	7.47	262	9.60	168
18	.27	679	.53	667	1.02	642	1.90	599	2.67	561	4.48	471	5.79	406	6.79	356	8.19	287	10.33	181
20	.31	784	.61	768	1.17	737	2.16	682	3.02	635	5.00	526	6.41	449	7.45	391	8.90	311	11.04	193
24	.39	983	.76	958	1.45	913	2.65	834	3.65	767	5.89	619	7.41	519	8.50	447	9.98	349		
25	.41	1032	.80	1005	1.52	956	2.76	870	3.80	799	6.10	641	7.64	535	8.74	459	10.21	358		
28	.47	1195	.92	1161	1.74	1097	3.14	990	4.29	901	6.76	710	8.37	586	9.50	499	10.99	385		
30	.52	1300	1.00	1260	1.88	1187	3.38	1064	4.59	964	7.16	752	8.80	616	9.94	522	11.42	400		
35	.64	1615	1.24	1558	2.31	1454	4.08	1284	5.47	1150	8.33	875	10.08	706	11.27	592				
40	.75	1896	1.44	1820	2.67	1685	4.65	1467	6.18	1299	9.20	966	10.99	770	12.17	639				
45	.87	2190	1.66	2092	3.05	1920	5.23	1649	6.88	1445	10.04	1054	11.85	830						
48	.92	2328	1.76	2218	3.21	2026	5.48	1727	7.16	1504	10.33	1085	12.12	849						
50	.96	2420	1.83	2301	3.32	2095	5.64	1777	7.34	1542	10.52	1105	12.29	861						

10 DIAMETRAL PITCH CAST IRON — 20° PRESSURE ANGLE — 1-1/4" FACE — REFERENCE PAGE 32.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
55	.65	1638	1.23	1550	2.22	1400	3.72	1173	4.80	1009	6.77	711	7.84	549						
60	.71	1778	1.33	1675	2.38	1501	3.94	1243	5.05	1061	7.01	737	8.06	564						
70	.84	2114	1.57	1974	2.77	1743	4.48	1413	5.65	1187	7.65	803								
80	.98	2462	1.81	2279	3.15	1984	5.00	1576	6.22	1307	8.23	865								
90	1.09	2742	2.00	2517	3.43	2162	5.35	1686	6.58	1382	8.54	897								
100	1.20	3016	2.18	2746	3.70	2329	5.67	1786	6.89	1448	8.80	924								
120	1.45	3650	2.59	3271	4.30	2709	6.40	2016	7.64	1605	9.48	996								
140	1.66	4177	2.93	3688	4.74	2989	6.88	2167	8.09	1699										
160	1.91	4814	3.32	4191	5.28	3329	7.49	2359	8.69	1826										
200	2.30	5802	3.90	4920	5.99	3773	8.17	2573												

8 DIAMETRAL PITCH STEEL — 20° PRESSURE ANGLE — 1-1/2" FACE — REFERENCE PAGE 33.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
12	.27	678	.53	667	1.03	647	1.93	609	2.74	576	4.71	495	6.19	434	7.35	386	9.03	316	11.72	205
14	.35	890	.69	874	1.34	843	2.50	787	3.51	738	5.92	622	7.68	537	9.01	473	10.91	382	13.81	242
15	.39	996	.77	976	1.49	939	2.77	873	3.88	816	6.49	681	8.35	585	9.76	513	11.73	411	14.70	257
16	.43	1084	.84	1061	1.62	1018	2.99	943	4.18	877	6.92	727	8.85	620	10.30	541	12.30	431		
18	.50	1268	.98	1238	1.88	1183	3.44	1086	4.77	1003	7.78	817	9.84	689	11.35	596	13.40	469		
20	.58	1462	1.13	1424	2.15	1354	3.91	1233	5.39	1131	8.64	908	10.82	758	12.38	650	14.47	507		
22	.66	1651	1.27	1604	2.41	1518	4.35	1371	5.95	1250	9.41	989	11.67	817	13.27	698	15.36	538		
24	.73	1831	1.41	1775	2.65	1672	4.75	1498	6.46	1357	10.08	1059	12.39	868	14.00	735	16.08	563		
28	.88	2224	1.70	2145	3.18	2003	5.61	1768	7.54	1583	11.47	1204	13.88	972	15.51	815				
32	1.06	2664	2.03	2557	3.76	2367	6.54	2060	8.68	1824	12.92	1358	15.44	1081	17.10	898				
36	1.22	3082	2.34	2944	4.29	2703	7.37	2321	9.68	2034	14.13	1484	16.68	1168						

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

NOTE: Ratings to right of heavy line are not recommended, as pitch line velocity exceeds 1000 feet per minute.
They should be used for interpolation purposes only.

*Torque Ratings (Lb. Ins.).

SPUR GEARS

APPROXIMATE HORSEPOWER AND TORQUE RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)*

8 DIAMETRAL PITCH CAST IRON — 20° PRESSURE ANGLE — 1-1/2" FACE — REFERENCE PAGE 33.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
40	.84	2111	1.59	2007	2.90	1928	4.92	1550	6.40	1345	9.18	964	10.72	751						
44	.95	2384	1.79	2256	3.23	2038	5.42	1707	6.99	1469	9.86	1035	11.41	799						
48	1.03	2587	1.93	2437	3.47	2184	5.74	1809	7.35	1543	10.20	1072	11.72	821						
56	1.22	3080	2.28	2876	4.03	2539	6.53	2057	8.23	1729	11.14	1170								
60	1.30	3283	2.42	3052	4.25	2676	6.81	2146	8.53	1792	11.40	1198								
64	1.42	3588	2.64	3322	4.59	2892	7.29	2297	9.07	1905	12.00	1260								
72	1.59	3997	2.91	3669	5.00	3151	7.80	2458	9.59	2014	12.44	1307								
80	1.79	4525	3.27	4119	5.54	3493	8.50	2679	10.34	2173	13.20	1386								
88	1.96	4929	3.53	4451	5.92	3729	8.93	2816	10.76	2262	13.54	1422								
96	2.11	5325	3.79	4772	6.27	3952	9.33	2941	11.15	2341	13.83	1453								
112	2.49	6266	4.39	5533	7.11	4483	10.31	3250	12.13	2549										
120	2.64	6651	4.63	5830	7.42	4677	10.63	3351	12.43	2610										
128	2.79	7028	4.85	6118	7.71	4860	10.93	3444	12.69	2667										

6 DIAMETRAL PITCH STEEL — 20° PRESSURE ANGLE — 2" FACE — REFERENCE PAGE 33 & 34.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
12	.63	1559	1.24	1565	2.38	1502	4.41	1391	6.16	1294	10.20	1072	13.06	915	15.19	798	18.14	635		
14	.83	2097	1.62	2046	3.10	1951	5.67	1786	7.84	1647	12.70	1334	16.02	1122	18.42	967	21.67	759		
15	.93	2345	1.81	2284	3.45	2171	6.27	1977	8.64	1814	13.85	1455	17.35	1215	19.85	1043	23.20	812		
16	1.01	2551	1.97	2480	3.73	2351	6.76	2129	9.26	1945	14.71	1545	18.30	1282	20.85	1095	24.21	848		
18	1.18	2981	2.29	2889	4.32	2722	7.74	2440	10.52	2210	16.41	1724	20.18	1413	22.79	1197	26.18	917		
21	1.46	3671	2.81	3541	5.25	3306	9.26	2919	12.44	2613	18.93	1988	22.91	1605	25.61	1345				
24	1.70	4294	3.27	4122	6.05	3815	10.54	3322	14.00	2941	20.83	2188	24.88	1743	27.56	1448				
27	1.98	4986	3.78	4763	6.94	4372	11.92	3755	15.66	3241	22.85	2400	26.98	1889						
30	2.25	5660	4.27	5381	7.77	4899	13.18	4155	17.17	3607	24.60	2584	28.75	2013						

6 DIAMETRAL PITCH CAST IRON — 20° PRESSURE ANGLE — 2" FACE — REFERENCE PAGE 34.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
33	1.53	3847	2.89	3641	5.22	3288	8.74	2755	11.28	2370	15.90	1670	18.42	1290						
36	1.71	4316	3.23	4066	5.78	3644	9.58	3018	12.26	2575	17.02	1788	19.56	1370						
42	2.04	5148	3.81	4807	6.73	4244	10.91	3439	13.76	2891	18.62	1955								
48	2.38	6009	4.41	5563	7.68	4843	12.21	3847	15.19	3191	20.09	2111								
54	2.74	6899	5.02	6333	8.63	5440	13.46	4243	16.55	3477	21.48	2256								
60	3.01	7591	5.48	6910	9.30	5860	14.26	4494	17.35	3645	22.14	2326								
66	3.38	8515	6.10	7691	10.22	6443	15.44	4864	18.60	3907	23.39	2457								
72	3.65	9200	6.54	8245	10.83	6827	16.12	5080	19.26	4045	23.90	2511								
84	4.30	10835	7.59	9566	12.30	7752	17.83	5620	20.98	4407										
96	4.82	12152	8.39	10579	13.33	8404	18.90	5955	21.95	4611										
108	5.47	13800	9.40	11583	14.67	9245	20.37	6420	23.41	4917										
120	5.97	15059	10.13	12770	15.54	9793	21.20	6680												

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

NOTE: Ratings to right of heavy line are not recommended, as pitch line velocity exceeds 1000 feet per minute.
They should be used for interpolation purposes only.

*Torque Ratings (Lb. Ins.).

SPUR GEARS

APPROXIMATE HORSEPOWER AND TORQUE RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)*

5 DIAMETRAL PITCH STEEL — 20° PRESSURE ANGLE — 2-1/2" FACE — REFERENCE PAGE 34.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
12	1.14	2865	2.22	2794	4.22	2662	7.71	2431	10.65	2237	17.19	1805	21.61	1513	24.80	1302	29.09	1019		
14	1.49	3756	2.89	3647	5.47	3449	9.87	3110	13.48	2832	21.25	2233	26.31	1843	29.87	1569	34.53	1209		
15	1.67	4198	3.23	4069	6.08	3833	10.90	3435	14.81	3112	23.11	2427	28.41	1990	32.09	1686	36.87	1291		
16	1.81	4565	3.50	4416	6.58	4146	11.72	3693	15.85	3329	24.47	2570	29.89	2093	33.61	1765				
18	2.12	5332	4.08	5138	7.60	4789	13.38	4216	17.92	3766	27.15	2852	32.77	2295	36.56	1920				
20	2.44	6141	4.68	5894	8.66	5456	15.07	4750	20.02	4205	29.79	3129	35.58	2492	39.41	2070				

5 DIAMETRAL PITCH CAST IRON — 20° PRESSURE ANGLE — 2-1/2" FACE — REFERENCE PAGE 34.

No. Teeth	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
24	1.82	4599	3.48	4381	6.35	4002	10.82	3411	14.15	2972	20.41	2144	23.95	1677						
25	1.91	4826	3.64	4588	6.63	4177	11.24	3542	14.64	3075	20.97	2203	24.51	1716						
28	2.21	5571	4.18	5267	7.54	4750	12.60	3970	16.23	3410	22.81	2396	26.37	1847						
30	2.40	6050	4.52	5700	8.10	5108	13.42	4230	17.18	3609	23.86	2506	27.41	1920						
35	2.97	7477	5.54	6982	9.78	6164	15.85	4995	19.98	4199	27.04	2840								
40	3.47	8737	6.42	8087	11.17	7040	17.75	5593	22.08	4639	29.21	3068								
45	3.98	10040	7.31	9216	12.56	7916	19.59	6174	24.09	5060	31.26	3284								
50	4.38	11046	7.98	10056	13.53	8528	20.75	6540	25.25	5304	32.22	3384								
60	5.32	13399	9.53	12008	15.78	9944	23.48	7400	28.05	5892	34.81	3657								
70	6.27	15794	11.06	13945	17.93	11300	26.00	8192	30.58	6425										
80	7.23	18229	12.59	15869	20.00	12605	28.34	8932	32.92	6916										
100	8.71	21969	14.78	18630	22.67	14288	30.92	9745												
110	9.68	24409	16.22	20449	24.50	15439	32.88	10362												
120	10.38	26168	17.19	21669	25.58	16125	33.85	10666												
140	11.70	29508	18.97	23910	27.50	17334	35.49	11182												
160	13.30	33526	21.13	26631	29.94	18870	37.83	11921												
180	14.49	36534	22.61	28495	31.40	19787	38.97	12281												

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

NOTE: Ratings to right of heavy line are not recommended, as pitch line velocity exceeds 1000 feet per minute.
They should be used for interpolation purposes only.

*Torque Ratings (Lb. Ins.).

STAINLESS STEEL GEAR GAUGE SET

14-1/2° and 20° PRESSURE ANGLES

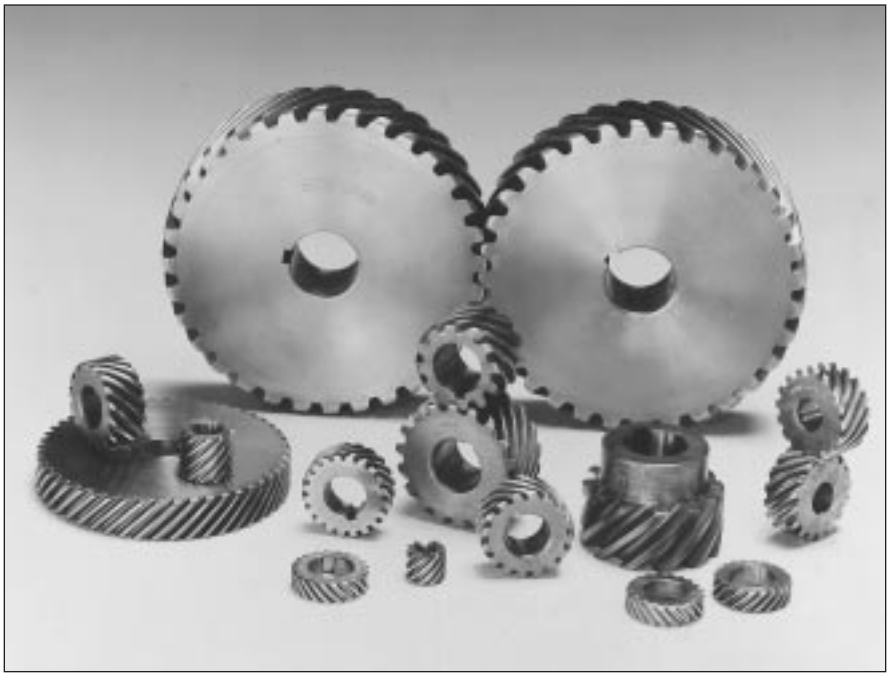
This handy, steel gear gauge set consists of 16 leaves — 24 gauges — to measure both 14-1/2° and 20° pressure angle tooth form, in diametral pitch sizes 64, 48, 32, 24, 20, 16, 12, 10, 8, 6, 5 and 4. Pitch sizes 8, 6, 5 and 4 both 14-1/2° and 20° are cut on individual leaves. Pitch sizes 64 through 10 inclusive, have both 14-1/2° and 20° pressure angles on a single leaf.

SOLD ONLY AS A COMPLETE SET

ORDER BY CATALOG NUMBER OR ITEM CODE

Catalog Number	Item Code
Gear Gauge	06000

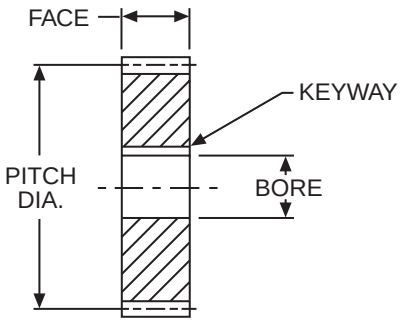
HELICAL GEARS



SECTION CONTENTS

24 THROUGH 10 TRANSVERSE DIAMETRAL PITCH
STEEL—HARDENED

14½° NORMAL PRESSURE ANGLE
45° HELIX ANGLE



These gears are hardened all over, except as noted. Teeth on all steel gears are polished.

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Keyway	Style See Page 153	RIGHT HAND Catalog Number	RIGHT HAND Item Code	LEFT HAND Catalog Number	LEFT HAND Item Code
24 TRANSVERSE DIAMETRAL PITCH					**Face: 8-15 Teeth = .375" 18-72 Teeth = .250"**			
8	.333	.1875	*	A	H2408R	18268	H2408L	18270
10	.417	.250	**		H2410R	18272	H2410L	18274
12	.500				H2412R	18276	H2412L	18278
15	.625	.375			H2415R	18280	H2415L	18282
18	.750		1/8 x 1/16		H2418R	18284	H2418L	18286
20	.833	.500			H2420R	18288	H2420L	18290
24	1.000				H2424R	18292	H2424L	18294
30	1.250	.625			H2430R	18296	H2430L	18298
36	1.500				H2436R†	18300	H2436L†	18302
48	2.000				H2448R†	18304	H2448L†	18306
60	2.500				H2460R†	18308	H2460L†	18310
72	3.000				H2472R†	18312	H2472L†	18314
20 TRANSVERSE DIAMETRAL PITCH					**Face: 8-15 Teeth = .563" 18-72 Teeth = .375"**			
8	.400	.250	**	A	H2008R	18228	H2008L	18230
10	.500	.3125			H2010R	18232	H2010L	18234
12	.600	.375			H2012R	18236	H2012L	18238
15	.750	.4375	1/8 x 1/16		H2015R	18240	H2015L	18242
20	1.000	.500			H2020R	18244	H2020L	18246
25	1.250	.625			H2025R	18248	H2025L	18250
30	1.500	.750	3/16 x 3/32		H2030R†	18252	H2030L†	18254
40	2.000				H2040R†	18256	H2040L†	18258
50	2.500				H2050R†	18260	H2050L†	18262
60	3.000				H2060R†	18264	H2060L†	18266
16 TRANSVERSE DIAMETRAL PITCH					**Face = .500"**			
12	.750	.375	1/16 x 1/32	A	H1612R	18200	H1612L	18202
16	1.000	.500	1/8 x 1/16		H1616R	18204	H1616L	18206
20	1.250				H1620R	18208	H1620L	18210
24	1.500				H1624R†	18212	H1624L†	18214
32	2.000				H1632R†	18216	H1632L†	18218
40	2.500				H1640R†	18220	H1640L†	18222
48	3.000				H1648R†	18224	H1648L†	18226
12 TRANSVERSE DIAMETRAL PITCH					**Face = .750"**			
12	1.000	.625	1/8 x 1/16	A	H1212R	18170	H1212L	18168
15	1.250				H1215R	18174	H1215L	18172
18	1.500				H1218R†	18178	H1218L†	18176
24	2.000				H1224R†	18182	H1224L†	18180
30	2.500				H1230R†	18186	H1230L†	18184
36	3.000				H1236R†	18190	H1236L†	18188
10 TRANSVERSE DIAMETRAL PITCH					**Face = .875"**			
8	.800	.375	1/16 x 1/32	A	H1008R	18130	H1008L	18128
10	1.000	.500	1/8 x 1/16		H1010R	18134	H1010L	18132
12	1.200	.625			H1012R	18138	H1012L	18136
15	1.500	.750	3/16 x 3/32		H1015R†	18142	H1015L†	18140
20	2.000				H1020R†	18146	H1020L†	18144
25	2.500				H1025R†	18148	H1025L†	18150
30	3.000				H1030R†	18154	H1030L†	18152
40	4.000				H1040R†	18158	H1040L†	18156

*1/16" wide x .04" deep slot cut on end of gear for drive pin, not key.
**3/32" wide x .06" deep slot cut on end of gear for drive pin, not key.
†Teeth only hardened.

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 55, 56
Lubrication — 152
Materials — 153
Selection Procedure — 54

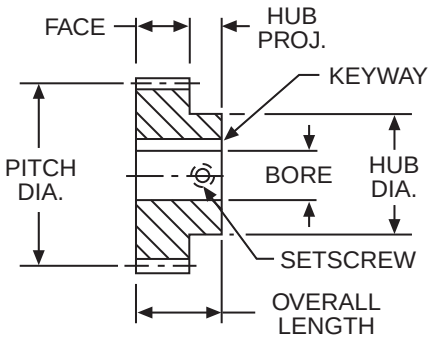
NOTE: Normal Diametral Pitch is equal to the Transverse Diametral Pitch divided by the cosine of the Helix Angle.

HELICAL GEARS

8 AND 6 TRANSVERSE DIAMETRAL PITCH
BRONZE AND STEEL—HARDENED

14½° NORMAL PRESSURE ANGLE
45° HELIX ANGLE

All gears with hubs have setscrew at 90° to keyway. Steel gears have teeth only hardened, except as noted. Teeth on all steel gears are polished.



STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

REFERENCE PAGES

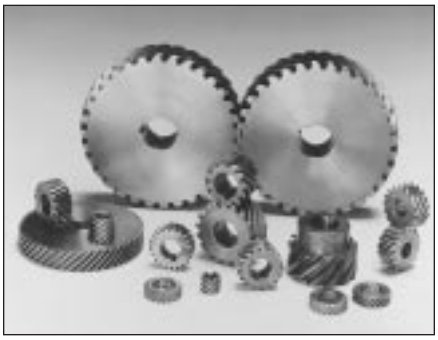
NOTE: Normal Diametral Pitch is equal to the Transverse Diametral Pitch divided by the cosine of the Helix Angle.

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Keyway	Style See Page 153	RIGHT HAND Catalog Number	RIGHT HAND Item Code	LEFT HAND Catalog Number	LEFT HAND Item Code
8 TRANSVERSE DIAMETRAL PITCH							**Face without Hubs = 1.000" –with Hubs = .750" Overall Length = Face + Hub Proj.**			
STEEL–HARDENED										
8	1.000	.500	–	–	1/8 x 1/16	A	H808R*	18066	H808L*	18064
10	1.250	.625	–	–			H810R*	18070	H810L*	18068
12	1.500	.750	–	–	3/16 x 3/32		H812R	18074	H812L	18072
16	2.000	.875	–	–			H816R	18078	H816L	18076
20	2.500						H820R	18082	H820L	18080
24	3.000						H824R	18086	H824L	18084
32	4.000						H832R	18090	H832L	18088
8	1.000	.500	.75	.50	1/8 x 1/16	A	HS808R*	18092	HS808L*	18094
10	1.250	.625	1.00	.50			HS810R*	18096	HS810L*	18098
12	1.500	.750	1.25	.50	3/16 x 3/32		HS812R*	18100	HS812L*	18102
16	2.000	1.000	1.62	.50	1/4 x 1/8		HS816R	18104	HS816L	18106
20	2.500		2.00				HS820R	18108	HS820L	18110
24	3.000						HS824R	18112	HS824L	18114
32	4.000						HS832R	18116	HS832L	18118
40	5.000						HS840R	18120	HS840L	18122
48	6.000		2.25				HS848R	18124	HS848L	18126
BRONZE										
8	1.000	.500	.75	.50	1/8 x 1/16	A	HB808R	18356	HB808L	18358
10	1.250	.625	1.00	.50			HB810R	18360	HB810L	18362
12	1.500	.750	1.24	.50	3/16 x 3/32		HB812R	18364	HB812L	18366
16	2.000	1.000	1.62	.50	1/4 x 1/8		HB816R	18368	HB816L	18370
20	2.500		2.00				HB820R	18372	HB820L	18374
24	3.000						HB824R	18376	HB824L	18378
32	4.000					B	HB832R	18380	HB832L	18382
40	5.000						HB840R	18384	HB840L	18386
48	6.000		2.25				HB848R	18388	HB848L	18390
6 TRANSVERSE DIAMETRAL PITCH							**Face without Hubs = 1.250" –with Hubs = 1.000" Overall Length = Face + Hub Proj.**			
STEEL–HARDENED										
8	1.333	.625	–	–	1/8 x 1/16	A	H608R	18000	H608L	18002
10	1.667	.750	–	–	3/16 x 3/32		H610R	18004	H610L	18006
12	2.000	1.000	–	–	1/4 x 1/8		H612R	18010	H612L	18008
15	2.500						H615R	18014	H615L	18012
18	3.000						H618R	18018	H618L	18016
24	4.000						H624R	18022	H624L	18020
8	1.333	.625	1.00	.75	1/8 x 1/16	A	HS608R	18024	HS608L	18026
9	1.500	.750	1.18	.75	3/16 x 3/32		HS609R	18028	HS609L	18030
10	1.667		1.34				HS610R	18032	HS610L	18034
12	2.000	1.000	1.62	.75	1/4 x 1/8		HS612R	18036	HS612L	18038
15	2.500	1.250	2.00	.75	5/16 x 5/32		HS615R	18040	HS615L	18042
18	3.000		2.25				HS618R	18044	HS618L	18046
20	3.333		2.50				HS620R	18048	HS620L	18050
24	4.000						HS624R	18052	HS624L	18054
30	5.000						HS630R	18056	HS630L	18058
36	6.000						HS636R	18060	HS636L	18062
BRONZE										
12	2.000	1.000	1.62	.75	1/4 x 1/8	A	HB612R	18328	HB612L	18330
15	2.500	1.250	2.00	.75	5/16 x 5/32		HB615R	18332	HB615L	18334
18	3.000		2.25				HB618R	18336	HB618L	18338
20	3.333		2.50				HB620R	18340	HB620L	18342
24	4.000						HB624R	18344	HB624L	18346
30	5.000					B	HB630R	18348	HB630L	18350
36	6.000						HB636R	18352	HB636L	18354

*Hardened all over.

HELICAL GEARS



Boston standard stock helical gears are made with a 45° helix angle to transmit motion and/or power between non-intersecting shafts that are parallel or at 90° to each other. They are stocked both right and left-handed. For parallel shaft operation, helical gears having opposite hand helix angles are required, while for shafts at 90° the same hand helix must be used.

For parallel shaft applications, helical gears provide overlapping tooth contact. This results in a smoother, quieter operation and higher horsepower capacity than afforded by spur gears of comparable size.

For 90° shaft applications, the tooth contact area is very small which considerably limits the load capacity. Horsepower ratings are not tabulated in this catalog, for 90° applications.

Boston helical gears are top hobbed, resulting in extremely close concentricity between the pitch diameter and the outside diameter.

SELECTION PROCEDURE

Approximate horsepower and torque ratings for selected sizes (numbers of teeth) at various operating speeds (RPM) are given for hardened steel helical gears. The ratings are based on the beam strength of the gear tooth. These ratings are for parallel shaft applications under normal operating conditions, that is: properly mounted and lubricated, carrying a smooth load for not more than 10 hours per day or a moderate shock load not more than 15 minutes in two hours (Service Factor 1.0). Refer to Table 1, below, for other types of service.

Ratings for gear sizes or speeds not listed may be interpolated from the values indicated. Pitchline velocities are limited as reflected by the lack of ratings for larger numbers of teeth at higher RPM's in the selection chart. Application in this area is not recommended.

Ref. Parallel shafts are approximately 98% efficient
90° shafts are approximately 50% efficient

Horsepower ratings for bronze gears are approximately 33% of these ratings.

1. Determine service factor.
   a. Using Application Classification Chart I, pages 155-156 determine service factor or
   b. With knowledge of operating conditions and load classification, select service factor from Table 1.
2. Determine Design Horsepower.

   Design HP = Application Load × Service Factor (Table 1)
3. Select pinion with horsepower capacity equal to (or greater than) design horsepower determined in Step 2. Reference Rating Pages 55, 56.
4. Select a driven gear with a catalog rating equal to (or greater than) the horsepower determined in Step 2.

TABLE 1

Service Factor	Operating Conditions
.8	Uniform – not more than 15 minutes in 2 hours.
1.0	Moderate Shock – not more than 15 minutes in 2 hours. Uniform – not more than 10 hours per day.
1.25	Moderate Shock – not more than 10 hours per day. Uniform – more than 10 hours per day.
1.50	Heavy Shock – not more than 15 minutes in 2 hours. Moderate Shock – more than 10 hours per day.
1.75	Heavy Shock – not more than 10 hours per day.
2.0	Heavy Shock – more than 10 hours per day.

Heavy shock loads and/or severe wear conditions may require the use of higher service factors. Consultation with factory is recommended in these applications.

APPROXIMATE HORSEPOWER AND TORQUE* RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)

No.	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
Teeth	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
24 DIAMETRAL PITCH – 33.94 NORMAL DIAMETRAL PITCH HARDENED STEEL .250-.375" FACE																				
8	.01	13.5	.01	13.5	.02	13.4	.04	13.2	.06	13.0	.12	12.5	.17	12.0	.22	11.6	.31	10.8	.51	8.9
10	.01	18.0	.01	17.9	.03	17.8	.06	17.4	.08	17.1	.16	16.3	.22	15.5	.28	14.8	.39	13.6	.62	10.9
12	.01	22.5	.02	22.3	.04	22.1	.07	21.6	.10	21.1	.19	20.0	.27	18.9	.34	17.9	.46	16.2	.72	12.6
15	.01	29.1	.02	28.9	.05	28.5	.09	27.8	.13	27.1	.24	25.2	.34	23.5	.42	22.0	.56	19.6	.84	14.8
18	.01	23.6	.02	23.4	.04	23.1	.07	22.4	.10	21.7	.19	19.9	.26	18.4	.33	17.1	.43	15.0	.62	10.9
20	.01	26.8	.02	26.5	.04	26.1	.08	25.2	.12	24.3	.21	22.2	.29	20.4	.36	18.8	.47	16.3	.67	11.7
24	.01	32.6	.03	32.3	.05	31.6	.10	30.3	.14	29.2	.25	26.1	.34	23.7	.41	21.6	.53	18.5	.73	12.8
30	.02	41.3	.03	40.8	.06	39.7	.12	37.8	.17	36.0	.30	31.6	.40	28.1	.48	25.3	.60	21.1	.81	14.1
36	.02	49.9	.04	49.1	.08	47.6	.14	44.9	.20	42.4	.35	36.4	.46	31.9	.54	28.4	.66	23.3	.86	15.1
48	.03	67.0	.05	65.6	.10	63.0	.19	58.3	.26	54.3	.43	45.0	.55	38.4	.64	33.5	.76	26.6	.94	16.5
60	.03	83.8	.06	81.6	.12	77.6	.22	70.7	.31	64.9	.50	52.0	.62	43.4	.71	37.3	.83	29.0	1.00	17.5
72	.04	101	.08	97.7	.15	92.1	.26	82.5	.36	74.8	.56	58.3	.68	47.8	.77	40.5	.89	31.0	1.00	18.2
20 DIAMETRAL PITCH – 28.28 NORMAL DIAMETRAL PITCH HARDENED STEEL .375-.563" FACE																				
8	.01	29.2	.02	29.1	.05	28.8	.09	28.4	.13	27.9	.25	26.6	.36	25.4	.46	24.3	.64	22.3	1.00	18.0
10	.01	37.7	.03	37.5	.06	37.1	.12	36.3	.17	35.6	.32	33.5	.45	31.7	.57	30.1	.78	27.2	1.20	21.2
12	.02	48.5	.04	48.2	.08	47.5	.15	46.4	.22	45.2	.40	42.2	.56	39.5	.71	37.1	.95	33.2	1.44	25.1
15	.02	62.7	.05	62.2	.10	61.2	.19	59.3	.27	51.6	.50	52.8	.70	48.8	.86	45.4	1.14	39.8	1.66	29.0
20	.02	57.7	.05	57.1	.09	55.9	.17	53.7	.25	51.6	.44	46.2	.60	41.9	.73	38.3	.93	32.7	1.30	22.7
25	.03	73.8	.06	72.8	.11	70.9	.21	67.4	.31	64.3	.54	56.4	.72	50.2	.86	45.2	1.08	37.7	1.44	25.2
30	.04	89.1	.07	87.6	.13	85.0	.25	80.0	.36	75.7	.62	65.0	.81	56.9	.96	50.7	1.19	41.5	1.54	27.0
40	.05	120	.09	118	.18	113	.33	104	.46	97.2	.77	80.5	.98	68.7	1.14	59.9	1.36	47.7	1.69	29.6
50	.06	151	.12	147	.22	139	.40	127	.55	117	.89	93.4	1.11	78.0	1.27	66.9	1.49	52.1	1.79	31.4
60	.07	180	.14	175	.26	165	.47	147	.64	134	.99	104	1.22	85.4	1.38	72.3	1.58	55.4	1.86	32.5
16 DIAMETRAL PITCH – 22.63 NORMAL DIAMETRAL PITCH HARDENED STEEL .500" FACE																				
12	.03	67.2	.05	66.6	.10	65.6	.20	63.6	.29	61.7	.54	56.6	.75	52.3	.93	48.6	1.20	42.6	1.80	31.1
16	.04	93.4	.07	92.4	.14	90.5	.28	86.9	.40	83.5	.71	74.8	.97	67.8	1.18	62.0	1.51	52.9	2.10	36.7
20	.05	120	.09	118	.18	115	.35	110	.50	104	.87	91.5	1.16	81.5	1.40	73.4	1.75	61.3	2.34	41.0
24	.06	146	.11	144	.22	139	.42	131	.59	124	1.00	107	1.33	93.3	1.58	83.0	1.94	68.1	2.52	44.2
32	.08	197	.15	193	.29	185	.54	172	.76	160	1.26	132	1.61	113	1.87	98.4	2.24	78.4	2.78	48.7
40	.10	249	.19	242	.37	230	.67	210	.92	193	1.47	154	1.84	129	2.11	111	2.46	86.2	3.00	51.8
48	.12	298	.23	289	.43	273	.77	244	1.05	221	1.64	173	2.02	141	2.28	120	2.62	91.8	3.08	53.9
12 DIAMETRAL PITCH – 16.97 NORMAL DIAMETRAL PITCH HARDENED STEEL .750" FACE																				
12	.07	179	.14	177	.27	173	.53	166	.76	160	1.36	143.2	1.85	130	2.26	119	2.89	101	4.01	70.2
15	.09	231	.18	228	.35	222	.67	211	.96	201	1.68	176	2.24	157	2.69	142	3.37	118	4.51	79.0
18	.11	281	.22	277	.43	268	.80	253	1.14	239	1.95	205	2.57	180	3.05	160	3.75	131	4.86	85.1
24	.15	387	.30	379	.58	364	1.07	337	1.49	313	2.47	260	3.16	222	3.68	193	4.39	154	5.45	95.5
30	.19	489	.38	477	.72	453	1.31	413	1.80	379	2.89	304	3.62	254	4.14	218	4.84	170	5.82	102
36	.23	589	.45	571	.85	538	1.53	482	2.08	437	3.24	341	3.99	279	4.50	237	5.17	181	6.08	106
10 DIAMETRAL PITCH – 14.14 NORMAL DIAMETRAL PITCH HARDENED STEEL .875" FACE																				
8	.07	181	.14	179	.28	176	.54	171	.79	165	1.44	151	1.78	139	2.45	129	3.20	112	4.62	80.9
10	.10	240	.19	238	.37	233	.71	223	1.02	215	1.83	193	2.49	174	3.03	159	3.88	136	5.39	94.4
12	.12	300	.23	296	.46	288	.87	275	1.25	262	2.20	231	2.95	206	3.55	186	4.46	156	6.01	105
15	.15	387	.30	381	.59	369	1.10	348	1.56	329	2.69	282	3.53	247	4.19	220	5.16	181	6.69	117
20	.21	533	.41	522	.79	501	1.47	464	2.05	432	3.40	357	4.35	305	5.06	266	6.05	212	7.51	131
25	.27	680	.53	662	1.00	630	1.82	573	2.50	526	4.01	422	5.03	352	5.75	302	6.72	235	8.09	142
30	.32	818	.63	793	1.19	747	2.12	669	2.89	606	4.50	473	5.54	388	6.25	328	7.18	252	8.44	148
40	.44	1097	.84	1053	1.55	975	2.69	849	3.58	751	5.32	559	6.36	445	7.04	370	7.89	276	8.97	157
8 DIAMETRAL PITCH – 11.31 NORMAL DIAMETRAL PITCH HARDENED STEEL .750" FACE																				
8	.10	242	.19	239	.37	234	.71	225	1.03	216	1.85	194	2.51	176	3.06	160	3.91	137	5.43	95
10	.13	321	.25	317	.49	309	.93	293	1.33	280	2.53	245	3.12	218	3.74	197	4.69	164	6.27	110
12	.16	400	.31	394	.61	382	1.14	360	1.62	340	2.78	292	3.65	256	4.34	228	5.33	187	6.92	121
16	.22	555	.43	543	.83	521	1.53	483	2.14	447	3.54	372	4.53	318	5.27	277	6.30	221	7.82	137
20	.28	710	.55	692	1.04	658	1.90	599	2.62	550	4.20	441	5.26	368	6.01	316	7.03	246	8.45	148
24	.34	862	.66	836	1.25	787	2.24	706	3.04	639	4.75	499	5.84	409	6.59	346	7.57	265	8.90	156
32	.46	1160	.88	1113	1.64	1031	2.85	897	3.78	794	5.63	591	6.72	471	7.44	391	8.34	292		
40	.58	1454	1.10	1383	2.00	1259	3.39	1068	4.41	927	6.32	664	7.39	517	8.07	424	8.88	311		
48	.69	1137	1.30	1636	2.33	1466	3.85	1214	4.93	1036	6.85	719	7.87	551	8.50	447				

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

NOTE: Ratings to right of heavy line exceed 1500 Feet per Minute and should be used for interpolation purposes only.

*Torque Rating (Lb. Ins.)

HELICAL GEARS

APPROXIMATE HORSEPOWER AND TORQUE RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)*

No.	25 RPM		50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM		3600 RPM	
Teeth	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque	H.P.	Torque
8 DIAMETRAL PITCH – 11.31 NORMAL DIAMETRAL PITCH HARDENED STEEL																		**1.000" FACE**		
8	.13	323	.25	319	.50	313	.95	300	1.4	288	2.5	258	3.3	234	4.1	214	5.2	183	7.2	127
10	.17	428	.34	422	.65	412	1.20	391	1.8	373	3.1	327	4.2	291	5.0	262	6.3	219	8.4	146
12	.21	534	.42	525	.81	509	1.50	480	2.2	453	3.7	389	4.9	341	5.8	304	7.1	249	9.2	162
16	.29	740	.57	725	1.1	696	2.00	644	2.9	599	4.7	496	6.1	423	7.0	370	8.4	294	10.4	182
20	.38	947	.73	923	1.4	877	2.50	799	3.5	733	5.6	588	7.0	491	8.0	421	9.3	328	11.1	197
24	.46	1150	.88	1114	1.7	1050	3.00	941	4.1	852	6.3	665	7.7	545	8.8	462	10.1	352	11.9	208
32	.61	1547	1.20	1485	2.2	1374	3.80	1196	5.0	1059	7.5	788	9.0	628	9.9	521	11.1	389	12.7	221
8 DIAMETRAL PITCH – 11.31 NORMAL DIAMETRAL PITCH BRONZE																		**.750" FACE**		
8	.04	97	.08	95.8	.15	93.8	.29	90.0	.41	86.5	.74	77.5	1.00	70.2	1.22	64.2	1.56	54.8	2.17	38.0
10	.05	128	.10	127	.20	123	.37	117	.53	112	.93	98.1	1.25	87.3	1.50	78.7	1.88	65.7	2.51	43.9
12	.06	160	.12	158	.24	153	.46	144	.65	136	1.11	117	1.46	102	1.73	91.1	2.13	74.7	2.77	48.4
16	.09	222	.17	217	.33	209	.61	193	.86	180	1.42	149	1.81	127	2.11	111	2.52	88.2	3.13	54.7
20	.11	284	.22	277	.42	263	.76	240	1.05	220	1.68	176	2.10	147	2.41	126	2.81	98.4	3.38	59.2
24	.14	345	.27	334	.50	315	.90	282	1.22	256	1.90	199	2.33	163	2.64	138	3.03	106	3.56	62.3
32	.18	464	.35	445	.65	412	1.14	359	1.51	318	2.75	236	2.69	188	2.98	156	3.34	117		
40	.23	582	.44	553	.80	504	1.36	427	1.76	371	2.53	266	2.95	207	3.23	169	3.55	124		
48	.28	695	.52	655	.93	587	1.54	486	1.97	414	2.74	288	3.15	220	3.40	179				
6 DIAMETRAL PITCH – 8.48 NORMAL DIAMETRAL PITCH HARDENED STEEL																		**1.000" FACE**		
8	.01	572	.45	564	.87	548	1.65	520	2.35	494	4.09	430	5.44	381	6.50	342	8.09	283	10.70	187
9	.26	664	.52	653	1.00	633	1.89	597	2.68	564	4.61	484	6.06	424	7.19	378	8.84	310	11.47	201
10	.30	758	.59	745	1.14	720	2.14	674	3.02	634	5.11	537	6.66	466	7.84	412	9.54	334	12.17	213
12	.37	944	.73	924	1.41	887	2.61	821	3.64	764	6.02	633	7.71	540	8.97	471	10.71	375	13.29	233
15	.48	1217	.94	1185	1.79	1127	3.26	1026	4.48	942	7.19	755	9.00	630	10.30	541	12.04	421	14.48	253
18	.59	1478	1.14	1433	2.14	1350	3.84	1210	5.22	1096	8.14	855	10.00	700	11.30	593	12.98	454	15.25	267
20	.66	1670	1.28	1613	2.40	1511	4.25	1340	5.73	1204	8.79	924	10.69	749	11.99	630	13.65	478		
24	.80	2024	1.54	1942	2.85	1798	4.97	1565	6.60	1386	9.82	1031	11.72	821	12.98	682	14.55	510		
30	1.01	2546	1.92	2420	3.50	2203	5.93	1868	7.72	1622	11.06	1162	12.92	905	14.11	741	15.54	544		
36	1.21	3048	2.28	2872	4.08	2573	6.76	2131	8.65	1818	12.02	1262	13.81	967	14.92	783				
6 DIAMETRAL PITCH – 8.48 NORMAL DIAMETRAL PITCH HARDENED STEEL																		**1.250" FACE**		
8	.28	715	.56	705	1.09	685	2.06	650	2.94	617	5.12	537	6.79	476	8.13	427	10.11	354	13.37	234
10	.38	948	.74	931	1.43	899	2.67	842	3.77	792	6.39	672	8.32	583	9.80	515	11.93	418	15.22	266
12	.47	1180	.92	1155	1.76	1109	3.26	1026	4.55	955	7.53	791	9.64	675	11.21	589	13.38	469	16.61	291
15	.60	1521	1.18	1482	2.24	1409	4.07	1282	5.60	1177	8.99	944	11.25	788	12.87	676	15.04	527	18.10	317
18	.73	1848	1.42	1791	2.68	1687	4.80	1512	6.52	1370	10.17	1068	12.50	876	14.12	742	16.22	568	19.06	334
24	1.00	2529	1.93	2428	3.57	2247	6.21	1956	8.24	1732	12.27	1289	14.65	1026	16.23	852	18.19	637		
6 DIAMETRAL PITCH – 8.48 NORMAL DIAMETRAL PITCH BRONZE																		**1.000" FACE**		
12	.15	378	.29	370	.56	355	1.04	328	1.46	306	2.41	253	3.08	216	3.59	188	4.28	150	5.32	93.1
15	.19	487	.38	474	.72	451	1.30	410	1.79	377	2.88	302	3.60	252	4.12	216	4.81	169	5.79	101
18	.23	591	.45	513	.86	540	1.54	484	2.09	439	3.25	342	4.00	280	4.52	237	5.19	182	6.10	107
20	.26	668	.51	645	.96	604	1.70	536	2.29	482	3.52	369	4.28	300	4.80	252	5.46	191		
24	.32	810	.62	777	1.14	719	1.99	626	2.64	554	3.93	412	4.69	328	5.19	273	5.82	204		
30	.40	1018	.77	968	1.40	881	2.37	747	3.09	649	4.42	465	5.17	362	5.65	296	6.22	218		
36	.48	1219	.91	1149	1.63	1029	2.70	852	3.46	727	4.81	505	5.52	387	5.97	313				

Ratings are based on strength calculation. Basic static strength rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

NOTE: Ratings to right of heavy line exceed 1500 Feet per Minute and should be used for interpolation purposes only.

*Torque Rating (Lb. Ins.)

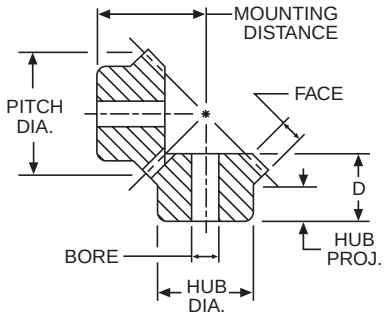
MITER AND BEVEL GEARS

SECTION CONTENTS

MITER GEARS

48 THROUGH 20 DIAMETRAL PITCH — 1:1 RATIO 20° PRESSURE ANGLE
NYLON, BRASS, STAINLESS STEEL AND STEEL—UNHARDENED

All gears have "Coniflex"® tooth form, except as noted.



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STANDARD TOLERANCES*

DIMENSION		TOLERANCE
BORE	All	±.0005

*Brass and Steel only.

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Face	Bore	MD *	D	Hub Dia.	Hub Proj.	Molded Nylon Catalog Number	Molded Nylon Item Code	Brass Catalog Number	Brass Item Code	Stainless Steel Catalog Number	Stainless Steel Item Code	Steel Unhardened Catalog Number	Steel Unhardened Item Code
48 DIAMETRAL PITCH															
15	.312	.07	.125	.312	.215	.25	.13	GP4815†‡	54096	G460Y†	12126	GSS460Y†	49984	—	—
18	.375	.08	.125	.406	.286	.33 .31	.19 .16	GP4818Y† —	54097 —	— G461Y†	— 12128	— GSS461Y†	— 49985	— L94Y†	— 12140
24	.500	.08	.1875	.531	.375	.38	.25	GP4824Y†	54098	—	—	—	—	—	—
32 DIAMETRAL PITCH															
16	.500	.12	.1875	.500	.349	.41	.19	GP3216Y†	54099	G462Y†	12114	GSS462Y†	49986	L97Y†	12146
24	.750	.14	.1875	.688	.406 .427	.50 .50	.19 .25	GP3224Y† —	54100 —	— G463Y†	— 12116	— GSS461Y†	— 49987	— L95Y†	— 12142
30 DIAMETRAL PITCH															
15	.500	.12	.1875	.500	.349	.41	.19	—	—	—	—	—	—	L93Y	12138
24 DIAMETRAL PITCH															
24	1.000	.20	.250	.906	.567	.62	.19 .28	GP2424Y† —	54101 —	— G464Y	— 12100	— —	— —	— L96Y	— 12144
30	1.250	.23	.250	1.031	.590	.62	.31	GP2430Y†	54102	G465Y	12102	—	—	—	—
36	1.500	.23	.3125	1.188	.620	.69	.31	GP2436Y†	54103	G466Y	12104	—	—	—	—
20 DIAMETRAL PITCH															
12	.600	.13	.250	.672	.489	.50	.31	—	—	—	—	—	—	L98Y	12148

*Mounting Distance (MD) must not be made less than dimension shown, see Page 147.

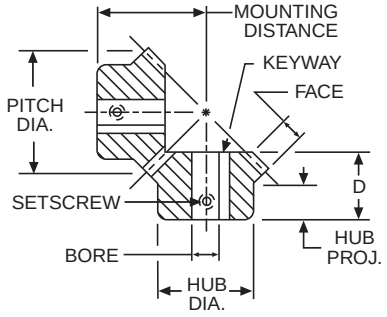
†Not "Coniflex" tooth form. Can be furnished with "Coniflex" tooth on special order.

‡Acetal.

MITER GEARS

16 THROUGH 10 DIAMETRAL PITCH — 1:1 RATIO 20° PRESSURE ANGLE
NYLON AND STEEL—UNHARDENED AND HARDENED

All gears have "Coniflex"® tooth form, except as noted.
All hardened steel gears have teeth only hardened, except as noted, and are equipped with standard keyways and setscrews



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STANDARD TOLERANCES*

DIMENSION		TOLERANCE
BORE	All	±.0005

*Steel only.

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

NO KEYWAY OR SETSCREW

No. of Teeth	Pitch Dia.	Face	Bore	MD *	D	Hub Dia.	Hub Proj.	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code
16 DIAMETRAL PITCH								**MOLDED NYLON**		**STEEL UNHARDENED**		**STEEL HARDENED**	
12	.750	.16	.3125	.812	.583	.62	.38	—	—	L99Y	12150	—	—
16	1.000	.23	.375	1.062	.755	.75	.44	GP1616Y†	54104	L110Y	12174	HLK110Y**	12326
20	1.250	.28	.4375	1.250	.849	1.00	.50	—	—	L111Y	12176	—	—
24	1.500	.32	.500	1.375	.880	1.00	.50	—	—	L112Y	12156	—	—
32	2.000	.39	.500	1.562	.875	1.25	.38	GP1632Y†‡	54105	—	—	—	—
14 DIAMETRAL PITCH													
14	1.000	.20	.375	1.062	.739	.88	.50	—	—	L124Y	12202	—	—
			.4375					—	—	L100Y	12152	—	—
12 DIAMETRAL PITCH													
15	1.250	.29	.375	1.250	.864	1.00	.50	—	—	L125Y	12204	—	—
			.4375					—	—	L126Y	12206	—	—
			.500					—	—	L101Y	12154	HLK101Y**	12328
18	1.500	.33	.500	1.500	1.021	1.25	.63	—	—	L127Y	12208	—	—
			.625					—	—	L102Y	12158	HLK102Y	12330
21	1.750	.40	.500	1.750	1.192	1.38	.69	—	—	L119Y	12190	—	—
			.5625					—	—	L120Y	12192	—	—
			.625					—	—	L121Y	12194	HLK121Y	12334
			.750					—	—	L133Y	12218	—	—
24	2.000	.44	.500	1.875	1.224	1.31	.69	—	—	L113Y	12178	—	—
30	2.500	.55	.625	2.312	1.489	1.62	.84	—	—	L114Y	12180	HLK114Y	12332
10 DIAMETRAL PITCH													
20	2.000	.45	.500	2.000	1.364	1.62	.81	—	—	L128Y	12210	—	—
			.625					—	—	L129Y	12212	HLK129Y	12348
			.750					—	—	L103Y	12160	HLK103Y	12344
25	2.500	.56	.750	2.438	1.630	2.00	.94	—	—	L130Y	12214	HLK130Y	12350
			.875					—	—	L104Y	12162	HLK104Y	12346
			1.000					—	—	L131Y	12216	HLK131Y	12352

*Mounting Distance (MD) must not be made less than dimension shown, see Page 147.

†Not "Coniflex" tooth form.

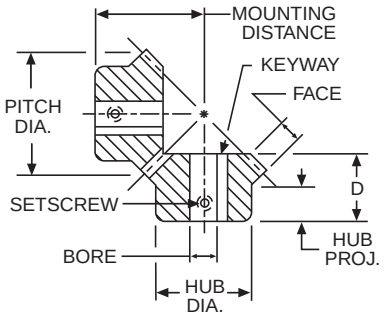
**Hardened all over.

‡Nylon (Mineral Filled).

MITER GEARS

8 THROUGH 4 DIAMETRAL PITCH — 1:1 RATIO 20° PRESSURE ANGLE
STEEL—UNHARDENED AND HARDENED AND CAST IRON

All gears have "Coniflex"® tooth form, except as noted.
All hardened steel gears have teeth only hardened, except as noted, and are equipped with standard keyways and setscrews.
All unhardened steel gears have no keyway and no setscrew.



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STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Teeth	Pitch Dia.	Face	Bore	MD *	D	Hub Dia.	Hub Proj.	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code
8 DIAMETRAL PITCH								**STEEL UNHARDENED**		**STEEL HARDENED**		**CAST IRON**	
24	3.000	.66 .68	.750 1.000 1.250	2.562 2.750	1.583 1.786	1.75 2.50	.81 1.00	L115Y L105Y-A L116Y	12182 12164 12184	HLK115Y HLK105YA HLK116Y	12366 12362 12368	— — —	— — —
28	3.500	.77	1.000 1.1875 1.250	3.250	2.099	2.50	1.25	L117Y L132Y L106Y	12186 12196 12166	HLK117Y HLK132Y HLK106Y	12370 12374 12364	— — —	— — —
		.77	.875	2.875	1.724	2.00	.88	—	—	—	—	OA828Y-1	12418
32	4.000	.85	1.000	3.625	2.286	3.00	1.13	L123Y	12200	HLK123Y	12372	—	—
		.85	.875	3.438	2.098	2.25	1.12	—	—	—	—	OA832Y-1	12420
6 DIAMETRAL PITCH													
24	4.000	.87	1.250 1.500	3.625	2.317	3.00	1.31	L118Y L107Y	12188 12168	HLK118Y HLK107Y	12386 12384	OA624Y† —	12412 —
27	4.500	.96	1.250 1.500	4.125	2.630	3.25	1.50	L134Y L135Y	12220 12222	— —	— —	— —	— —
30	5.000	1.16	1.000	4.250	2.640	2.50	1.38	—	—	—	—	OA630Y-1	12414
36	6.000	1.28	1.125	4.625	2.605	2.88	1.19	—	—	—	—	OA636Y-1	12416
5 DIAMETRAL PITCH													
25	5.000	1.12	1.375 1.500 1.750	4.625	3.005	3.50	1.75	L122Y L136Y L108Y	12198 12224 12170	HLK122Y — HLK108Y	12398 — 12396	— OA525Y —	— 12408 —
40	8.000	1.50	1.375	5.500	2.660	3.75	1.00	—	—	—	—	OA540Y-1	12410
4 DIAMETRAL PITCH													
24	6.000	1.35	1.500 1.750	5.500	3.567	4.00	1.94	L137Y L109Y	12226 12172	— HLK109Y	— 12404	— OA424Y**	— 12406
28	7.000	1.43	2.000	6.000	3.630	5.00	1.94	L138Y	12228	—	—	—	—

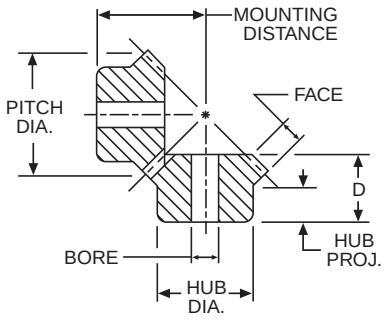
*Mounting Distance (MD) must not be made less than dimension shown, see Page 147.
†Hub Dia. — 2.750"
**Hub Proj. — 2.000"

SPIRAL MITER GEARS

18 THROUGH 5 DIAMETRAL PITCH
STEEL—UNHARDENED AND HARDENED

1:1 RATIO 20° PRESSURE ANGLE
35° SPIRAL ANGLE

All hardened steel gears have teeth only hardened, except as noted, and are equipped with standard keyways and setscrews



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STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

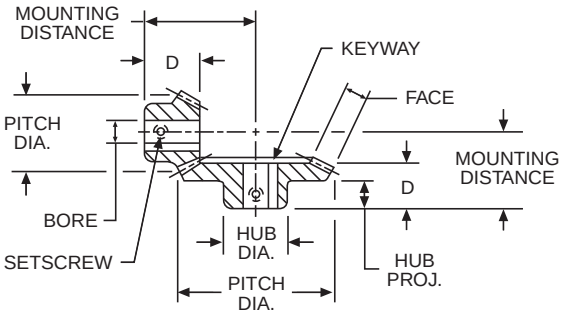
No. of Teeth	Pitch Dia.	Face	Bore	MD *	D	Hub Dia.	Hub Proj.	Catalog Number	Item Code	Catalog Number	Item Code
18 DIAMETRAL PITCH								**STEEL UNHARDENED**		**STEEL HARDENED**	
18	1.000	.22	.375	1.062	.739	.75	.44	LSA110Y-R LSA110Y-L	12310 12312	HLSK110Y-R† HLSK110Y-L†	12322 12324
12 DIAMETRAL PITCH											
15	1.250	.30	.500	1.250	.864	1.00	.50	LSA101Y-R LSA101Y-L	12282 12284	HLSK101Y-R† HLSK101Y-L†	12336 12338
18	1.500	.34	.625	1.500	1.021	1.25	.56	LSA102Y-R LSA102Y-L	12286 12288	HLSK102Y-R HLSK102Y-L	12340 12342
10 DIAMETRAL PITCH											
20	2.000	.47	.750	2.000	1.364	1.62	.78	LSA103Y-R LSA103Y-L	12290 12292	HLSK103Y-R HLSK103Y-L	12354 12356
25	2.500	.58	.875	2.438	1.630	2.00	.91	LSA104Y-R LSA104Y-L	12294 12296	HLSK104Y-R HLSK104Y-L	12358 12360
8 DIAMETRAL PITCH											
28	3.500	.78	1.1875	3.250	2.099	2.50	1.25	LSA106Y-R LSA106Y-L	12302 12304	HLSK106Y-R HLSK106Y-L	12376 12378
7 DIAMETRAL PITCH											
21	3.000	.69	1.000	2.750	1.786	2.50	.88	LSA105YA-R LSA105YA-L	12298 12300	HLSK105YA-R HLSK105YA-L	12380 12382
6 DIAMETRAL PITCH											
24	4.000	.89	1.250	3.625	2.317	3.00	1.31	LSA118Y-R LSA118Y-L	12314 12316	HLSK118Y-R HLSK118Y-L	12392 12394
			1.500					LSA107Y-R LSA107Y-L	12306 12308	HLSK107Y-R HLSK107Y-L	12388 12390
5 DIAMETRAL PITCH											
25	5.000	1.15	1.375	4.625	3.005	3.50	1.75	LSA122Y-R LSA122Y-L	12318 12320	HLSK122Y-R HLSK122Y-L	12400 12402

*Mounting Distance (MD) must not be made less than dimension shown, see Page 147.

†Hardened all over.

48 THROUGH 20 DIAMETRAL PITCH — 20° PRESSURE ANGLE
BRASS AND STAINLESS STEEL AND STEEL — HARDENED AND UNHARDENED

All gears have "Coniflex"® tooth form, except as noted. All hardened steel gears have teeth only hardened and are equipped with standard keyways and setscrews, except as noted.



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STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Ratio	No. of Teeth	Pitch Dia.	Face	Bore	MD *	D	Hub Dia.	Hub Proj.	Catalog Number	Item Code	Catalog Number	Item Code
48 DIAMETRAL PITCH									BRASS		STAINLESS STEEL	
2:1	36 18	.750 .375	.12	.1875 .125	.438 .594	.257 .335	.44 .28	.19 .19	G479Y-G† G479Y-P†	12136 12134	GSS479Y-G† GSS479Y-P†	49991 49990
3:1	36 12	.750 .250	.09	.1875 .125	.375 .562	.257 .285	.44 .22	.19 .17	G478Y-G† G478Y-P†	12132 12130	GSS478Y-G† GSS478Y-P†	49989 49988
32 DIAMETRAL PITCH												
2:1	32 16	1.000 .500	.14	.1875	.594 .719	.382 .365	.56 .38	.25 .17	G481Y-G† G481Y-P†	12120 12118	GSS481Y-G† GSS481Y-P†	49993 49992
4:1	64 16	2.000 .500	.24	.3125 .1875	.688 1.250	.445 .500	1.00 .38	.31 .22	G486Y-G† G486Y-P†	12108 12106	GSS486Y-G† GSS486Y-P†	49995 49994
24 DIAMETRAL PITCH												
2:1	36 18	1.500 .750	.24	.250 .1875	.781 1.062	.460 .540	.88 .56	.31 .25	G485Y-G G485Y-P	12124 12122	— —	— —
	48 24	2.000 1.000	.26	.3125 .250	.938 1.375	.507 .630	1.12 .69	.31 .28	G487Y-G G487Y-P	12112 12110	— —	— —
20 DIAMETRAL PITCH									STEEL UNHARDENED		STEEL HARDENED	
2:1	20 10	1.000 .500	.18	.375 .1875	.688 .750	.460 .425	.75 .41	.31 .25	L147Y-G L147Y-P	12234 12236	— —	— —
	20 10	1.000 .500	.18	.375 .1875	.688 .750	.460 .425	.75 .41	.31 .25	— —	— —	HL147Y-G‡ HL147Y-P‡	11854 11856

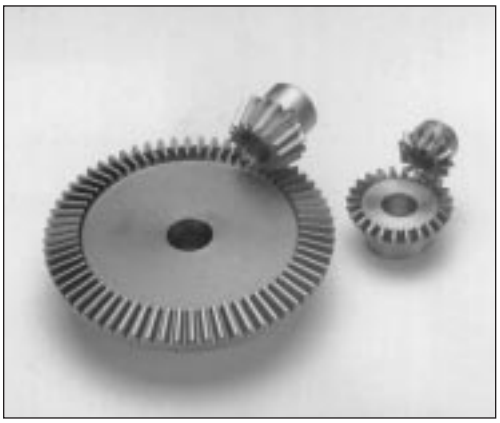
*Mounting Distance (MD) must not be made less than dimension shown, see Page 147.

†Not "Coniflex" tooth form. Can be furnished with "Coniflex" tooth on special order.

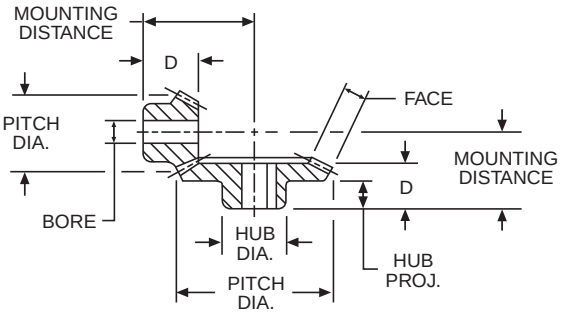
‡These gears have No. 47 (.0785) drilled hole in hub. No keyway or setscrew.

16 THROUGH 12 DIAMETRAL PITCH
STEEL—UNHARDENED AND HARDENED AND CAST IRON

20° PRESSURE ANGLE



All gears have “Coniflex”® tooth form.
All Hardened steel gears have teeth only hardened and are equipped with standard keyways and setscrews.



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STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Ratio	No. of Teeth	Pitch Dia.	Face	Bore	MD *	D	Hub Dia.	Hub Proj.	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code
16 DIAMETRAL PITCH									**STEEL UNHARDENED**		**STEEL HARDENED**		**CAST IRON GEARS STEEL PINIONS**	
1-1/2:1	24 16	1.500 1.000	.26	.500 .375	1.188 1.250	.760 .740	1.12 .81	.56 .44	L146Y-G L146Y-P	12230 12232	— —	— —	— —	— —
	24 16	1.500 1.000	.26	.500 .375	1.188 1.250	.750 .740	1.12 .81	.56 .44	— —	— —	HL146Y-G HL146Y-P	11850 11852	— —	— —
2:1	24 12	1.500 .750	.20 .19	.500 .375	1.000 1.125	.625 .575	1.00 .66	.44 .34	L148Y-G L148Y-P	12238 12240	HL148Y-G HL148Y-P	11858 11860	— —	— —
	32 16	2.000 1.000	.36	.500 .375	1.188 1.500	.775 .845	1.12 .81	.50 .44	L149Y-G L149Y-P	12242 12244	HL149Y-G HL149Y-P	11862 11864	— —	— —
3:1	48 16	3.000 1.000	.42	.625 .4375	1.312 2.000	.882 .920	1.50 .88	.56 .47	— —	— —	— —	— —	PA3316Y-G PA3316Y-P	12484 12486
4:1	64 16	4.000 1.000	.49	.625 .500	1.375 2.500	.898 .990	2.25 .81	.56 .47	— —	— —	— —	— —	PA4416Y-G PA4416Y-P	12492 12494
6:1	96 16	6.000 1.000	.62	.625 .500	1.688 3.750	1.257 1.375	1.75 .94	.88 .72	— —	— —	— —	— —	PA6616Y-G PA6616Y-P	12516 12518
14 DIAMETRAL PITCH														
2:1	28	2.000	.36	.500	1.375	.945	1.62	.66	L150Y-G	12246	HL150Y-G	11866	—	—
	14	1.000	.35	.375 .500	1.625	.965	.81	.56	— L150Y-P	— 12248	HL150Y-P —	11868 —	— —	— —
12 DIAMETRAL PITCH														
1-1/2:1	27	2.250	.42	.500 .750	1.750	1.135	1.50	.78	L151Y-G —	12250 —	— HL151Y-G	— 11870	— —	— —
	18	1.500	.41	.500	1.875	1.130	1.25	.66	L151Y-P	12254	HL151Y-P	11872	—	—
2:1	36 18	3.000 1.500	.54 .54	.625 .500	1.875 2.375	1.275 1.385	2.12 1.31	.88 .81	L152BY-G L152BY-P	12260 12262	— —	— —	— —	— —
	36	3.000	.54	1.000	1.875	1.275	2.12	.88	L152Y-G	12256	HL152Y-G	11874	—	—
	18	1.500	.53	.625 .750	2.375	1.375	1.31	.81	— L152Y-P	— 12258	HL152Y-P —	11876 —	— —	— —

*Mounting Distance (MD) must not be made less than dimension shown, see Page 147.

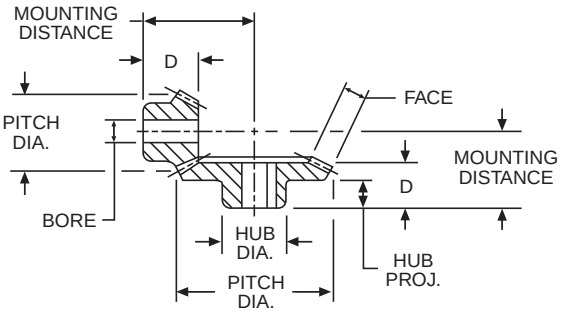
Continued next page

BEVEL GEARS

12 AND 10 DIAMETRAL PITCH
STEEL—UNHARDENED AND HARDENED AND CAST IRON

20° PRESSURE ANGLE

All gears have “Coniflex”® tooth form.
All Hardened steel gears have teeth only hardened and are equipped with standard keyways and setscrews.



REFERENCE PAGES

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

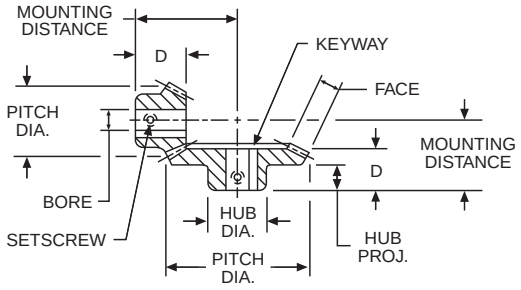
Ratio	No. of Teeth	Pitch Dia.	Face	Bore	MD *	D	Hub Dia.	Hub Proj.	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code
12 DIAMETRAL PITCH									**STEEL UNHARDENED**		**STEEL HARDENED**		**CAST IRON GEARS STEEL PINIONS**	
2:1	36 18	3.000 1.500	.47	.625 .500	1.500 2.250	1.882 1.205	1.44 1.25	.50 .69	— —	— —	— —	— —	PA3212Y-G PA3212Y-P	12480 12482
	48 24	4.000 2.000	.59	.625 .500	2.000 2.875	1.180 1.440	1.63 1.50	.75	— —	— —	— —	— —	PA4212Y-G PA4212Y-P	12488 12490
3:1	54 18	4.500 1.500	.60	.625 .500	1.750 3.000	1.063 1.350	1.75 1.25	.75 .69	— —	— —	— —	— —	PA45312Y-G PA45312Y-P	12532 12534
4:1	72 18	6.000 1.500	.61	.750 .500	2.000 3.750	1.320 1.365	2.00 1.25	.95 .72	— —	— —	— —	— —	PA6412Y-G PA6412Y-P	12508 12510
6:1	72 12	6.000 1.000	.74	.750 .500	1.750 3.750	1.320 1.495	2.00 .94	.95 .72	— —	— —	— —	— —	PA6612Y-G PA6612Y-P	12512 12514
10 DIAMETRAL PITCH														
1 1/2:1	30	3.000	.58	.750 1.000	2.250	1.445	2.50	1.00	L153Y-G —	12264 —	— HL153Y-G	— 11878	— —	— —
	20	2.000	.58	.750	2.500	1.525	1.75	.91	L153Y-P	12266	HL153Y-P	11880	—	—
2:1	40 20	4.000 2.000	.72	.875 .750	2.500 3.125	1.695 1.805	3.00 1.75	1.19 1.06	L155Y-G L155Y-P	12268 12270	— —	— —	— —	— —
	40 20	4.000 2.000	.72	1.250 .875	2.500 3.125	1.695 1.805	3.00 1.75	1.19 1.06	— —	— —	HL155Y-G HL155Y-P	11882 11884	— —	— —
	50 25	5.000 2.500	.71	.750	2.625 3.375	1.600 1.555	2.00 2.00	1.00 .75	— —	— —	— —	— —	PA5210Y-G PA5210Y-P	12496 12498
3:1	60 20	6.000 2.000	.79	1.000 .875	2.750 4.375	1.865 2.155	3.00 1.75	1.38 1.31	L157Y-G L157Y-P	12274 12276	— —	— —	— —	— —
	60 20	6.000 2.000	.79	.875 .750	2.750 4.375	1.913 2.155	3.00 1.75	1.38 1.31	— —	— —	— —	— —	PA6310Y-G PA6310Y-P	12500 12502
4:1	60 15	6.000 1.500	.73	.875 .625	2.250 3.875	1.632 1.610	2.50 1.44	1.13 .84	— —	— —	— —	— —	PA6410Y-G PA6410Y-P	12504 12506
6:1	90 15	9.000 1.500	.86	1.000 .625	2.500 5.500	1.820 1.870	2.75 1.44	1.31 .97	— —	— —	— —	— —	PA9610Y-G PA9610Y-P	12524 12526

*Mounting Distance (MD) must not be made less than dimension shown, see Page 147.

BEVEL GEARS

8 THROUGH 4 DIAMETRAL PITCH — 20° PRESSURE ANGLE
STEEL—UNHARDENED AND HARDENED AND CAST IRON

All gears have “Coniflex”® tooth form.
All Hardened steel gears have teeth only hardened and are equipped with standard keyways and setscrews.



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STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Ratio	No. of Teeth	Pitch Dia.	Face	Bore	MD *	D	Hub Dia.	Hub Proj.	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code
8 DIAMETRAL PITCH									**STEEL UNHARDENED**		**STEEL HARDENED**		**CAST IRON GEARS STEEL PINIONS**	
2:1	40	5.000	.83	1.000 1.500	2.875	1.850	3.00	1.25	L156Y-G —	12252 —	— HL156Y-G	— 11886	— —	— —
	20	2.500	.83	1.000	4.000	2.290	2.12	1.41	L156Y-P	12272	HL156Y-P	11888	—	—
	40 20	5.000 2.500	.83	1.000 .875	2.875 4.000	1.850 2.290	3.00 2.12	1.25 1.41	— —	— —	— —	— —	PA528Y-G PA528Y-P	12424 12426
3:1	48 16	6.000 2.000	.84	.875 .750	2.375 4.250	1.632 2.085	2.75 1.75	1.00 1.19	— —	— —	— —	— —	PA638Y-G PA638Y-P	12436 12438
4:1	64 16	8.000 2.000	.85	1.000 .875	2.750 5.250	1.882 2.105	2.75 1.88	1.25 1.22	— —	— —	— —	— —	PA848Y-G PA848Y-P	12452 12454
	72 18	9.000 2.250	1.23	1.125 .875	3.250 5.750	2.320 2.470	3.00 2.13	1.69 1.22	— —	— —	— —	— —	PA948Y-G PA948Y-P	12460 12462
6 DIAMETRAL PITCH														
2:1	36 18	6.000 3.000	1.07 1.06	1.125	3.500 4.750	2.260 2.765	3.25 2.50	1.50 1.59	L158Y-G L158Y-P	12278 12280	— —	— —	— —	— —
	36 18	6.000 3.000	1.07 1.06	1.750 1.125	3.500 4.750	2.260 2.765	3.25 2.50	1.50 1.59	— —	— —	HL158Y-G HL158Y-P	11890 11892	— —	— —
	36 18	6.000 3.000	1.07	1.125 1.000	3.500 4.750	2.260 2.765	3.25 2.50	1.50 1.59	— —	— —	— —	— —	PA626Y-G PA626Y-P	12432 12434
	42 21	7.000 3.500	1.06	1.125 1.000	3.750 5.000	2.305 2.515	3.50 2.50	1.50 1.25	— —	— —	— —	— —	PA726Y-G PA726Y-P	12440 12442
	48 24	8.000 4.000	1.18	1.125 1.000	3.438 5.438	1.898 2.560	3.25 2.62	1.00 1.25	— —	— —	— —	— —	PA826Y-G PA826-Y-P	12448 12450
3:1	45 15	7.500 2.500	1.08	1.125 .875	3.000 5.250	2.132 2.575	3.25 2.12	1.25 1.44	— —	— —	— —	— —	PA7536Y-G PA7536Y-P	12520 12522
5 DIAMETRAL PITCH														
2:1	30 15	6.000 3.000	1.05	1.125 1.000	3.500 4.375	2.257 2.390	3.25 2.62	1.38 1.28	— —	— —	— —	— —	PA625Y-G PA625Y-P	12428 12430
3:1	45 15	9.000 3.000	1.32	1.250 1.000	3.750 5.875	2.507 2.685	3.75 2.62	1.69 1.31	— —	— —	— —	— —	PA935Y-G PA935Y-P	12456 12458
4 DIAMETRAL PITCH														
2:1	32 16	8.000 4.000	1.40	1.125 1.125	4.250 6.000	2.695 3.350	3.75 3.25	1.56 1.81	— —	— —	— —	— —	PA824Y-G PA824Y-P	12444 12446

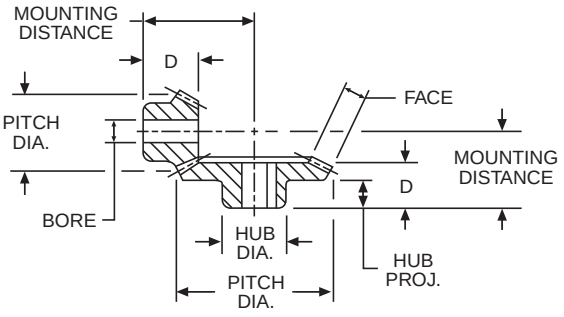
*Mounting Distance (MD) must not be made less than dimension shown, see Page 147.

SPIRAL BEVEL GEARS

30 THROUGH 8 DIAMETRAL PITCH
STEEL—UNHARDENED AND HARDENED

20° PRESSURE ANGLE
35° SPIRAL ANGLE

All Hardened steel gears have teeth only hardened and are equipped with standard keyways and setscrews, except as noted. All pinions are left hand.



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STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Ratio	No. of Teeth	Pitch Dia.	Face	Bore	MD *	D	Hub Dia.	Hub Proj.	Catalog Number	Item Code	Catalog Number	Item Code
30 DIAMETRAL PITCH									**STEEL UNHARDENED**		**STEEL HARDENED**	
2:1	26 13	.87 .43	.14	.250 .1875	.688 .750	.480 .453	.75 .38	.38 .30	SS302-G SS302-P	11938 11940	— —	— —
	26 13	.87 .43	.14	.375 .1875	.688 .750	.480 .453	.75 .38	.38 .30	— —	— —	SH302-G SH302-P†	11914 11916
19 DIAMETRAL PITCH												
2:1	26 13	1.37 .68	.25	.500 .3125	1.000 1.062	.730 .623	1.12 .62	.42 .33	SS192-G SS192-P	11934 11936	— —	— —
	26 13	1.37 .68	.25	.625 .3125	1.000 1.062	.730 .623	1.12 .62	.42 .33	— —	— —	SH192-G SH192-P†	11910 11912
14 DIAMETRAL PITCH												
2:1	26 13	1.86 .93	.31	.625 .4375	1.188 1.250	.760 .625	1.38 .81	.50 .30	SS142-G SS142-P	11926 11928	— —	— —
	26 13	1.86 .93	.31	.750 .4375	1.188 1.250	.760 .625	1.38 .81	.50 .30	— —	— —	SH142-G SH142-P	11902 11904
	32 16	2.29 1.14	.38	.750 .500	1.375 1.625	.855 .848	1.62 1.00	.56 .45	SS142-1G SS142-1P	11930 11932	— —	— —
	32 16	2.29 1.14	.38	.875 .500	1.375 1.625	.855 .848	1.62 1.00	.56 .45	— —	— —	SH142-1G SH142-1P	11906 11908
10 DIAMETRAL PITCH												
2:1	34 17	3.40 1.70	.57	1.000 .625	1.875 2.375	1.135 1.219	2.00 1.50	.75 .63	SS102-G SS102-P	11922 11924	— —	— —
	34 17	3.40 1.70	.57	1.1875 .625	1.875 2.375	1.135 1.219	2.00 1.50	.75 .63	— —	— —	SH102-G SH102-P	11898 11900
8 DIAMETRAL PITCH												
2:1	34 17	4.250 2.125	.71	1.250 .750	2.500 3.125	1.575 1.677	2.88 1.88	1.06 .94	SS82-G SS82-P	11918 11920	— —	— —
	34 17	4.250 2.125	.71	1.500 .750	2.500 3.125	1.575 1.677	2.88 1.88	1.06 .94	— —	— —	SH82-G SH82-P	11894 11896

*Mounting Distance (MD) must not be made less than dimension shown, see Page 147.

†No keyway or setscrew.

MITER AND BEVEL GEARS

Boston stock miter and bevel gears are designed for transmission of power and/or motion between intersecting shafts at a right angle (90°). Miter gears are a special type of bevel gear designed to operate as pairs being identical in number of teeth and pitch (1 to 1 ratio only). Other Boston stock bevel gear sets are available with ratios from 1-1/2:1 to 6:1.

All Boston standard stock bevels and miters are manufactured with a 20° pressure angle. These bevel gears are made in accordance with AGMA specifications for a long and short addendum system for gears and pinions, which serves to reduce the amount of pinion tooth undercut and to nearly equalize the strength and durability of the gear and pinion. Boston straight tooth bevel and miter gears have generated teeth with "Coniflex"® tooth form, unless otherwise specified.

INTERCHANGE

Stock miter and bevel gears having identical diametral pitch, number of teeth and mounting distance (and spiral angle for spiral bevels) are interchangeable.

SPIRAL VS. STRAIGHT TOOTH

Boston standard stock straight bevel gears can be used for all applications requiring transmission of power and motion between intersecting shafts. Boston standard stock spiral bevel gears have an overlapping tooth action which results in a smoother gear action, lower noise, and higher load capacity than a straight bevel of equal size.

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SELECTION PROCEDURE

Approximate horsepower ratings for selected sizes (number of teeth) at various operating speeds (RPM) are given for Boston standard stock Bevel and Miter gears.

For straight tooth Miter gears, refer to Pages 68, 69.
For straight tooth Bevel gears, refer to Page 70.
For spiral tooth Miter gears, refer to Page 71.
For spiral tooth Bevel gears, refer to Page 71.

All ratings are based on normal operating conditions, that is: properly mounted and lubricated, carrying a smooth load for not more than 10 hours (Service Factor = 1.0). Refer to Table 1 for service factors in other service conditions.

1. Determine service factor.
   a. Using Application Classification Chart I, pages 155–156 determine service factor or
   b. With knowledge of operating conditions and load classification, select service factor from Table 1.
2. Determine Design Horsepower.

Design HP = Application Load x Service Factor (Table 1)

3. Select a gear set with horsepower capacity equal to (or greater than) design horsepower determined in Step 2.

TABLE 1

Service Factor	Operating Conditions
.8	Uniform — not more than 15 minutes in 2 hours.
1.0	Moderate Shock — not more than 15 minutes in 2 hours. Uniform — not more than 10 hours per day.
1.25	Moderate Shock — not more than 10 hours per day. Uniform — more than 10 hours per day.
1.50	Heavy Shock — not more than 15 minutes in 2 hours. Moderate Shock — more than 10 hours per day.
1.75	Heavy Shock — not more than 10 hours per day.
2.0	Heavy Shock — more than 10 hours per day.

Heavy shock loads and/or severe wear conditions may require the use of higher service factors. Consultation with factory is recommended in these applications.

STEEL & IRON — STRAIGHT TOOTH
1:1 RATIO

L-Series–Unhardened Steel
HLK Series–Hardened Steel (Teeth only)
OA Series–Cast Iron

APPROXIMATE HP & TORQUE* RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)

Catalog Number	Pitch	50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM	
		HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque
L110Y	16	.02	25.2	.03	18.9	.06	18.9	.09	18.9	.15	15.8	.21	14.7	.26	13.7	.33	11.6
L111Y		.03	37.8	.05	31.5	.10	31.5	.13	27.3	.24	25.2	.32	22.4	.38	20.0	.48	16.8
L101Y L125Y L126Y	12	.03	37.8	.06	37.8	.12	37.8	.17	35.7	.29	30.5	.40	28.0	.47	24.7	.59	20.7
HLK110Y	16	.04	50.4	.06	37.8	.12	37.8	.18	37.8	.30	31.5	.42	29.4	.52	27.3	.66	23.1
L112Y				.07	44.1	.14	44.1	.20	42.0	.30	31.5	.44	30.8	.52	27.3	.64	22.4
L102Y L127Y	12	.05	63.0	.09	56.7	.18	56.7	.25	52.5	.42	44.1	.56	39.2	.66	34.7	.81	28.4
L119Y L120Y L121Y L133Y	12	.07	88.2	.14	88.2	.25	78.7	.35	73.5	.60	63.0	.77	53.9	.90	47.3	1.1	38.5
HLK101Y	12	.06	75.6	.12	75.6	.24	75.6	.34	71.4	.58	60.9	.96	67.2	1.1	57.8	1.3	45.5
L113Y		.09	113	.17	107	.33	104	.45	94.5	.75	78.8	.96	67.2	1.1	57.8	1.3	45.5
HLK102Y		.10	126	.18	113	.36	113	.50	105	.84	88.2	1.1	77.0	1.3	68.3	1.6	56.0
L103Y L128Y L129Y	10	.11	139	.20	126	.37	117	.52	109	.87	91.4	1.1	77.0	1.3	68.3	1.5	52.5
L114Y	12	.15	189	.29	183	.52	164	.71	149	1.1	116	1.4	98.0	1.6	84.0	1.9	66.5
HLK121Y		.14	176	.28	176	.50	157	.70	147	1.2	126	1.5	105	1.8	94.5	2.2	77.0
L130Y L104Y L131Y	10	.18	227	.33	208	.61	192	.83	174	1.3	137	1.6	112	1.7	89.3	2.2	77.0
HLK103Y HLK129Y	10	.20	252	.40	252	.74	233	1.0	210	1.7	179	2.2	154	2.6	137	3.1	109
OA828Y-1	8	.28	353	.53	334	.93	293	1.2	252	1.9	200	2.3	161	—	—	—	—
L105Y-A L115Y L116Y	8	.30	378	.56	353	1.0	315	1.4	294	2.1	221	2.6	182	3.0	158	3.4	119
HLK114Y	12	.29	366	.58	365	1.0	315	1.4	294	2.3	242	2.8	196	3.2	168	3.9	137
OA832Y-1	8	.37	466	.68	428	1.2	378	1.6	336	2.4	252	2.8	196	—	—	—	—
HLK104Y HLK130Y HLK131Y	10	.33	416	.66	416	1.2	378	1.7	357	2.6	273	3.3	231	3.8	200	4.5	158

Ratings are based on strength calculation. Basic Static Strength Rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.
NOTE: Ratings to right of heavy line are not recommended, as pitch line velocity exceeds 1000 feet per minute. Use for interpolation purposes only.
*Torque Rating (Lb. Ins.)

STEEL & IRON — STRAIGHT TOOTH
1:1 RATIO

L-Series–Unhardened Steel
HLK Series–Hardened Steel (Teeth only)
OA Series–Cast Iron

APPROXIMATE HP & TORQUE* RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)

Catalog Number	Pitch	50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM	
		HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque
L106Y L117Y L132Y	8	.42	529	.79	498	1.4	441	1.9	399	2.8	294	3.4	238	3.8	200	—	—
OA624Y	6	.46	580	.87	548	1.5	472	2.0	420	3.0	315	3.5	245	—	—	—	—
L123Y	8	.55	693	1.0	630	1.8	567	2.4	504	3.5	368	4.2	294	4.6	242	—	—
HLK105YA HLK115Y HLK116Y	8	.55	693	1.1	693	2.0	630	2.7	567	4.3	452	5.3	371	5.9	310	6.9	242
L107Y L118Y	6	.69	870	1.3	819	2.2	693	3.0	630	4.5	473	5.3	371	5.8	305	—	—
OA630Y-1	6	.82	1034	1.5	945	2.5	787	3.2	672	4.7	494	—	—	—	—	—	—
OA525Y	5	.90	1134	1.6	1008	2.7	850	3.5	735	5.1	536	—	—	—	—	—	—
L134Y L135Y	6	.90	1134	1.6	1008	2.8	882	3.7	777	5.4	567	6.4	448	7.0	368	—	—
HLK106Y HLK117Y HLK132Y	8	.80	1008	1.6	1108	2.8	882	3.7	777	5.7	599	6.8	476	7.6	399	—	—
OA636Y-1	6	1.1	1387	1.9	1197	3.2	1008	4.1	861	5.8	609	—	—	—	—	—	—
HLK123Y	8	1.0	1260	2.0	1260	3.6	1134	4.7	987	7.0	735	8.4	588	9.2	483	—	—
L108Y L122Y L136Y	5	1.3	1639	2.4	1512	4.1	1291	5.3	1113	7.6	798	9.0	630	—	—	—	—
HLK107Y HLK118Y	6	1.3	1639	2.6	1638	4.5	1417	6.0	1260	8.0	840	11.0	770	12.0	630	—	—
OA424Y	4	1.6	2017	2.8	1764	4.6	1449	5.9	1239	8.2	861	—	—	—	—	—	—
OA540Y-1	5	2.0	2521	3.5	2205	5.6	1764	7.0	1470	—	—	—	—	—	—	—	—
L109Y L137Y	4	2.3	2899	4.2	2646	7.0	2205	8.7	1827	12.4	1302	14.3	1001	—	—	—	—
L138Y	4	3.0	3781	5.3	3339	8.6	2709	10.8	2268	14.6	1533	16.6	1162	—	—	—	—
HLK108Y HLK122Y	5	2.4	3026	4.9	3087	8.2	2583	10.0	2100	15.0	1575	18.0	1260	—	—	—	—
HLK109Y	4	4.2	5294	8.3	5529	14.0	4410	17.0	3510	25.0	2625	28.0	1960	—	—	—	—

Ratings are based on strength calculation. Basic Static Strength Rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.
NOTE: Ratings to right of heavy line are not recommended, as pitch line velocity exceeds 1000 feet per minute. Use for interpolation purposes only.
*Torque Rating (Lb. Ins.)

STEEL & IRON — STRAIGHT TOOTH

L-Series/PA Series Pinions–Unhardened Steel
PA Series–Cast Iron
HL Series–Hardened Steel (Teeth Only)

APPROXIMATE HP & TORQUE* RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)

Catalog Number	Pitch	Ratio	†50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM	
			HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque
L146Y	16	1-1/2:1	.03	37.9	.06	37.1	.11	35.6	.16	34.2	.29	30.7	.40	27.8	.48	25.4	.62	21.7
HL146Y	16		.04	52.6	.08	51.5	.16	49.4	.23	47.5	.41	42.6	.55	38.6	.67	35.3	.86	30.1
L151Y	12		.10	128	.20	124	.37	117	.53	111	.91	95.1	1.19	83.4	1.41	74.2	1.74	60.8
HL151Y	12		.14	178	.27	173	.52	163	.73	154	1.26	132	1.65	116	1.96	103	2.41	84.5
L153Y	10		.24	296	.45	285	.84	263	1.17	245	1.93	203	2.47	173	2.88	151	3.44	120
HL153Y	10		.33	412	.63	395	1.16	366	1.62	341	2.68	282	3.44	241	4.00	210	4.77	167
L148Y	16	2:1	.02	20.4	.03	20.1	.06	19.5	.09	18.9	.17	17.3	.23	16.0	.28	14.9	.37	13.1
HL148Y	16		.02	28.3	.04	27.9	.09	27.0	.12	26.2	.23	24.1	.32	22.3	.39	20.7	.52	18.1
L149Y	16		.04	55.8	.09	54.6	.17	52.4	.24	50.4	.43	45.2	.58	40.9	.71	37.4	.91	31.9
L150Y	14		.05	60.6	.09	59.3	.18	57.0	.26	54.8	.47	49.1	.64	44.5	.77	40.6	.99	34.7
HL150Y	14		.07	84.2	.13	82.4	.25	79.1	.36	76.1	.65	68.2	.88	61.8	1.07	56.5	1.38	48.2
HL149Y	16		.06	77.5	.12	75.9	.23	72.8	.33	70.0	.60	62.7	.81	56.8	.99	52.0	1.27	44.3
PA3212Y	12	2:1	.04	50.4	.09	56.7	.16	50.4	.23	48.3	.40	42.0	.52	36.4	.62	32.55	.76	26.6
PA4212Y	12		.08	101	.16	101	.29	91.3	.41	86.1	.68	71.4	.87	60.9	1.00	52.50	1.20	42.0
L152Y	12		.14	174	.27	169	.50	159	.72	150	1.23	129	1.62	113	1.92	101	2.36	82.5
PA5210Y	10		.15	189	.28	176	.51	161	.70	147	1.10	115	1.40	98.0	1.60	84.00	—	—
HL152Y	12		.19	242	.37	234	.70	221	.99	209	1.71	179	2.24	157	2.66	140	3.27	115
L155Y	10		.30	384	.58	369	1.08	341	1.51	318	2.50	263	3.20	224	3.73	196	4.45	156
PA528Y	8	2:1	.20	252	.38	239	.70	220	.96	202	1.50	157	1.90	133	2.20	115.50	—	—
L156Y	8		.54	686	1.03	652	1.88	594	2.59	545	4.16	437	5.21	365	5.96	313	6.97	244
HL155Y	10		.42	533	.81	512	1.50	474	2.10	441	3.48	365	4.45	312	5.18	272	6.18	217
PA626Y	6		.40	504	.75	472	1.30	409	1.80	378	2.90	304	3.50	245	4.00	210	—	—
PA625Y	5		.43	542	.82	517	1.50	472	2.00	420	3.10	325	3.80	266	4.30	225.75	—	—
PA726Y	6		.48	605	.89	561	1.60	504	2.10	441	3.90	409	—	—	—	—	—	—
L158Y	6	2:1	1.07	1350	2.02	1272	3.62	1140	4.92	1033	7.67	806	9.43	660	10.65	559	12.24	429
PA826Y	6		.63	794	1.20	756	2.00	630	2.70	567	4.00	420	4.80	336	—	—	—	—
HL156Y	8		.76	952	1.44	905	2.62	824	3.60	757	5.78	607	7.24	507	8.28	435	9.68	339
PA824Y	4		.98	1235	1.80	1134	3.20	1008	4.20	882	7.30	1766	7.50	525	—	—	—	—
HL158Y	6		1.49	1875	2.80	1766	5.02	1583	6.83	1434	10.65	1119	13.10	917	14.79	777	17.00	595
PA3316Y	16	3:1	.05	68.7	.11	67.2	.20	64.5	.30	62.0	.53	55.6	.72	50.4	.88	46.1	1.12	39.3
PA45312Y	12		.16	203	.31	197	.59	186	.84	176	1.44	151	1.89	132	2.24	118	2.75	96.5
PA6310Y	10		.34	431	.66	414	1.21	383	1.70	356	2.81	295	3.60	252	4.18	220	5.00	175
PA638Y	8		.43	538	.82	516	1.52	478	2.12	445	3.51	368	4.49	314	5.22	274	6.24	218
L157Y	10		.34	431	.66	414	1.21	383	1.70	356	2.81	295	3.60	252	4.18	220	5.00	175
PA7536Y	6		.88	1103	1.66	1049	3.03	955	4.17	876	6.69	703	8.38	587	9.59	504	11.21	393
PA935Y	5		1.53	1925	2.88	1813	5.16	1625	7.01	1472	10.93	1149	13.44	942	15.19	798	17.45	611
PA4416Y	16	4:1	.06	79.7	.12	78.0	.24	74.9	.34	72.0	.61	64.5	.83	58.5	1.02	53.4	1.30	45.6
PA6412Y	12		.17	209	.32	203	.61	191	.86	181	1.48	155	1.94	136	2.31	121	2.83	99.2
PA6410Y	10		.22	276	.42	268	.80	252	1.13	238	1.95	205	2.56	179	3.04	160	3.74	131
PA848Y	8		.43	546	.83	524	1.54	485	2.15	452	3.56	374	4.56	319	5.30	278	6.33	222
PA948Y	8		.75	943	1.43	901	2.62	827	3.64	764	5.92	622	7.50	525	8.65	454	10.21	357
PA6616Y	16	6:1	.09	112	.17	109	.33	105	.48	101	.86	90.3	1.17	81.9	1.42	74.8	1.82	63.9
PA6612Y	12		.12	147	.23	144	.44	138	.63	133	1.13	119	1.54	108	1.88	98.6	2.40	84.2

Ratings are based on strength calculation. Basic Static Strength Rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

*Torque Rating (Lb. Ins.)

†RPM of Pinion

STEEL SPIRAL MITER GEARS
1:1 RATIO

LSA-Series–Unhardened Steel
HLSK Series–Hardened Steel (Teeth Only)

APPROXIMATE HP & TORQUE* RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)

Catalog Number	Pitch	50 RPM		100 RPM		200 RPM		300 RPM		600 RPM		900 RPM		1200 RPM		1800 RPM	
		HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque
LSA110Y	18	.01	12.6	.02	12.6	.04	12.6	.07	14.7	.14	14.7	.20	14.0	.25	13.1	.35	12.2
LSA101Y	12	.02	25.2	.04	25.2	.08	25.2	.13	27.3	.25	26.2	.35	24.5	.45	23.6	.62	21.7
LSA102Y	12	.03	37.8	.07	44.1	.13	40.9	.20	42.0	.38	39.9	.54	37.8	.63	33.1	.95	33.2
HLSK110Y	18	.03	37.8	.07	44.1	.14	44.1	.21	44.1	.42	44.1	.59	41.3	.76	39.9	1.0	35.0
HLSK101Y	12	.06	75.6	.13	81.9	.26	81.9	.39	81.9	.75	78.7	1.0	70.0	1.3	68.2	1.8	63.0
LSA103Y	10	.07	88.2	.15	94.5	.30	94.5	.44	92.4	.80	84.0	1.1	77.0	1.4	73.5	2.0	70.6
HLSK102Y	12	.10	126	.21	132	.41	129	.61	128	1.0	105	1.6	112	2.0	105	2.8	98.0
LSA104Y	10	.15	189	.30	189	.57	180	.83	174	1.5	151	2.0	140	2.6	136	3.6	126
LSA105YA	7	.22	277	.44	277	.84	265	1.2	252	2.2	231	3.0	210	3.8	199	5.1	178
HLSK103Y	10	.23	290	.46	290	.89	280	1.3	273	2.4	252	3.4	238	4.3	226	5.9	206
LSA106Y	8	.34	429	.69	435	1.3	409	1.8	378	3.3	346	4.5	315	5.7	299	7.8	273
LSA107Y LSA118Y	6 6	.46	580	.90	567	1.7	535	2.4	504	4.3	451	5.9	413	7.4	388	10.0	350
HLSK104Y	10	.45	567	.90	567	1.7	535	2.5	525	4.5	472	6.1	427	7.9	415	11.1	388
HLSK105YA	7	.67	845	1.3	819	2.5	787	3.6	756	6.5	682	9.0	630	11.0	577	15.0	525
LSA122Y	5	.83	1046	1.6	1008	3.0	945	4.3	903	7.5	787	10.0	700	12.0	630	17.0	595
HLSK106Y	8	1.0	1260	2.0	1260	3.9	1228	5.6	1176	10.0	1050	13.0	910	17.0	892	23.0	805
HLSK107Y HLSK118Y	6 6	1.3	1639	2.7	1701	5.1	1606	7.3	1533	13.0	1365	17.0	1190	22.0	1155	33.0	1155
HLSK122Y	5	2.4	3025	4.9	3087	9.1	2866	13.1	2751	23.1	2425	30.0	2100	38.0	1995	51.0	1785

STEEL SPIRAL BEVEL GEARS**
2:1 RATIO

SS-Series–Unhardened Steel
SH Series–Hardened Steel (Teeth Only)

APPROXIMATE HP & TORQUE* RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)

Catalog Number	Pitch	50 RPM†		100 RPM†		200 RPM†		300 RPM†		600 RPM†		900 RPM†		1200 RPM†		1800 RPM†	
		HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque	HP	Torque
SS302	30	.002	2.5	.004	2.5	.008	2.5	.013	2.7	.025	2.6	.037	2.6	.05	2.6	.07	2.4
SH302	30	.005	6.3	.01	6.3	.02	6.3	.03	6.3	.06	6.3	.09	6.3	.12	6.3	.18	6.3
SS192	19	.01	12.6	.02	12.6	.04	12.6	.06	12.6	.12	12.6	.18	12.6	.24	12.6	.35	12.2
SS142	14	.02	25.2	.05	31.5	.09	28.3	.14	29.4	.26	27.3	.39	27.3	.51	26.8	.76	26.6
SH192	19	.03	37.8	.05	31.5	.10	31.5	.16	33.6	.31	32.5	.46	32.2	.60	31.5	.88	30.8
SS142-1	14	.04	50.4	.08	50.4	.16	50.4	.23	48.3	.45	47.2	.67	46.9	.88	46.2	1.3	45.5
SH142	14	.06	75.6	.12	75.6	.23	72.4	.34	71.4	.66	69.3	.98	68.6	1.3	68.2	1.9	66.5
SH142-1	14	.10	126	.20	126	.39	123	.58	122	1.1	115	1.7	119	2.2	115	3.2	112
SS102	10	.14	176	.27	170	.52	164	.78	164	1.5	151	2.2	154	2.9	152	4.3	150
SS82	8	.26	328	.50	315	.99	312	1.5	315	2.8	294	4.2	294	5.5	289	8.0	280
SH102	10	.34	429	.67	422	1.3	409	2.0	420	3.8	399	5.6	392	7.3	383	10.7	374
SH82	8	.64	807	1.3	819	2.5	787	3.7	777	7.1	745	10.5	735	13.7	719	20.0	700

Ratings are based on strength calculation. Basic Static Strength Rating, or for hand operation of above gears is approximately 3 times the 100 RPM rating.

*Torque Rating (Lb. Ins.)

**Ratings reflect Gear and Pinion sets.

†Pinion RPM

NOTES

WORMS AND WORM GEARS

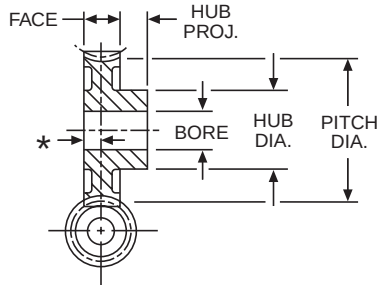
SECTION CONTENTS

48 DIAMETRAL PITCH
BRONZE WORM GEARS – STEEL WORMS – Unhardened and Hardened
ACETAL WORM GEARS AND WORMS

PRESSURE ANGLE – SINGLE THREAD 14½°
DOUBLE THREAD 20°
QUAD THREAD 25°

RATIO = Gear Teeth ÷ Worm Threads

All Worms and Worm Gears stocked RIGHT HAND ONLY.



ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

48 DIAMETRAL PITCH — WORM GEARS — FACE = .156" *CENTER LINE WORM TO FLUSH END = .078"

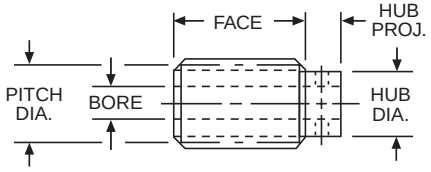
No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
ACETAL											
20	.417	.188	.34	.19	B	GP1018	54106	–	–	–	–
30	.625		.44	.25		GP1019	54107	–	–	–	–
40	.833		.50			GP1020	54108	–	–	–	–
50	1.042					GP1021	54109	–	–	–	–
ACETAL WITH BRASS INSERTS**											
20	.417	.125	.34	.19	B	GP1018-1/8	54118	–	–	–	–
30	.625	.125	.44	.25		GP1019-1/8	54119	–	–	–	–
		.188				GP1019-3/16	54120	–	–	–	–
40	.833	.188	.50	.25		GP1020-3/16	54121	–	–	–	–
		.250				GP1020-1/4	54122	–	–	–	–
50	1.042	.188	.50	.25		GP1021-3/16	54123	–	–	–	–
		.250				GP1021-1/4	54124	–	–	–	–
BRONZE											
20	.417	.1875	.34	.19	A	G1018	13564	D1118	13488	Q1318	13440
30	.625		.44	.25		G1019	13566	D1119	13490	Q1319	13442
40	.833		.50			G1020	13568	D1120	13492	Q1320	13444
50	1.042		.50			G1021	13570	D1121	13494	Q1321	13446
60	1.250		.62			G1024	13572	D1124	13500	Q1324	13452
80	1.667	.250	.62	.31		G1022	13574	D1122	13496	Q1322	13448
100	2.083		.69		B	G1023	13576	D1123	13498	Q1323	13450

STANDARD TOLERANCES

DIMENSION			TOLERANCE
BORE	Bronze and Steel	All	±.0005
	Acetal	All	+.000 –.002
	Acetal with Brass Insert	All	+.001 –.000

WORM LEAD and LEAD ANGLE

	SINGLE	DOUBLE	QUAD
LEAD	.0654"	.1309"	.2618"
LEAD ANGLE	3°35′	7°7′	14°2′



48 DIAMETRAL PITCH — WORMS FOR ABOVE GEARS

Pitch Dia.	Face	Bore	Hub Dia.	Hub Proj.	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
ACETAL										
.333	.562	.1875	.26	.19	LSHP	54141	–	–	–	–
UNHARDENED – STEEL										
.333	.562	.1875	.26	.19	LSH-1	12920	DSH-1	12928	QSH-1	12934
HARDENED – STEEL										
.333	.562	.1875	.26	.19	HLSH-1 GLSH-1	13026 12952	HDSH-1 GDSH-1	13052 13036	HQSH-1 GQSH-1	13062 13042

All Steel worms have .0625 drilled hole in hub.
Hxxx worms have polished threads.
Gxxx worms have ground and polished threads.
**These are in effect Helical Gears with a Helix Angle compatible with the worms. When in mesh they operate as a worm pair at right angles.

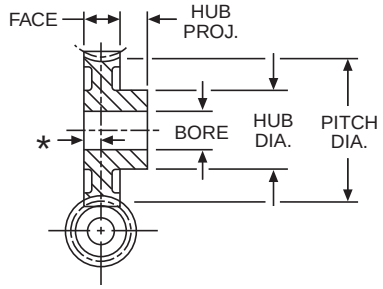
REFERENCE PAGES

Alterations — 152
Lubrication — 152
Materials — 153

WORMS AND WORM GEARS

32 DIAMETRAL PITCH
BRONZE WORM GEARS – STEEL WORMS – Unhardened and Hardened
ACETAL WORM GEARS AND WORMS

PRESSURE ANGLE – SINGLE THREAD 14½°
DOUBLE THREAD 20°
QUAD THREAD 25°



RATIO = Gear Teeth ÷ Worm Threads

All Worms and Worm Gears stocked RIGHT HAND ONLY.

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

32 DIAMETRAL PITCH — WORM GEARS — FACE = .219" *CENTER LINE WORM TO FLUSH END = .109"

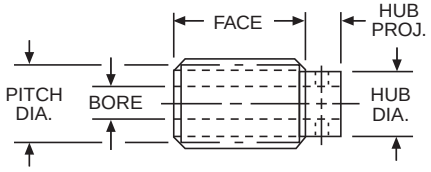
No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
ACETAL											
20	.625	.188	.50	.25	B	GP1026	54110	–	–	–	–
30	.938		.63			GP1027	54111	–	–	–	–
40	1.250	.250	.63	.31		GP1028	54112	–	–	–	–
50	1.562		.63			GP1029	54113	–	–	–	–
ACETAL WITH BRASS INSERTS											
20	.625	.188	.50	.25	B	GP1026-3/16	54125	–	–	–	–
		.250				GP1026-1/4	54126	–	–	–	–
30	.938	.188	.63	.25		GP1027-3/16	54127	–	–	–	–
		.250				GP1027-1/4	54128	–	–	–	–
40	1.250	.250	.63	.31		GP1028-1/4	54129	–	–	–	–
		.313				GP1028-5/16	54130	–	–	–	–
50	1.562	.250	.63	.31		GP1029-1/4	54131	–	–	–	–
		.3125				GP1029-5/16	54132	–	–	–	–
BRONZE											
20	.625	.1875	.50	.25	A	G1026	13578	D1126	13502	Q1326	13454
30	.938		.62			G1027	13580	D1127	13504	Q1327	13456
40	1.250	.250	.62	.31		G1028	13582	D1128	13506	Q1328	13458
50	1.562		.62			G1029	13584	D1129	13508	Q1329	13460
60	1.875		.69			G1032	13586	D1132	13514	Q1332	13466
80	2.500	.3125	.69	.31	D	G1030	13588	D1130	13510	Q1330	13462
96	3.000					G1031	13590	–	–	Q1331	13464
100	3.125					G1033	13592	D1133	13516	–	–

STANDARD TOLERANCES

DIMENSION			TOLERANCE
BORE	Bronze and Steel	All	±.0005
	Acetal	All	+.000 –.002
	Acetal with Brass Insert	All	+.001 –.000

WORM LEAD and LEAD ANGLE

	SINGLE	DOUBLE	QUAD
LEAD	.0982"	.1963"	.3927"
LEAD ANGLE	4°5′	8°8′	15°57′



32 DIAMETRAL PITCH — WORMS FOR ABOVE GEARS

Pitch Dia.	Face	Bore	Hub Dia.	Hub Proj.	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
ACETAL										
.438	.641	.1875	.32	.19	LTHBP	54142	–	–	–	–
UNHARDENED – STEEL										
.438	.688	.1875	.32	.19	LTHB-1	12922	DTH-1	12930	QTH-1	12936
HARDENED – STEEL										
.438	.688	.2187	.32	.19	HLTH-1	13028	HDTH-1	13054	HQTH-1	13064
					GLTH-1	12954	GDTH-1	13038	GQTH-1	13044

All Steel worms have .0625 drilled hole in hub.
Hxxx worms have polished threads.
Gxxx worms have ground and polished threads.

REFERENCE PAGES

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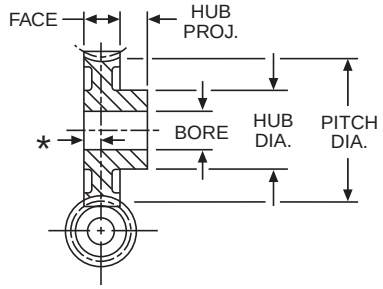
Lubrication — 152
Materials — 153

24 DIAMETRAL PITCH
BRONZE WORM GEARS – STEEL WORMS – Unhardened and Hardened
MINLON® WORM GEARS – NYLON WORMS

PRESSURE ANGLE – SINGLE THREAD 14½°
DOUBLE THREAD 20°
QUAD THREAD 25°

RATIO = Gear Teeth ÷ Worm Threads

All Worms and Worm Gears stocked RIGHT HAND ONLY.

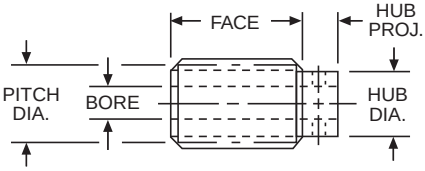


STANDARD TOLERANCES

DIMENSION			TOLERANCE
BORE	Bronze and Steel	All	±.0005
	Minlon/Nylon	All	+.000 –.002
	Minlon/Nylon w/Brass Insert	All	+.001 –.000

WORM LEAD and LEAD ANGLE

	SINGLE	DOUBLE	QUAD
LEAD	.1309"	.2618"	.5236"
LEAD ANGLE	4°46´	9°28´	18°26´



ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

24 DIAMETRAL PITCH — WORM GEARS — FACE = .250" *CENTER LINE WORM TO FLUSH END = .125"

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
MINLON											
20	.833	.1875	.63	.31	B	GP1034	54114	–	–	–	–
30	1.250					GP1035	54115	–	–	–	–
40	1.667	.3125	.75			GP1036	54116	–	–	–	–
50	2.083					GP1037	54117	–	–	–	–
MINLON WITH BRASS INSERTS*											
20	.833	.1875	.63	.31	B	GP1034-3/16	54133	–	–	–	–
		.250				GP1034-1/4	54134	–	–	–	–
30	1.250	.1875				GP1035-3/16	54135	–	–	–	–
		.250				GP1035-1/4	54136	–	–	–	–
40	1.667	.250	.75			GP1036-1/4	54137	–	–	–	–
		.3125				GP1036-5/16	54138	–	–	–	–
50	2.083	.250				GP1037-1/4	54139	–	–	–	–
		.3125				GP1037-5/16	54140	–	–	–	–
BRONZE											
20	.833	.1875	.62	.31	A	G1034	13594	D1134	13518	Q1334	13470
30	1.250					G1035	13596	D1135	13520	Q1335	13472
40	1.667	.250	.62	.31		G1036	13598	D1136	13522	Q1336	13474
50	2.083	.3125	.75	.31	B	G1037	13600	D1137	13524	Q1337	13476
60	2.500				C	G1040	13602	D1140	13530	Q1340	13482
72	3.000					G1038	13604	D1138	13526	Q1338	13478
80	3.333		.88	.38	D	G1041	13606	D1141	13532	Q1341	13484
96	4.000	.375	.88	.38		G1039	13608	D1139	13528	–	–
100	4.167					G1049	13610	D1149	13534	–	–

24 DIAMETRAL PITCH — WORMS FOR ABOVE GEARS

Pitch Dia.	Face	Bore	Hub Dia.	Hub Proj.	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
NYLON										
.500	.643	.188	.38	.25	LUHBP	54143	–	–	–	–
UNHARDENED – STEEL										
.500	.812	.1875	.38	.25	LUHB	12924	DUH	12932	QUH	12938
HARDENED – STEEL										
.500	.812	.25	.38	.25	HLUH	13030	HDUH	13056	HQUH	13066
					GLUH	12956	GDUH	13040	GQUH	13060

All Steel worms have .0938 drilled hole in hub.
Hxxx worms have polished threads.
Gxxx worms have ground and polished threads.
MINLON® is a registered trademark of E.I. DuPont.
** These are in effect Helical Gears with a Helix Angle compatible with the worms. When in mesh they operate as a worm pair at right angles.

REFERENCE PAGES

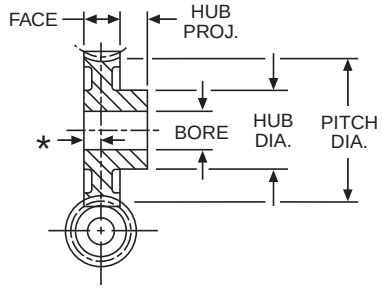
Alterations — 152
Lubrication — 152
Materials — 153

16 DIAMETRAL PITCH
BRONZE AND CAST IRON WORM GEARS
STEEL WORMS – UNHARDENED AND HARDENED

PRESSURE ANGLE – SINGLE THREAD 14½°
DOUBLE THREAD 14½°
QUAD THREAD 20°

RATIO = Gear Teeth ÷ Worm Threads

All Worms and Worm Gears stocked RIGHT HAND ONLY.

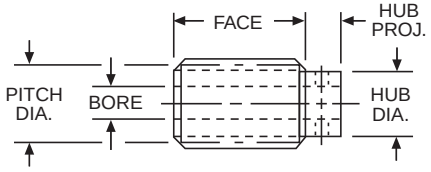


STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

WORM LEAD and LEAD ANGLE

	SINGLE	DOUBLE	QUAD
LEAD	.1963"	.3927"	.7854"
LEAD ANGLE	5°43′	11°19′	21°48′



ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

16 DIAMETRAL PITCH — WORM GEARS — FACE = .313" *CENTER LINE WORM TO FLUSH END = .156"

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
BRONZE											
20	1.250	.250	.62	.31	A	G1042	13612	D1142	13700	Q1342	13536
30	1.875	.3125	.75	.38	B	G1043	13614	D1143	13702	Q1343	13538
40	2.500				C	G1044	13616	D1144	13704	Q1344	13540
50	3.125	.375	.88	.44	D	G1045	13618	D1145	13706	Q1345	13542
60	3.750					G1048	13620	D1148	13708	Q1348	13544
80	5.000					G1046	13622	–	–	Q1346	13546
100	6.250		1.00	.50		G1047	13624	–	–	–	–
CAST IRON											
20	1.250	.250	.62	.31	A	CG1042	63506	CD1142	63513	CQ1342	63518
30	1.875	.3125	.75	.38	B	CG1043	63507	CD1143	63514	CQ1343	63519
40	2.500				C	CG1044	63508	CD1144	63515	CQ1344	63520
50	3.125	.375	.88	.44		CG1045	63509	CD1145	63516	CQ1345	63521
60	3.750					CG1048	63510	CD1148	63517	CQ1348	63522
80	5.000					CG1046	63511	–	–	CQ1346	63523
100	6.250		1.00	.50		CG1047	63512	–	–	–	–

16 DIAMETRAL PITCH — WORMS FOR ABOVE GEARS

Pitch Dia.	Face	Bore	Hub Dia.	Hub Proj.	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
UNHARDENED – STEEL										
.625	1.00	.250	.44	.25	LVHB-1	12926	DVH-1	12862	QVH-1	12940
HARDENED – STEEL										
.625	1.00	.3125	.44	.25	HLVH-1 GLVH-1	13032 12958	HDVH-1 GDVH-1	13004 12950	HQVH-1 GQVH-1	13058 13046

All worms have .0938 drilled hole in hub.
Hxxx worms have polished threads.
Gxxx worms have ground and polished threads.

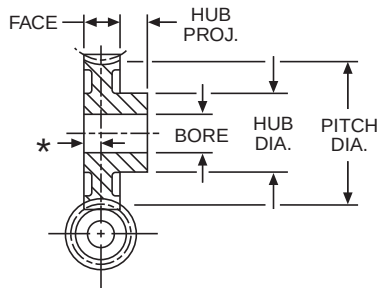
REFERENCE PAGES

Alterations — 152
Lubrication — 152
Materials — 153

12 DIAMETRAL PITCH
BRONZE AND CAST IRON WORM GEARS
STEEL WORMS – UNHARDENED AND HARDENED

PRESSURE ANGLE – 14½°

RATIO = Gear Teeth ÷ Worm Threads
RH = RIGHT HAND — LH = LEFT HAND
All others stocked RIGHT HAND ONLY.

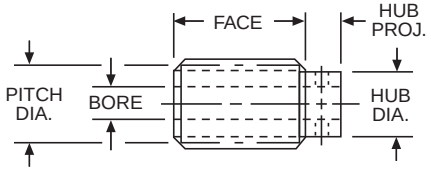


STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

WORM LEAD and LEAD ANGLE

	SINGLE	DOUBLE	QUAD
LEAD	.2618"	.5236"	1.0472"
LEAD ANGLE	4°46´	9°28´	18°26´



REFERENCE PAGES

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

12 DIAMETRAL PITCH — WORM GEARS — FACE = .500" *CENTER LINE WORM TO FLUSH END = .250"

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
BRONZE											
12	1.000	.5625	1.00	.62	A	–	–	–	–	QB1212†	13762
16	1.333	.6875	1.25	.62		–	–	–	–	QB1216†	13764
20	1.667	.500	1.25	.50		GB1050A	13626	DB1400	13714	DB1600	13766
30	2.500	.500	1.19	.62	B	GB1051	13628	–	–	–	–
		.750		.62		–	–	DB1401A	13716	DB1601A	13768
40	3.333	.625	1.44	.62		GB1052A	13630	–	–	–	–
		.750		.62		–	–	DB1402A	13718	DB1602A	13770
50	4.167	.625	1.44	.62		GB1053A	13632	–	–	–	–
		.750		.62		–	–	DB1403A	13720	DB1603A	13772
60	5.000	.625	1.69	.75		GB1260A	13634	–	–	–	–
		.750		.75		–	–	DB1260A	13722	QB1260A	13774
80	6.667	.625	1.94	.75	C	GB1054	13636	–	–	–	–
100	8.333	.750	1.94	.75		GB1055	13638	–	–	–	–
CAST IRON											
20	1.667	.500	1.25	.50	A	G1050ARH G1050ALH	13110 13112	D1400RH D1400LH	13260 13262	D1600	13352
30	2.500	.500	1.19	.62	B	G1051RH G1051LH	13114 13116	–	–	–	–
		.750		.62		–	–	D1401ARH D1401ALH	13264 13266	D1601A	13354
40	3.333	.625	1.44	.62		G1052ARH G1052ALH	13118 13120	–	–	–	–
		.750		.62		–	–	D1402ARH D1402ALH	13268 13270	D1602A	13356
50	4.167	.625	1.44	.62		G1053ARH G1053ALH	13122 13124	–	–	–	–
		.750		.62		–	–	D1403ARH D1403ALH	13272 13274	D1603A	13358
60	5.000	.625	1.69	.75		G1260RH G1260LH	13126 13128	–	–	–	–
		.750				–	–	D1260A	13276	Q1260A	13360
80	6.667	.625	1.94	.75		G1054	13130	–	–	–	–
		.750				–	–	D1404	13278	–	–
100	8.333	.750	1.94	.75	C	G1055	13134	–	–	–	–

12 DIAMETRAL PITCH — WORMS FOR ABOVE GEARS

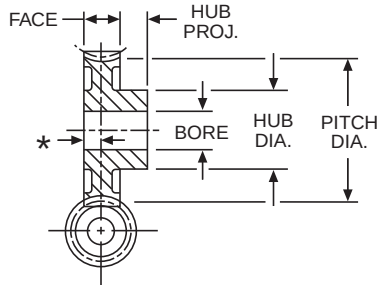
Pitch Dia.	Face	Bore	Hub Dia.	Hub Proj.	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
UNHARDENED – STEEL										
1.000	1.125	.625	–	–	–	–	D1407KRH‡ D1407KLH‡	12806 12808	D1607KRH‡ D1607KLH‡	12822 12824
	1.625	.625	–	–	–	–	L1407‡	12912	–	–
		.500	–	–	L1056‡	12900	–	–	–	–
	1.125	.500	.75	.38	GH1056RH GH1056LH	12884 12886	DH1407RH DH1407LH	12838 12840	DH1607 –	12854 –
HARDENED – STEEL										
1.000	1.125	.625	–	–	–	–	H1407RH‡ H1407LH‡	12980 12982	H1607‡ –	12996 –
	1.625	.625	–	–	–	–	HL1407‡	13018	–	–
		.500	–	–	HL1056‡	13006	–	–	–	–
	1.125	.500	–	–	H1056RH‡ H1056LH‡	12962 12960	– –	– –	– –	– –

†.750" Face, Center Line Worm to Flush End = .375"
‡Furnished with .125" Keyway.
Hardened Worms have ground and polished threads.

10 DIAMETRAL PITCH
BRONZE AND CAST IRON WORM GEARS
STEEL WORMS – UNHARDENED AND HARDENED

PRESSURE ANGLE – 14½°

RATIO = Gear Teeth ÷ Worm Threads
RH = RIGHT HAND — LH = LEFT HAND
All others stocked RIGHT HAND ONLY.

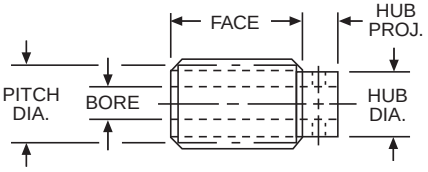


STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

WORM LEAD and LEAD ANGLE

	SINGLE	DOUBLE	QUAD
LEAD	.3142"	.6283"	1.2566"
LEAD ANGLE	4°34´	9°5´	17°45´



REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 85, 86
Lubrication — 152
Materials — 153
Selection Procedure — 84

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

10 DIAMETRAL PITCH — WORM GEARS — FACE = .625" *CENTER LINE WORM TO FLUSH END = .312"

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
BRONZE											
16	1.600	.750	1.50	.75	A	–	–	–	–	QB1016†	13780
20	2.000	.500	1.25	.62	A	GB1060A	13640	–	–	–	–
		.875	1.62			–	–	DB1410	13728	DB1610	13782
30	3.000	.625	1.69	.62	B	GB1061A	13648	–	–	–	–
		.875				–	–	DB1411	13736	DB1611	13788
40	4.000	.625	1.69	.62	B	GB1062A	13642	–	–	–	–
		.875				–	–	DB1412	13730	DB1612	13784
50	5.000	.750	1.94	.75	B	GB1063	13644	–	–	–	–
		.875				–	–	DB1413A	13732	DB1613A	13786
60	6.000	.750	1.94	.75	B	GB1064	13646	–	–	–	–
		.875				–	–	DB1414A	13734	–	–
80	8.000	.750	1.94	.75	C	GB1067	13650	–	–	–	–
100	10.000	.750	2.00	.75	C	GB1065	13652	–	–	–	–
CAST IRON											
20	2.000	.500	1.25	.62	A	G1060ARH G1060ALH	13136 13138	–	–	–	–
		.875	1.62			–	–	D1410RH D1410LH	13282 13284	D1610	13366
30	3.000	.625	1.69	.62	B	G1061ARH G1061ALH	13142 13140	–	–	–	–
		.875	1.69			–	–	D1411RH D1411LH	13286 13288	D1611	13368
40	4.000	.625	1.69	.62	B	G1062ARH G1062ALH	13144 13146	–	–	–	–
		.875	1.69			–	–	D1412RH D1412LH	13290 13292	D1612	13370
50	5.000	.750	1.94	.75	B	G1063RH G1063LH	13148 13150	–	–	–	–
		.875	1.94			–	–	D1413ARH D1413ALH	13294 13296	D1613A	13372
60	6.000	.750	1.94	.75	B	G1064RH G1064LH	13152 13154	–	–	–	–
		.875	1.94			–	–	D1414A	13298	D1614A	13374
80	8.000	.750	1.94	.75	C	G1067	13156	–	–	–	–
		.875	1.94			–	–	D1080A	13300	Q1080A	13376
100	10.000	.750	1.94	.75	C	G1065	13158	–	–	–	–
		.875	1.94			–	–	D1415A	13302	–	–

10 DIAMETRAL PITCH — WORMS FOR ABOVE GEARS

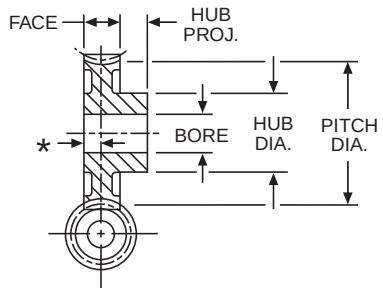
Pitch Dia.	Face	Bore	Hub Dia.	Hub Proj.	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
UNHARDENED – STEEL										
1.250	1.375	.750	–	–	– –	– –	D1418KRH‡ D1418KLH‡	12810 12812	D1618KRH‡ D1618KLH‡	12826 12828
	2.000	.750	–	–	–	–	L1418‡	12914	–	–
		.625	–	–	L1066‡	12902	–	–	–	–
	1.375	.625	–	–	G1066KRH‡ G1066KLH‡	12864 12866	–	–	–	–
			.97	.50	GH1066RH GH1066LH	12888 12890	DH1418RH DH1418LH	12842 12844	DH1618 –	12856 –
HARDENED STEEL										
1.250	1.375	.750	–	–	– –	– –	H1418RH‡ H1418LH‡	12986 12984	H1618‡ –	12998 –
	2.000	.750	–	–	–	–	HL1418‡	13020	–	–
		.625	–	–	HL1066‡	13008	–	–	–	–
	1.375	.625	–	–	H1066RH‡ H1066LH‡	12966 12964	–	–	–	–

†.875" Face, Center Line Worm to Flush End = .438"
‡Furnished with 3/16" Keyway.
Hardened Worms have ground and polished threads.

8 DIAMETRAL PITCH
BRONZE AND CAST IRON WORM GEARS
STEEL WORMS – UNHARDENED AND HARDENED

PRESSURE ANGLE – 14½°

RATIO = Gear Teeth ÷ Worm Threads
RH = RIGHT HAND — LH = LEFT HAND
All others stocked RIGHT HAND ONLY.

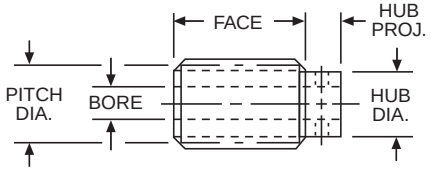


STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

WORM LEAD and LEAD ANGLE

	SINGLE	DOUBLE	QUAD
LEAD	.3927"	.7854"	1.5708"
LEAD ANGLE	4°46´	9°28´	18°26´



REFERENCE PAGES

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

8 DIAMETRAL PITCH — WORM GEARS — FACE = .750" *CENTER LINE WORM TO FLUSH END = .375"

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
BRONZE											
8	1.000	.500	1.12	.88	A	–	–	–	–	QB808†	13790
12	1.500	.750	1.50	.88	A	–	–	–	–	QB812†	13792
16	2.000	1.000	2.00	.88	A	–	–	–	–	QB816†	13794
20	2.500	.750	1.75	.75	A	GB1070	13654	–	–	–	–
		1.000	1.75	.75	A	–	–	DB1420A	13740	DB1620A	13796
30	3.750	.750	1.69	.75	B	GB1071	13656	–	–	–	–
		1.000	1.69	.75	B	–	–	DB1421A	13742	DB1621A	13798
40	5.000	1.000	2.19	.75	B	GB1072A	13658	DB1422	13744	DB1622	13800
48	6.000	1.000	2.38	.88	B	GB1073	13660	–	–	–	–
50	6.250	1.000	2.31	.88	B	GB850RH	13662	DB1423A	13746	DB1623A	13802
60	7.500	1.000	2.44	.88	C	GB860	13664	DB860A	13748	–	–
80	10.000	1.250	2.75	.88	D	GB1074A	13666	–	–	–	–
100	12.500	1.250	3.00	1.00	C	GB8100	13668	–	–	–	–
CAST IRON											
20	2.500	.750	1.75	.75	A	G1070RH G1070LH	13160 13162	–	–	–	–
		1.000	1.75	.75	A	–	–	D1420ARH D1420ALH	13304 13306	D1620A	13380
30	3.750	.750	1.69	.75	B	G1071RH G1071LH	13164 13166	–	–	–	–
		1.000	1.69	.75	B	–	–	D1421ARH D1421ALH	13308 13310	D1621A	13382
40	5.000	1.000	1.69	.75	B	G1072ARH G1072ALH	13168 13170	D1422ARH D1422ALH	13312 13314	D1622A	13384
48	6.000	1.000	2.38	.88	B	G1073RH G1073LH	13174 13172	–	–	–	–
50	6.250	1.000	2.31	.88	B	G850RH G850LH	13176 13178	D1423A	13316	D1623A	13386
60	7.500	1.000	2.44	.88	C	G860	13180	D860A	13320	Q860A	13388
80	10.000	1.000	2.69	.88	D	–	–	D1424A	13322	D1624A	13390
		1.250	2.69	.88	D	G1074ARH	13182	–	–	–	–
96	12.000	1.250	3.00	1.00	C	G1075	13186	–	–	–	–
100	12.500	1.250	2.69	1.00	C	G8100A	13188	–	–	–	–

8 DIAMETRAL PITCH — WORMS FOR ABOVE GEARS

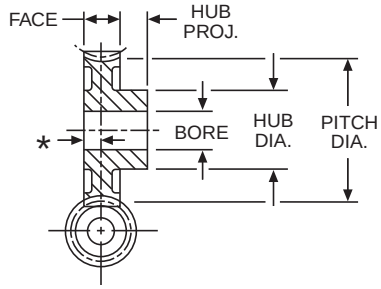
Pitch Dia.	Face	Bore	Hub Dia.	Hub Proj.	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
UNHARDENED – STEEL										
1.500	1.750	.875	–	–	–	–	D1427KRH‡ D1427KLH‡	12814 12816	D1627KRH‡ D1627KLH‡	12830 12832
	2.500	.875	–	–	–	–	L1427‡	12916	–	–
		.750	–	–	L1076‡	12904	–	–	–	–
	1.750	.750	–	–	G1076KRH‡ G1076KLH‡	12868 12870	–	–	–	–
		.750	1.18	.62	GH1076RH GH1076LH	12892 12894	DH1427RH DH1427LH	12846 12848	DH1627	12858
HARDENED STEEL										
1.500	1.750	.875	–	–	–	–	H1427RH‡ H1427LH‡	12990 12988	H1627‡ –	13000 –
	2.500	.875	–	–	–	–	HL1427‡	13022	–	–
		.750	–	–	HL1076‡	13010	–	–	–	–
	1.750	.750	–	–	H1076RH‡ H1076LH‡	12970 12968	–	–	–	–

†1.000" Face, Center Line Worm to Flush End = .500"
‡Furnished with .188" Keyway.
Hardened Worms have ground and polished threads.

6 DIAMETRAL PITCH
BRONZE AND CAST IRON WORM GEARS
STEEL WORMS – UNHARDENED AND HARDENED

PRESSURE ANGLE – 14½°

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

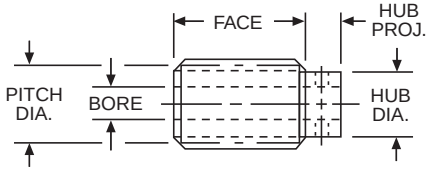


STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

WORM LEAD and LEAD ANGLE

	SINGLE	DOUBLE	QUAD
LEAD	.5236"	1.0472"	2.0944"
LEAD ANGLE	4°46´	9°28´	18°26´



REFERENCE PAGES

RATIO = Gear Teeth ÷ Worm Threads
RH = RIGHT HAND — LH = LEFT HAND
All others stocked RIGHT HAND ONLY.

†1.250" Face, Center Line Worm to Flush End = .625"
‡Furnished with .188" Keyway.
†Furnished with .250" Keyway.
Hardened Worms have ground and polished threads.

6 DIAMETRAL PITCH — WORM GEARS — FACE = 1.000" *CENTER LINE WORM TO FLUSH END = .500"

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
BRONZE											
16	2.667	1.250	2.38	1.00	A	–	–	–	–	QB616**	13804
20	3.333	.750	2.00	.88	A	GB1077A	13670	–	–	–	–
		1.000	2.00			–	–	DB620A	13752	–	–
		1.250	2.00			–	–	–	–	QB620A	13806
24	4.000	.750	1.94	.88	B	GB1080A	13672	–	–	–	–
		1.250				–	–	DB1430A	13754	DB1630A	13808
30	5.000	.875	2.19	.88	B	GB1081	13674	–	–	–	–
		1.250				–	–	DB1431A	13756	DB1631A	13810
36	6.000	1.000	2.50	.88	B	GB1082	13676	–	–	–	–
40	6.667	1.000	2.44	.88	B	GB1078	13678	–	–	–	–
		1.250				–	–	DB1432A	13758	DB1632A	13812
48	8.000	1.250	2.75	1.00	C	GB1083	13680	–	–	–	–
50	8.333	1.250	2.69	1.00	C	GB1079	13682	–	–	–	–
60	10.000	1.250	3.00	1.00	C	GB1087	13684	–	–	–	–
72	12.000	1.250	3.00	1.25	C	GB1084	13686	–	–	–	–
CAST IRON											
20	3.333	.750	1.81	.88	B	G1077RH G1077LH	13190 13192	–	–	–	–
		1.000				–	–	D620ARH D620ALH	13326 13328	Q620A	13394
24	4.000	.750	1.94	.88	B	G1080ARH G1080ALH	13194 13196	–	–	–	–
		1.250				–	–	D1430ARH D1430ALH	13330 13332	D1630A	13396
30	5.000	.875	2.19	.88	B	G1081RH G1081LH	13198 13200	–	–	–	–
		1.250				–	–	D1431ARH D1431ALH	13334 13336	D1631A	13398
36	6.000	1.000	2.50	.88	B	G1082RH G1082LH	13202 13204	–	–	–	–
40	6.667	1.000	2.44	.88	B	G1078RH G1078LH	13206 13208	–	–	–	–
		1.250				–	–	D1432ARH D1432ALH	13338 13340	D1632A	13400
48	8.000	1.250	2.75	1.00	B	G1083RH G1083LH	13212 13210	–	–	–	–
50	8.333	1.250	2.69	1.00	C	G1079	13214	D1433	13342	D1633	13402
60	10.000	1.250	2.69	1.00	C	G1087ARH	13218	D660	13344	Q660	13404
72	12.000	1.250	2.94	1.00	C	G1084ARH	13220	D1434	13346	D1634	13406
80	13.333	1.250	3.00	1.00	C	G1088A	13224	–	–	–	–
96	16.000	1.375	3.00	1.00	C	G1085ARH	13226	–	–	–	–
100	16.667	1.375	3.00	1.00	D	G1089ARH	13228	–	–	–	–

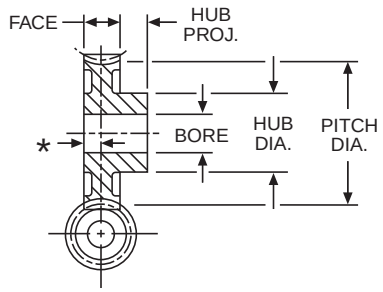
6 DIAMETRAL PITCH — WORMS FOR ABOVE GEARS

Pitch Dia.	Face	Bore	Hub Dia.	Hub Proj.	SINGLE Thread Catalog Number	SINGLE Thread Item Code	DOUBLE Thread Catalog Number	DOUBLE Thread Item Code	QUAD Thread Catalog Number	QUAD Thread Item Code
UNHARDENED – STEEL										
2.000	2.500	1.000	–	–	–	–	D1438KRH† D1438KLH†	12818 12820	D1638KRH† D1638KLH†	12834 12836
	3.500	1.000	–	–	–	–	L1438	12918	–	–
		.875	–	–	L1086‡	12906	–	–	–	–
	2.500	.875	–	–	G1086KRH‡ G1086KLH‡	12872 12874	–	–	–	–
		.875	1.56	.75	GH1086RH GH1086LH	12896 12898	DH1438RH DH1438LH	12850 12852	DH1638	12860
HARDENED STEEL										
2.000	2.500	1.000	–	–	–	–	H1438RH‡ H1438LH‡	12994 12992	H1638†	13002
	3.500	1.000	–	–	–	–	HL1438‡	13024	–	–
		.875	–	–	HL1086‡	13012	–	–	–	–
	2.500	.875	–	–	H1086RH‡ H1086LH‡	12974 12972	–	–	–	–

4 DIAMETRAL PITCH
BRONZE AND CAST IRON WORM GEARS
STEEL WORMS – UNHARDENED AND HARDENED

PRESSURE ANGLE – 14½°

RATIO = Gear Teeth ÷ Worm Threads
RH = RIGHT HAND — LH = LEFT HAND
All others stocked RIGHT HAND ONLY.

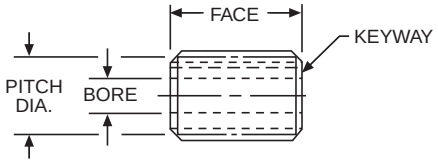


STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

WORM LEAD and LEAD ANGLE

LEAD	.7854
LEAD ANGLE	4°46´



REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 85, 86
Lubrication — 152
Materials — 153
Selection Procedure — 84

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

4 DIAMETRAL PITCH — FACE = 1.500" — *CENTER LINE WORM TO FLUSH END = .750" — WORM GEARS

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	SINGLE Thread Catalog Number	SINGLE Thread Item Code
BRONZE							
20	5.000	1.000	2.50	1.25	B	GB1100	13688
24	6.000					GB1101	13690
CAST IRON							
20	5.000	1.000	2.50	1.25	B	G1100RH	13230
						G1100LH	13232
24	6.000					G1101RH	13234
						G1101LH	13236
32	8.000	1.250	3.00			G1102RH	13238
						G1102LH	13240
40	10.000					G1103	13242
48	12.000	1.500	3.50			G1104	13244
64	16.000				D	G1105	13246

4 DIAMETRAL PITCH — WORMS FOR ABOVE GEARS

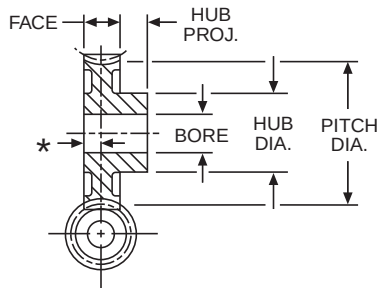
Pitch Dia.	Face	Bore	Hub Dia.	Hub Proj.	SINGLE Thread Catalog Number*	SINGLE Thread Item Code
UNHARDENED – STEEL						
3.000	3.500	1.250	–	–	G1106KRH	12876
					G1106KLH	12878
	4.500	1.250	–	–	L1106	12908
HARDENED STEEL						
3.000	3.500	1.250	–	–	H1106	12976
	4.500	1.250	–	–	HL1106	13014
	5.750				HP1106	13034

*All worms furnished with .313 keyway.
Hardened Worms have ground and polished threads.

3 DIAMETRAL PITCH
CAST IRON WORM GEARS
STEEL WORMS – UNHARDENED AND HARDENED

PRESSURE ANGLE – 14½°

RATIO = Gear Teeth ÷ Worm Threads
All Worm and Worm Gears stocked RIGHT HAND ONLY.

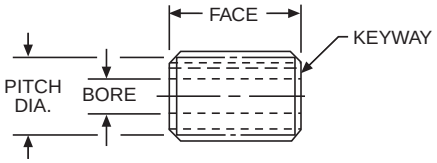


STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

WORM LEAD and LEAD ANGLE

LEAD	1.0472"
LEAD ANGLE	4°46'



ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

3 DIAMETRAL PITCH WORM GEARS — FACE = 2.000" *CENTER LINE WORM TO FLUSH END = 1.000"

No. of Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Style See Page 153	SINGLE Thread Catalog Number	SINGLE Thread Item Code
18	6.000	1.000	3.00	1.50	B	G1110	13248
24	8.000	1.500	3.50	1.50	B	G1111	13250
30	10.000	1.500	3.50	1.50	B	G1112	13252
36	12.000	1.500	3.50	1.50	B	G1113	13254
48	16.000	1.500	4.00	1.50	C	G1114	13256
54	18.000	1.500	4.00	1.50	D	G1115	13258

3 DIAMETRAL PITCH WORMS FOR ABOVE GEARS

Pitch Dia.	Face	Bore	Hub Dia.	Hub Proj.	SINGLE Thread Catalog Number	SINGLE Thread Item Code
UNHARDENED – STEEL						
4.000	4.000 5.500	1.500	–	–	G1116KRH L1116	12880 12910
HARDENED STEEL						
4.000	4.000 5.500	1.500	–	–	H1116 HL1116	12978 13016

*All worms furnished with .375" keyway.
Hardened Worms have ground and polished threads.

REFERENCE PAGES

Alterations — 152
Horsepower Ratings — 85, 86
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Materials — 153
Selection Procedure — 84

WORMS AND WORM GEARS

Boston worms and worm gears provide an effective answer for such power transmission applications as high-ratio speed reduction, limited space, right-angle shafts and non-intersecting shafts. When properly applied, they are the smoothest and quietest form of gearing. Steel worms and cast iron or bronze worm gears are available in single, double or quadruple threads, 48 to 3 diametral pitch.

Acetal worms and worm gears are available in single thread, 48 to 24 diametral pitch.

SELECTION PROCEDURE

Approximate input horsepower and output torque ratings for Boston stock worm and worm gear combinations from 12 to 3 DP are listed on Pages 85, 86. These ratings are for hardened, ground and polished worms operating with bronze worm gears. For other combinations multiply the listed ratings by the following percentages:

Hardened, ground and polished steel worms with cast iron gears 50%. Unhardened steel worms with cast iron gears 25%.

These ratings are listed at selected worm speeds. Ratings for intermediate speeds can be interpolated from the values indicated.

These ratings are based on gears operating with a Service Factor of 1.0, properly mounted in accordance with good design practice and continuously lubricated with a sufficient supply of oil.

1. Determine service factor.
   a. Using Application Classification Chart I, pages 155, 156, determine service factor or
   b. With knowledge of operating conditions and load classification, select service factor from Table 1.
2. Determine Design Horsepower.

   Design HP = Application Load x Service Factor (Table 1)
3. Select worm gear set with horsepower capacity equal to [or greater than] design horsepower determined in Step 2.

TABLE 1

Service Factor	Operating Conditions
0.8	Uniform—not more than 15 minutes in 2 hours.
1.0	Moderate Shock—not more than 15 minutes in 2 hours. Uniform—not more than 10 hours per day.
1.25	Moderate Shock—not more than 10 hours per day. Uniform—more than 10 hours per day.
1.50	Heavy Shock—not more than 15 minutes in 2 hours. Moderate Shock—more than 10 hours per day.
1.75	Heavy Shock—not more than 10 hours per day.
2.0	Heavy Shock—more than 10 hours per day.

Heavy shock loads and/or severe wear conditions may require the use of higher service factors. Consultation with factory is recommended in these applications.

STEEL-HARDENED, GROUND AND POLISHED WORMS
BRONZE WORM GEARS

APPROXIMATE HORSEPOWER AND TORQUE* RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)

Worm RPM		1800		600		100		Worm Cat. No.	Gear Cat. No.	DP
Ratio	Center Distance	Input HP	Output Torque	Input HP	Output Torque	Input HP	Output Torque			
3	1.000 1.500	.52 1.19	50 109	.27 .66	72 183	.06 .15	83 227	H1607 H1627	QB1212 QB812	12 8
4	1.167 1.425 1.750 2.333	.78 1.11 1.77 3.01	99 142 216 392	.40 .61 .98 1.84	143 223 361 689	.08 .13 .22 .45	166 267 454 933	H1607 H1618 H1627 H1638	QB1216 QB1016 QB816 QB616	12 10 8 6
5	1.333 1.625 2.000 2.667	.68 1.03 1.73 3.92	109 165 264 639	.34 .57 .96 2.40	158 257 441 1124	.07 .12 .22 .59	180 309 551 1512	H1607 H1618 H1627 H1638	DB1600 DB1610 DB1620A QB620A	12 10 8 6
6	3.000	3.82	746	2.34	1317	.57	1777	H1638	DB1630A	6
7.5	1.750 2.125 2.625 3.500	1.04 1.59 2.65 4.80	247 381 607 1174	.53 .87 1.47 2.94	355 599 1016 2064	.11 .19 .33 .72	411 714 1276 2789	H1607 H1618 H1627 H1638	DB1601A DB1611 DB1621A DB1631A	12 10 8 6
10	1.333 1.625 2.000 2.167 2.667 2.625 3.250 4.333	.44 .67 1.05 1.39 2.01 2.11 3.54 6.43	130 196 318 441 616 672 1082 2094	.23 .38 .63 .71 1.26 1.16 1.96 3.94	189 305 525 641 1071 1061 1806 3685	.05 .09 .15 .15 .32 .25 .44 .96	208 366 649 756 1450 1267 2270 4980	H1407 H1418 H1427 H1607 H1438 H1618 H1627 H1638	DB1400 DB1410 DB1420A DB1602A DB620A DB1612 DB1622 DB1632A	12 10 8 12 6 10 8 6
12	3.000	2.39	882	1.50	1537	.38	2042	H1438	DB1430A	6
12.5	2.583 3.125 3.875	1.72 2.61 4.40	683 1042 1681	.87 1.44 2.44	985 1641 2810	.18 .31 .55	1134 1961 3466	H1607 H1618 H1627	DB1603A DB1613A DB1623A	12 10 8
15	1.750 2.125 2.625 3.000 3.500	.64 .98 1.54 2.04 2.94	284 436 699 966 1355	.33 .55 .92 1.03 1.84	410 678 1150 1402 2364	.07 .13 .22 .22 .47	463 804 1428 1617 3120	H1407 H1418 H1427 H1607 H1438	DB1401A DB1411 DB1421A QB1260A DB1431A	12 10 8 12 6
18	5.000†	2.27	1308	1.38	2373	.41	4198	H1116	G1110†	3
20	1.333 1.625 2.000 2.167 2.667 2.625 3.250 4.000 4.333	.28 .42 .65 .83 1.22 1.25 1.98 2.92 3.77	140 217 343 483 665 742 1191 1667 2318	.15 .25 .41 .43 .80 .71 1.18 1.99 2.36	210 336 567 693 1156 1156 1974 3025 4034	.04 .06 .10 .09 .22 .16 .28 .64 .60	227 391 706 794 1550 1374 2433 4663 5420	H1056 H1066 H1076 H1407 H1086 H1418 H1427 H1106 H1438	GB1050A GB1060A GB1070 DB1402A GB1077A DB1412 DB1422 GB1100 DB1432A	12 10 8 12 6 10 8 4 6
24	3.000 6.000† 4.500	1.42 3.23 3.41	933 2218 2336	.93 1.81 2.32	1613 4020 4235	.26 .53 .75	2163 7109 6504	H1086 H1116 H1106	GB1080A G1111† GB1101	6 3 4
25	2.583 3.125 3.875 5.167	.99 1.50 2.39 2.27	726 1112 1794 1738	.52 .85 1.43 1.42	1048 1730 2962 3028	.11 .19 .34 .36	1197 2048 3671 4018	H1407 H1418 H1427 H1438	DB1403A DB1413A DB1423A D1433†	12 10 8 6
30	1.750 2.125 2.625 3.000 3.500 3.625 4.500 7.000†	.40 .59 .90 1.15 1.69 1.74 2.75 4.23	294 452 725 1008 1386 1544 2489 3326	.21 .35 .57 .60 1.12 .98 1.65 2.53	410 693 1197 1450 2426 2395 4128 6002	.05 .09 .13 .13 .31 .22 .39 .76	473 831 1286 1663 3233 2836 5105 10683	H1056 H1066 H1076 H1407 H1086 H1418 H1427 H1116	GB1051 GB1061A GB1071 DB1260A GB1081A DB1414A DB860A G1112†	12 10 8 12 6 10 8 3
32	5.500	2.13	1955	1.46	3546	.47	5445	H1106	G1102†	4
36	4.000 8.000†	1.95 3.87	1915 3990	1.29 1.33	3366 4130	.36 .68	4470 12816	H1086 H1116	GB1082A G1113†	6 3

*Torque in Lb. Ins.

†Cast Iron Gear Rating with Hardened Worm shown.

All Worm and Worm Gear Ratings are based on a Hardened Steel Worm used with a Bronze Worm Gear.

1. **For a Hardened Steel Worm used with a Cast Iron Gear, multiply the listed Rating by .50.**
2. **For an Unhardened Steel Worm used with a Cast Iron Gear, multiply the listed Rating by .25.**

STEEL-HARDENED, GROUND AND POLISHED WORMS
BRONZE WORM GEARS

APPROXIMATE HORSEPOWER AND TORQUE* RATINGS FOR CLASS I SERVICE (Service Factor = 1.0)

Worm RPM		1800		600		100		Worm Cat. No.	Gear Cat. No.	DP
Ratio	Center Distance	Input HP	Output Torque	Input HP	Output Torque	Input HP	Output Torque			
40	2.167	.48	490	.26	672	.06	782	H1056	GB1052A	12
	2.625	.72	742	.43	1134	.11	1361	H1066	GB1062A	10
	3.250	1.12	1190	.71	1974	.18	2420	H1076	GB1072A	8
	4.333	2.11	2310	1.39	4034	.38	5345	H1086	GB1078	6
48	3.750	1.26	1614	.79	2622	.20	3267	H1076	GB1073	8
	5.000	2.37	3110	1.56	5445	.43	7260	H1086	GB1083	6
	10.000†	4.06	5320	1.68	6608	.72	17088	H1116	G1114†	3
50	2.583	.55	700	.30	998	.07	1134	H1056	GB1053A	12
	3.125	.83	1068	.51	1733	.12	1954	H1066	GB1063	10
	3.875	1.30	1716	.82	2836	.21	3498	H1076	GB850	8
	5.167	2.43	3327	1.60	5777	.44	7563	H1086	GB1079	6
54	11.000†	4.34	5985	1.79	7434	.77	19224	H1116	G1115†	3
60	3.000	.60	924	.33	1323	.08	1664	H1056	GB1260A	12
	3.625	.91	1408	.54	2142	.13	2571	H1066	GB1064	10
	4.500	1.42	2269	.89	3718	.23	4538	H1076	GB860	8
	6.000	2.66	4370	1.75	7625	.49	10210	H1086	GB1087	6
72	7.000	2.79	5521	1.84	9605	.51	12705	H1086	GB1084	6
80	3.833	.64	1288	.35	1849	.08	2118	H1056	GB1054	12
	4.625	.96	1961	.57	3042	.14	3630	H1066	GB1067	10
	5.750	1.49	3165	.94	5210	.24	6555	H1076	GB1074A	8
100	4.667	.60	1505	.33	2206	.08	2458	H1056	GB1055	12
	5.625	.90	2310	.54	3571	.13	4223	H1066	GB1065	10
	7.000	1.40	3711	.88	6092	.22	7563	H1076	GB8100	8

*Torque in Lb. Ins.

†Cast Iron Gear Rating with Hardened Worm shown.

All Worm and Worm Gear Ratings are based on a Hardened Steel Worm used with a Bronze Worm Gear.

1. **For a Hardened Steel Worm used with a Cast Iron Gear, multiply the listed Rating by .50.**
2. **For an Unhardened Steel Worm used with a Cast Iron Gear, multiply the listed Rating by .25.**

CENTER DISTANCES AND RATIOS AVAILABLE WITH STOCK WORM GEARING

Center Distance (inches)	Pitch	No. of Teeth in Gear	Worm Thread		
			Single	Double	Quad
			Ratio		
.375	48	20	20	10	5
.479	48	30	30	15	7.5
.531	32	20	20	10	5
.583	48	40	40	20	10
.666	24	20	20	10	5
.688	48	50	50	25	12.5
.688	32	30	30	15	7.5
.792	48	60	60	30	15
.844	32	40	40	20	10
.875	24	30	30	15	7.5
.938	16	20	20	10	5
1.000	48	80	80	40	20
1.000	32	50	50	25	12.5
1.083	24	40	40	20	10
1.156	32	60	60	30	15
1.208	48	100	100	50	25
1.250	16	30	30	15	7.5
1.292	24	50	50	25	12.5
1.333	12	20	20	10	5
1.469	32	80	80	40	20
1.500	24	60	60	30	15
1.562	16	40	40	20	10
1.625	10	20	20	10	5
1.719	32	96	96	48	24
1.750	24	72	72	36	18
1.750	12	30	30	15	7.5
1.781	32	100	100	50	25
1.875	16	50	50	25	12.5
1.917	24	80	80	40	20
2.000	8	20	20	10	5
2.125	10	30	30	15	7.5
2.167	12	40	40	20	10
2.188	16	60	60	30	15
2.250	24	96	96	48	24
2.333	24	100	100	50	25
2.583	12	50	50	25	12.5
2.625	10	40	40	20	10
2.625	8	30	30	15	7.5
2.667	6	20	20	10	5
2.812	16	80	80	–	20
3.000	12	60	60	30	15
3.000	6	24	24	12	6
3.125	10	50	50	25	12.5
3.250	8	40	40	20	10
3.438	16	100	100	–	–
3.500	6	30	30	15	7.5
3.625	10	60	60	30	15
3.750	8	48	48	–	–
3.833	12	80	80	40	–
3.875	8	50	50	25	12.5
4.000	6	36	36	–	–
4.000	4	20	20	–	–
4.333	6	40	40	20	10
4.500	8	60	60	30	15
4.500	4	24	24	–	–
4.625	10	80	80	40	20
4.667	12	100	100	–	–
5.000	6	48	48	–	–
5.000	3	18	18	–	–
5.167	6	50	50	25	12.5
5.500	4	32	32	–	–
5.625	10	100	100	50	–
5.750	8	80	80	–	–
6.000	6	60	60	30	15
6.000	3	24	24	–	–
6.500	4	40	40	–	–
6.750	8	96	96	–	–
7.000	8	100	100	–	–
7.000	6	72	72	36	18
7.000	3	30	30	–	–
7.500	4	48	48	–	–
7.667	6	80	80	–	–
8.000	3	36	36	–	–
9.000	6	96	96	–	–
9.333	6	100	100	–	–
9.500	4	64	64	–	–
10.000	3	48	48	–	–
11.000	3	54	54	–	–

Example: Given a center distance of 2.625", Table lists Worm and Worm Gear Ratios available:

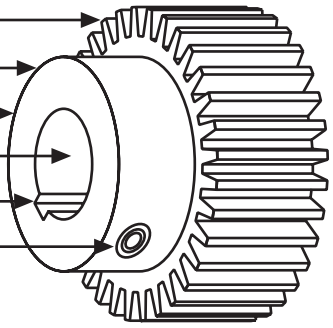
10 Pitch, 40 tooth, single = 40 to 1
10 Pitch, 40 tooth, double = 20 to 1
10 Pitch, 40 tooth, quad = 10 to 1
8 Pitch, 30 tooth, single = 30 to 1
8 Pitch, 30 tooth, double = 15 to 1
8 Pitch, 30 tooth, quad = 7.5 to 1

Customer-ized Gearing

MODIFY STOCK GEARING TO MEET CUSTOMERS UNIQUE REQUIREMENTS WITHIN 24 HOURS

Stock Product Alterations Within 24-Hours

- FACE WIDTH REDUCED
- HUB PROJECTION REDUCED
- HUB DIAMETER REDUCED
- BORES ENLARGED
- KEYWAY(S) ADDED
- TAPPED HOLES ADDED FOR SET SCREWS



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SECTION CONTENTS

CUSTOM GEAR CAPABILITIES

1. GEAR TYPES:

Spur
Helical
Miter & Bevel
Worm & Worm Gear

2. AGMA CLASS:

AGMA 9 Non-Heat Treated, Spur & Helical Gears only;
AGMA 8 Heat Treated & Non-Heat Treated, all other gears.

Note: Worm & Worm Gears do not have AGMA Class listings, however Boston Gear manufacturing tolerances relate to AGMA 8.

Gear Type	Diametral Pitch	Pitch Diameter	Face Max.
Spur	64DP-3DP	.250"-36.000"	5.000"
Helical	64DP-3DP	.337"-24.000"	5.000"
Internal Spur	64DP-3DP	1.000"-24.000"	5.000"
Bevel & Miter	64DP-3DP	.500"-24.000"	3.000"
Worm	48DP-3DP	.333"-4.000"	12.000"
Worm Gear	48DP-3DP	.420"-24.000"	5.000"
Shaved Gear	24DP-3DP	1.000"-24.000"	5.000"
Splines	Consult Engineering		

3. CAPACITIES:

Note: Circular Pitch (.0491"-1.0472") or Module Pitch (.4mm-8mm) within the Diametral Pitch Limits are optional (refer to page 139).

Module	Diametral Pitch	Circular Pitch (Inches)
.4	63.500	.0495
.5	50.800	.0618
.6	42.333	.0742
.8	31.750	.0989
1	25.400	.1237
1.25	20.320	.1546
1.5	16.933	.1855
2	12.700	.2474
2.5	10.160	.3092
3	8.467	.3711
4	6.350	.4947
5	5.080	.6184
6	4.233	.7422
8	3.175	.9895

4. TOLERANCES:

Features	≤ 2" Diameter	> 2" Diameter
Bore Diameter	.0005"	.0010"
Ground O.D.	.0005"	.0010"
Turned O.D.	.0020"	.0020"
Bore Length	.0020"	.0020"
Keyway Width	.0020"	.0020"
Keyway Depth	.0100"	.0100"
Tapped Holes	2B Thread	

5. GEOMETRIC DIMENSIONING:

Features	≤ 2" Diameter	> 2" Diameter
Perpendicularity	.0010"	.0010"
Parallelism	.0010"	.0010"
Circular Runout	.0010"	.0010"
Flatness	.0010"	.0010"
Concentricity	.0005"	.0010"

6. BACKLASH:

Refer to Engineering Information found on pages 140 and 145.
Refer to engineering for backlash related to helical and worm gearing.

7. LOT SIZES:

25 pcs Minimum Quantity on 6" OD and less;
10 pcs Minimum Quantity on 6" OD to 18" OD;
5 pcs Minimum Quantity on 18" OD and over.

8. FINISHES:

63 RMS Minimum on gear teeth;
32 RMS Minimum on Bores, Shaved Gear Teeth, Ground Worms, and Machined Surfaces.

9. MATERIAL:

Description	Designation
Low Carbon Steels	11L17, 12L14, 12L15
Medium Carbon Steels	11L41, 1045
Low Carbon Alloy Steels	86(L)20* (*86L20 or 8620)
Medium Carbon Alloy Steels	41(L)30, 41(L)40, 41(L)50
Preheat Treated Steels	4140, 4150
Stainless Steels	17-4PH, 303, 304
Cast Iron	Grade 25, Grade 30
Brass	Free Cutting, Half Hard
Bronze	
Non-Metallic	Phenolic (NEMA"C"), Delron, Nylon

CUSTOM GEAR REQUEST FOR QUOTATION FORM

SPUR HELICAL MITER BEVEL WORM WORM GEAR






Customer Name _____ Date _____

Address _____ Ref. _____

City/State _____ Zip _____ Quantity Req. _____

Tel. No. _____ Fax No. _____ P.O. No. _____

Contact _____

TYPE OF GEAR	SPUR	HELICAL	MITER	BEVEL	WORM	WORM GEAR
No. of Teeth						
Pitch (DP, CP MOD)						
Pressure Angle						
Helix Angle						
Hand (LH, RH)						
Material						
Face Width						
Length Through Bore						
Hub Diameter						
Hub Projection						
Bore Diameter						
Keyway						
Setscrew(s)						
Teeth in Mating Gear						
Center Distance						
Mounting Distance						
No. of Starts (Thread)						
Outside Diameter						
Heat Treat — Yes/No						
Depth of Hardness						

SPECIAL INFORMATION

_____

_____

_____

_____

Mail to or call:

Boston Gear
14 Hayward Street
Quincy, MA 02171

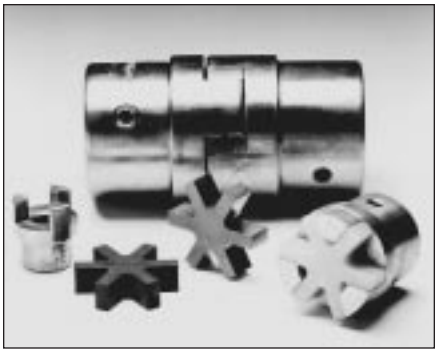
tel 617.328.3300
fax 617.479.6238

SHAFT COUPLINGS

SECTION CONTENTS

SHAFT COUPLINGS

INSERT (3-JAW) TYPE — *FC SERIES*



PRECISION MACHINED BORED OR SOLID HUBS
THREE TYPES OF INSERTS for different service requirements.
NO LUBRICATION NEEDED
BORE SIZES FROM 3/8" TO 2-1/8"
COMPLETE WITH KEYWAY AND SETSCREW

REFERENCE PAGES

Alignment—151
Keyways and Setscrews—153

COUPLING INSERTS

OIL-IMPREGNATED BOST-BRONZ—Recommended for high torque loads, particularly at slower speeds.

OIL-RESISTANT SYNTHETIC RUBBER—Recommended where quietness is desired, particularly at motor speeds.

POLYURETHANE—Recommended where moderate to heavy shock loads are encountered.

LOAD DATA

HORSEPOWER AND TORQUE RATING AT RECOMMENDED SPEEDS FOR INSERTS INDICATED

Coupling Size	Shaft Diameter Range	Maximum Horsepower Rating at RPM of *								Max. Torque (Lb. Ins.)
		50	100	300	690	870	1150	1750	3450	
XFCBB BOST-BRONZ INSERTS										
FC12	3/8–5/8	.16	.32	.95	2.2	2.8	3.6	5.6	—	200
FC15	1/2–7/8	.40	.79	2.4	5.5	6.9	9.1	13.9	—	500
FC20	1/2–1-1/8	.79	1.6	4.8	10.9	13.8	18.2	—	—	1000
FC25	3/4–1-3/8	1.4	2.9	8.6	19.7	24.8	—	—	—	1800
FC30	1–1-5/8	2.5	5.1	15.2	35.0	—	—	—	—	3200
FC38	1-1/4–1-7/8	5.6	11.1	33.3	—	—	—	—	—	7000
FC45	1-3/4–-2-1/8	8.7	17.5	—	—	—	—	—	—	11000
XFCR RUBBER INSERTS										
FC12	3/8–5/8	—	.10	.31	.71	.90	1.2	1.8	3.6	65
FC15	1/2–7/8	—	.20	.60	1.4	1.7	2.3	3.5	6.8	125
FC20	1/2–1-1/8	—	.40	1.2	2.7	3.5	4.6	6.9	13.7	250
FC25	3/4–1-3/8	—	.71	2.1	4.9	6.2	8.2	12.5	24.6	450
FC30	1–1-5/8	—	1.3	3.8	8.8	11.0	14.6	22.2	43.8	800
FC38	1-1/4–1-7/8	—	2.5	7.6	17.5	22.1	29.2	44.4	—	1600
FC45	1-3/4–2-1/8	—	4.4	13.3	30.7	38.7	51.1	77.7	—	2800
XFCA POLYURETHANE INSERTS										
FC12	3/8–5/8	.09	.19	.56	1.2	1.6	2.0	3.0	5.7	125
FC15	1/2–7/8	.18	.37	1.1	2.5	3.1	4.0	6.0	11.3	250
FC20	1/2–1-1/8	.35	.70	2.1	4.6	5.7	7.5	11.1	20.7	470
FC25	3/4–1-3/8	.62	1.2	3.7	8.1	10.1	13.1	19.3	35.8	845
FC30	1–1-5/8	1.1	2.2	6.5	14.4	17.9	23.3	34.3	63.6	1500
FC38	1-1/4–1-7/8	2.2	4.3	12.9	28.4	35.3	45.8	67.3	—	3000
FC45	1-3/4–2-1/8	3.7	7.5	22.4	49.2	61.0	79.0	115.9	—	5250

*For Uniform Load.

SELECTION PROCEDURE

1. From Table select Service Factor.
2. Determine Design Load

   Design HP = Application HP x S.F.
   or
   Design Torque = Application Torque x S.F.
3. Select coupling size from Load Rating Table which has a rating equal to or greater than the design load.

COUPLING SERVICE FACTORS

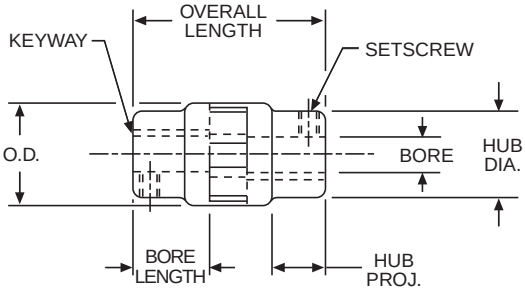
Load Classification	Service Factor
Uniform	1.00
Moderate Shock	1.75
Heavy Shock	2.50

$$HP = \frac{T \times RPM}{63{,}025}$$

SHAFT COUPLINGS

INSERT (3-JAW) TYPE

FC SERIES
BORED AND SOLID HUBS



STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	+.001 –.000

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE
To order complete coupling order two coupling halves and one coupling insert.

Coupling Size	Bore	Bore Length+	O.D.	Overall Length ++	Hub Dia.	Hub Proj.	Assembly Clearance†	Coupling Halves Catalog Number	Coupling Halves Item Code	Coupling Inserts Bost-Bronz Catalog Number	Bost-Bronz Item Code	Rubber Catalog Number	Rubber Item Code	Polyurethane Catalog Number	Polyurethane Item Code
FC12	—	—	1.25	2.32	1.00	.62	3.19	FC12 SOLID	47448	XFCBB12	08064	XFCR12	08078	XFCA12	08050
	3/8	.94						FC12–3/8	08246						
	7/16							FC12–7/16	08248						
	1/2							FC12–1/2	08250						
	5/8							FC12-5/8	52405						
FC15	—	—	1.50	2.76	1.25	.75	3.75	FC15 SOLID	47449	XFCBB15	08066	XFCR15	08080	XFCA15	08052
	1/2	1.13						FC15–1/2	08252						
	9/16							FC15–9/16	61421						
	5/8							FC15–5/8	08254						
	3/4							FC15–3/4	08256						
	7/8							FC15–7/8	61422						
FC20	—	—	2.00	3.69	1.75	1.12	4.81	FC20 SOLID	47450	XFCBB20	08068	XFCR20	08082	XFCA20	08054
	1/2	1.57						FC20–1/2	08258						
	9/16							FC20–9/16	66063						
	5/8							FC20–5/8	08260						
	3/4							FC20–3/4	08262						
	7/8							FC20–7/8	08264						
	15/16							FC20–15/16	08266						
	1							FC20–1	08268						
	1-1/8							FC20-1-1/8	52406						
FC25	—	—	2.50	4.13	2.25	1.25	5.38	FC25 SOLID	47451	XFCBB25	08070	XFCR25	08084	XFCA25	08056
	3/4	1.76						FC25–3/4	08270						
	7/8							FC25–7/8	08272						
	1							FC25–1	08274						
	1-1/8							FC25–1-1/8	08276						
	1-3/16							FC25–1-3/16	08278						
	1-1/4							FC25–1-1/4	08280						
	1-3/8							FC25-1-3/8	52408						
FC30	—	—	3.00	5.48	2.75	1.69	7.00	FC30 SOLID	47452	XFCBB30	08072	XFCR30	08086	XFCA30	08058
	1	2.35						FC30–1	08282						
	1-1/8							FC30–1-1/8	08284						
	1-1/4							FC30–1-1/4	08286						
	1-3/8							FC30–1-3/8	08288						
	1-7/16							FC30–1-7/16	08290						
	1-1/2							FC30–1-1/2	08292						
	1-5/8							FC30-1-5/8	52409						
FC38	—	—	3.75	6.32	3.50	1.88	8.19	FC38 SOLID	24650	XFCBB38	08074	XFCR38	08088	XFCA38	08060
	1-1/4	2.69						FC38–1-1/4	08294						
	1-1/2							FC38–1-1/2	08296						
	1-9/16							FC38–1-9/16	08298						
	1-5/8							FC38–1-5/8	08300						
	1-3/4							FC38–1-3/4	08302						
	1-7/8							FC38–1-7/8	08304						
FC45	—	—	4.50	7.19	4.00	2.12	9.31	FC45 SOLID	24816	XFCBB45	08076	XFCR45	08090	XFCA45	08062
	1-3/4	3.07						FC45–1-3/4	08306						
	1-7/8							FC45–1-7/8	08308						
	2							FC45–2	08310						
	2-1/8							FC45–2-1/8	08312						

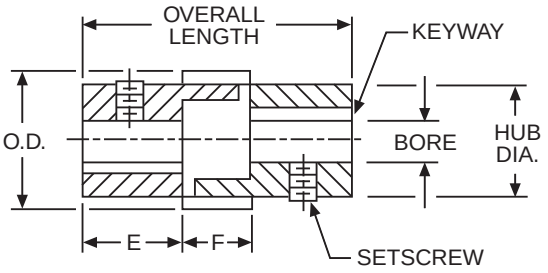
+Length of hole in each half.
++Total length of coupling with jaws engaged full depth.
†Total length of coupling with jaws completely disengaged for insert assembly.

SHAFT COUPLINGS

SPIDER RING (3-JAW) TYPE

BF SERIES
BOST-FLEX®

ECONOMICAL 3-JAW COUPLING
SPIDER RING URETHANE INSERTS absorb shock and vibration. Provides thru-bore opening for close coupling of shafts.
BORE SIZES FROM 3/8" TO 1-1/4"
COMPLETE WITH KEYWAY AND SETSCREW



STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	+.001 –.000

REFERENCE PAGES

Alignment—151
Keyways and Setscrews—153

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE
(Includes two coupling halves and one coupling insert.)

Coupling Size	Bore A	Bore B	Hub Dia.	O.D.	Overall Length	E	F	Assem. Clear.	Approx. Weight (Oz.)	Coupling Catalog Number	Coupling Item Code	Replacement Insert Item Code
BF7	3/8	3/8	.88	1.22	1.35	.50	.34	1.66	2	BF7 3/8–3/8	11730	11722
		1/2								BF7 3/8–1/2	11734	
	1/2	1/2								BF7 1/2–1/2	11732	
BF10	1/2	1/2	1.26	1.59	1.97	.75	.46	2.41	6.5	BF10 1/2–1/2	11736	11724
		5/8								BF10 1/2–5/8	11742	
		3/4								BF10 1/2–3/4	11744	
	5/8	5/8								BF10 5/8–5/8	11738	
		3/4								BF10 5/8–3/4	11746	
	3/4	3/4								BF10 3/4–3/4	11740	
BF13	3/4	3/4	1.62	1.97	2.47	.94	.59	3.00	14	BF13 3/4–3/4	11748	11726
		7/8								BF13 3/4–7/8	11754	
		1								BF13 3/4–1	11756	
	7/8	7/8								BF13 7/8–7/8	11750	
		1								BF13 7/8–1	11758	
	1	1								BF13 1–1	11752	
BF18	1	1	2.25	2.72	2.97	1.13	.71	3.66	37	BF18 1–1	11760	11728
		1-1/8								BF18 1–1-1/8	11766	
		1-1/4								BF18 1–1-1/4	11768	
	1-1/8	1-1/8								BF18 1-1/8–1-1/8	11762	
		1-1/4								BF18 1-1/8–1-1/4	11770	
	1-1/4	1-1/4								BF18 1-1/4–1-1/4	11764	

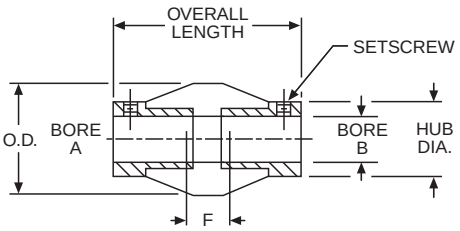
SELECTION PROCEDURE

For Service Factors and Procedure, refer to FC Couplings (Page 91).

HORSEPOWER AND TORQUE RATING AT RECOMMENDED SPEEDS FOR INSERTS INDICATED

Size	Maximum Horsepower Rating at RPM of *							Max Torque (Lb. Ins.)
	100	300	690	870	1150	1750	3450	
BF 7	.044	.13	.31	.39	.51	.78	1.5	28
BF 10	.11	.34	.78	1.00	1.30	2.00	3.9	72
BF 13	.25	.76	1.70	2.20	2.90	4.40	8.8	160
BF 18	.48	1.40	3.30	4.10	5.50	8.30	16.4	300

*For uniform load.



METAL HUBS JOINED BY PERMANENTLY BONDED ELASTOMER require no lubrication. Flexible in any direction—accommodates misalignment up to 1/32" parallel, 2° angular.
HIGH TORSIONAL DEFLECTION isolates low frequency vibration.
BORE SIZES FROM 1/8" TO 1"
COMPLETE WITH STANDARD SETSCREWS (Not installed).

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Coupling Size	Bore A	Bore B	Hub Dia.	O.D.	Overall Length	F*	Catalog Number	Item Code
BG47	1/8	1/8	7/16	9/16	13/16	3/16	BG47-2-2	49887
		3/16					BG47-2-3	49888
		1/4					BG47-2-4	49889
	3/16	3/16					BG47-3-3	49890
		1/4					BG47-3-4	49891
	1/4	1/4					BG47-4-4	49892
BG11-1	3/16	3/16	5/8	13/16	1-3/8	11/32	BG11-1-3-3	49893
		1/4					BG11-1-3-4	49894
	1/4	1/4					BG11-1-4-4	49895
		5/16					BG11-1-4-5	49896
	5/16	5/16					BG11-1-5-5	49897
BG11-2	1/4	1/4	3/4	1	1-3/4	13/32	BG11-2-4-4	49898
		5/16					BG11-2-4-5	49899
		3/8					BG11-2-4-6	49900
	5/16	5/16					BG11-2-5-5	49901
		3/8					BG11-2-5-6	49902
	3/8	3/8					BG11-2-6-6	49903
BG11-3	5/16	5/16	7/8	1-1/4	2-1/8	15/32	BG11-3-5-5	49904
		3/8					BG11-3-5-6	49905
		1/2					BG11-3-5-8	49906
	3/8	3/8					BG11-3-6-6	49907
		1/2					BG11-3-6-8	49908
	1/2	1/2					BG11-3-8-8	49909
BG11-4	3/8	3/8	1	1-3/8	2-1/4	17/32	BG11-4-6-6	49910
		1/2					BG11-4-6-8	49911
		5/8					BG11-4-6-10	49912
	1/2	1/2					BG11-4-8-8	49913
		5/8					BG11-4-8-10	49914
	5/8	5/8					BG11-4-10-10	49915
BG11-5	1/2	1/2	1-1/8	1-5/8	2-1/2	19/32	BG11-5-8-8	49916
		5/8					BG11-5-8-10	49917
		3/4					BG11-5-8-12	49918
	5/8	5/8					BG11-5-10-10	49919
	3/4	3/4					BG11-5-12-12	49920
BG11-6	1/2	1/2	1-3/8	1-13/16	2-11/16	11/16	BG11-6-8-8	49921
		3/4					BG11-6-8-12	49922
	5/8	5/8					BG11-6-10-10	49923
		3/4					BG11-6-10-12	49924
	3/4	3/4					BG11-6-12-12	49925
BG11-7	1/2	3/4	1-1/2	2	2-7/8	3/4	BG11-7-8-12	49926
	5/8	5/8					BG11-7-10-10	49927
		3/4					BG11-7-10-12	49928
	3/4	3/4					BG11-7-12-12	49929
		7/8					BG11-7-12-14	49930
	1	1					BG11-7-16-16	49931

*Shafts should not extend into "F" dimension.

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	1/8–3/8	+.001 –.000
	1/2–5/8	+.0015 –.000
	3/4–1	+.002 –.000

REFERENCE PAGES

Alignment—151
Keyways and Setscrews—153

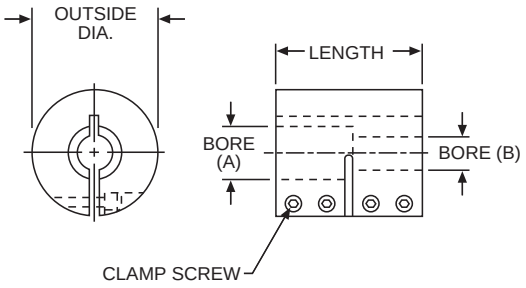
LOAD DATA

HORSEPOWER AND TORQUE RATING AT RECOMMENDED SPEEDS FOR INSERTS INDICATED

Size	Maximum Horsepower Rating at RPM of *							Max Torque (Lb. Ins.)
	100	300	690	870	1150	1750	3450	
BG-47	.001	.003	.008	.010	.013	.020	.039	.72
BG11-1	.004	.011	.025	.031	.041	.062	.123	2.25
BG11-2	.007	.021	.049	.062	.082	.125	.246	4.50
BG11-3	.014	.043	.099	.124	.164	.250	.493	9.00
BG11-4	.019	.057	.131	.166	.219	.333	.657	12.00
BG11-5	.029	.086	.197	.248	.328	.500	.985	18.00
BG11-6	.043	.129	.296	.313	.493	.750	1.478	27.00
BG11-7	.057	.171	.394	.497	.657	1.000	1.971	36.00

15º torsional deflection at rated torque assures efficient vibration isolation. *For uniform load.

LOW CARBON STEEL COUPLINGS with a black oxide finish.
BORE SIZES FROM 1/4" TO 2"



STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	+.001 –.000

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Bore A	Bore B	O.D.	Length	Clamp Screws (4)	Catalog Number	Item Code
1/4	1/4	13/16	1-1/4	4-40	SCC1/4x1/4	49289
3/8	1/4 3/8	1-1/16	1-5/8	6-32	SCC3/8x1/4 SCC3/8x3/8	49290 49291
1/2	3/8 1/2	1-1/4	1-7/8	8-32	SCC1/2x3/8 SCC1/2x1/2	49292 49293
5/8	1/2 5/8	1-1/2	2-1/4	10-32	SCC5/8x1/2 SCC5/8x5/8	49294 49295
3/4	1/2 5/8 3/4	1-3/4	2-5/8	1/4-28	SCC3/4x1/2 SCC3/4x5/8 SCC3/4x3/4	49296 49297 49298
7/8	5/8 7/8	1-7/8	2-7/8	1/4-28	SCC7/8x5/8 SCC7/8x7/8	49299 49300
1	1	2	3	1/4-28	SCC1x1	49302
1-1/8	1 1-1/8	2-1/8	3-1/4	1/4-28	SCC1-1/8x1 SCC1-1/8x1-1/8	49303 49304
1-1/4	1 1-1/4	2-1/4	3-3/8	1/4-28	SCC1-1/4x1 SCC1-1/4x1-1/4	49305 49306
1-3/8	1 1-3/8	2-3/8	3-5/8	1/4-28	SCC1-3/8x1 SCC1-3/8x1-3/8	49307 49308
1-1/2	1 1-1/2	2-1/2	3-3/4	1/4-28	SCC1-1/2x1 SCC1-1/2x1-1/2	49309 49310
1-3/4	1-3/4	3	4-1/2	5/16-24	SCC1-3/4x1-3/4	49312
2	2	3-1/4	4-7/8	5/16-24	SCC2x2	49314

LOAD DATA

Capacity is based on a standard steel, one-piece coupling mounted with recommended screw torque on a dry shaft. Capacities shown are for general guidance only. In applications involving control of torque loads, capacity should be determined experimentally on actual parts involved.

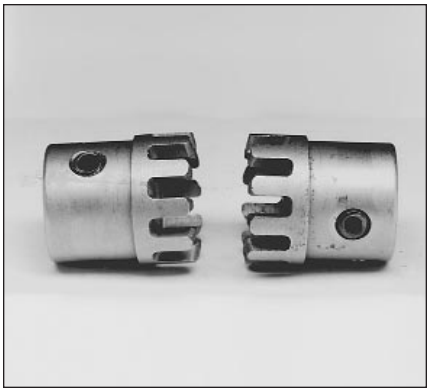
TORQUE CAPACITY

Bore	Torque Capacity (Lb. Ins.)	Screw Size	Recommended Screw Torque (Lb. Ins.)
1/4	72	4-40	20
3/8	192	6-32	30
1/2	480	8-32	55
5/8	1200	10-32	90
3/4 7/8 1 1-1/8 1-1/4 1-3/8 1-1/2	1500 1680 1920 2200 3000 3500 4000	1/4-28	220
1-3/4 2	5400 6000	5/16-24	435

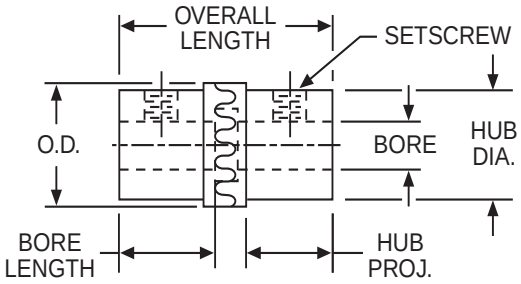
SHAFT COUPLINGS

MULTI-JAW TYPE

FA SERIES



UNTREATED STEEL COUPLINGS for use in light duty applications, require no lubrication.
BORE SIZES FROM 3/16" TO 1/2"
COMPLETE WITH STANDARD SETSCREWS



STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005

REFERENCE PAGES

Alignment—151
Keyways and Setscrews—153

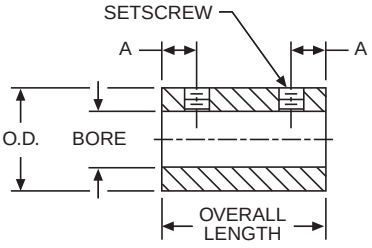
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Coupling Size	Bore	O.D.	Length†	Bore Length++	Assembly Clearance‡	Hub		Teeth	Steel	
						Dia.	Proj.		Catalog Number	Item Code
FA5	3/16 7/32 1/4	1/2	1-1/8	.48	.48	7/16	7/16	10	FA5 3/16–3/16 FA5 7/32–7/32 FA5 1/4–1/4	07900 07902 07904
FA75	5/16 3/8	3/4	1-1/2	5/8	1-3/4	11/16	33/64	10	FA75 5/16–5/16 FA75 3/8–3/8	07910 07912
FA10	7/16 1/2	1	2	.86	.86	15/16	3/4	12	FA10 7/16–7/16 FA10 1/2–1/2	07908 07906

†Total length of coupling with jaws engaged full depth.
++Length of hole in each half.
‡Approximate total length of coupling with jaws completely disengaged.

RIGID (ONE PIECE) TYPE

CR SERIES



BORE SIZES FROM 1/4" TO 1-1/4"
COMPLETE WITH STANDARD SETSCREWS

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Bore	O.D.	Overall Length	A	Setscrew	Catalog Number	Item Code
1/4	.48	3/4	3/16	#6-32	CR4	34200
5/16	.60	1	1/4	#10-32	CR5	34202
3/8	.72	1	1/4	#10-32	CR6	34204
1/2	.97	1-1/2	3/8	1/4-20	CR8	34206
5/8	1.21	2	1/2	1/4-20	CR10	34208
3/4	1.47	2	1/2	3/8-16	CR12	34210
7/8	1.72	2	1/2	3/8-16	CR14	34212
1	1.96	3	3/4	3/8-16	CR16	34214
1-1/4	2.21	4	1	1/2-13	CR20	34216

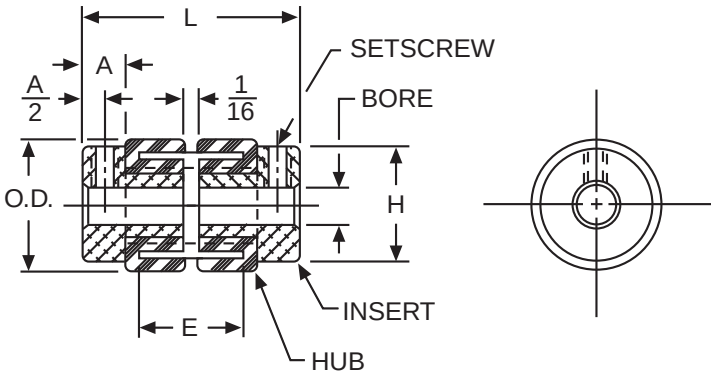
REFERENCE PAGES

Keyways and Setscrews—153

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	+.001 –.000

SPLINED HUBS AND URETHANE SLEEVE accommodate misalignment to 5°.
SLEEVE STOCK available for producing special lengths.
NO LUBRICATION NEEDED
COMPLETE WITH SETSCREWS



MATERIALS

Urethane Sleeves
Delrin Hubs
Aluminum Alloy Inserts

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	+.001 –.000

REFERENCE PAGES

Alignment—151

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Bore	O.D.	A	E	H	L	Setscrew	Complete Coupling		Insert and Hub Assembly		Sleeve Only	
							Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code
.125	37/64	7/32	7/16	9/16	15/16	4-40	FCP21-1/8	54893	XFCP21-1/8	54903	X5R21-16	54913
.1875						6-32	FCP21-3/16	54894	XFCP21-3/16	54904		
.250							FCP21-1/4	54895	XFCP21-1/4	54905		
.3125	1-5/64	3/8	11/16	1	1-9/16	8-32	FCP23-5/16	54899	XFCP23-5/16	54909	X5R23-32	54915
.375						10-32	FCP23-3/8	54900	XFCP23-3/8	54910		
.4375						1/4-20	FCP23-7/16	54901	XFCP23-7/16	54911		
.500							FCP23-1/2	54902	XFCP23-1/2	54912		

LOAD DATA

HORSEPOWER RATINGS (Maximum) AT 1750 RPM

Size	Horsepower
FCP21	1/20
FCP23	1/2

SLEEVE STOCK

ORDER BY CATALOG NUMBER OR ITEM CODE

O.D.	Length (Inches)	Catalog Number	Item Code
1/2	10	5R21-16S	54916
1	12	5R23-32S	54918

ORDERING INFORMATION

GEAR COUPLING PART NUMBERING SYSTEM

1-1/2 **GC** - **E** **FF** - **P16** - **P16**

Coupling Size
0
1
1-1/4
1-1/2
2
2-1/2
3
3-1/2
4
4-1/2
5
5-1/2
6
7

Type
GC = Gear Coupling Complete
GH = Gear Coupling Half

Style
E = Exposed Bolts
S = Shrouded Bolts

Model
FF = Full Flex
FR = Flex Rigid

Hub Bore
P = Bored to Size (1/16")
B = Rough Bore (B00)
M = Metric Bored to Size (mm)

Second Flex Hub Bore if FF Complete or Rigid Hub Bore if FR Complete
P = Bored to Size (1/16")
B = Rough Bore (B00)
M = Metric Bored to Size (mm)

HOW TO ORDER – COMPLETE COUPLING (TWO HALVES)

When ordering a complete gear coupling (two coupling halves, fasteners, gasket, o-rings and lube plugs) please include code letters/numbers for size, type, style, model, and both bores. Please refer to Pages 99-100 for details.

Example:
Required Size 1-1/2 complete gear coupling with shrouded bolts, two flexible halves with one half bored to one inch and the other half bored to two inches.

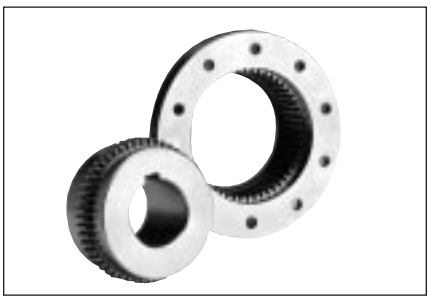
1-1/2 | GC | — | S | FF | — | P16 | — | P32

HOW TO ORDER – COUPLING HALF (ONE HALF ONLY)

When ordering a complete coupling half (one coupling half, fasteners, gasket, o-rings and lube plugs) please include code letters/numbers for size, type, style, model, and bore. Please refer to Pages 99-100 for details.

Example:
Required Size 2-1/2 complete gear coupling half with exposed bolts, flexible half bored to one inch:

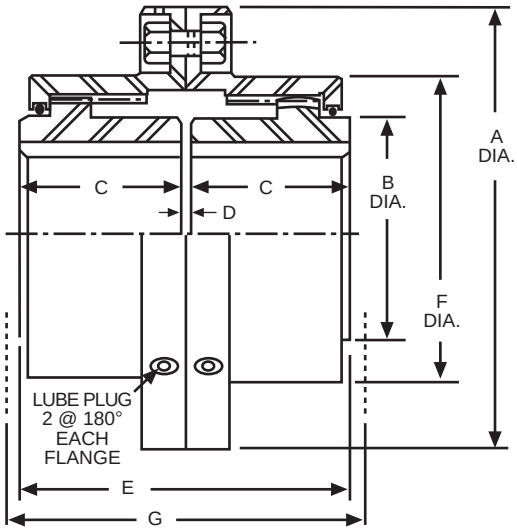
2-1/2 | GH | — | E | FF | — | P16



MODEL FF FULL FLEX FLEXIBLE COUPLINGS

Description: The Model FF Flexible Coupling is designed with bolted center flanges to facilitate installation and alignment. Optimum separation of gear meshes permits high parallel offset capacity. Flanged-sleeve design makes possible minimum distances between bearing housings to facilitate shaft alignment. In addition, Model FF hubs are designed with a greater bore capacity.

- ±1-1/2° angular misalignment capacity
- Torque ratings at full misalignment
- Precision machined carbon steel hubs and sleeves
- O-ring seals enshrouded to prevent damage



ALL DIMENSIONS IN INCHES

Size*	Maximum Bore		Parallel Offset Capacity**	Load Capacity		Maximum RPM	A	B	C	D	E	F	G***	Solid Hub Weight (Lbs.)
	Square Key	Reduced Key		HP Per 100 RPM	Torque (Lb. In.) x 10^3									
0	0.81	0.88	.023	3	1.9	8,500	2.94	1.25	1.06	.12	2.25	1.94	2.88	2.3
1	1.25	1.31	.042	5	3.2	7,700	3.56	1.75	1.38	.12	2.88	2.56	3.50	4.5
1-1/4	1.63	1.75	.057	12	7.6	7,100	4.00	2.25	1.69	.12	3.50	3.00	4.12	7.0
1-1/2	2.25	2.38	.058	27	17.0	5,400	6.00	3.12	1.94	.12	4.00	3.93	4.75	17.0
2	2.75	2.88	.079	50	31.5	4,800	7.00	4.00	2.44	.12	5.00	4.86	6.00	30.0
2-1/2	3.50	3.75	.102	85	53.6	4,300	8.38	4.88	3.03	.19	6.25	5.88	7.25	53.0
3	4.00	4.25	.119	150	94.5	4,000	9.44	5.75	3.59	.19	7.38	6.88	8.50	82.0
3-1/2	4.50	4.75	.142	225	142	3,600	11.00	6.50	4.19	.25	8.62	7.90	10.00	127
4	5.50	5.88	.164	340	214	3,200	12.50	7.75	4.75	.25	9.75	9.24	11.00	193
4-1/2	6.25	6.75	.187	515	324	3,000	13.62	9.00	5.31	.31	10.94	10.37	12.25	266
5	6.62	6.75	.218	660	416	2,600	15.31	9.50	6.03	.31	12.38	11.44	13.75	368
5-1/2	7.50	7.62	.245	875	551	2,400	16.56	10.50	6.62	.31	13.56	12.69	15.25	488
6	8.25	8.62	.275	1,190	750	2,200	18.00	11.75	7.41	.31	15.12	13.75	16.50	640
7	9.62	10.25	.314	1,640	1,033	1,800	20.75	13.50	8.69	.38	17.75	16.00	19.25	973

*Sizes 0, 1 and 1-1/4 flange fasteners are self locking socket head cap screws (S) (one flange tapped, one flange through drilled).
Sizes 1-1/2 through 5-1/2 are available with either shrouded bolts (S) or exposed bolts (E).
Sizes 6 and 7 are available with exposed bolts (E) only.

** Combined angular and parallel offset should not exceed ±1-1/2° per gear mesh.

*** Clearance for aligning coupling.

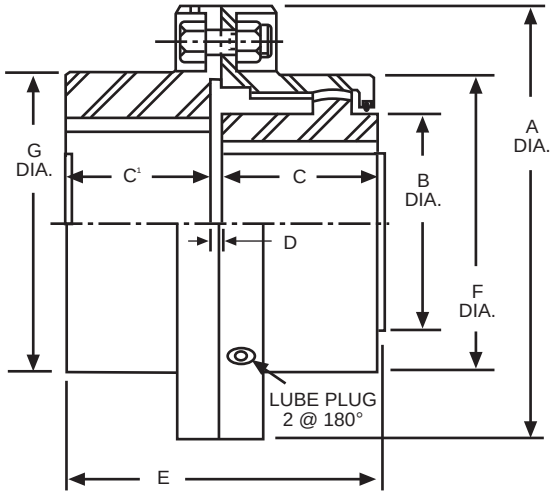
Puller holes available on a special order basis.
Refer to Page 101 for bore tolerance and flange details.

Refer to Page 98 for ordering information.

MODEL FR FLEX RIGID FLEXIBLE COUPLINGS

Application: FR couplings are used primarily in tandem pairs, connected by an intermediate floating shaft, or as an individual unit in conjunction with a driver or driven shaft having a self-aligning support bearing. When used singularly, they compensate for angular misalignment only.

Description: The Model FR Flexible Coupling consists of one standard flexible coupling half and one rigid half. The bolted center flanges facilitate installation and alignment.



ALL DIMENSIONS IN INCHES

Size*	Maximum Bore Flex Half		Maximum Bore Rigid Half		Load Capacity		Maximum RPM	A	B	C	C1	D	E	F	G	Solid Hub Weight (Lbs.)
	Square Key	Reduced Key	Square Key	Reduced Key	HP Per 100 RPM	Torque (Lb. In.) x 10^3										
0	0.81	0.88	1.31	1.38	3	1.9	8,500	2.94	1.25	1.06	1.05	.08	2.19	1.94	1.94	2.5
1	1.25	1.31	1.75	1.88	5	3.2	7,700	3.56	1.75	1.38	1.23	.08	2.69	2.56	2.56	4.6
1-1/4	1.63	1.75	2.00	2.13	12	7.6	7,100	4.00	2.25	1.69	1.48	.08	3.25	3.00	3.00	7.0
1-1/2	2.25	2.38	2.69	2.88	27	17.0	5,400	6.00	3.12	1.94	1.78	.16	3.88	3.93	3.93	18.6
2	2.75	2.88	3.25	3.50	50	31.5	4,800	7.00	4.00	2.44	2.28	.16	4.88	4.86	4.86	32.2
2-1/2	3.50	3.75	4.00	4.25	85	53.6	4,300	8.38	4.88	3.03	2.91	.19	6.12	5.88	5.88	56.7
3	4.00	4.25	4.62	5.00	150	94.5	4,000	9.44	5.75	3.59	3.41	.19	7.19	6.88	6.88	85.7
3-1/2	4.50	4.75	5.38	5.75	225	142	3,600	11.00	6.50	4.19	3.97	.22	8.38	7.90	7.90	134
4	5.50	5.88	6.25	6.75	340	214	3,200	12.50	7.75	4.75	4.44	.31	9.50	9.24	9.24	200
4-1/2	6.25	6.75	6.88	7.38	515	324	3,000	13.62	9.00	5.31	5.00	.34	10.66	10.37	10.18	275
5	6.62	6.75	7.88	8.38	660	416	2,600	15.31	9.50	6.03	5.75	.34	12.12	11.44	11.44	392
5-1/2	7.50	7.62	8.75	9.25	875	551	2,400	16.56	10.50	6.62	6.12	.34	13.09	12.69	12.69	507
6	8.25	8.62	9.38	9.88	1,190	750	2,200	18.00	11.75	7.41	7.16	.41	14.97	13.75	13.75	685
7	9.62	10.25	10.75	11.50	1,640	1,033	1,800	20.75	13.50	8.69	8.44	.50	17.62	16.00	15.75	1,045

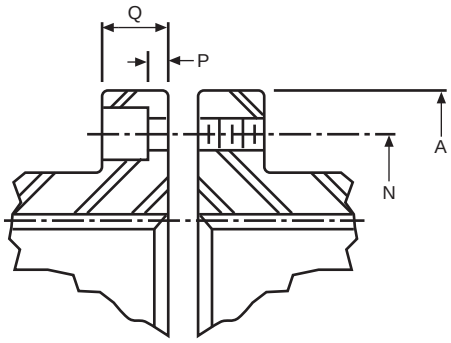
*Sizes 0, 1 and 1-1/4 flange fasteners are self locking socket head cap screws (S) (Rigid flange tapped. Matching flex sleeve must be through drilled).
Sizes 1-1/2 through 5-1/2 are available with either shrouded bolts (S) or exposed bolts (E).
Sizes 6 and 7 are available with exposed bolts (E) only.

** Combined angular and parallel offset should not exceed ±1-1/2° per gear mesh.

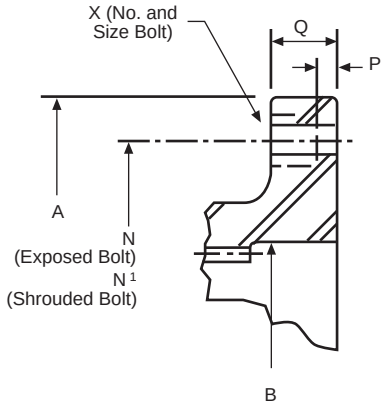
Puller holes available on a special order basis.
Refer to Page 101 for bore tolerance and flange details.

Refer to Page 98 for ordering information.

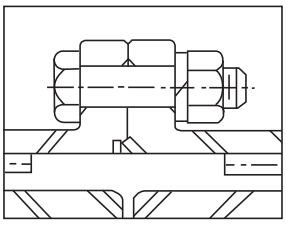
FLANGE INFORMATION
BORE TOLERANCES



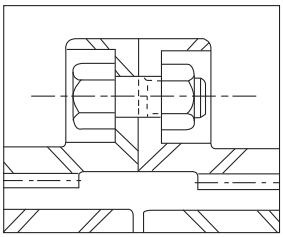
SIZES* 0 – 1-1/4



SIZES 1-1/2 – 7



Exposed Bolts



Shrouded Bolts

Size	Common Dimensions			Exposed Bolt			Shrouded Bolt			
	A	B	Q	N D.B.C.	X (Bolts) No.	X (Bolts) Size	N[1] D.B.C.	P	X (Bolts) No.	X (Bolts) Size
0	2.94	—	0.44	—	—	—	2.38	.12	4	1/4-28*
1	3.56	—	0.44	—	—	—	3.00	.12	4	1/4-28*
1-1/4	4.00	—	0.44	—	—	—	3.44	.12	4	1/4-28*
1-1/2	6.00	3.69	0.75	4.81	8	3/8	4.81	.22	8	3/8
2	7.00	4.56	0.75	5.88	6	1/2	5.81	.22	10	3/8
2-1/2	8.38	5.56	0.88	7.12	6	5/8	7.00	.28	10	1/2
3	9.44	6.47	0.88	8.12	8	5/8	8.00	.28	12	1/2
3-1/2	11.00	7.26	1.06	9.50	8	3/4	9.28	.33	12	5/8
4	12.50	8.56	1.06	11.00	8	3/4	10.62	.33	14	5/8
4-1/2	13.62	9.81	1.06	12.00	10	3/4	11.75	.33	14	5/8
5	15.31	10.73	1.50	13.50	8	7/8	13.19	.52	14	3/4
5-1/2	16.56	11.73	1.50	14.50	14	7/8	14.44	.52	16	3/4
6	18.00	12.73	1.00	15.75	14	7/8	—	—	—	—
7	20.75	15.06	1.12	18.25	16	1	—	—	—	—

*Size 0, 1, 1-1/4 flange fasteners utilize self-locking socket head cap screws (one flange side is tapped, one flange side is through drilled).

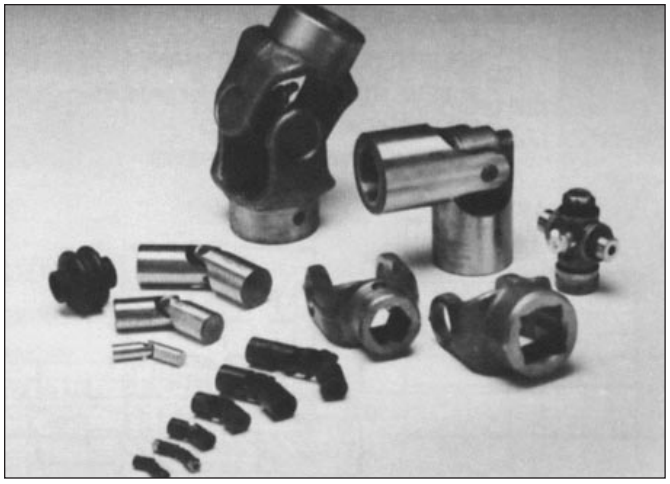
BORE TOLERANCE AND FIT

Nominal Bore Size		Shaft	Bore	Interference
Over	Through	Tolerance	Tolerance	Range
0.0000	1.5000	+.0000 -.0005	-.0005/-.0010	-.0000/-.0010
1.5000	3.0000	+.0000 -.0010	-.0010/-.0020	-.0000/-.0020
3.0000	4.0000		-.0015/-.0030	-.0005/-.0030
4.0000	5.0000		-.0020/-.0035	-.0010/-.0035
5.0000	7.0000		-.0025/-.0040	-.0015/-.0040
7.0000	8.0000		-.0030/-.0050	-.0020/-.0050
8.0000	9.0000		-.0035/-.0055	-.0025/-.0055
9.0000	10.0000		-.0040/-.0060	-.0030/-.0060
10.0000	11.0000		-.0045/-.0065	-.0035/-.0065

STANDARD KEYWAYS

Nominal Bore Range		Keyway (Inches)		
Over	Through	Width	Depth Sq. Key	Depth Red. Key
0.312	0.438	0.094	0.047	—
0.438	0.562	0.125	0.063	0.047
0.562	0.875	0.188	0.094	0.062
0.875	1.250	0.250	0.125	0.094
1.250	1.375	0.312	0.156	0.125
1.375	1.750	0.375	0.188	0.125
1.750	2.250	0.500	0.250	0.188
2.250	2.750	0.625	0.313	0.219
2.750	3.250	0.750	0.375	0.250
3.250	3.750	0.875	0.438	0.313
3.750	4.500	1.000	0.500	0.375
4.500	5.500	1.250	0.625	0.438
5.500	6.500	1.500	0.750	0.500
6.500	7.500	1.750	0.875	0.750
7.500	9.000	2.000	1.000	0.750
9.000	11.000	2.500	1.250	0.875

UNIVERSAL JOINTS



SECTION CONTENTS

UNIVERSAL JOINTS

PIN AND BLOCK TYPE STEEL AND STAINLESS STEEL

J/JS SERIES

Boston Gear precision machined J and JS Series Universal Joints are designed for connecting shafts at angles up to 30 degrees and speeds up to 2000 RPM. All sizes are stocked with both solid and bored hubs.

Joints J100 and J100B and larger are equipped with self-closing, ball valve oilers, creating an oil reservoir to provide enclosed lubrication.

The self-locking assembly ring on joints with 7/8" and larger hub diameter, fits into recess provided in center bearing block and snaps around groove in small bearing pin—assuring locking of entire assembly—allowing for quick and easy disassembly and reassembly. Joints with 3/4" and smaller hub diameters are locked by riveting the small bearing pin.

Joint covers (boots) keep dirt and moisture out and lubricants in.

SELECTION

Torque ratings may be calculated from data in tables. The tables indicate the Rated Static Torque (Lb. Ins.) of alloy and stainless steel joints and Speed-Angle factors suggested for various operating conditions.

The approximate service torque rating of a particular joint is obtained by dividing the Rated Static Torque by the appropriate Speed-Angle factor.

Selecting a universal joint to satisfy a specified torque requirement is also made convenient with the data provided.

The designated torque load should be multiplied by the appropriate Speed-Angle factor to obtain an equivalent static torque load.

A universal joint with a rated static torque equal to or greater than the calculated torque load would then be selected.

EXAMPLE:

A pair of universal joints are desired to transmit 1/2 HP from one shaft running at 500 RPM to another located at an angle of 10 degrees (from a straight line).

The joints will be connected by an intermediate shaft and arranged to operate at equal angles of 5 degrees.

A Speed-Angle factor of 9 is indicated in the table for an operating angle of 5 degrees and a speed of 500 RPM.

$$\text{Torque Load} = \frac{63025 \times HP}{RPM} = \frac{63025 \times 1/2}{500} = 63 \text{ Lb. Ins.}$$

Equivalent Static Load = Torque load x Factor
= 63 x 9 = 567 Lb. Ins.

J100 size alloy steel or JS175 size stainless steel universals would be suggested for this application.

SPEED ANGLE FACTORS

Speed in RPM	Operating Angle — Degrees (Deviation from Straight Line)														
	0	1/2	1	2	3	4	5	6	8	10	12	15	20	25	30
2000	21	22	23.2	25.2	27.4	29.4	31.6	—	—	—	—	—	—	—	—
1800	19	20	21.0	22.8	24.8	26.6	28.6	30.4	—	—	—	—	—	—	—
1600	17	17.8	18.8	20.4	22.2	23.8	25.6	27.2	—	—	—	—	—	—	—
1400	15	15.8	16.6	18.0	19.6	21.0	22.6	24.0	27	—	—	—	—	—	—
1200	13	13.6	14.4	15.6	17.0	18.2	19.6	20.8	23.4	—	—	—	—	—	—
1000	11	11.6	12.2	13.2	14.4	15.4	16.6	17.6	19.8	22	—	—	—	—	—
900	10	10.6	11.0	12.0	13.0	14.0	15.0	16.0	18.0	20	22	—	—	—	—
800	9.0	9.4	10.0	10.8	11.8	12.6	13.6	14.4	16.2	18	19.8	—	—	—	—
700	8.0	8.4	8.8	9.6	10.4	11.2	12.0	12.8	14.4	16	17.6	20	—	—	—
600	7.0	7.4	7.8	8.4	9.2	9.8	10.6	11.2	12.6	14	15.4	17.6	—	—	—
500	6.0	6.4	6.6	7.2	7.8	8.4	9.0	9.6	10.8	12	13.2	15.0	18	—	—
400	5.0	5.2	5.6	6.0	6.6	7.0	7.6	8.0	9.0	10	11.0	12.6	15	17.6	—
300	4.0	4.2	4.4	4.8	5.2	5.6	6.0	6.4	7.2	8.0	8.8	10.0	12	14.0	16
200	3.0	3.2	3.4	3.6	4.0	4.2	4.6	4.8	5.4	6.0	6.6	7.6	9.0	10.6	12
100	2.0	2.2	2.2	2.4	2.6	2.8	3.0	3.2	3.6	4.0	4.4	5.0	6.0	7.0	8.0
50	1.5	1.6	1.7	1.8	2.0	2.2	2.2	2.4	2.8	3.0	3.4	3.8	4.6	5.2	6.0
25	1.3	1.3	1.4	1.5	1.6	1.8	1.9	2.0	2.2	2.6	2.8	3.2	3.8	4.4	5.0
10	1.1	1.2	1.2	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.4	3.8	4.4
0	1.0	1.1	1.1	1.2	1.3	1.4	1.5	1.6	1.8	2.0	2.2	2.6	3.0	3.6	4.0

RATED STATIC TORQUE (LB. INS.) **STRAIGHT LINE**

ALLOY STEEL UNIVERSAL JOINTS

Catalog Number	J37	J50	J62	J75	J87	J100	J112	J125	J150	J175	J200	J250	J300	J400
Torque — Lb. Ins.	20	80	166	320	370	600	670	1040	1680	2500	4400	7000	11,000	26,400

STAINLESS STEEL UNIVERSAL JOINTS

Catalog Number	JS37	JS50	JS62	JS75	JS87	JS100	JS112	JS125	JS150	JS175	JS200	JS250	JS300	JS400
Torque — Lb. Ins.	6	24	50	96	110	180	200	310	500	750	1320	1900	3100	7360

UNIVERSAL JOINTS

PIN AND BLOCK TYPE
STEEL AND STAINLESS STEEL

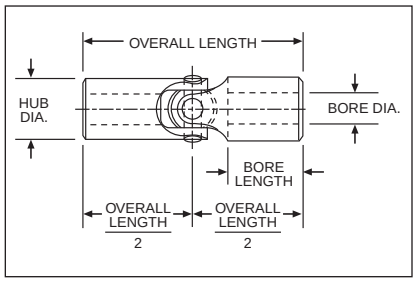
J/JS SERIES
BORED AND SOLID HUBS

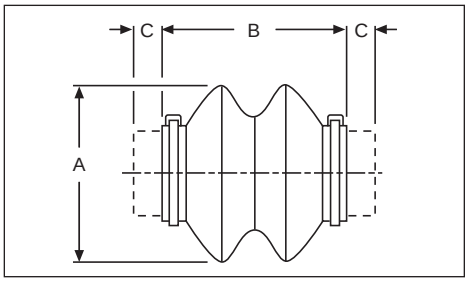
STANDARD TOLERANCES

Dimensions		Tolerance
Bore	All	± .001
Hub Dia.	All	+ .000 – .003
Bore Length	All	±1/16
Overall Length	1-3/4 - 4-1/4	±1/64
	5 - 10-5/8	±1/32

REFERENCE PAGES

Lubrication—151
Mounting—151





Boot Kit

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Universal Joints											Boot Kits†				
Catalog Number	Item Code	Catalog Number	Item Code	Bore**	Bore Length	Hub Dia. *	Overall Length	Keyway	Setscrew	Approx. Weight Lbs.	A	B	C	Catalog† Number	Item Code
J37A-3/16 J37B J37	72467 08426 08400	- JS37B JS37	- 08472 08452	3/16	11/16	3/8	1-3/4	- - -	2-56NC - -	.04 .04 .05	1-1/32	1-1/32	9/32	UB37	47602
J50A-1/4 J50B J50	72468 08428 08402	- JS50B JS50	- 08474 08454	1/4	3/4	1/2	2	- - -	4-40NC - -	.08 .08 .10	1-1/4	1-5/16	11/32	UB50	47603
J62A-5/16 J62B J62	72469 08430 08404	- JS62B JS62	- 08476 08456	5/16	13/16	5/8	2-1/4	3/32x3/64 - -	10-32NF - -	.14 .14 .18	1-1/2	1-7/16	13/16	UB62	47604
J75A-3/8 J75B J75	72470 08432 08406	- JS75B JS75	- 08478 08458	3/8	31/32	3/4	2-11/16	3/32x3/64 - -	10-32NF - -	.24 .24 .30	1-3/4	1-9/16	9/16	UB75	47605
J87A-7/16 J87B J87	72471 08434 08408	-- JS87B JS87	 08480 08460	7/16	1-1/32	7/8	3	3/32x3/64 - -	10-32NF - -	.31 .31 .45	2	1-13/16	19/32	UB87	47606
J100A-1/2 J100B J100	72472 08436 08410	- JS100B JS100	- 08482 08462	1/2	1-3/16	1	3-3/8	1/8x1/16 - -	1/4-20NC - -	.50 .50 .66	2-1/4	2-1/8	5/8	UB100	47607
J112A-9/16 J112B J112	72473 72474 72475	- JS112B JS112	- 72483 72484	9/16	1-7/32	1-1/8	3-1/2	1/8x1/16 - -	1/4-20NC - -	.69 .69 .88	2-9/16	2-7/16	17/32	UB112	72491
J125A-5/8 J125B J125	72476 08438 08412	-- JS125B JS125	 08484 08464	5/8	1-1/4	1-1/4	3-3/4	3/16x3/32 - -	5/16-18NC - -	.88 .88 1.15	2-7/8	2-3/4	1/2	UB125	47608
J150A-3/4 J150B J150	72477 08440 08414	- JS150B JS150	- 08486 08466	3/4	1-11/32	1-1/2	4-1/4	3/16x3/32 - -	5/16-18NC - -	1.44 1.44 1.81	3-1/4	3-1/4	1/2	UB150	47609
J175A-7/8 J175B J175	72478 08442 08416	- JS175B JS175	- 08488 08468	7/8	1-9/16	1-3/4	5	3/16x3/32 - -	5/16-18NC - -	2.31 2.31 2.86	3-5/8	3-3/4	5/8	UB175	47610
J200A-1 J200B J200	72479 08444 08418	- JS200B JS200	- 08490 08470	1	1-5/8	2	5-7/16	1/4x1/8 - -	3/8-16NC - -	3.31 3.31 4.06	4-1/2	4-3/16	5/8	UB200	47611
J250A-1-1/4 J250B J250	72480 08446 08420	- JS250B JS250	- 72485 72486	1-1/4	2-3/32	2-1/2	7	1/4x1/8 - -	3/8-16NC - -	6.81 6.81 8.25	5-1/2	4-7/8	1-1/16	UB250	47612
J300A-1/1/2 J300B J300	72481 08448 08422	- JS300B JS300	- 72487 72488	1-1/2	2-27/32	3	9	3/8x3/16 - -	1/2-13NC - -	12.5 12.5 15.25	6	5-5/8	1-11/16	UB300	47613
J400A-2 J400B J400	72482 08450 08424	- JS400B JS400	- 72489 72490	2	3-1/8	4	10-5/8	1/2x1/4 - -	1/2-13NC - -	25.8 25.8 31.3	6-7/8	6-5/8	2	UB400	47614

*Approximate Hub Projection
†Each Kit contains (2) Boots and (4) Ties together with complete instructions for installation and lubrication.
**Style A includes bore, keyway and setscrew. Style B includes bore only

REPLACEMENT PARTS

ORDER BY UNIVERSAL JOINT CATALOG NUMBER AND REPLACEMENT PART NUMBER*

PART	 Yoke (Large Pin)	 Yoke (Small Pin)	 Center Bearing Block	 Large Pin	Small Pin	Self Locking Assembly Ring¶	Oiler ‡
Part No.	01	02	03	04	05	06	07

*Example-Center Block for J87-order J87-03
‡Used on size J100 and larger. Will be furnished in Part 4
††Used on size J87 and larger

FORGED/CAST STEEL

UJNS/UJNL SERIES BOS-TRONG®

A BOS-trong® joint is composed of two yokes and a center kit. BOS-trong joints may be purchased assembled, or as separate yokes and center kits. Individually boxed.

AVAILABLE IN TWO SIZES
EQUIPPED WITH NEEDLE BEARINGS
PRECISION MACHINED FOR LONG, SMOOTH OPERATION
CONTINUOUS OR INTERMITTENT SERVICE
HIGH CAPACITY WITH MINIMUM SWING DIAMETER
BROAD RANGE OF HOLE DIAMETERS
AVAILABLE WITH ROUND, SQUARE OR HEXAGON HOLES
COMPLETE WITH KEYWAY AND SETSCREW
REPLACEABLE CENTER KITS
FITTING FOR LUBRICATION

SELECTION

Universal Joints are used in many different types of applications and under a wide variety of operating conditions. No convenient method can be presented for determining ratings for all possible circumstances. Performance will be affected by vibration, shock loading, high temperature, dusty environment, etc.

The simplest solution to this problem is to provide approximate ratings of universal joints operating at various angles and speeds under normal service conditions.

The suggested ratings are for general use in applications where two joints are arranged at equal angles with the bearing pins of the intermediate yokes in line with each other.

Service torque ratings of the two sizes of BOS-trong® Needle Bearing universals are listed in tables. Ratings for intermediate speeds and/or angles not shown may be found by interpolation.

LOAD DATA

APPROXIMATE TORQUE RATINGS (LB. INS.)

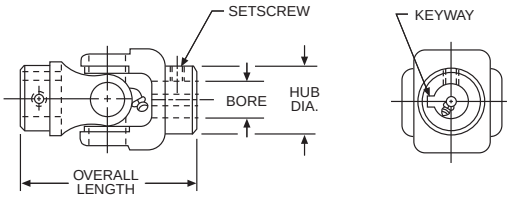
Speed RPM	UJNS Series — Operating Angle*—Degrees (Deviation from Straight Line)						UJNL Series — Operating Angle†—Degrees (Deviation from Straight Line)					
	Up to 3°	5°	8°	12°	20°	30°	Up to 3°	5°	8°	12°	20°	30°
1800	610	515	440	—	—	—	845	710	610	—	—	—
1200	700	590	505	435	—	—	965	815	695	600	—	—
900	770	650	555	480	365	—	1060	895	765	660	500	—
600	880	740	635	545	415	260	1210	1020	875	755	575	355
300	1110	935	800	690	525	325	1530	1290	1100	950	725	450
200	1270	1070	915	790	600	370	1750	1480	1260	1090	825	515
100	1600	1350	1150	995	755	470	2210	1860	1590	1370	1040	645
50	2020	1700	1450	1250	950	590	2780	2350	2000	1730	1310	815
25	2540	2140	1830	1580	1200	745	3500	2960	2530	2180	1650	1020
10	3450	2900	2480	2140	1630	1010	4760	4010	3430	2960	2250	1390

Non Operating Flex angle—90°

*Maximum Angles (Momentary)—45°
†Maximum Angles (Momentary)—35°

FORGED/CAST STEEL

UJNS/UJNL SERIES BOS-TRONG®



All joints have round holes with standard keyways and 3/8–16 hex socket setscrews.

ALL DIMENSIONS IN INCHES

Overall Length	Bore Hub-A	Bore Hub-B	Hub Dia. Hub-A	Hub Dia. Hub-B	Approx. Weight (Lbs.)	Catalog Number	Item Code
UJNS SERIES						**SWING DIAMETER—2-1/2"**	
5	5/8	5/8	1-5/8	1-5/8	2	UJNS 10-10	17300
		3/4		1-5/8		UJNS 10-12	17302
		13/16		1-5/8		UJNS 10-13	17304
		7/8		1-5/8		UJNS 10-14	17306
		15/16		1-5/8		UJNS 10-15	17308
		1		1-5/8		UJNS 10-16	17310
		1-1/8		2-1/4		UJNS 10-18	17312
5	3/4	3/4	1-5/8	1-5/8	2	UJNS 12-12	17314
		13/16		1-5/8		UJNS 12-13	17316
		7/8		1-5/8		UJNS 12-14	17318
		15/16		1-5/8		UJNS 12-15	17320
		1		1-5/8		UJNS 12-16	17322
		1-1/8		2-1/4		UJNS 12-18	17324
5	13/16	13/16	1-5/8	1-5/8	2	UJNS 13-13	17326
		7/8		1-5/8		UJNS 13-14	17328
		15/16		1-5/8		UJNS 13-15	17330
		1		1-5/8		UJNS 13-16	17332
		1-1/8		2-1/4		UJNS 13-18	17334
5	7/8	7/8	1-5/8	1-5/8	2	UJNS 14-14	17336
		15/16		1-5/8		UJNS 14-15	17338
		1		1-5/8		UJNS 14-16	17340
		1-1/8		2-1/4		UJNS 14-18	17342
5	15/16	15/16	1-5/8	1-5/8	2	UJNS 15-15	17344
		1		1-5/8		UJNS 15-16	17346
		1-1/8		2-1/4		UJNS 15-18	17348
5	1	1	1-5/8	1-5/8	2	UJNS 16-16	17350
		1-1/8		2-1/4		UJNS 16-18	17352
5	1-1/8	1-1/8	2-1/4	2-1/4	3	UJNS 18-18	17498
UJNL SERIES						**SWING DIAMETER—2-3/4"**	
5-1/2	1	1	2	2	3-3/4	UJNL 16-16	17354
		1-1/8		2-1/4		UJNL 16-18	17356
		1-3/16		2-1/4		UJNL 16-19	17358
		1-1/4		2-1/4		UJNL 16-20	17360
		1-3/8		2-1/4		UJNL 16-22	17362
		1-7/16		2-1/4		UJNL 16-23	17364
		1-1/2		2-1/4		UJNL 16-24	17366
5-1/2	1-1/8	1-1/8	2-1/4	2-1/4	3-3/4	UJNL 18-18	17368
		1-3/16		2-1/4		UJNL 18-19	17370
		1-1/4		2-1/4		UJNL 18-20	17372
		1-3/8		2-1/4		UJNL 18-22	17374
		1-7/16		2-1/4		UJNL 18-23	17376
		1-1/2		2-1/4		UJNL 18-24	17378
5-1/2	1-3/16	1-3/16	2-1/4	2	3-1/4	UJNL 19-19	17380
		1-1/4		2-1/4		UJNL 19-20	17382
		1-3/8		2-1/4		UJNL 19-22	17384
		1-7/16		2-1/4		UJNL 19-23	17386
		1-1/2		2-1/4		UJNL 19-24	17388
5-1/2	1-1/4	1-1/4	2-1/4	2	3-1/4	UJNL 20-20	17390
		1-3/8		2-1/4		UJNL 20-22	17392
		1-7/16		2-1/4		UJNL 20-23	17394
		1-1/2		2-1/4		UJNL 20-24	17396
5-1/2	1-3/8	1-3/8	2-1/4	2-1/4	3-1/4	UJNL 22-22	17398
		1-7/16		2-1/4		UJNL 22-23	17400
		1-1/2		2-1/4		UJNL 22-24	17402
5-1/2	1-7/16	1-7/16	2-1/4	2-1/4	3-1/4	UJNL 23-23	17404
		1-1/2				UJNL 23-24	17406
5-1/2	1-1/2	1-1/2	2-1/4	2-1/4	3-1/4	UJNL 24-24	17408

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	+.002 –.000

REFERENCE PAGES

Mounting —151
Lubrication — 151

ORDERING INFORMATION

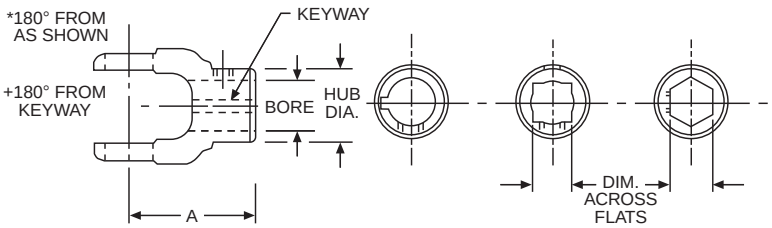
Joints can also be ordered in various combinations of round, square or hex holes. To order the combination desired, specify “UJNS” or “UJNL” and hole size and type as listed in table of Yokes, Page 107. Use “S” for square and “H” for hexagon.

STANDARD TOLERANCES

DIMENSION		TOLERANCE	
Bore	Round	+.000 – +.002	
	Square	3/4 –13/16	–0 – +.002
		7/8 –1-1/2	+.001 +.003
	Hexagon	+.002 +.004	

YOKES

These yokes are for assembly with UJSC Center Kits.
All yokes are furnished with 3/8–16 hex socket setscrew.
UJS14H is 1/8 NPT straight.



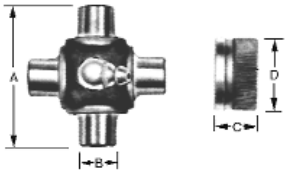
ALL DIMENSIONS IN INCHES

A	Round Bores: Bore	Hub Dia.	Keyway	Approx. Weight (Lbs.)	Catalog Number	Item Code	Dimension Across Flats	Hub Dia.	Approx. Weight (Lbs.)	Square Bores: Catalog Number	Item Code	Hexagon Bores: Catalog Number	Item Code
UJS SERIES													
2-1/2	.625	1.63	3/16 x 3/32	3/4	UJS 10	17410	.750	1.63	3/4	UJS 12S	17438	—	—
	.750	1.63			UJS 12	17412	.813	1.63		UJS 13S	17440	—	—
	.813	1.63			UJS 13	17414	.875 x 1	2.25		UJS 14S	17442	UJS 14H†*	17454
	.875	1.63	1/4 x 1/8		UJS 14	17416	.938 x 1	2.25	1-1/4	UJS 15S	17444	—	—
	.938	1.63			UJS 15	17418	1.000 x .875	2.25		UJS 16S	17446	—	—
	1.000	1.63			UJS 16	17420	1.126	2.25		UJS 18S	17448	UJS 18H**	17456
	1.125	2.25		1-1/4	UJS 18	17422							
UJL SERIES													
2-3/4	1.000	2.00	1/4 x 1/8	1-1/2	UJL 16	17424	1.000	2.25	1-1/2	UJL 16S	17450	—	—
	1.125	2.25			UJL 18	17426	1.126			UJL 18S	17452	UJL 18H**	17458
	1.1875	2.25		1-1/4	UJL 19	17428							
	1.250	2.25			UJL 20	17430							
	1.375	2.25	5/16 x 5/32		UJL 22	17432							
	1.4375	2.25	3/8 x 3/16		UJL 23	17434							
	1.500	2.25			UJL 24**	17436							

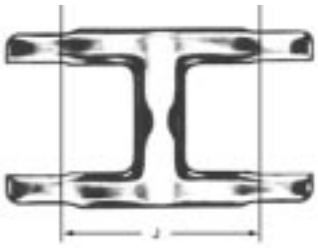
†Hub Dia. 1-5/8", furnished with 1/8 NPT instead of 3/8-16 setscrew.
‡Hub Dia. 1-7/8"
UJL 18 thru UJL 23 Setscrew. 180° from shown

*.880/.885 Across flats.
**(2) S.S. @ 90°

CENTER KITS



DOUBLE YOKES



ALL DIMENSIONS IN INCHES

Center Kits*: A	B	C	D	Approx. Weight (Lbs.)	Catalog Number	Item Code	Double Yokes: J	Maximum Operating Angle	Approx. Weight (Lbs.)	Catalog Number	Item Code
UJS Series							**UJS Series Forged**				
1-61/64	35/64	19/32	31/32	1/2	UJSC	17464	2-1/2	15°	1	UJSD	17460
UJL Series							**UJL Series Forged – 2 piece Welded Construction**				
2-5/16	.644	5/8	1-1/16	3/4	UJLC	17466	4-7/16	35°	2-1/4	UJLD	17462

*Center Kits include 1 cross, 4 bearings, 4 cork washers and 4 lock rings.

MOLDED TYPE

JP SERIES
SINGLE AND DOUBLE

MOLDED DELRIN BODY provides vibration dampening and electrical insulation.

MAX. ANGULAR DISPLACEMENT—Single 45°, Double 90°

MAX. AMBIENT TEMPERATURE—180°F

COMPLETE WITH SETSCREWS

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	+.001 –.000

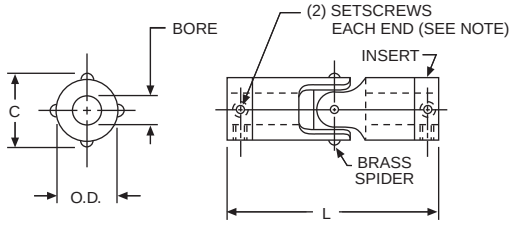
REFERENCE PAGES

Mounting—151

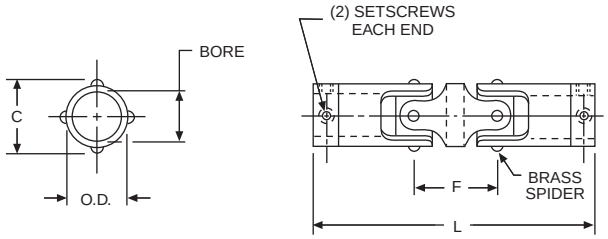
MATERIALS

Delrin Body
Nickel Plated Brass Spider and Insert

SINGLE



DOUBLE



ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Bore	Bore Depth (Typical)	O.D.	C	L		DOUBLE ONLY		Setscrew	SINGLE		DOUBLE	
				Single	Double	F	Max. Parallel Offset		Catalog Number	Item Code	Catalog Number	Item Code
1/8	.39	1/4	.27	1-3/64	1-23/64	5/16	.22	#4-40	JP25-1/8*	54194	JPD25-1/8	54202
1/8 3/16	.52	3/8	.41	1-31/64	2	17/32	.36	#4-40	JP37-1/8* JP37-3/16	54195 54196	JPD37-1/8 JPD37-3/16	54203 54204
3/16 1/4	.63	1/2	.54	1-13/16	2-7/16	5/8	.43	#6-32	JP50-3/16 JP50-1/4	54197 54198	JPD50-3/16 JPD50-1/4	54205 54206
1/4 5/16 3/8	.86	5/8	.68	2-41/64	3-33/64	7/8	.61	#8-32	JP62-1/4 JP62-5/16 JP62-3/8	54199 54200 54201	JPD62-1/4 JPD62-5/16 JPD62-3/8	54207 54208 54209

*One setscrew each end.

LOAD DATA

Basic Size	Maximum Torque† (Lb. Ins.)	
	Single	Double
25	5	2.5
37	16	7
50	26	12
62	60	47

†This is the ultimate or breaking torque for static, zero angle conditions. Actual operating conditions will dictate use of significantly lower values.

MOLDED TYPE

JPE SERIES WITH SLIDE EXTENSION

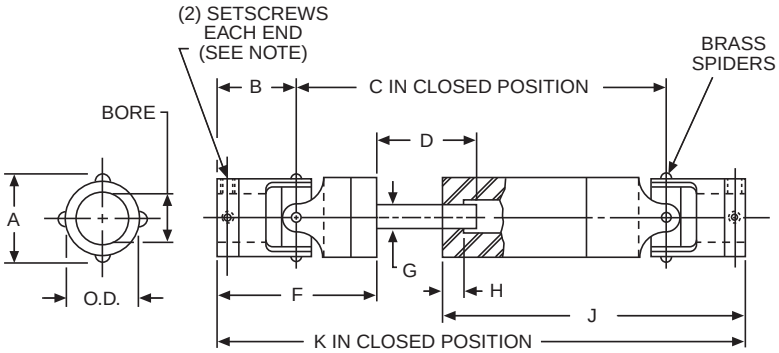
MOLDED DELRIN BODY provides vibration dampening and electrical insulation.

MAX. ANGULAR DISPLACEMENT—90°

MAX. AMBIENT TEMPERATURE—180°F

MAX. EXTENSION—3/4"

COMPLETE WITH SETSCREWS



STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	+.001 –.000

REFERENCE PAGES

Mounting—151

MATERIALS

Delrin Body
Nickel Plated Brass Spider and Insert

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Bore	Bore Depth (Typical)	O.D.	A	B	C	D	E	F	G (Sq.)	H	J	K	Setscrew	Catalog Number	Item Code
1/8 3/16	.52	3/8	.41	.74	2-59/64	1-1/8	—	1-47/64	3/16	23/64	2-43/64	4-13/32	#4-40	JPE37-1/8 JPE37-3/16	54210 54211
3/16 1/4	.63	1/2	.54	.91	2-23/64	1-1/8	3/8	1-34/64	3/16	23/64	2-9/16	4-11/64	#6-32	JPE50-3/16 JPE50-1/4	54212 54213

LOAD DATA

Basic Size	Maximum Recommended Torque (Lb. Ins.)*	
	Closed	Open
JPE37	8	5
JPE50	14	10

*This is the ultimate or breaking torque for static zero angle conditions.
Actual operating conditions will dictate use of significantly lower values.

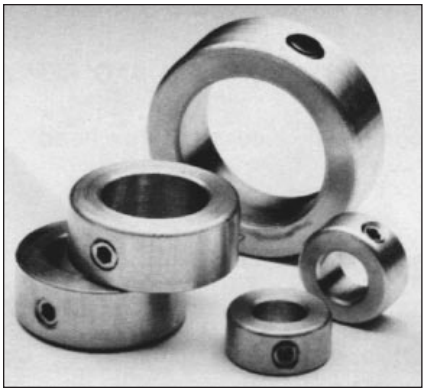
SHAFT COLLARS

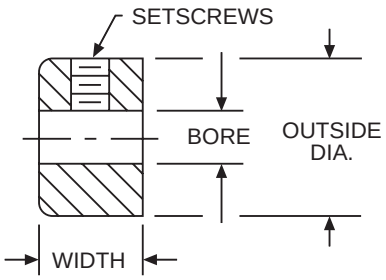
SECTION CONTENTS

SETSCREW COLLARS

STEEL AND STAINLESS STEEL

SC/SSC SERIES





STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	1/8-1	+.001 +.003
	1-1/16-3	+.001 +.004

MATERIAL

Stainless Steel—Type 303 Austenitic Steel—Low Carbon, Zinc Plated Finish

STEEL BORE SIZES FROM 1/8" TO 3"

STAINLESS STEEL BORE SIZES FROM 1/8" TO 2"

STAINLESS STEEL COLLARS ARE CORROSION-RESISTANT AND NON-MAGNETIC suitable for temperatures up to 800°F. Ideal for applications requiring hygienic cleanliness.

ALL COLLARS COMPLETE WITH STANDARD HOLLOW POINT SETSCREWS.

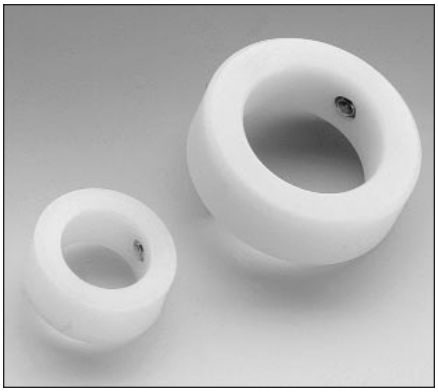
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

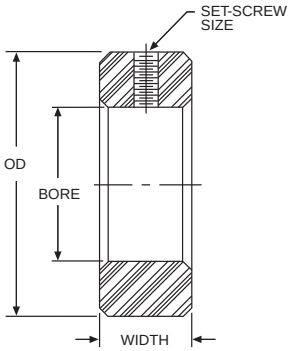
Bore	Outside Dia.	Width	Alloy Steel		Stainless Steel	
			Catalog Number	Item Code	Catalog Number	Item Code
1/8	.36	.25	SC12	67697	SSC12	67740
3/16	.42	.25	SC18	67698	SSC18	67741
1/4	.48	5/16	SC25	67699	SSC25	67742
5/16	.61	5/16	SC31	67700	SSC31	67743
3/8	.73	3/8	SC37	67701	SSC37	67744
7/16	7/8	7/16	SC43	67702	—	—
1/2 9/16	.98	.44	SC50 SC56	67703 67704	SSC50 —	67745 —
5/8	1.11	.50	SC62	67705	SSC62	67746
11/16 3/4	1.23	.56	SC68 SC75	67706 67707	— SSC75	— 67747
13/16	1-1/4	9/16	SC81	67708	—	—
7/8	1.48	.56	SC87	67709	SSC87	67748
15/16 1	1.50	.56 .62	SC93 SC100	67710 67711	— SSC100	— 67749
1-1/16 1-1/8	1.73	.62	SC106 SC112	67712 67713	— SSC112	— 67784
1-3/16 1-1/4	1.98	.69	SC118 SC125	67714 67715	— SSC125	— 67785
1-5/16 1-3/8	2-1/8	11/16 3/4	SC131 SC137	67716 67717	— —	— —
1-7/16 1-1/2	2.23	.75	SC143 SC150	67718 67719	— SSC150	— 67788
1-9/16 1-5/8 1-11/16	2-1/2	13/16	SC156 SC162 SC168	67720 67721 67722	— — —	— — —
1-3/4 1-13/16 1-7/8	2.72 2-3/4 2-3/4	.88	SC175 SC181 SC187	67723 67724 67725	SSC175 — —	67789 — —
1-15/16 2 2-1/8	2.98	.88	SC193 SC200 SC212	67726 67727 67728	— SSC200 —	— 67790 —
2-3/16 2-1/4 2-5/16 2-3/8	3-1/4	15/16	SC218 SC225 SC231 SC237	67729 67730 67731 67732	— — — —	— — — —
2-7/16 2-1/2	3-1/2	1	SC243 SC250	67733 67734	— —	— —
2-9/16	3-3/4	1	SC256	67735	—	—
2-11/16 2-3/4	4	1-1/8	SC268 SC275	67736 67737	— —	— —
2-15/16 3	4-1/4	1-1/8	SC293 SC300	67738 67739	— —	— —

SETSCREW COLLARS

NONMETALLIC WASHDOWN DUTY

NSC SERIES





BORE SIZES FROM 1/4" TO 3"

USDA/FDA APPROVED

STAINLESS STEEL HARDWARE

CORROSION RESISTANT

MOISTURE RESISTANT

SELF LUBRICATING

INTERCHANGEABLE WITH THEIR METAL COUNTERPARTS

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	1/4 – 1	+.003 – .000
	1-3/16 – 2	+.004 – .000
	2-3/16 – 3	+.006 – .000

MATERIAL

Nylon

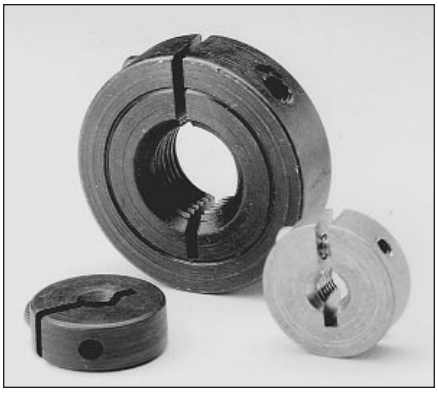
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

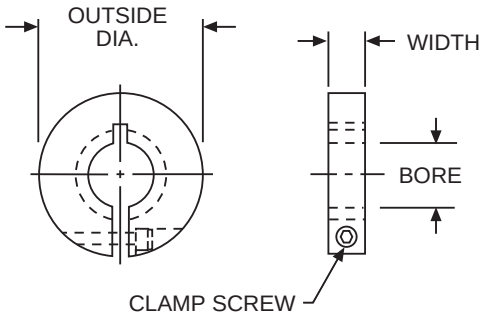
Bore	Outside Dia.	Width	Set Screw Thread	Catalog Number	Item Code
1/4	3/4	7/16	10-24	NSC25	38802
5/16	7/8	7/16	10-24	NSC31	38803
3/8	7/8	7/16	10-24	NSC37	38804
7/16	7/8	7/16	1/4-20	NSC43	38805
1/2	1	7/16	1/4-20	NSC50	38806
9/16	1-1/8	1/2	1/4-20	NSC56	–
5/8	1-1/8	1/2	5/16-18	NSC62	38807
3/4	1-1/4	9/16	5/16-18	NSC75	38808
7/8	1-1/2	9/16	5/16-18	NSC87	38809
1	1-5/8	5/8	5/16-18	NSC100	38810
1-3/16	2	11/16	3/8-16	NSC118	–
1-1/4	2	11/16	3/8-16	NSC125	38811
1-3/8	2-1/8	3/4	3/8-16	NSC137	–
1-7/16	2-1/4	3/4	3/8-16	NSC143	38812
1-1/2	2-1/4	3/4	3/8-16	NSC150	38813
1-5/8	2-1/2	13/16	3/8-16	NSC162	–
1-3/4	2-3/4	7/8	1/2-13	NSC175	38814
1-7/8	2-3/4	7/8	1/2-13	NSC187	–
1-15/16	3	7/8	1/2-13	NSC193	–
2	3	7/8	1/2-13	NSC200	38815
2-3/16	3-1/4	15/16	1/2-13	NSC218	–
2-1/4	3-1/4	15/16	1/2-13	NSC225	–
2-7/16	3-1/2	1	1/2-13	NSC243	–
2-1/2	3-1/2	1	1/2-13	NSC250	–
2-3/4	3-3/4	1	1/2-13	NSC275	–
3	4-1/4	1-1/8	1/2-13	NSC300	–

CLAMPING COLLARS

THREADED TYPE STEEL AND STAINLESS STEEL

CSC/CSSC SERIES





DESIGN PROVIDES CONVENIENT SETTING, ADJUSTING AND REMOVAL - prevents shaft damage.

OSHA CONFORMANCE - collars have completely recessed screw head.

BORE THREADS FROM 10-32 TO 1 1/4-12

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	+.003 –.000

MATERIAL

Steel—Low Carbon, Black Oxide Finish
Stainless—Type 303 Austenitic

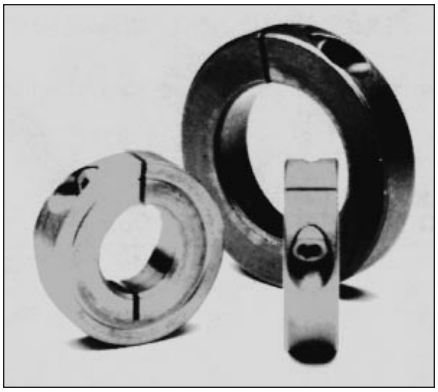
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

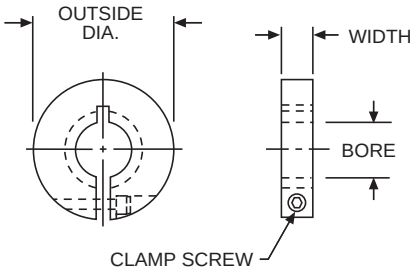
Bore Thread	Outside Dia.	Width	Clamp Screws	Steel		Stainless Steel	
				Catalog Number	Item Code	Catalog Number	Item Code
10-32	11/16	1/4	4-40	CSC10-32	49237	—	—
1/4-20	13/16	1/4	4-40	CSC25-20	49238	CSSC25-20	49265
1/4-28				CSC25-28	49239	—	—
5/16-18				CSC31-18	49240	—	—
5/16-24				CSC31-24	49241	—	—
3/8-16	1-1/16	5/16	6-32	CSC37-16	49242	CSSC37-16	49269
3/8-24				CSC37-24	49243	CSSC37-24	49270
1/2-13	1-1/4	3/8	8-32	CSC50-13	49244	CSSC50-13	49271
1/2-20				CSC50-20	49245	CSSC50-20	49272
5/8-11	1-1/2	13/32	10-32	CSC62-11	49246	CSSC62-11	49273
5/8-18				CSC62-18	49247	CSSC62-18	49274
3/4-10	1-3/4	1/2	1/4-28	CSC75-10	49248	CSSC75-10	49275
3/4-16				CSC75-16	49249	CSSC75-16	49276
7/8-9	1-7/8	1/2	1/4-28	CSC87-9	49250	—	—
7/8-14				CSC87-14	49251	—	—
1-8	2	1/2	1/4-28	CSC100-8	49252	CSSC100-8	49279
1-14				CSC100-14	49253	CSSC100-14	49280
1-1/8-7	2-1/8	1/2	1/4-28	CSC112-7	49254	—	—
1-1/8-12				CSC112-12	49255	—	—
1-1/4-7	2-1/4	1/2	1/4-28	CSC125-7	49256	—	—
1-1/4-12				CSC125-12	49257	CSSC125-12	49284

CLAMPING COLLARS

1-PIECE TYPE
STEEL, STAINLESS STEEL AND ALUMINUM

CSC/CSSC/CASC SERIES





DESIGN PROVIDES CONVENIENT SETTING, ADJUSTING AND REMOVAL prevents shaft damage.

OSHA CONFORMANCE collars have completely recessed screw head.

BORE SIZES FROM 1/8" TO 3"

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	+.003 –.000

MATERIAL

Steel—Low Carbon, Black Oxide FInish
Stainless—Type 303 Austenitic
Aluminum—2024

LOAD DATA

Capacity is based on a standard steel, one-piece collar mounted with recommended screw torque on a lightly oiled shaft. Capacity is load to move collar .010". Data shown is for guidance only. In applications involving control of axial loads, capacity should be determined experimentally on actual parts involved.

Bore	Axial Load Capacity (Lbs.)	Screw Size	Recommended Screw Torque (Lb. Ins.)	
			Steel	Stainless Steel
1/8–5/16	400	4-40	20	16
3/8–7/16	600	6-32	30	24
1/2–9/16	1400	8-32	55	35
5/8–11/16	1800	10-32	90	72
3/4–1-9/16	4000	1/4-28	220	170
1-5/8–2-3/8	6500	5/16-24	435	340
2-7/16–3	8500	3/8-24	710	550

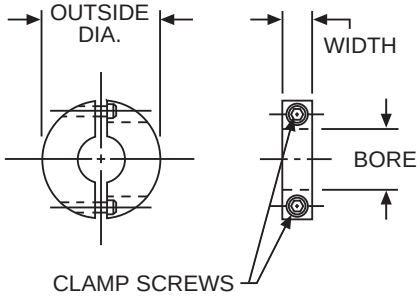
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Bore	Outside Dia.	Width	Clamp Screws	Steel		Stainless Steel		Aluminum	
				Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code
1/8	13/16	1/4	4-40	CSC12	49000	CSSC12	49094	—	—
3/16				CSC18	49001	CSSC18	49095	CASC18	49048
1/4				CSC25	49002	CSSC25	49096	CASC25	49049
5/16				CSC31	49003	CSSC31	49097	CASC31	49050
3/8	1-1/16	5/16	6-32	CSC37	49004	CSSC37	49098	CASC37	49051
7/16				CSC43	49005	CSSC43	49099	—	—
1/2	1-1/4	3/8	8-32	CSC50	49006	CSSC50	49100	CASC50	49053
9/16				CSC56	49007	CSSC56	49101	CASC56	49054
5/8	1-1/2	13/32	10-32	CSC62	49008	CSSC62	49102	CASC62	49055
11/16				CSC68	49009	—	—	—	—
3/4	1-3/4	1/2	1/4-28	CSC75	49010	CSSC75	49104	CASC75	49057
13/16				CSC81	49011	—	—	—	—
7/8	1-7/8			CSC87	49012	CSSC87	49106	CASC87	49059
15/16				CSC93	49013	CSSC93	49107	—	—
1	2			CSC100	49014	CSSC100	49108	CASC100	49061
1-1/16				CSC106	49015	CSSC106	49109	—	—
1-1/8	2-1/8			CSC112	49016	CSSC112	49110	—	—
1-3/16				CSC118	49017	CSSC118	49111	—	—
1-1/4	2-1/4			CSC125	49018	CSSC125	49112	CASC125	49065
1-5/16				CSC131	49019	CSSC131	49113	—	—
1-3/8	2 3/8			CSC137	49020	—	—	—	—
1-7/16				CSC143	49021	CSSC143	49115	—	—
1-1/2	2-1/2			CSC150	49022	CSSC150	49116	CASC150	49069
1-9/16				CSC156	49023	—	—	—	—
1-5/8	3	5/8	5/16-24	CSC162	49024	—	—	—	—
1-11/16				CSC168	49025	—	—	—	—
1-3/4				CSC175	49026	—	—	CASC175	49073
1-7/8	3-1/4			CSC187	49028	—	—	—	—
1-15/16				CSC193	49029	CSSC193	49123	—	—
2				CSC200	49030	CSSC200	49124	CASC200	49077
2-3/16	3-1/2			CSC218	49033	—	—	—	—
2-1/4				CSC225	49034	—	—	—	—
2-3/8				CSC237	49036	—	—	—	—
2-7/16	4	3/4	3/8-24	CSC243	49037	—	—	—	—
2-1/2				CSC250	49038	—	—	—	—
2-5/8	4-1/4			CSC262	49040	—	—	—	—
2-11/16				CSC268	49041	—	—	—	—
2-3/4				CSC275	49042	—	—	—	—
2-7/8	4-1/2			CSC287	49044	—	—	—	—
2-15/16				CSC293	49045	—	—	—	—
3				CSC300	49046	—	—	—	—

CLAMPING COLLARS

2-PIECE TYPE STEEL AND STAINLESS STEEL

2SC/2SSC SERIES



DESIGN PROVIDES CONVENIENT SETTING, ADJUSTING AND REMOVAL prevents shaft damage.

OSHA CONFORMANCE collars have completely recessed screw head.

BORE SIZES FROM 1/8" TO 3"

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	+.003 –.000

MATERIAL

Steel—Low Carbon, Black Oxide Finish
Stainless—Type 303 Austenitic

LOAD DATA

Capacity is based on a standard steel, one-piece collar mounted with recommended screw torque on a lightly oiled shaft. Capacity is load to move collar .010". Data shown is for guidance only. In applications involving control of axial loads, capacity should be determined experimentally on actual parts involved.

Bore	Axial Load Capacity (Lbs.)	Screw Size	Recommended Screw Torque (Lb. Ins.)	
			Steel	Stainless Steel
1/8–5/16	400	4-40	20	16
3/8–7/16	600	6-32	30	24
1/2–9/16	1400	8-32	55	35
5/8–11/16	1800	10-32	90	72
3/4–1-9/16	4000	1/4-28	220	170
1-5/8–2-3/8	6500	5/16-24	435	340
2-7/16–3	8500	3/8-24	710	550

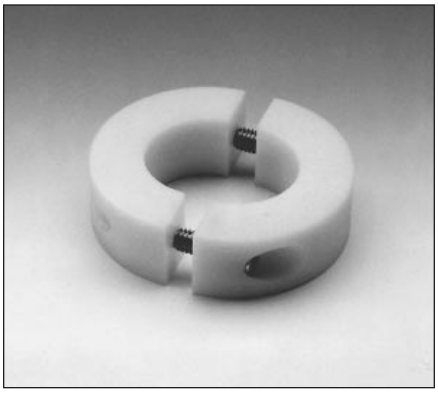
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Bore	Outside Dia.	Width	Clamp Screws	Steel		Stainless Steel	
				Catalog Number	Item Code	Catalog Number	Item Code
1/8	13/16	1/4	4-40	2SC12	49141	—	—
3/16				2SC18	49142	—	—
1/4				2SC25	49143	2SSC25	49190
5/16				2SC31	49144	2SSC31	49191
3/8	1-1/16	5/16	6-32	2SC37	49145	2SSC37	49192
7/16				2SC43	49146	2SSC43	49193
1/2	1-1/4	3/8	8-32	2SC50	49147	2SSC50	49194
9/16				2SC56	49148	2SSC56	49195
5/8	1-1/2	13/32	10-32	2SC62	49149	2SSC62	49196
11/16				2SC68	49150	2SSC68	49197
3/4	1-3/4	1/2	1/4-28	2SC75	49151	2SSC75	49198
13/16				2SC81	49152	—	—
7/8	1-7/8			2SC87	49153	2SSC87	49200
15/16				2SC93	49154	—	—
1	2			2SC100	49155	2SSC100	49202
1-1/16				2SS106	49156	2SSC106	49203
1-1/8	2-1/8			2SC112	49157	2SSC112	49204
1-3/16				2SC118	49158	—	—
1-1/4	2-1/4			2SC125	49159	2SSC125	49206
1-5/16				2SC131	49160	2SSC131	49207
1-3/8	2-3/8			2SC137	49161	—	—
1-7/16				2SC143	49162	2SSC143	49209
1-1/2	2-1/2			2SC150	49163	2SSC150	49210
1-9/16				2SC156	49164	—	—
1-5/8	3	5/8	5/16-24	2SC162	49165	—	—
1-11/16				2SC168	49166	—	—
1-3/4				2SC175	49167	—	—
1-7/8	3-1/4			2SC187	49169	2SSC187	49216
1-15/16				2SC193	49170	2SSC193	49217
2				2SC200	49171	2SSC200	49218
2-1/8	3-1/2			2SC212	49173	—	—
2-3/16				2SC218	49174	—	—
2-1/4				2SC225	49175	—	—
2-3/8				2SC237	49177	—	—
2-7/16	4	3/4	3/8-24	2SC243	49178	—	—
2-1/2				2SC250	49179	—	—
2-5/8	4-1/4			2SC262	49181	—	—
2-11/16				2SC268	49182	—	—
2-3/4				2SC275	49183	—	—
2-7/8	4-1/2			2SC287	49185	—	—
2-15/16				2SC293	49186	—	—
3				2SC300	49187	—	—

CLAMPING COLLARS

2 PIECE TYPE NONMETALLIC WASHDOWN DUTY

2 NSC SERIES



BORE SIZES FROM 1/4" TO 3"

USDA/FDA APPROVED

STAINLESS STEEL HARDWARE

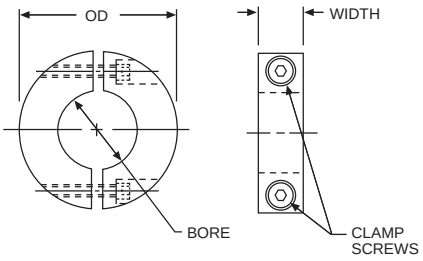
CORROSION RESISTANT

MOISTURE RESISTANT

SELF LUBRICATING

INTERCHANGEABLE WITH THEIR METAL COUNTERPARTS

RECESSED CLAMPING SCREWS FOR SAFETY



STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	1/4 – 1	+.003 – .000
	1-3/16 – 2	+.004 – .000
	2-3/16 – 3	+.006 – .000

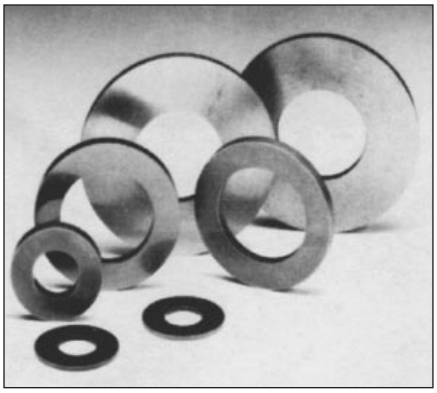
MATERIAL

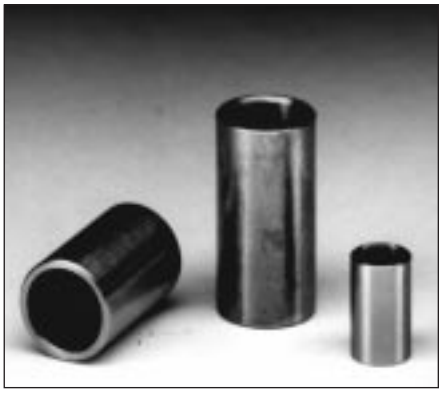
Nylon

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Bore	Outside Dia.	Width	Clamp Screw Thread	Catalog Number	Item Code
1/4	1	3/8	6-32	2NSC25	38788
5/16	1	3/8	6-32	2NSC31	38789
3/8	1-1/4	1/2	6-32	2NSC37	38790
7/16	1-1/4	1/2	6-32	2NSC43	38791
1/2	1-3/8	9/16	8-32	2NSC50	38792
9/16	1-3/8	9/16	8-32	2NSC56	–
5/8	1-5/8	5/8	10-32	2NSC62	38793
3/4	1-3/4	5/8	10-32	2NSC75	38794
7/8	2	3/4	10-32	2NSC87	38795
1	2-1/8	3/4	1/4-20	2NSC100	38796
1-3/16	2-5/16	3/4	1/4-20	2NSC118	–
1-1/4	2-3/8	3/4	1/4-20	2NSC125	38797
1-3/8	2-1/2	3/4	1/4-20	2NSC137	–
1-7/16	2-5/8	3/4	1/4-20	2NSC143	38798
1-1/2	2-5/8	3/4	1/4-20	2NSC150	38799
1-5/8	3	15/16	5/16-18	2NSC162	–
1-3/4	3-1/8	15/16	5/16-18	2NSC175	38800
1-7/8	3-1/4	15/16	5/16-18	2NSC187	–
1-15/16	3-1/4	15/16	5/16-18	2NSC193	–
2	3-3/8	15/16	5/16-18	2NSC200	38801
2-3/16	3-5/8	15/16	5/16-18	2NSC218	–
2-1/4	3-5/8	15/16	5/16-18	2NSC225	–
2-7/16	4-1/8	1-1/8	3/8-16	2NSC243	–
2-1/2	4-1/8	1-1/8	3/8-16	2NSC250	–
2-3/4	4-3/8	1-1/8	3/8-16	2NSC275	–
3	4-1/2	1-1/8	3/8-16	2NSC300	–

WASHERS & BUSHINGS

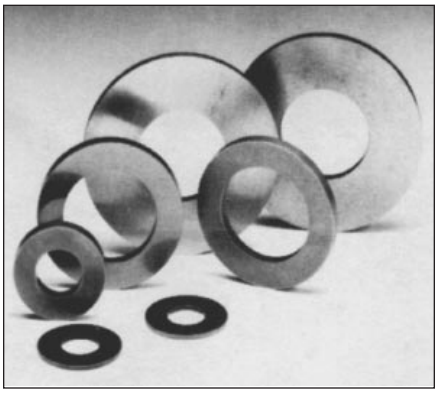




SECTION CONTENTS

THRUST WASHERS

STEEL AND STAINLESS STEEL



HARDENED AND GROUND

STEEL BORE SIZES FROM 3/16" TO 2"

STAINLESS STEEL BORE SIZES FROM 3/16" TO 1/2"

STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	06700 Series	+.0015 – .007
	18000 Series	+.002 +.010
O.D.	06700 Series	+.000 – .005
	18000 Series	±.030
Thickness	All	+.000 – .005

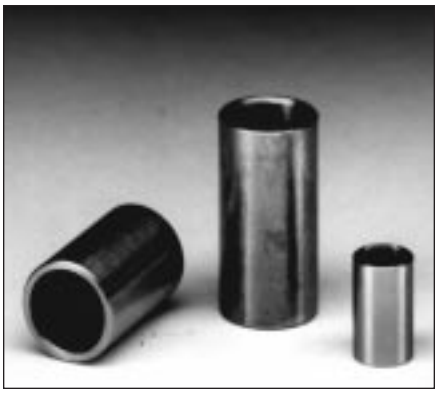
ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

HARDENED STEEL			
Bore	**Outside Diameter**	**Thickness**	**Catalog No.**
3/16	9/32	1/16 3/32	18800 18802
	3/8	1/16 3/32	18804 18806
	7/16	1/16	06724*
1/4	1/2	1/16 3/32	18808 18810
	9/16	1/16	06726*
5/16	5/8	5/64 1/16 1/8	06728* 18812 18814
3/8	5/8	1/16 1/8	18816 18818
	11/16	3/32	06730*
7/16	7/8	1/16 5/32	18820 18822
1/2	3/4	1/16 1/8	18824 18826
	7/8	1/8	06734*
	1-1/8	1/16 5/32	18828 18830
	1-1/4	3/16	18832
9/16	1-3/8	3/32 3/16	18834 18836
5/8	25/32	1/16 1/8	18838 18840
	1-1/4	3/32 3/16	18842 18844
	1-3/8	3/16	18846
	1-1/2	3/32 3/16	18848 18850
	1-3/4	3/16	18852
3/4	1	3/32	18854
	1-5/16	3/32 3/16	18856 18858
	1-5/8	1/8 3/16	18860 18862
	1-3/4	3/16	18864
	2	3/16	18866

HARDENED STEEL			
Bore	**Outside Diameter**	**Thickness**	**Catalog No.**
7/8	1-3/16	3/32	18868
	2	1/8	18870
	2	3/16	18872
	2-1/4	3/16	18874
7/16	13/16	3/32	06732*
1	1-9/16	1/8 3/16	18876 18878
	2	1/8 3/16	18880 18882
	2-1/4	9/64 3/16	18884 18886
	2-1/2	1/4	18888
1-1/16	2-1/2	1/4	18890
1-1/8	2-1/2	1/4	18894
1-3/16	2	3/16	18896
1-1/4	2	9/64 3/16	18898 18922
	2-7/16	9/64 1/4	18900 18924
	2-3/4	9/64	18902
	3	1/4	18904
1-5/16	2-3/4	1/4	18906
1-3/8	3	5/32 1/4	18908 18910
1-1/2	3	5/32 1/4	18912 18914
	3-1/4	1/8	18916
2	4	5/32 5/16	18918 18920
STAINLESS STEEL†			
Bore	**Outside Diameter**	**Thickness**	**Catalog No.**
3/16 1/4 5/16 3/8 1/2	7/16 9/16 5/8 11/16 7/8	1/16 1/16 5/64 3/32 1/8	06760 06762 06764 06766 06770

*These Washers also listed with AO Bearings.
†These Washers also listed with SAO Bearings.

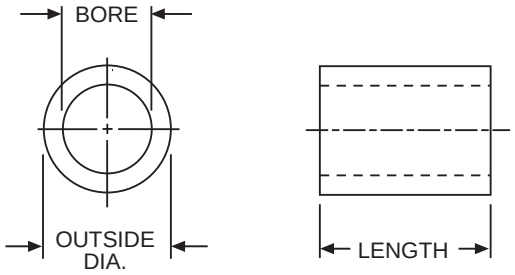
SOFT STEEL



BORE SIZES FROM 3/16" TO 1-1/4"

MULTI-PURPOSE BUSHINGS suitable for use as hole reducers, spacers, standoffs or slip bushings.

ADAPTABLE FOR OTHER USES including wear sleeves, liners or cutting arbor studs.

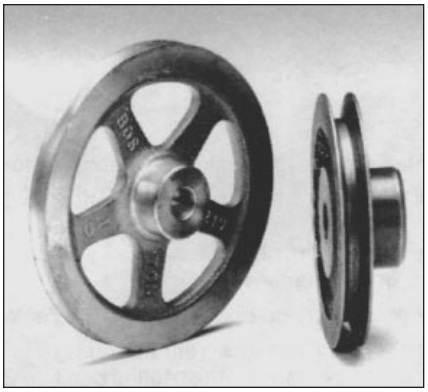


STANDARD TOLERANCES

DIMENSION		TOLERANCE
BORE	All	±.0005
O.D.	Up to 1-1/4	+.0005 +.0015
	Over 1-1/4	+.001 +.002
LENGTH	Up to 1”	+.000 –.007
	Over 1”	+.000–.010

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

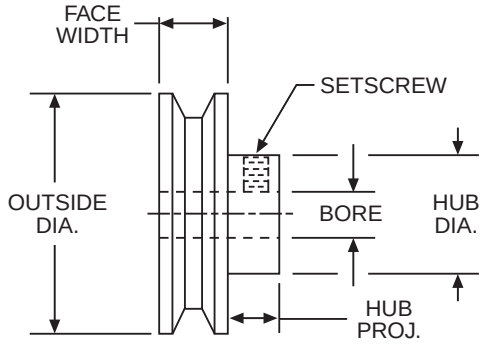
Bore	Outside Diameter	Length	Catalog No.
3/16	1/4 5/16 3/8	5/8	18510 18512 18516
1/4	5/16 3/8	5/8	18514 18518
	1/2	3/4 1	18522 18524
5/16	3/8	5/8	18520
	1/2	3/4 1	18526 18528
3/8	1/2	3/4 1	18530 18532
	5/8	3/4 1-1/4	18534 18536
7/16	5/8	3/4 1-1/4	18538 18540
1/2	5/8	3/4 1 1-1/4	18542 18544 18546
	3/4	3/4 1	18554 18556
5/8	3/4	3/4 1	18560 18562
	7/8	1-1/4	18566
3/4	7/8 1 1-3/8 1-1/2	1-1/4 1-1/2 2 1-1/2	18568 18574 18626 18606
7/8	1	1-1/2	18576
1	1-1/4 1-3/8 2	2	18596 18602 18622
1-1/8	1-1/4	2	18598
1-1/4	1-3/8 1-1/2 2	2 1-1/2 2	18604 18614 18624



BRASS AND IRON

BORE SIZES FROM 3/16" TO 3/4"

COMPLETE WITH STANDARD SETSCREWS



STANDARD TOLERANCES

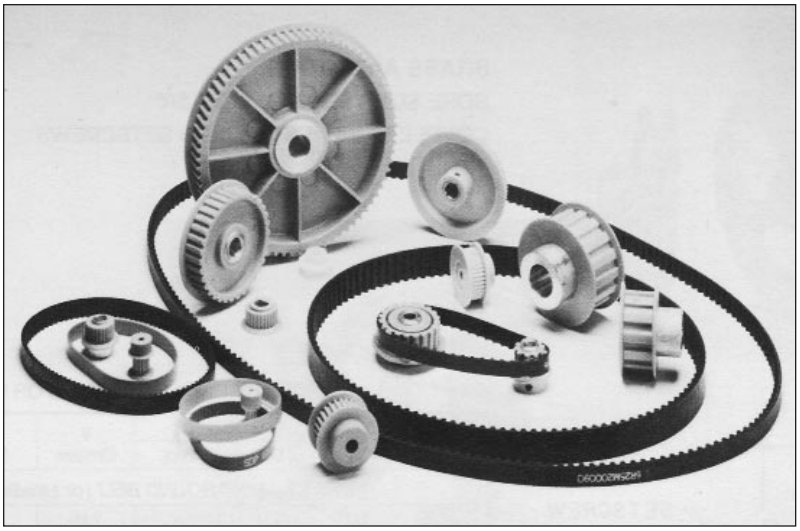
DIMENSION		TOLERANCE
BORE	All	+.001 –.000

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

Bore	Outside Dia.	Hub Dia.	Hub Proj.	V Groove	Style	Catalog Number	Item Code
BRASS—3/16" ROUND BELT (or smaller)—1/4" FACE							
3/16	1/2 7/8	1/2 5/8	1/4	74° 46°	Plain	G1214 G1215	18700 18702
1/4	1 1-1/2	5/8	5/16	46°	Plain	G1216 G1217	18704 18706
5/16	2 3 4	5/8 3/4 3/4	5/16	46°	Webbed Spoked Spoked	G1218 G1219 G1220	18708 18710 18712
IRON†—3/8" ROUND BELTS (or smaller)—1/2" FACE							
1/2	1 1-1/2 2 3	15/16 1 1 1-1/4	1/2	53°	Plain	G1202* G1203* G1204*	18718 18720 18722
5/8	4 5	1-5/8	3/4		Webbed	G1205 G1206 G1207	18724 18726 18728
3/4	6 8	1-3/4	1		Spoked	G1208 G1209	18730 18732

*These pulleys are steel
†Outside diameter, sides, grooves, hole and ends of hub, finished.

MINIATURE TIMING BELTS & PULLEYS



SECTION CONTENTS

MINIATURE HTD® TIMING BELT DRIVES

BASIC CONSTRUCTION

Timing belts are essentially flat belts with the addition of evenly spaced teeth along the surface that contacts toothed pulleys. Power is transmitted smoothly and without slippage. Pulley pitch diameters are larger than their outside diameters and the belt pitch lines lie within the flat portion. Tension members are molded in the flat portion to serve as load-carrying elements. Miniature HTD timing belts have deep curvilinear tooth forms, as contrasted to trapezoidal for conventional timing belts. Greater strength, lower tooth pressures and decreased stress concentration result in superior performance.

SELECTION

The following general guidelines apply to selection of miniature HTD timing belts and pulleys:

Design with ample reserve horsepower capacity and apply the proper service factors.

The belt must have six or more teeth in engagement with the smaller pulley to carry rated Horsepower.

Avoid small pulley diameters where practical to assure satisfactory belt life.

Belt speed should not exceed 6500 feet per minute.

At least one pulley in the drive should be flanged.

For vertical shafts or where center distance exceeds eight times the smaller pulley diameter, both pulleys should be flanged.

Horsepower Rating Tables provide ratings for operation no more than ten hours per day under uniform loading. Selection procedure is as follows:

1. Select Service Factor from chart below.
2. Determine Design Horsepower.

Design Horsepower = Application Horsepower x Service Factor.

3. Select small pulley and belt size from the rating tables, choosing a combination whose rating does not exceed the Design Horsepower.
4. For speed increasing applications an additional amount must be added to the Service Factor.
5. For speeds, higher than shown in rating Tables, consult factory.

SERVICE FACTORS

Load Classification	Service Factor
Uniform to 10 hrs./day	1.0
Uniform over 10 hrs./day Moderate Shock to 10 hrs./day	1.5
Moderate Shock over 10 hrs./day Heavy Shock to 10 hrs./day	2.0

SPEED-UP DRIVES

Ratio Range	Additional Factor
1 through 1.24	0
1.25 through 1.74	0.1
1.75 through 2.49	0.2
2.50 through 3.49	0.3
3.50 and over	0.4

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MINIATURE HTD TIMING BELT DRIVES (Continued)
HORSEPOWER RATINGS

3mm PITCH—6mm WIDE BELT

RPM of Small Pulley	NUMBER OF GROOVES ON THE SMALL PULLEY													
	10	11	12	14	15	16	18	20	22	24	25	28	30	32
PD	.376	.414	.451	.526	.564	.602	.677	.752	.827	.902	.940	1.053	1.128	1.203
100	.005	.005	.006	.007	.008	.009	.010	.011	.012	.013	.013	.016	.019	.020
300	.016	.017	.018	.021	.023	.025	.029	.033	.037	.040	.041	.048	.055	.059
500	.022	.024	.027	.030	.032	.035	.039	.043	.048	.053	.055	.062	.066	.070
700	.031	.035	.037	.042	.046	.049	.054	.061	.068	.075	.078	.087	.092	.098
1160	.040	.045	.050	.056	.061	.066	.072	.078	.089	.097	.101	.113	.120	.127
1500	.052	.058	.064	.072	.078	.085	.093	.101	.115	.125	.130	.145	.155	.165
1750	.061	.068	.075	.085	.091	.099	.108	.117	.134	.146	.152	.170	.182	.194
2500	.067	.074	.080	.091	.101	.107	.117	.134	.148	.161	.168	.192	.200	.213
3500	.094	.103	.113	.127	.141	.151	.165	.188	.207	.226	.236	.268	.278	.296

3mm PITCH—9mm WIDE BELT

RPM of Small Pulley	NUMBER OF GROOVES ON THE SMALL PULLEY													
	10	11	12	14	15	16	18	20	22	24	25	28	30	32
PD	.376	.414	.451	.526	.564	.602	.677	.752	.827	.902	.940	1.053	1.128	1.203
100	.007	.008	.009	.011	.013	.014	.016	.017	.019	.021	.022	.025	.030	.032
300	.025	.027	.029	.033	.036	.040	.046	.052	.059	.063	.066	.076	.087	.092
500	.035	.038	.043	.048	.051	.055	.062	.068	.076	.084	.088	.098	.104	.111
700	.049	.056	.059	.067	.073	.078	.085	.096	.107	.119	.124	.138	.146	.156
1160	.063	.071	.079	.089	.097	.104	.114	.123	.141	.154	.160	.179	.190	.203
1500	.082	.092	.101	.114	.123	.135	.147	.160	.182	.198	.206	.230	.246	.263
1750	.097	.108	.119	.135	.144	.157	.171	.185	.212	.231	.241	.269	.289	.308
2500	.106	.117	.127	.144	.160	.169	.185	.212	.235	.255	.266	.304	.317	.338
3500	.149	.163	.179	.201	.223	.239	.262	.298	.328	.358	.372	.425	.441	.470

5mm PITCH—9mm WIDE BELT

RPM of Small Pulley	NUMBER OF GROOVES ON THE SMALL PULLEY											
	11	12	14	15	16	18	20	22	24	25	28	30
PD	.689	.752	.877	.940	1.003	1.128	1.253	1.379	1.504	1.566	1.754	1.880
100	.021	.024	.027	.030	.033	.039	.042	.045	.051	.053	.063	.069
300	.063	.069	.081	.090	.096	.108	.126	.138	.153	.159	.186	.204
500	.090	.099	.117	.126	.132	.150	.165	.183	.198	.206	.231	.249
700	.129	.138	.162	.174	.186	.210	.231	.255	.279	.291	.324	.348
1160	.162	.180	.207	.225	.240	.270	.300	.327	.360	.375	.420	.447
1500	.210	.231	.270	.291	.309	.348	.387	.423	.465	.484	.543	.579
1750	.243	.270	.315	.339	.360	.405	.453	.495	.540	.562	.633	.675
2500	.267	.291	.342	.366	.393	.441	.492	.540	.588	.613	.687	.735
3500	.372	.405	.477	.510	.549	.615	.690	.756	.822	.856	.960	1.03

Belt life will be reduced for ratings to the left of the heavy line.

MINIATURE HTD TIMING BELT DRIVES (Continued)
HORSEPOWER RATINGS

5mm PITCH—15mm WIDE BELT

RPM of Small Pulley	NUMBER OF GROOVES ON THE SMALL PULLEY										
	11	12	14	15	16	18	20	22	24	28	30
PD	.689	.752	.877	.940	1.003	1.128	1.253	1.379	1.504	1.754	1.880
100	.038	.043	.049	.054	.060	.071	.076	.082	.093	.115	.126
300	.115	.126	.148	.164	.175	.197	.230	.252	.280	.340	.373
500	.164	.181	.214	.230	.241	.274	.302	.335	.362	.423	.456
700	.236	.252	.296	.318	.340	.384	.423	.467	.511	.593	.637
1160	.296	.329	.379	.412	.439	.494	.549	.599	.659	.769	.819
1500	.384	.423	.494	.533	.566	.637	.709	.775	.852	.995	1.06
1750	.445	.494	.577	.621	.659	.742	.830	.907	.989	1.16	1.23
2500	.489	.533	.626	.670	.720	.808	.901	.989	1.07	1.25	1.34
3500	.681	.742	.874	.934	1.00	1.12	1.26	1.38	1.50	1.75	1.88

Belt life will be reduced for ratings to the left of the heavy line.

CENTER DISTANCE

To calculate the approximate Belt Length:

$$BL = 2C + \frac{D_1 - D_2}{4C} + 1.57\,(D_1 + D_2)$$

An approximate formula for center distance of a timing belt drive is:

$$C = \frac{P}{4}\left[NB - \frac{N_1 + N_2}{2} + \sqrt{\left(NB - \frac{N_1 + N_2}{2}\right)^2 - 2\left(\frac{N_1 - N_2}{\pi}\right)^2}\right]$$

Where:
C = Center Distance—Inches
P = Belt Pitch—Inches
NB = Number of Teeth in Belt
N_1 = Number of Grooves in larger Pulley
N_2 = Number of Grooves in smaller Pulley
BL = Belt Length
D_1 = Pitch Diameter of larger Pulley
D_2 = Pitch Diameter of smaller Pulley

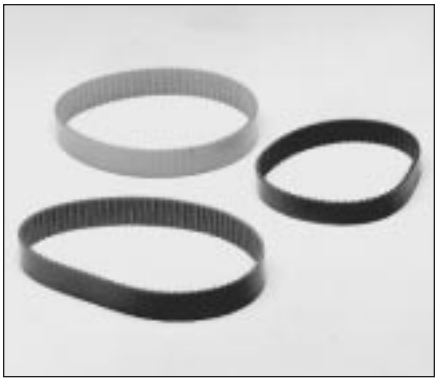
INSTALLATION SUGGESTIONS

1. Use care in handling belts to avoid breakage of the reinforcing fibers.
2. Make sure shafts are parallel and pulleys in alignment.
3. Belt should fit snugly, neither too loose nor too tight. Avoid preload, which can cause premature failure.
4. Provision for some Center Distance adjustment will ease the installation and permit proper initial fitting of belts.

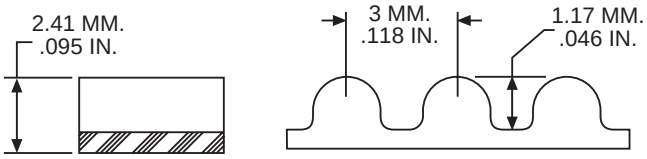
MINIATURE HTD TIMING BELTS

3mm Pitch

3M SERIES
6 AND 9mm WIDTHS



NEOPRENE—NYLON COVERED, FIBERGLASS REINFORCED
AMBIENT TEMPERATURE RANGE— –18°C to +85°C
BREAKING STRENGTH—6 mm WIDTH—74.4 KGS
9 mm WIDTH—111.6 KGS



ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Grooves	Pitch Length		6mm Belt Width		9mm Belt Width	
	mm	Inch	Catalog Number	Item Code	Catalog Number	Item Code
35	105	4.134	3M035060	54214	3M035090	54290
37	111	4.370	3M037060	54215	3M037090	54291
48	144	5.669	3M048060	54216	3M048090	54292
49	147	5.787	3M049060	54217	3M049090	54293
50	150	5.905	3M050060	54218	3M050090	54294
52	156	6.142	3M052060	54219	3M052090	54295
53	159	6.260	3M053060	54220	3M053090	54296
56	168	6.614	3M056060	54221	3M056090	54297
59	177	6.968	3M059060	54222	3M059090	54298
60	180	7.087	3M060060	54223	3M060090	54299
65	195	7.677	3M065060	54224	3M065090	54300
67	201	7.913	3M067060	54225	3M067090	54301
68	204	8.031	3M068060	54226	3M068090	54302
69	207	8.150	3M069060	54227	3M069090	54303
70	210	8.268	3M070060	54228	3M070090	54304
71	213	8.386	3M071060	54229	3M071090	54305
75	225	8.858	3M075060	54230	3M075090	54306
78	234	9.213	3M078060	54231	3M078090	54307
80	240	9.449	3M080060	54232	3M080090	54308
84	252	9.921	3M084060	54233	3M084090	54309
85	255	10.039	3M085060	54234	3M085090	54310
88	264	10.394	3M088060	54235	3M088090	54311
89	267	10.512	3M089060	54236	3M089090	54312
90	270	10.630	3M090060	54237	3M090090	54313
92	276	10.866	3M092060	54238	3M092090	54314
94	282	11.102	3M094060	54239	3M094090	54315
95	285	11.220	3M095060	54240	3M095090	54316
96	288	11.339	3M096060	54241	3M096090	54317
97	291	11.457	3M097060	54242	3M097090	54318
99	297	11.693	3M099060	54243	3M099090	54319
100	300	11.811	3M100060	54244	3M100090	54320
104	312	12.283	3M104060	54245	3M104090	54321
106	318	12.520	3M106060	54246	3M106090	54322
111	333	13.110	3M111060	54247	3M111090	54323
112	336	13.228	3M112060	54248	3M112090	54324
113	339	13.346	3M113060	54249	3M113090	54325
115	345	13.583	3M115060	54250	3M115090	54326
119	357	14.055	3M119060	54251	3M119090	54327

ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Grooves	Pitch Length		6mm Belt Width		9mm Belt Width	
	mm	Inch	Catalog Number	Item Code	Catalog Number	Item Code
121	363	14.291	3M121060	54252	3M121090	54328
128	384	15.118	3M128060	54253	3M128090	54329
130	390	15.354	3M130060	54254	3M130090	54330
132	396	15.591	3M132060	54255	3M132090	54331
140	420	16.535	3M140060	54256	3M140090	54332
145	435	17.126	3M145060	54257	3M145090	54333
149	447	17.598	3M149060	54258	3M149090	54334
153	459	18.071	3M153060	54259	3M153090	54335
155	465	18.307	3M155060	54260	3M155090	54336
158	474	18.661	3M158060	54261	3M158090	54337
160	480	18.898	3M160060	54262	3M160090	54338
162	486	19.134	3M162060	54263	3M162090	54339
163	489	19.252	3M163060	54264	3M163090	54340
167	501	19.724	3M167060	54265	3M167090	54341
171	513	20.197	3M171060	54266	3M171090	54342
175	525	20.670	3M175060	54267	3M175090	54343
177	531	20.905	3M177060	54268	3M177090	54344
179	537	21.142	3M179060	54269	3M179090	54345
188	564	22.205	3M188060	54270	3M188090	54346
192	576	22.677	3M192060	54271	3M192090	54347
199	597	23.504	3M199060	54272	3M199090	54348
200	600	23.622	3M200060	54273	3M200090	54349
204	612	24.094	3M204060	54274	3M204090	54350
211	633	24.921	3M211060	54275	3M211090	54351
223	669	26.338	3M223060	54276	3M223090	54352
237	711	27.992	3M237060	54277	3M237090	54353
250	750	29.527	3M250060	54278	3M250090	54354
251	753	29.646	3M251060	54279	3M251090	54355
294	892	34.724	3M294060	54280	3M294090	54356
315	945	37.205	3M315060	54281	3M315090	54357
354	1062	41.811	3M354060	54282	3M354090	54358
375	1125	44.291	3M375060	54284	3M375090	54360
415	1245	49.016	3M415060	54285	3M415090	54361
421	1263	49.724	3M421060	54286	3M421090	54362
500	1500	59.055	3M500060	54287	3M500090	54363
510	1530	60.235	3M510060	54288	3M510090	54364
621	1863	73.346	3M621060	54289	3M621090	54365

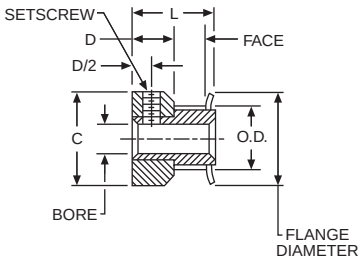
TIMING BELT PULLEYS

3mm PITCH ALUMINUM

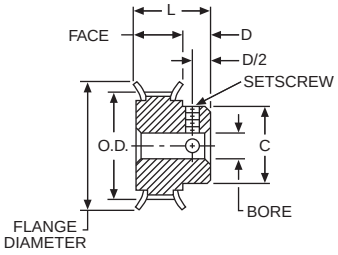
PA SERIES FOR 6mm WIDE BELTS

ALUMINUM ALLOY—CLEAR ANODIZED
COMPLETE WITH SETSCREWS

WITH FLANGES
10-17 GROOVES



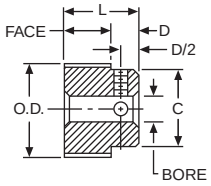
WITH FLANGES
18-44 GROOVES



STANDARD TOLERANCES

DIMENSION		TOLERANCES
BORE	All	+.001 – .000
O.D.	10-26 Grooves	+.002 – .000
	28-48 Grooves	+.003 – .000
	60-72 Grooves	+.004 – .000

WITHOUT FLANGES



ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Grooves	Pitch Dia.	O.D.	B	Face Width	C	D	L	Flange Dia.	Setscrew*	With Flanges		Without Flanges	
										Catalog Number	Item Code	Catalog Number	Item Code
10	.376	.346	.125	.282	.505	15/64	9/16	.505	#4-40	PA3010DF060	54448	—	—
11	.414	.384			.530			.530		PA3011DF060	54449	—	—
12	.451	.421	.1875		.580			.580	#6-40	PA3012DF060	54450	—	—
13	.489	.459			.610			.610		PA3013DF060	54451	—	—
14	.526	.496			.635			.635		PA3014DF060	54452	—	—
15	.564	.534			.685			.685		PA3015DF060	54453	—	—
16	.602	.572			.710			.710		PA3016DF060	54454	—	—
17	.639	.609			.740			.740		PA3017DF060	54455	—	—
18	.677	.647	.250	.386	.442	19/64	11/16	.790	#8-32	PA3018DF060	54456	PA3018NF060	54471
19	.714	.684			.468			.815		PA3019DF060	54457	PA3019NF060	54472
20	.752	.722			.500			.895		PA3020DF060	54458	PA3020NF060	54473
22	.827	.797			.562			.945		PA3022DF060	54459	PA3022NF060	54474
24	.902	.872			.625			1.025		PA3024DF060	54460	PA3024NF060	54475
25	.940	.910			.625			1.060		PA3025DF060	54461	PA3025NF060	54476
26	.977	.947			.625			1.105		PA3026DF060	54462	PA3026NF060	54477
28	1.053	1.023			.701			1.173		PA3028DF060	54463	PA3028NF060	54478
30	1.128	1.098			.776			1.250		PA3030DF060	54464	PA3030NF060	54479
32	1.203	1.173			.851			1.323		PA3032DF060	54465	PA3032NF060	54480
34	1.278	1.248		.407	.921		23/32	1.398		PA3034DF060	54466	PA3034NF060	54481
36	1.353	1.323			1.000			1.473		PA3036DF060	54467	PA3036NF060	54482
38	1.429	1.399			1.075			1.549		PA3038DF060	54468	PA3038NF060	54483
40	1.504	1.474			1.150			1.625		PA3040DF060	54469	PA3040NF060	54484
44	1.654	1.624			1.300			1.775		PA3044DF060	54470	PA3044NF060	54485
48	1.805	1.775	.3125		1.250	21/64	47/64	—		—	—	PA3048NF060	54486
50	1.880	1.850						—		—	—	PA3050NF060	54487
56	2.105	2.075						—		—	—	PA3056NF060	54488
60	2.256	2.226						—		—	—	PA3060NF060	54489
62	2.331	2.301						—		—	—	PA3062NF060	54490
72	2.707	2.677						—		—	—	PA3072NF060	54491

*Pulleys with 10 to 13 grooves have one setscrew. All others have two at 90°.

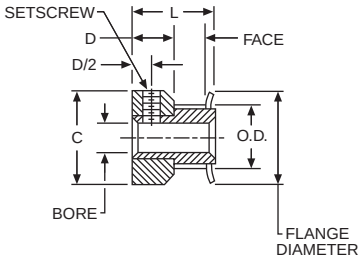
TIMING BELT PULLEYS

3mm PITCH ALUMINUM

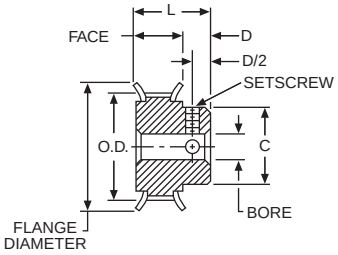
PA SERIES FOR 9mm WIDE BELTS

ALUMINUM ALLOY—CLEAR ANODIZED
COMPLETE WITH SETSCREWS

WITH FLANGES
10-17 GROOVES



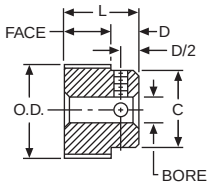
WITH FLANGES
18-44 GROOVES



STANDARD TOLERANCES

DIMENSION		TOLERANCES
BORE	All	+.001 –.000
O.D.	10-26 Grooves	+.002 –.000
	28-48 Grooves	+.003 –.000
	60-72 Grooves	+.004 –.000

WITHOUT FLANGES



ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Grooves	Pitch Dia.	O.D.	B	Face Width	C	D	L	Flange Dia.	Setscrew*	With Flanges		Without Flanges	
										Catalog Number	Item Code	Catalog Number	Item Code
10	.376	.346	.125	.401	.505	15/64	11/16	.505	#4-40	PA3010DF090	54492	—	—
11	.414	.384			.530			.530		PA3011DF090	54493	—	—
12	.451	.421	.1875		.580			.580		PA3012DF090	54494	—	—
13	.489	.459			.610			.610	#6-40	PA3013DF090	54495	—	—
14	.526	.496			.635			.635		PA3014DF090	54496	—	—
15	.564	.534			.685			.685		PA3015DF090	54497	—	—
16	.602	.572			.710			.710		PA3016DF090	54498	—	—
17	.639	.609			.740			.740		PA3017DF090	54499	—	—
18	.677	.647	.250	.506	.442	19/64	13/16	.790	#8-32	PA3018DF090	54500	PA3018NF090	54515
19	.714	.684			.468			.815		PA3019DF090	54501	PA3019NF090	54516
20	.752	.722			.500			.895		PA3020DF090	54502	PA3020NF090	54517
22	.827	.797			.562			.945		PA3022DF090	54503	PA3022NF090	54518
24	.902	.872			.625			1.025		PA3024DF090	54504	PA3024NF090	54519
25	.940	.910			.625			1.060		PA3025DF090	54505	PA3025NF090	54520
26	.977	.947			.625			1.105		PA3026DF090	54506	PA3026NF090	54521
28	1.053	1.023			.701			1.173		PA3028DF090	54507	PA3028NF090	54522
30	1.128	1.098			.776			1.250		PA3030DF090	54508	PA3030NF090	54523
32	1.203	1.173			.851			1.323		PA3032DF090	54509	PA3032NF090	54524
34	1.278	1.248		.527	.921		27/32	1.398		PA3034DF090	54510	PA3034NF090	54525
36	1.353	1.323			1.000			1.473		PA3036DF090	54511	PA3036NF090	54526
38	1.429	1.399			1.075			1.549		PA3038DF090	54512	PA3038NF090	54527
40	1.504	1.474			1.150			1.625		PA3040DF090	54513	PA3040NF090	54528
44	1.654	1.624			1.300			1.775		PA3044DF090	54514	PA3044NF090	54529
48	1.805	1.775	.3125	.500	1.250	3/8	7/8	—		—	—	PA3048NF090	54530
50	1.880	1.850						—		—	—	PA3050NF090	54531
56	2.105	2.075						—		—	—	PA3056NF090	54532
60	2.256	2.226						—		—	—	PA3060NF090	54533
62	2.331	2.301						—		—	—	PA3062NF090	54534
72	2.707	2.677						—		—	—	PA3072NF090	54535

*Pulleys with 10 to 13 grooves have one setscrew. All others have two at 90°.

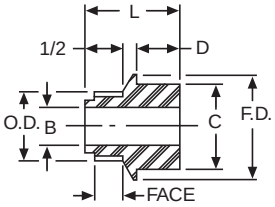
TIMING BELT PULLEYS

3mm PITCH LEXAN

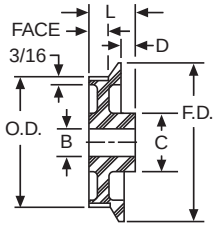
PL SERIES FOR 9mm WIDE BELTS

LEXAN—FIBERGLASS REINFORCED

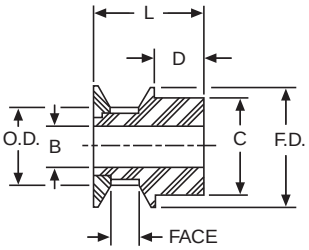
SINGLE FLANGE
10-28 GROOVES



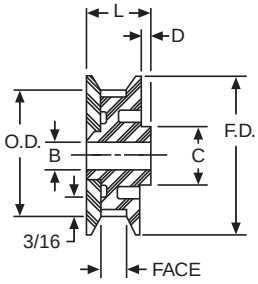
SINGLE FLANGE
32-120 GROOVES



DOUBLE FLANGE
10-28 GROOVES



DOUBLE FLANGE
32-80 GROOVES



STANDARD TOLERANCES

DIMENSION		TOLERANCES
BORE	All	+.001 –.000

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Grooves	Pitch Dia.	O.D.	B	Face Width	C	D	L	Flange Dia.	Single Flange Catalog Number	Single Flange Item Code	Double Flange Catalog Number	Double Flange Item Code
10	.376	.346							PL3010SF090	54536	PL3010DF090	54560
11	.414	.384			5/8		3/4*	.63	PL3011SF090	54537	PL3011DF090	54561
12	.451	.421							PL3012SF090	54538	PL3012DF090	54562
13	.489	.459						.69	PL3013SF090	54539	PL3013DF090	54563
14	.526	.496							PL3014SF090	54540	PL3014DF090	54564
15	.564	.534	3/16					.73	PL3015SF090	54541	PL3015DF090	54565
16	.602	.572						.78	PL3016SF090	54542	PL3016DF090	54566
17	.639	.609			11/16			,87	PL3017SF090	54543	PL3017DF090	54567
18	.677	.647				1/4		.93	PL3018SF090	54544	PL3018DF090	54568
19	.714	.684						.93	PL3019SF090	54545	PL3019DF090	54569
20	.752	.722		7/16				.93	PL3020SF090	54546	PL3020DF090	54570
22	.827	.797					13/16	1.06	PL3022SF090	54547	PL3022DF090	54571
25	.940	.910						1.19	PL3025SF090	54548	PL3025DF090	54572
28	1.053	1.023			3/4			1.24	PL3028SF090	54549	PL3028DF090	54573
32	1.203	1.173	1/4					1.44	PL3032SF090	54550	PL3032DF090	54574
36	1.353	1.323						1.57	PL3036SF090	54551	PL3036DF090	54575
40	1.504	1.474						1.76	PL3040SF090	54552	PL3040DF090	54576
48	1.805	1.775						2.02	PL3048SF090	54553	PL3048DF090	54577
60	2.256	2.226			7/8			2.46	PL3060SF090	54554	PL3060DF090	54578
72	2.707	2.677					13/16**	2.92	PL3072SF090	54555	PL3072DF090	54579
80	3.008	2.978	5/16			5/16		3.29	PL3080SF090	54556	PL3080DF090	54580
84	3.158	3.128					13/16	3.38	PL3084SF090	54557	—	—
96	3.609	3.579			1			3.83	PL3096SF090	54558	—	—
120	4.511	4.481	3/8	1/2		3/8	7/8	—	PL3120NF090†	54559	—	—

*13/16" for Double Flanges.
**7/8" for Double Flanges.
†No Flange.

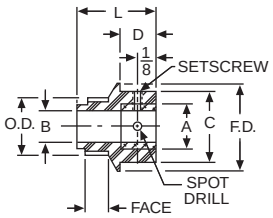
TIMING BELT PULLEYS

3mm PITCH LEXAN

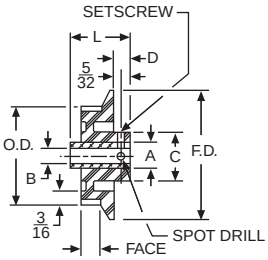
PLB SERIES FOR 9mm WIDE BELTS

LEXAN—FIBERGLASS REINFORCED
KNURLED ALUMINUM INSERTS
COMPLETE WITH SETSCREWS

SINGLE FLANGE
10-16 GROOVES



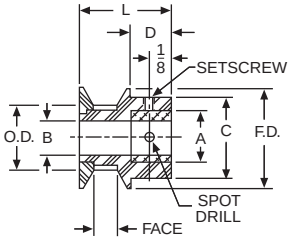
SINGLE FLANGE
17-28 GROOVES



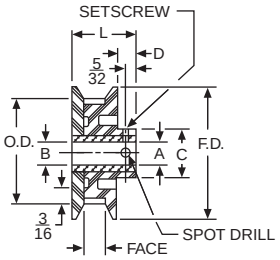
STANDARD TOLERANCES

DIMENSION		TOLERANCES
BORE	All	+.001 –.000

DOUBLE FLANGE
10-16 GROOVES



DOUBLE FLANGE
17-28 GROOVES



ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Grooves	Pitch Dia.	O.D.	B	Face Width	C	D	Insert Dia.	L	Flange Dia.	Setscrew	Single Flange Catalog Number	Single Flange Item Code	Double Flange Catalog Number	Double Flange Item Code
10	.376	.346									PLB3010SF090	54581	PLB3010DF090	54633
11	.414	.384			5/8				.63		PLB3011SF090	54582	PLB3011DF090	54634
12	.451	.421						3/4			PLB3012SF090	54583	PLB3012DF090	54635
13	.489	.459	3/16						.69		PLB3013SF090	54584	PLB3013DF090	54636
14	.526	.496									PLB3014SF090	54585	PLB3014DF090	54637
15	.564	.534							.73		PLB3015SF090	54586	PLB3015DF090	54638
16	.602	.572							.78		PLB3016SF090	54587	PLB3016DF090	54639
17	.639	.609	3/16 1/4						.87		PLB3017SF090-3/16 PLB3017SF090-1/4	54588 54589	PLB3017DF090-3/16 PLB3017DF090-1/4	54640 54641
18	.677	.647	3/16 1/4	7/16	11/16	1/4	3/8		.93	#6-32	PLB3018SF090-3/16 PLB3018SF090-1/4	54590 54591	PLB3018DF090-3/16 PLB3018DF090-1/4	54642 54643
19	.714	.684	3/16 1/4								PLB3019SF090-3/16 PLB3019SF090-1/4	54592 54593	PLB3019DF090-3/16 PLB3019DF090-1/4	54644 54645
20	.752	.722	3/16 1/4					13/16			PLB3020SF090-3/16 PLB3020SF090-1/4	54594 54595	PLB3020DF090-3/16 PLB3020DF090-1/4	54646 54647
22	.827	.797	3/16 1/4						1.06		PLB3022SF090-3/16 PLB3022SF090-1/4	54596 54597	PLB3022DF090-3/16 PLB3022DF090-1/4	54648 54649
25	.940	.910	1/4 5/16 3/8		3/4		1/2		1.19	#8-32	PLB3025SF090-1/4 PLB3025SF090-5/16 PLB3025SF090-3/8	54598 54599 54600	PLB3025DF090-1/4 PLB3025DF090-5/16 PLB3025DF090-3/8	54650 54651 54652
28	1.053	1.023	1/4 5/16 3/8						1.24		PLB3028SF090-1/4 PLB3028SF090-5/16 PLB3028SF090-3/8	54601 54602 54603	PLB3028DF090-1/4 PLB3028DF090-5/16 PLB3028DF090-3/8	54653 54654 54655

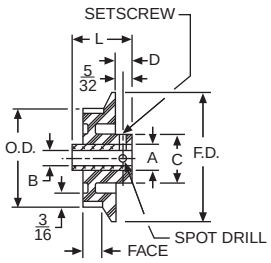
TIMING BELT PULLEYS

3mm PITCH
LEXAN

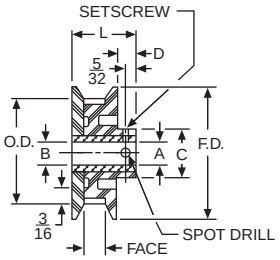
PLB SERIES
FOR 9mm WIDE BELTS

LEXAN—FIBERGLASS REINFORCED
KNURLED ALUMINUM INSERTS
COMPLETE WITH SETSCREWS

SINGLE FLANGE



DOUBLE FLANGE



STANDARD TOLERANCES

DIMENSION		TOLERANCES
BORE	All	+.001 – .000

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

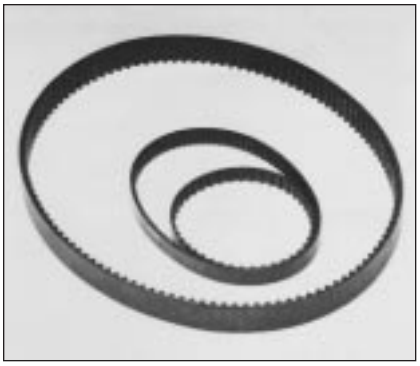
No. of Grooves	Pitch Dia.	O.D.	B	Face Width	C	D	Insert Dia.	L	Flange Dia.	Setscrew	Single Flange Catalog Number	Single Flange Item Code	Double Flange Catalog Number	Double Flange Item Code
32	1.203	1.173	1/4 5/16 3/8	7/16	3/4	1/4	1/2	13/16	1.44	#8-32	PLB3032SF090-1/4 PLB3032SF090-5/16 PLB3032SF090-3/8	54604 54605 54606	PLB3032DF090-1/4 PLB3032DF090-5/16 PLB3032DF090-3/8	54656 54657 54658
36	1.353	1.323	1/4 5/16 3/8		7/8				1.57		PLB3036SF090-1/4 PLB3036SF090-5/16 PLB3036SF090-3/8	54607 54608 54609	PLB3036DF090-1/4 PLB3036DF090-5/16 PLB3036DF090-3/8	54659 54660 54661
40	1.504	1.474	1/4 5/16 3/8						1.76		PLB3040SF090-1/4 PLB3040SF090-5/16 PLB3040SF090-3/8	54610 54611 54612	PLB3040DF090-1/4 PLB3040DF090-5/16 PLB3040DF090-3/8	54662 54663 54664
48	1.805	1.775	1/4 5/16 3/8						2.02		PLB3048SF090-1/4 PLB3048SF090-5/16 PLB3048SF090-3/8	54613 54614 54615	PLB3048DF090-1/4 PLB3048DF090-5/16 PLB3048DF090-3/8	54665 54666 54667
60	2.256	2.226	5/16 3/8 1/2			5/16	5/8	13/16†	2.46	#10-32	PLB3060SF090-5/16 PLB3060SF090-3/8 PLB3060SF090-1/2	54616 54617 54618	PLB3060DF090-5/16 PLB3060DF090-3/8 PLB3060DF090-1/2	54668 54669 54670
72	2.707	2.677	5/16 3/8 1/2						2.92		PLB3072SF090-5/16 PLB3072SF090-3/8 PLB3072SF090-1/2	54619 54620 54621	PLB3072DF090-5/16 PLB3072DF090-3/8 PLB3072DF090-1/2	54671 54672 54673
80	3.008	2.978	5/16 3/8 1/2						3.29		PLB3080SF090-5/16 PLB3080SF090-3/8 PLB3080SF090-1/2	54622 54623 54624	PLB3080DF090-5/16 PLB3080DF090-3/8 PLB3080DF090-1/2	54674 54675 54676
84	3.158	3.128	5/16 3/8 1/2					13/16	3.38		PLB3084SF090-5/16 PLB3084SF090-3/8 PLB3084SF090-1/2	54625 54626 54627	— — —	— — —
96	3.609	3.579	5/16 3/8 1/2		1				3.83		PLB3096SF090-5/16 PLB3096SF090-3/8 PLB3096SF090-1/2	54628 54629 54630	— — —	— — —
120	4.511	4.481	3/8 1/2	1/2		3/8		7/8	—		PLB3120NF090-3/8* PLB3120NF090-1/2*	54631 54632	— —	— —

†7/8" for Double Flange
*No Flange

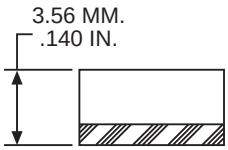
MINIATURE HTD TIMING BELTS

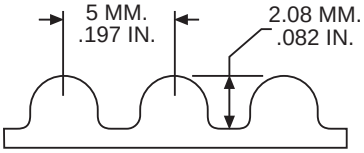
5mm PITCH

5M SERIES
9 and 15mm WIDTHS



NEOPRENE—NYLON COVERED, FIBERGLASS REINFORCED
AMBIENT TEMPERATURE RANGE— –18°C to +85°C
BREAKING STRENGTH—9 mm WIDTH—234 KGS
15 mm WIDTH—390 KGS





ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Grooves	Pitch Length		9mm Belt Width		15mm Belt Width	
	mm	Inch	Catalog Number	Item Code	Catalog Number	Item Code
64	320	12.598	—	—	5M064150	54407
66	330	12.992	5M066090	54367	5M066150	54408
70	350	13.779	5M070090	54368	5M070150	54409
75	375	14.764	5M075090	54369	5M075150	54410
80	400	15.748	5M080090	54370	5M080150	54411
85	425	16.732	5M085090	54371	5M085150	54412
90	450	17.716	5M090090	54372	5M090150	54413
95	475	18.700	5M095090	54373	5M095150	54414
100	500	19.685	5M100090	54374	5M100150	54415
104	520	20.472	5M104090	54375	5M104150	54416
107	535	21.063	5M107090	54376	5M107150	54417
113	565	22.244	5M113090	54377	5M113150	54418
120	600	23.622	5M120090	54378	5M120150	54419
123	615	24.213	5M123090	54379	5M123150	54420
127	635	25.000	5M127090	54380	5M127150	54421
133	665	26.181	5M133090	54381	5M133150	54422
134	670	26.378	5M134090	54382	5M134150	54423
142	710	27.953	5M142090	54383	5M142150	54424
148	740	29.134	5M148090	54384	5M148150	54425
151	755	29.724	5M151090	54385	5M151150	54426
160	800	31.496	5M160090	54386	5M160150	54427
166	830	32.677	5M166090	54387	5M166150	54428
167	835	32.874	5M167090	54388	5M167150	54429
170	850	33.464	5M170090	54389	5M170150	54430
178	890	35.039	5M178090	54390	5M178150	54431
185	925	36.417	5M185090	54391	5M185150	54432
186	930	36.614	5M186090	54392	5M186150	54433
190	950	37.401	5M190090	54393	5M190150	54434
200	1000	39.370	5M200090	54394	5M200150	54435
210	1050	41.339	5M210090	54395	5M210150	54436
225	1125	44.291	5M225090	54396	5M225150	54437
254	1270	50.000	5M254090	54397	5M254150	54438
284	1420	55.905	5M284090	54398	5M284150	54439
319	1595	62.795	5M319090	54399	5M319150	54440
358	1790	70.472	5M358090	54400	5M358150	54441
360	1800	70.866	5M360090	54401	5M360150	54442
374	1870	73.622	5M374090	54402	5M374150	54443
379	1895	74.606	5M379090	54403	5M379150	54444
389	1945	76.575	5M389090	54404	5M389150	54445
400	2000	78.740	5M400090	54405	5M400150	54446
505	2525	99.409	5M505090	54406	5M505150	54447

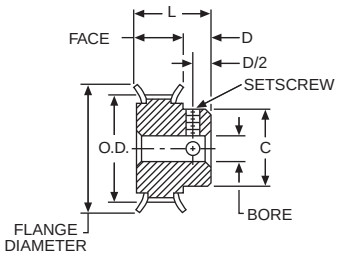
TIMING BELT PULLEYS

5mm PITCH ALUMINUM

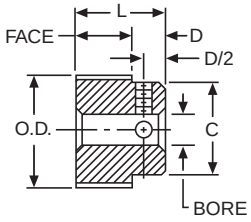
PA SERIES FOR 9mm WIDE BELTS

ALUMINUM ALLOY—CLEAR ANODIZED
COMPLETE WITH SETSCREWS

WITH FLANGE



WITHOUT FLANGE



STANDARD TOLERANCES

DIMENSION		TOLERANCES
BORE	All	+.001 – .000
O.D.	12–16 Grooves	+.002 – .000
	17–32 Grooves	+.003 – .000
	34–62 Grooves	+.004 – .000
	72 Grooves	+.005 – .000

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Grooves	Pitch Dia.	O.D.	B	Face Width	C	D	L	Flange Dia.	Setscrew*	With Flange		Without Flange	
										Catalog Number	Item Code	Catalog Number	Item Code
12	.752	.707	.250	35/64	7/16	1/4	51/64	7/8	#8-32	PA5012DF090	54677	PA5012NF090	54694
13	.815	.770			1/2			15/16		PA5013DF090	54678	PA5013NF090	54695
14	.877	.832			1/2			1		PA5014DF090	54679	PA5014NF090	54696
15	.940	.895			9/16			1-1/16		PA5015DF090	54680	PA5015NF090	54697
16	1.003	.958			9/16			1-3/32		PA5016DF090	54681	PA5016NF090	54698
17	1.065	1.020			5/8			1-3/16		PA5017DF090	54682	PA5017NF090	54699
18	1.128	1.083			11/16			1-1/4		PA5018DF090	54683	PA5018NF090	54700
19	1.191	1.146			3/4			1-5/16		PA5019DF090	54684	PA5019NF090	54701
20	1.253	1.208			13/16			1-3/8		PA5020DF090	54685	PA5020NF090	54702
22	1.379	1.334			15/16			1-1/2		PA5022DF090	54686	PA5022NF090	54703
24	1.504	1.459			1	5/16	55/64	1-5/8		PA5024DF090	54687	PA5024NF090	54704
25	1.566	1.521			1			1-11/16		PA5025DF090	54688	PA5025NF090	54705
26	1.629	1.584			1-1/16			1-3/4		PA5026DF090	54689	PA5026NF090	54706
28	1.754	1.709			1-3/16			1-7/8		PA5028DF090	54690	PA5028NF090	54707
30	1.880	1.835			1-3/16			2		PA5030DF090	54691	PA5030NF090	54708
32	2.005	1.960			1-1/4			2-1/8		PA5032DF090	54692	PA5032NF090	54709
34	2.130	2.085			1-3/8			2-1/4		PA5034DF090	54693	PA5034NF090	54710
36	2.256	2.211	.3125		1-1/2	25/64	15/16	—		—	—	PA5036NF090	54711
38	2.381	2.336						—		—	—	PA5038NF090	54712
40	2.506	2.461						—		—	—	PA5040NF090	54713
44	2.757	2.712						—		—	—	PA5044NF090	54714
48	3.008	2.963	.375					—	#10-32	—	—	PA5048NF090	54715
50	3.133	3.088						—		—	—	PA5050NF090	54716
56	3.509	3.464						—		—	—	PA5056NF090	54717
60	3.760	3.715						—		—	—	PA5060NF090	54718
62	3.885	3.840						—		—	—	PA5062NF090	54719
72	4.511	4.466						—		—	—	PA5072NF090	54720

*Pulleys with 12 and 13 grooves have one setscrew. All others have two at 90°.

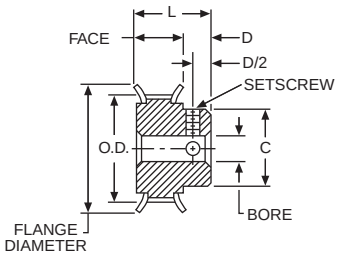
TIMING BELT PULLEYS

5mm PITCH ALUMINUM

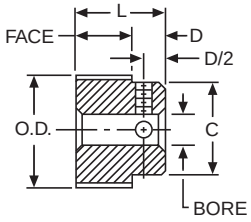
PA SERIES FOR 15mm WIDE BELTS

ALUMINUM ALLOY—CLEAR ANODIZED†
COMPLETE WITH SETSCREWS

WITH FLANGE



WITHOUT FLANGE



STANDARD TOLERANCES

DIMENSION		TOLERANCES
BORE	All	+.001 – .000
O.D.	12–16 Grooves	+.002 – .000
	17–32 Grooves	+.003 – .000
	34–62 Grooves	+.004 – .000
	72 Grooves	+.005 – .000

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Grooves	Pitch Dia.	O.D.	B	Face Width	C	D	L	Flange Dia.	Setscrew*	With Flange		Without Flange	
										Catalog Number	Item Code	Catalog Number	Item Code
12	.752	.707			7/16			7/8		PA5012DF150	54721	PA5012NF150	54738
13	.815	.770			1/2			15/16		PA5013DF150	54722	PA5013NF150	54739
14	.877	.832			1/2			1		PA5014DF150	54723	PA5014NF150	54740
15	.940	.895			9/16			1-1/16		PA5015DF150	54724	PA5015NF150	54741
16	1.003	.958			9/16	1/4	1-1/32	1-3/32		PA5016DF150	54725	PA5016NF150	54742
17	1.065	1.020			5/8			1-3/16		PA5017DF150	54726	PA5017NF150	54743
18	1.128	1.083			11/16			1-1/4		PA5018DF150	54727	PA5018NF150	54744
19	1.191	1.146			3/4			1-5/16		PA5019DF150	54728	PA5019NF150	54745
20	1.253	1.208	.250		13/16			1-3/8		PA5020DF150	54729	PA5020NF150	54746
22	1.379	1.334			15/16			1-1/2		PA5022DF150	54730	PA5022NF150	54747
24	1.504	1.459			1			1-5/8	#8-32	PA5024DF150	54731	PA5024NF150	54748
25	1.566	1.521			1			1-11/16		PA5025DF150	54732	PA5025NF150	54749
26	1.629	1.584			1-1/16			1-3/4		PA5026DF150	54733	PA5026NF150	54750
28	1.754	1.709		25/32	1-3/16	5/16	1-3/32	1-7/8		PA5028DF150	54734	PA5028NF150	54751
30	1.880	1.835			1-3/16			2		PA5030DF150	54735	PA5030NF150	54752
32	2.005	1.960			1-1/4			2-1/8		PA5032DF150	54736	PA5032NF150	54753
34	2.130	2.085			1-3/8			2-1/4		PA5034DF150	54737	PA5034NF150	54754
36	2.256	2.211						—		—	—	PA5036NF150	54755
38	2.381	2.336	.3125					—		—	—	PA5038NF150	54756
40	2.506	2.461						—		—	—	PA5040NF150	54757
44	2.757	2.712						—		—	—	PA5044NF150	54758
48	3.008	2.963			1-1/2	13/32	1-3/16	—		—	—	PA5048NF150	54759
50	3.133	3.088						—		—	—	PA5050NF150	54760
56	3.509	3.464	.375					—	#10-32	—	—	PA5056NF150	54761
60	3.760	3.715						—		—	—	PA5060NF150	54762
62	3.885	3.840						—		—	—	PA5062NF150	54763
72	4.511	4.466						—		—	—	PA5072NF150	54764

*Pulleys with 12 and 13 grooves have one setscrew. All others have two at 90°.
†44-72 grooves material is A356-T6 (cast).

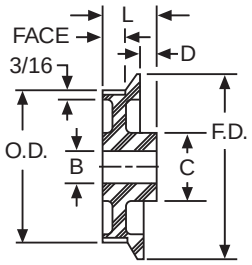
TIMING BELT PULLEYS

5mm PITCH
LEXAN

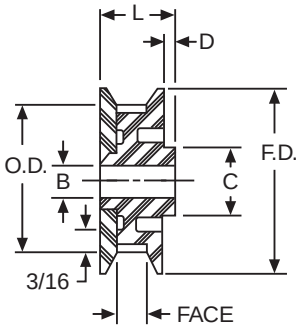
PL SERIES
FOR 9mm WIDE BELTS

LEXAN—FIBERGLASS REINFORCED

SINGLE FLANGE



DOUBLE FLANGE



STANDARD TOLERANCES

DIMENSION		TOLERANCES
BORE	All	+.001 – .000

ALL DIMENSIONS IN INCHES
ORDER BY CATALOG NUMBER OR ITEM CODE

No. of Grooves	Pitch Dia.	O.D.	B	Face Width	C	D	L	Flange Dia.	Single Flange Catalog Number	Single Flange Item Code	Double Flange Catalog Number	Double Flange Item Code
11	.689	.644	3/16	7/16	11/16	1/4	13/16	.87	PL5011SF090	54765	PL5011DF090	54782
12	.752	.707						.93	PL5012SF090	54766	PL5012DF090	54783
13	.815	.770						.99	PL5013SF090	54767	PL5013DF090	54784
14	.877	.832						1.06	PL5014SF090	54768	PL5014DF090	54785
15	.940	.895	1/4		3/4			1.19	PL5015SF090	54769	PL5015DF090	54786
16	1.003	.958						1.19	PL5016SF090	54770	PL5016DF090	54787
17	1.065	1.020						1.24	PL5017SF090	54771	PL5017DF090	54788
18	1.128	1.083						1.31	PL5018SF090	54772	PL5018DF090	54789
19	1.191	1.146						1.38	PL5019SF090	54773	PL5019DF090	54790
20	1.253	1.208			7/8			1.44	PL5020SF090	54774	PL5020DF090	54791
22	1.379	1.334						1.57	PL5022SF090	54775	PL5022DF090	54792
25	1.566	1.521						1.76	PL5025SF090	54776	PL5025DF090	54793
28	1.754	1.709						1.95	PL5028SF090	54777	PL5028DF090	54794
29	1.817	1.772						2.02	PL5029SF090	54778	PL5029DF090	54795
30	1.880	1.835						2.08	PL5030SF090	54779	PL5030DF090	54796
40	2.506	2.461	5/16			5/16	13/16*	2.71	PL5040SF090	54780	PL5050DF090	54797
50	3.133	3.088						3.29	PL5050SF090	54781	PL5050DF090	54798

*7/8" for Double Flange.

TIMING BELT PULLEYS

5mm PITCH
LEXAN

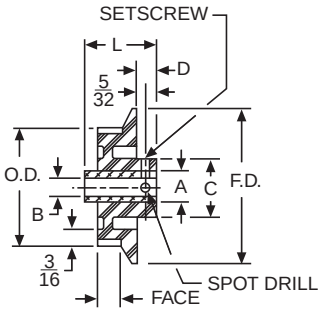
PLB SERIES
FOR 9mm WIDE BELTS

LEXAN—FIBERGLASS REINFORCED
KNURLED ALUMINUM INSERTS
COMPLETE WITH SETSCREWS

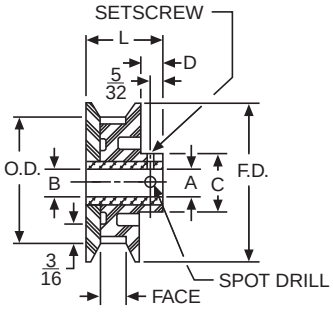
STANDARD TOLERANCES

DIMENSION		TOLERANCES
BORE	All	+.001 – .000

SINGLE FLANGE



DOUBLE FLANGE



No. of Grooves	Pitch Dia.	O.D.	B	Face Width	C	D	Insert Dia.	L	Flange Dia.	Setscrew	Single Flange Catalog Number	Single Flange Item Code	Double Flange Catalog Number	Double Flange Item Code
11	.689	.644	3/16 1/4	7/16	11/16	1/4	3/8	13/16	.87	#6-32	PLB5011SF090-3/16 PLB5011SF090-1/4	54799 54800	PLB5011DF090-3/16 PLB5011DF090-1/4	54846 54847
12	.752	.707	3/16 1/4						.93		PLB5012SF090-3/16 PLB5012SF090-1/4	54801 54802	PLB5012DF090-3/16 PLB5012DF090-1/4	54848 54849
13	.815	.770	3/16 1/4						.99		PLB5013SF090-3/16 PLB5013SF090-1/4	54803 54804	PLB5013DF090-3/16 PLB5013DF090-1/4	54850 54851
14	.877	.832	3/16 1/4						1.06		PLB5014SF090-3/16 PLB5014SF090-1/4	54805 54806	PLB5014DF090-3/16 PLB5014DF090-1/4	54852 54853
15	.940	.895	1/4 5/16 3/8		3/4		1/2		1.19	#8-32	PLB5015SF090-1/4 PLB5015SF090-5/16 PLB5015SF090-3/8	54807 54808 54809	PLB5015DF090-1/4 PLB5015DF090-5/16 PLB5015DF090-3/8	54854 54855 54856
16	1.003	.958	1/4 5/16 3/8						1.19		PLB5016SF090-1/4 PLB5016SF090-5/16 PLB5016SF090-3/8	54810 54811 54812	PLB5016DF090-1/4 PLB5016DF090-5/16 PLB5016DF090-3/8	54857 54858 54859
17	1.065	1.020	1/4 5/16 3/8						1.24		PLB5017SF090-1/4 PLB5017SF090-5/16 PLB5017SF090-3/8	54813 54814 54815	PLB5017DF090-1/4 PLB5017DF090-5/16 PLB5017DF090-3/8	54860 54861 54862
18	1.128	1.083	1/4 5/16 3/8						1.31		PLB5018SF090-1/4 PLB5018SF090-5/16 PLB5018SF090-3/8	54816 54817 54818	PLB5018DF090-1/4 PLB5018DF090-5/16 PLB5018DF090-3/8	54863 54864 54865
19	1.191	1.146	1/4 5/16 3/8						1.38		PLB5019SF090-1/4 PLB5019SF090-5/16 PLB5019SF090-3/8	54819 54820 54821	PLB5019DF090-1/4 PLB5019DF090-5/16 PLB5019DF090-3/8	54866 54867 54868
20	1.253	1.208	1/4 5/16 3/8						1.44		PLB5020SF090-1/4 PLB5020SF090-5/16 PLB5020SF090-3/8	54822 54823 54824	PLB5020DF090-1/4 PLB5020DF090-5/16 PLB5020DF090-3/8	54869 54870 54871
22	1.379	1.334	1/4 5/16 3/8		7/8				1.57		PLB5022SF090-1/4 PLB5022SF090-5/16 PLB5022SF090-3/8	54825 54826 54827	PLB5022DF090-1/4 PLB5022DF090-5/16 PLB5022DF090-3/8	54872 54873 54874
25	1.566	1.521	1/4 5/16 3/8						1.76		PLB5025SF090-1/4 PLB5025SF090-5/16 PLB5025SF090-3/8	54828 54829 54830	PLB5025DF090-1/4 PLB5025DF090-5/16 PLB5025DF090-3/8	54875 54876 54877
28	1.754	1.709	1/4 5/16 3/8						1.95		PLB5028SF090-1/4 PLB5028SF090-5/16 PLB5028SF090-3/8	54831 54832 54833	PLB5028DF090-1/4 PLB5028DF090-5/16 PLB5028DF090-3/8	54878 54879 54880
29	1.817	1.772	1/4 5/16 3/8						2.02		PLB5029SF090-1/4 PLB5029SF090-5/16 PLB5029SF090-1/4	54834 54835 54836	PLB5029DF090-1/4 PLB5029DF090-5/16 PLB5029DF090-1/4	54881 54882 54883
30	1.880	1.835	1/4 5/16 3/8						2.08		PLB5030SF090-1/4 PLB5030SF090-5/16 PLB5030SF090-3/8	54837 54838 54839	PLB5030DF090-1/4 PLB5030DF090-5/16 PLB5030DF090-3/8	54884 54885 54886
40	2.506	2.461	5/16 3/8 1/2			5/16	5/8	13/16*	2.71	#10-32	PLB5040SF090-5/16 PLB5040SF090-3/8 PLB5040SF090-1/2	54840 54841 54842	PLB5040DF090-5/16 PLB5040DF090-3/8 PLB5040DF090-1/2	54887 54888 54889
50	3.133	3.088	5/16 3/8 1/2						3.29		PLB5050SF090-5/16 PLB5050SF090-3/8 PLB5050SF090-1/2	54843 54844 54845	PLB5050DF090-5/16 PLB5050DF090-3/8 PLB5050DF090-1/2	54890 54891 54892

*7/8" for Double Flange.

ENGINEERING INFORMATION

SECTION CONTENTS

SPUR GEARS
GEAR NOMENCLATURE

ADDENDUM (a) is the height by which a tooth projects beyond the pitch circle or pitch line.

BASE DIAMETER (D_b) is the diameter of the base cylinder from which the involute portion of a tooth profile is generated.

BACKLASH (B) is the amount by which the width of a tooth space exceeds the thickness of the engaging tooth on the pitch circles. As actually indicated by measuring devices, backlash may be determined variously in the transverse, normal, or axial-planes, and either in the direction of the pitch circles or on the line of action. Such measurements should be corrected to corresponding values on transverse pitch circles for general comparisons.

BORE LENGTH is the total length through a gear, sprocket, or coupling bore.

CIRCULAR PITCH (p) is the distance along the pitch circle or pitch line between corresponding profiles of adjacent teeth.

CIRCULAR THICKNESS (t) is the length of arc between the two sides of a gear tooth on the pitch circle, unless otherwise specified.

CLEARANCE-OPERATING (c) is the amount by which the dedendum in a given gear exceeds the addendum of its mating gear.

CONTACT RATIO (m_c) in general, the number of angular pitches through which a tooth surface rotates from the beginning to the end of contact.

DEDENDUM (b) is the depth of a tooth space below the pitch line. It is normally greater than the addendum of the mating gear to provide clearance.

DIAMETRAL PITCH (P) is the ratio of the number of teeth to the pitch diameter.

FACE WIDTH (F) is the length of the teeth in an axial plane.

FILLET RADIUS (r_f) is the radius of the fillet curve at the base of the gear tooth.

FULL DEPTH TEETH are those in which the working depth equals 2.000 divided by the normal diametral pitch.

GEAR is a machine part with gear teeth. When two gears run together, the one with the larger number of teeth is called the gear.

HUB DIAMETER is outside diameter of a gear, sprocket or coupling hub.

HUB PROJECTION is the distance the hub extends beyond the gear face.

INVOLUTE TEETH of spur gears, helical gears and worms are those in which the active portion of the profile in the transverse plane is the involute of a circle.

LONG- AND SHORT-ADDENDUM TEETH are those of engaging gears (on a standard designed center distance) one of which has a long addendum and the other has a short addendum.

KEYWAY is the machined groove running the length of the bore. A similar groove is machined in the shaft and a key fits into this opening.

NORMAL DIAMETRAL PITCH (P_n) is the value of the diametral pitch as calculated in the normal plane of a helical gear or worm.

NORMAL PLANE is the plane normal to the tooth surface at a pitch point and perpendicular to the pitch plane. For a helical gear this plane can be normal to one tooth at a point laying in the plane surface. At such point, the normal plane contains the line normal to the tooth surface and this is normal to the pitch circle.

NORMAL PRESSURE ANGLE ($ø_n$) in a normal plane of helical tooth.

OUTSIDE DIAMETER (D_o) is the diameter of the addendum (outside) circle.

SPUR GEARS
GEAR NOMENCLATURE (Continued)

PITCH CIRCLE is the circle derived from a number of teeth and a specified diametral or circular pitch. Circle on which spacing or tooth profiles is established and from which the tooth proportions are constructed.

PITCH CYLINDER is the cylinder of diameter equal to the pitch circle.

PINION is a machine part with gear teeth. When two gears run together, the one with the smaller number of teeth is called the pinion.

PITCH DIAMETER (D) is the diameter of the pitch circle. In parallel shaft gears, the pitch diameters can be determined directly from the center distance and the number of teeth.

PRESSURE ANGLE (ø) is the angle at a pitch point between the line of pressure which is normal to the tooth surface, and the plane tangent to the pitch surface. In involute teeth, pressure angle is often described also as the angle between the line of action and the line tangent to the pitch circle. Standard pressure angles are established in connection with standard gear-tooth proportions.

ROOT DIAMETER (D_r) is the diameter at the base of the tooth space.

PRESSURE ANGLE—OPERATING ($ø_r$) is determined by the center distance at which the gears operate. It is the pressure angle at the operating pitch diameter.

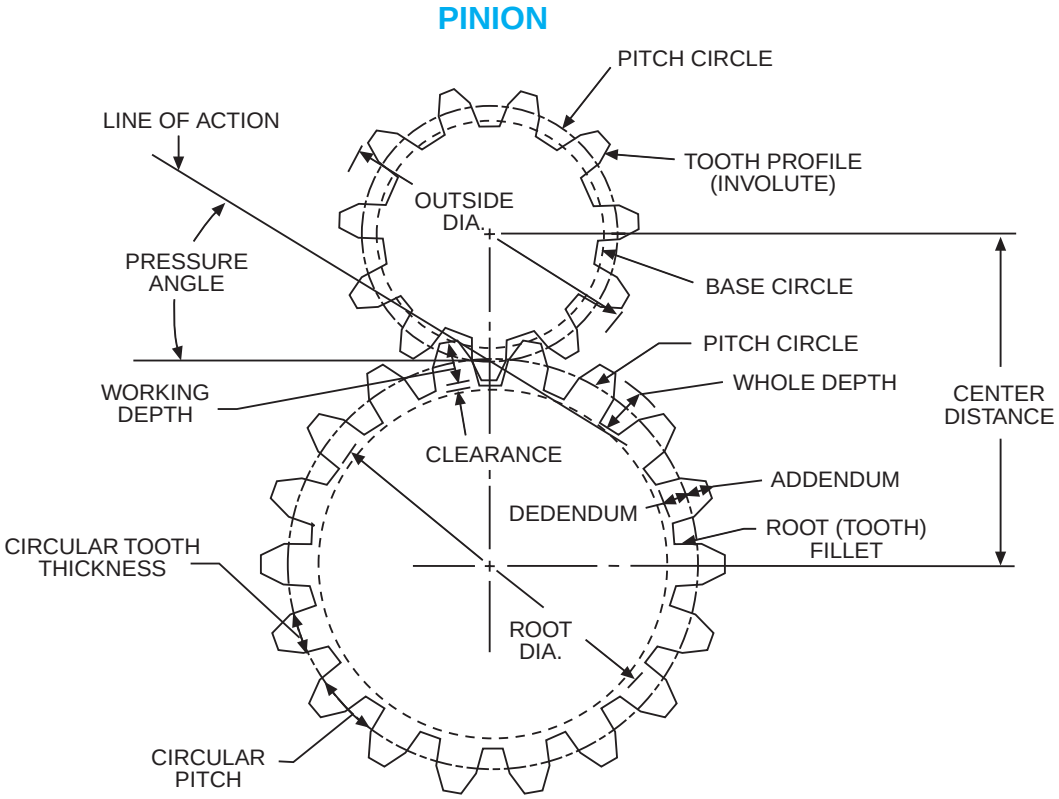
TIP RELIEF is an arbitrary modification of a tooth profile whereby a small amount of material is removed near the tip of the gear tooth.

UNDERCUT is a condition in generated gear teeth when any part of the fillet curve lies inside a line drawn tangent to the working profile at its point of juncture with the fillet.

WHOLE DEPTH (h_t) is the total depth of a tooth space, equal to addendum plus dedendum, equal to the working depth plus variance.

WORKING DEPTH (h_k) is the depth of engagement of two gears; that is, the sum of their addendums.

TOOTH PARTS

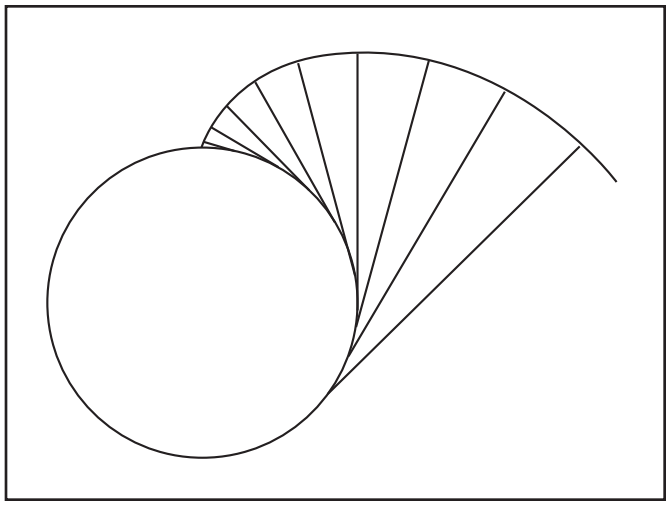


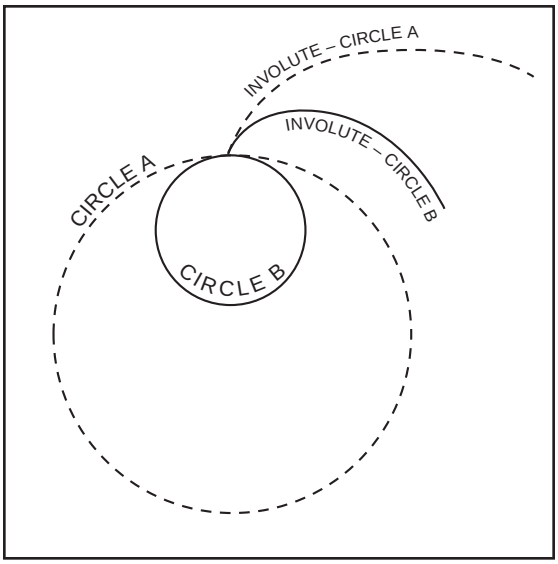
SPUR GEARS
INVOLUTE FORM

Gear teeth could be manufactured with a wide variety of shapes and profiles. The involute profile is the most commonly used system for gearing today, and all Boston spur and helical gears are of involute form.

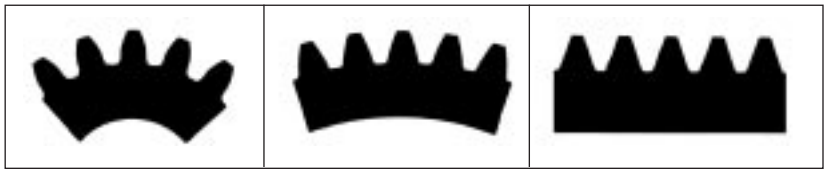
An involute is a curve that is traced by a point on a taut cord unwinding from a circle, which is called a BASE CIRCLE. The involute is a form of spiral, the curvature of which becomes straighter as it is drawn from a base circle and eventually would become a straight line if drawn far enough.

An involute drawn from a larger base circle will be less curved (straighter) than one drawn from a smaller base circle. Similarly, the involute tooth profile of smaller gears is considerably curved, on larger gears is less curved (straighter), and is straight on a rack, which is essentially an infinitely large gear.





Involute gear tooth forms and standard tooth proportions are specified in terms of a basic rack which has straight-sided teeth, for involute systems.



20 TEETH | 48 TEETH | RACK

SPUR GEARS

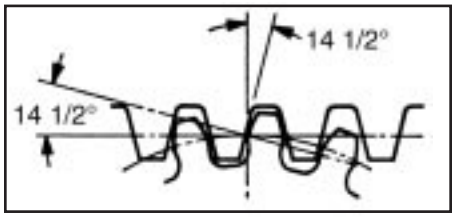
DIAMETRAL PITCH SYSTEM

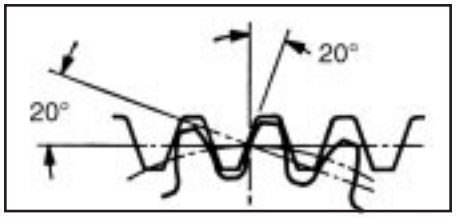
All stock gears are made in accordance with the diametral pitch system. The diametral pitch of a gear is the number of teeth in the gear for each inch of pitch diameter. Therefore, the diametral pitch determines the size of the gear tooth.

PRESSURE ANGLE

Pressure angle is the angle at a pitch point between the line of pressure which is normal to the tooth surface, and the plane tangent to the pitch surface. The pressure angle, as defined in this catalog, refers to the angle when the gears are mounted on their standard center distances.

Boston Gear manufactures both 14-1/2° and 20° PA, involute, full depth system gears. While 20°PA is generally recognized as having higher load carrying capacity, 14-1/2°PA gears have extensive use. The lower pressure angle results in less change in backlash due to center distance variation and concentricity errors. It also provides a higher contact ratio and consequent smoother, quieter operation provided that undercut of teeth is not present.

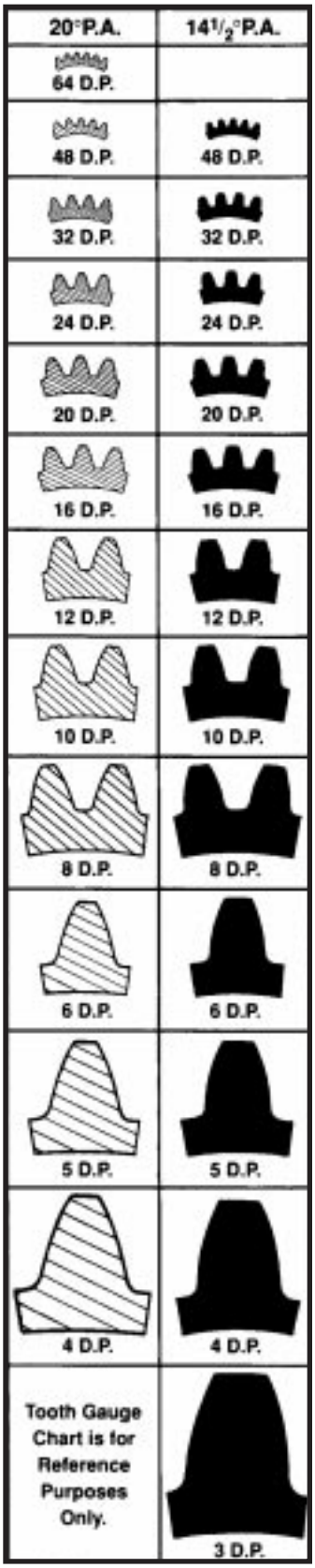




TOOTH DIMENSIONS

For convenience, Tooth Proportions of various standard diametral pitches of Spur Gears are given below.

Diametral Pitch	Circular Pitch (Inches)	Thickness of Tooth on Pitch Line (Inches)	Depth to be Cut in Gear (Inches) (Hobbed Gears)	Addendum (Inches)
3	1.0472	.5236	.7190	.3333
4	.7854	.3927	.5393	.2500
5	.6283	.3142	.4314	.2000
6	.5236	.2618	.3565	.1667
8	.3927	.1963	.2696	.1250
10	.3142	.1571	.2157	.1000
12	.2618	.1309	.1798	.0833
16	.1963	.0982	.1348	.0625
20	.1571	.0785	.1120	.0500
24	.1309	.0654	.0937	.0417
32	.0982	.0491	.0708	.0312
48	.0654	.0327	.0478	.0208
64	.0491	.0245	.0364	.0156



SPUR GEARS

BACKLASH

Stock spur gears are cut to operate at standard center distances. The standard center distance being defined by:

$$\text{Standard Center Distance} = \frac{\text{Pinion PD} + \text{Gear PD}}{2}$$

When mounted at this center distance, stock spur gears will have the following average backlash:

Diametral Pitch	Backlash (Inches)	Diametral Pitch	Backlash (Inches)
3	.013	8-9	.005
4	.010	10-13	.004
5	.008	14-32	.003
6	.007	33-64	.0025
7	.006		

An increase or decrease in center distance will cause an increase or decrease in backlash.

Since, in practice, some deviation from the theoretical standard center distance is inevitable and will alter the backlash, such deviation should be as small as possible. For most applications, it would be acceptable to limit the deviation to an increase over the nominal center distance of one half the average backlash. Varying the center distance may afford a practical means of varying the backlash to a limited extent.

The approximate relationship between center distance and backlash change of 14-1/2° and 20° pressure angle gears is shown below:

For 14-1/2°–Change in Center Distance = 1.933 x Change in Backlash
For 20° –Change in Center Distance = 1.374 x Change in Backlash

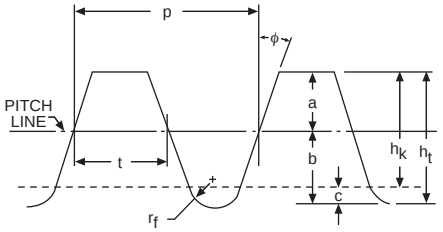
From this, it is apparent that a given change in center distance, 14-1/2° gears will have a smaller change in backlash than 20° gears. This fact should be considered in cases where backlash is critical.

UNDERCUT

When the number of teeth in a gear is small, the tip of the mating gear tooth may interfere with the lower portion of the tooth profile. To prevent this, the generating process removes material at this point. This results in loss of a portion of the involute adjacent to the tooth base, reducing tooth contact and tooth strength.

On 14-1/2°PA gears undercutting occurs where a number of teeth is less than 32 and for 20°PA less than 18. Since this condition becomes more severe as tooth numbers decrease, it is recommended that the minimum number of teeth be 16 for 14-1/2°PA and 13 for 20°PA.

In a similar manner INTERNAL Spur Gear teeth may interfere when the pinion gear is too near the size of its mating internal gear. The following may be used as a guide to assure proper operation of the gear set. For 14-1/2°PA, the difference in tooth numbers between the gear and pinion should not be less than 15. For 20°PA the difference in tooth numbers should not be less than 12.



a = ADDENDUM
b = DEDENDUM
c = CLEARANCE
h_k = WORKING DEPTH
h_t = WHOLE DEPTH
p = CIRCULAR PITCH
r_f = FILLET RADIUS
t = CIRCULAR TOOTH THICKNESS
ϕ = PRESSURE ANGLE

SPUR GEAR FORMULAS

FOR FULL DEPTH INVOLUTE TEETH

To Obtain	Having	Formula
Diametral Pitch (P)	Circular Pitch (p)	$P = \frac{3.1416}{p}$
	Number of Teeth (N) & Pitch Diameter (D)	$P = \frac{N}{D}$
	Number of Teeth (N) & Outside Diameter (D_o)	$P = \frac{N + 2}{D_o}$ (Approx.)
Circular Pitch (p)	Diametral Pitch (P)	$p = \frac{3.1416}{P}$
Pitch Diameter (D)	Number of Teeth (N) & Diametral Pitch (P)	$D = \frac{N}{P}$
	Outside Diameter (D_o) & Diametral Pitch (P)	$D = D_o - \frac{2}{P}$
Base Diameter (D_b)	Pitch Diameter (D) and Pressure Angle (ø)	Db = Dcosø
Number of Teeth (N)	Diametral Pitch (P) & Pitch Diameter (D)	N = P x D
Tooth Thickness (t) @Pitch Diameter (D)	Diametral Pitch (P)	$t = \frac{1.5708}{P}$
Addendum (a)	Diametral Pitch (P)	$a = \frac{1}{P}$
Outside Diameter (D_o)	Pitch Diameter (D) & Addendum (a)	$D_o = D + 2a$
Whole Depth (h_t) (20P & Finer)	Diametral Pitch (P)	$h_t = \frac{2.2}{P} + .002$
Whole Depth (h_t) (Courser than 20P)	Diametral Pitch (P)	$h_t = \frac{2.157}{P}$
Working Depth (h_k)	Addendum (a)	$h_k = 2(a)$
Clearance (c)	Whole Depth (h_t) Addendum (a)	$c = h_t - 2a$
Dedendum (b)	Whole Depth (h_t) & Addendum (a)	$b = h_t - a$
Contact Ratio (M_C)	Outside Radii, Base Radii, Center Distance and Pressure Angle+C.P.	$M_C = \frac{\sqrt{R_o^2 - R_b^2} + \sqrt{r_o^2 - r_b^2} - C\sin\phi^*}{p\cos\phi}$
Root Diameter (D_r)	Pitch Diameter (D) and Dedendum (b)	$D_r = D - 2b$
Center Distance (C)	Pitch Diameter (D) or No. of Teeth and Pitch	$C = \frac{D_1 + D_2}{2}$ or $\frac{N_1 + N_2}{2P}$

*R_o = Outside Radius, Gear
r_o = Outside Radius, Pinion
R_b = Base Circle Radius, Gear
r_b = Base Circle Radius, Pinion

SPUR GEARS

LEWIS FORMULA (Barth Revision)

Gear failure can occur due to tooth breakage (tooth stress) or surface failure (surface durability) as a result of fatigue and wear. Strength is determined in terms of tooth-beam stresses for static and dynamic conditions, following well established formula and procedures. Satisfactory results may be obtained by the use of Barth's Revision to the Lewis Formula, which considers beam strength but not wear. The formula is satisfactory for commercial gears at Pitch Circle velocities of up to 1500 FPM. It is this formula that is the basis for all Boston Spur Gear ratings.

METALLIC SPUR GEARS

$$W = \frac{SFY}{P}\left(\frac{600}{600 + V}\right)$$

W = Tooth Load, Lbs. (along the Pitch Line)
S = Safe Material Stress (static) Lbs. per Sq. In. (Table II)
F = Face Width, In.
Y = Tooth Form Factor (Table I)
P = Diametral Pitch
D = Pitch Diameter
V = Pitch Line Velocity, Ft. per Min. = .262 x D x RPM

For NON-METALLIC GEARS, the modified Lewis Formula shown below may be used with (S) values of 6000 PSI for Phenolic Laminated material.

$$W = \frac{SFY}{P}\left(\frac{150}{200 + V} + .25\right)$$

TABLE II–VALUES OF SAFE STATIC STRESS (s)

Material	(s) Lb. per Sq. In.
Plastic	5000
Bronze	10000
Cast Iron	12000
Steel: .20 Carbon (Untreated)	20000
Steel: .20 Carbon (Case-hardened)	25000
Steel: .40 Carbon (Untreated)	25000
Steel: .40 Carbon (Heat-treated)	30000
Steel: .40 C. Alloy (Heat-treated)	40000

Max. allowable torque (T) that should be imposed on a gear will be the safe tooth load (W) multiplied by $\frac{D}{2}$ or $T = \frac{W \times D}{2}$

The safe horsepower capacity of the gear (at a given RPM) can be calculated from $HP = \frac{T \times RPM}{63{,}025}$ or directly from (W) and (V);

$$HP = \frac{WV}{33{,}000}$$

For a known HP, $T = \frac{63025 \times HP}{RPM}$

TABLE I TOOTH FORM FACTOR (Y)

Number of Teeth	14-1/2° Full Depth Involute	20° Full Depth Involute
10	0.176	0.201
11	0.192	0.226
12	0.210	0.245
13	0.223	0.264
14	0.236	0.276
15	0.245	0.289
16	0.255	0.295
17	0.264	0.302
18	0.270	0.308
19	0.277	0.314
20	0.283	0.320
22	0.292	0.330
24	0.302	0.337
26	0.308	0.344
28	0.314	0.352
30	0.318	0.358
32	0.322	0.364
34	0.325	0.370
36	0.329	0.377
38	0.332	0.383
40	0.336	0.389
45	0.340	0.399
50	0.346	0.408
55	0.352	0.415
60	0.355	0.421
65	0.358	0.425
70	0.360	0.429
75	0.361	0.433
80	0.363	0.436
90	0.366	0.442
100	0.368	0.446
150	0.375	0.458
200	0.378	0.463
300	0.382	0.471
Rack	0.390	0.484

HELICAL GEARS

GEAR NOMENCLATURE

The information contained in the Spur Gear section is also pertinent to Helical Gears with the addition of the following:

HELIX ANGLE (ψ) is the angle between any helix and an element of its cylinder. In helical gears, it is at the pitch diameter unless otherwise specified.

LEAD (L) is the axial advance of a helix for one complete turn, as in the threads of cylindrical worms and teeth of helical gears.

NORMAL DIAMETRAL PITCH (P_n) is the Diametral Pitch as calculated in the normal plane.

HAND – Helical Gears of the same hand operate at right angles, see Fig. 1
Helical Gears of opposite hands run on parallel shafts. Fig. 2

TWO RIGHT-HAND HELICAL GEARS

TWO LEFT-HAND HELICAL GEARS

LEFT-HAND AND RIGHT-HAND HELICAL GEARS

Figure 1

Figure 2

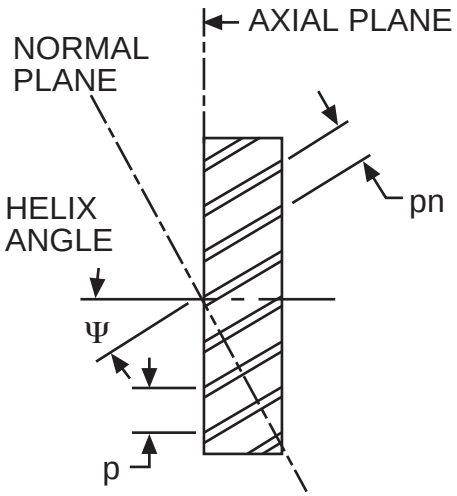
LEFT HAND HELICAL GEAR

The teeth of a LEFT HAND Helical Gear lean to the left when the gear is placed flat on a horizontal surface.

RIGHT HAND HELICAL GEAR

The teeth of a RIGHT HAND Helical Gear lean to the right when the gear is placed flat on a horizontal surface.

HELIX ANGLE—



p = AXIAL CIRCULAR PITCH
pn = NORMAL CIRCULAR PITCH

All Boston Helicals are cut to the Diametral Pitch system, resulting in a Normal Pitch which is lower in number than the Diametral Pitch.

INVOLUTE—The Helical tooth form is involute in the plane of rotation and can be developed in a manner similar to that of the Spur Gear. However, unlike the Spur Gear, which may be viewed as two-dimensional, the Helical Gear must be viewed as three-dimensional to show change in axial features.

Helical gears offer additional benefits relative to Spur Gears, those being:

- Improved tooth strength due to the elongated helical wrap-around.
- Increased contact ratio due to the axial tooth overlap.
- Helical Gears thus tend to have greater load carrying capacity than Spur Gears of similar size.
- Due to the above, smoother operating characteristics are apparent.

HELICAL GEARS

HELICAL GEAR FORMULAS

To Obtain	Having	Formula
Transverse Diametral Pitch (P)	Number of Teeth (N) & Pitch Diameter (D)	$P = \frac{N}{D}$
	Normal Diametral Pitch (P_n) Helix Angle (ψ)	$P = P_N \cos\psi$
Pitch Diameter (D)	Number of Teeth (N) & Transverse Diametral Pitch (P)	$D = \frac{N}{P}$
Normal Diametral Pitch (P_N)	Transverse Diametral Pitch (P) & Helix Angle (ψ)	$P_N = \frac{P}{\cos\psi}$
Normal Circular Tooth Thickness (τ)	Normal Diametral Pitch (P_N)	$\tau = \frac{1.5708}{P_N}$
Transverse Circular Pitch (p_t)	Diametral Pitch (P) (Transverse)	$p_t = \frac{\pi}{P}$
Normal Circular Pitch (p_n)	Transverse Circular Pitch (p)	$p_n = p_t \cos\psi$
Lead (L)	Pitch Diameter and Pitch Helix Angle	$L = \frac{\pi D}{\tan\psi}$

TRANSVERSE VS. NORMAL DIAMETRAL PITCH FOR BOSTON 45° HELICAL GEARS

P Transverse Diametral Pitch	P_N Normal Diametral Pitch
24	33.94
20	28.28
16	22.63
12	16.97
10	14.14
8	11.31
6	8.48

HELICAL GEAR LEWIS FORMULA

The beam strength of Helical Gears operating on *parallel shafts* can be calculated with the Lewis Formula revised to compensate for the difference between Spur and Helical Gears, with modified Tooth Form Factors Y.

$$W = \frac{SFY}{P_N}\left(\frac{600}{600 + V}\right)$$

W = Tooth Load, Lbs. (along the Pitch Line)
S = Safe Material Stress (static) Lbs. per Sq. In. (Table III)
F = Face Width, Inches
Y = Tooth Form Factor (Table IV)
P_N = Normal Diametral Pitch
(Refer to Conversion Chart)
D = Pitch Diameter
V = Pitch Line Velocity, Ft. Per Min. = .262 x D x RPM

TABLE III–VALUES OF SAFE STATIC STRESS (S)

Material	(s) Lb. per Sq. In.
Bronze	10000
Cast Iron	12000
Steel .20 Carbon (Untreated)	20000
Steel .20 Carbon (Case-hardened)	25000
Steel .40 Carbon (Untreated)	25000
Steel .40 Carbon (Heat-treated)	30000
Steel .40 C. Alloy (Heat-treated)	40000

TABLE IV—VALUES OF TOOTH FORM FACTOR (Y)

FOR 14-1/2°PA—45° HELIX ANGLE GEAR			
No. of Teeth	Factor Y	No. of Teeth	Factor Y
8	.295	25	.361
9	.305	30	.364
10	.314	32	.365
12	.327	36	.367
15	.339	40	.370
16	.342	48	.372
18	.345	50	.373
20	.352	60	.374
24	.358	72	.377

HORSEPOWER AND TORQUE

Max. allowable torque (T) that should be imposed on a gear will be the safe tooth load (W) multiplied by $\frac{D}{2}$ or $T = \frac{W \times D}{2}$

The safe horsepower capacity of the gear (at a given RPM) can be calculated from $HP = \frac{T \times RPM}{63{,}025}$ or directly from (W) and (V);

$HP = \frac{WV}{33{,}000}$

For a known HP, $T = \frac{63025 \times HP}{RPM}$

HELICAL GEARS

When Helical gears are operated on other than Parallel shafts, the tooth load is concentrated at a point, with the result that very small loads produce very high pressures. The sliding velocity is usually quite high and, combined with the concentrated pressure, may cause galling or excessive wear, especially if the teeth are not well lubricated. For these reasons, the tooth load which may be applied to such drives is very limited and of uncertain value, and is perhaps best determined by trial under actual operating conditions. If one of the gears is made of bronze, the contact area and thereby the load carrying capacity, may be increased, by allowing the gears to "run-in" in their operating position, under loads which gradually increase to the maximum expected.

THRUST LOADS

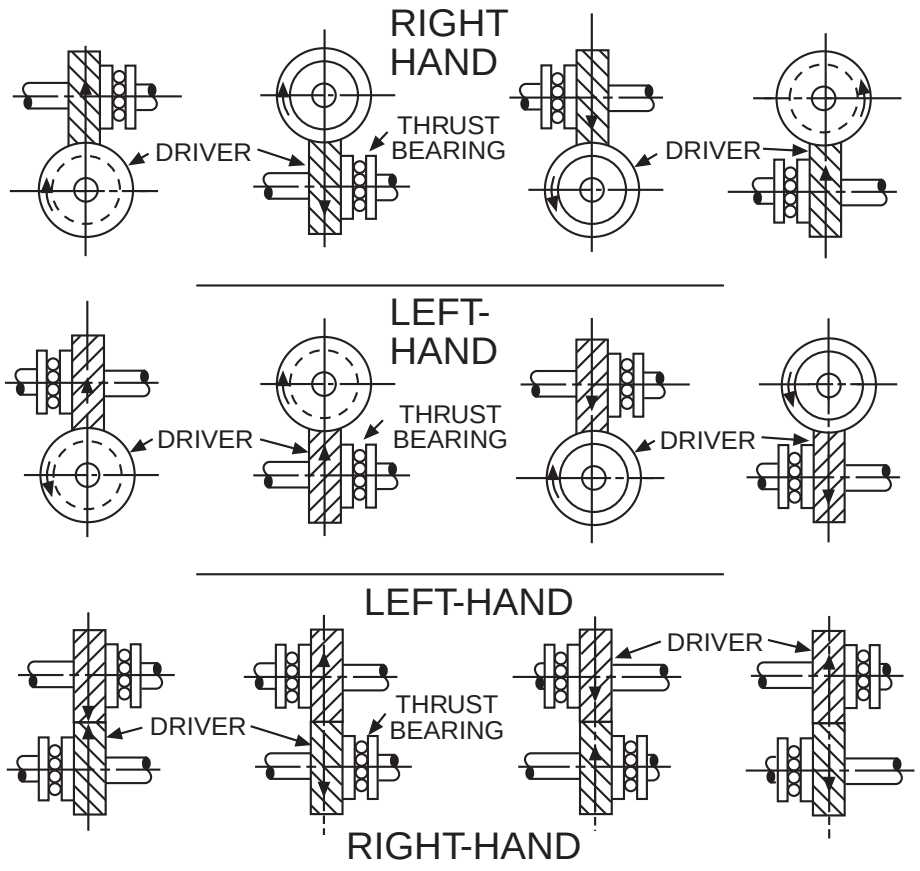
As a result of the design of the Helical Gear tooth, an axial or thrust load is developed. Bearings must be adequate to absorb this load. The thrust load direction is indicated below. The magnitude of the thrust load is based on calculated Horsepower.

$$\text{Axial Thrust Load} = \frac{126{,}050 \times \text{HP}}{\text{RPM} \times \text{Pitch Diameter}}$$

Boston Helicals are all 45° Helix Angle, producing a tangential force equal in magnitude to the axial thrust load. A separating force is also imposed on the gear set based on calculated Horsepower.

Separating Load = Axial Thrust Load x .386

Above formulae based on Boston 45° Helix Angle and 14-1/2° Normal Pressure Angle.



See page 118 for hardened and ground Thrust Washers.

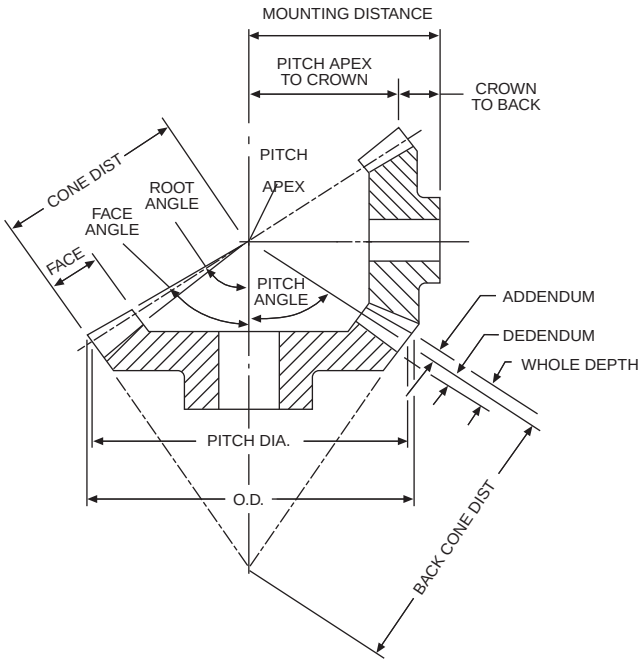
MITER AND BEVEL GEARS

Gear geometry for both straight and spiral tooth Miter and Bevel gears is of a complex nature and this text will not attempt to cover the topic in depth.

The basic tooth form is a modification to the involute form and is the common form used in production today. All Boston standard stock Miter and Bevel gears are manufactured with a 20° Pressure Angle. Bevel gears are made in accordance with A.G.M.A. specifications for long and short Addendum system for gears and pinions (pinion is cut long Addendum) which serves to reduce the amount of pinion tooth undercut and to nearly equalize the strength and durability of the gear set.

NOMENCLATURE

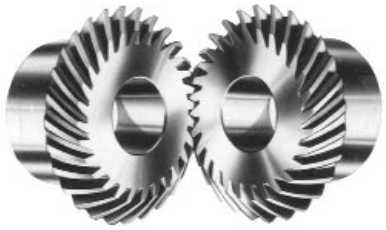
Nomenclature may best be understood by means of graphic representation depicted below:



Stock gears are cut to operate on an exact Mounting Distance with the following average backlash:

Diametral Pitch	Backlash (Inches)
4	.008
5	.007
6	.006
8	.005
10	.004
12-20	.003
24-48	.002

Similar in nature to Helical gearing, Spiral Miters and Bevels must be run with a mating pinion or gear of opposite hand.



The teeth of a Left Hand gear lean to the left when the gear is placed on a horizontal surface.

The teeth of a Right Hand gear lean to the right when the gear is placed flat on a horizontal surface.

All Boston Spiral Miter and Bevel gears are made with 35° spiral angles with all pinions cut left hand.

Straight Tooth Miter and Bevel Gear Formulas

To Obtain	Having	Formula	
		Pinion	Gear
Pitch Diameter (D,d)	No. of Teeth and Diametral Pitch (P)	$d = \frac{n}{P}$	$D = \frac{n}{P}$
Whole Depth (h_T)	Diametral Pitch (P)	$h_T = \frac{2.188}{P} + .002$	$h_T = \frac{2.188}{P} + .002$
Addendum (a)	Diametral Pitch (P)	$a = \frac{1}{P}$	$a = \frac{1}{P}$
Dedendum (b)	Whole Depth (h_T) & Addendum (a)	$b = h_T - a$	$b = h_T - a$
Clearance	Whole Depth (n_T) & Addendum (a)	$c = h_T - 2a$	$c = h_T - 2a$
Circular Tooth Thickness (τ)	Diametral Pitch (P)	$\tau = \frac{1.5708}{P}$	$\tau = \frac{1.5708}{P}$
Pitch Angle	Number of Teeth In Pinion (N_p) and Gear (N_G)	$L_p = \tan^{-1}\left(\frac{N_p}{N_G}\right)$	$L_G = 90 - L_p$
Outside Diameter (D_o, d_o)	Pinion & Gear Pitch Diameter ($D_p + D_G$) Addendum (a) & Pitch Angle ($L_p + L_G$)	$d_o = D_p + 2a(\cos L_p)$	$D_o = D_G + 2a(\cos L_G)$

MITER AND BEVEL GEARS

Straight tooth bevel (and miter) gears are cut with generated tooth form having a localized lengthwise tooth bearing known as the "Coniflex"® tooth form. The superiority of these gears over straight bevels with full length tooth bearing, lies in the control of tooth contact. The localization of contact permits minor adjustment of the gears in assembly and allows for some displacement due to deflection under operating loads, without concentration of the load on the end of the tooth. This results in increased life and quieter operation.

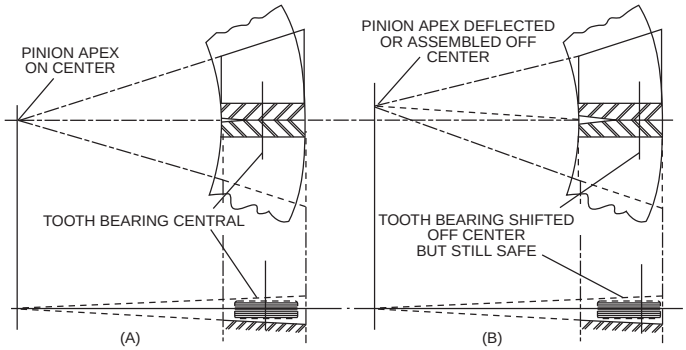


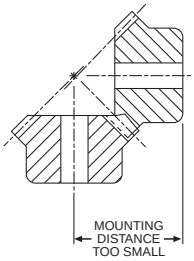
ILLUSTRATION OF LOCALIZED TOOTH BEARING IN STRAIGHT BEVEL CONIFLEX® GEARS

Boston Gear Bevel and Miter Gears will provide smooth, quiet operation and long life when properly mounted and lubricated. There are several important considerations in mounting these gears.

1. All standard stock bevel and miter gears must be mounted at right angles (90°) for proper tooth bearing.
2. Mounting Distance (MD) is the distance from the end of the hub of one gear to the center line of its mating gear. When mounted at the MD specified, the gears will have a proper backlash and the ends of the gear teeth will be flush with each other (see drawings).
3. All bevel and miter gears develop radial and axial thrust loads when transmitting power. See page 148. These loads must be accommodated by the use of bearings.

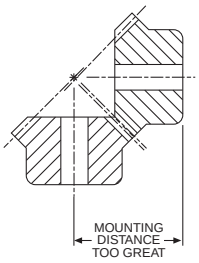
Incorrect

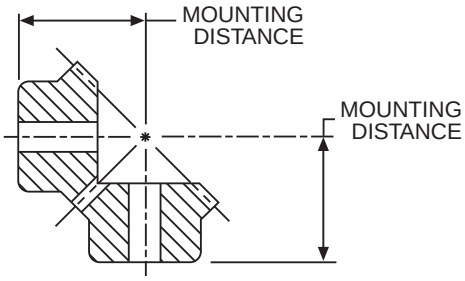
If Mounting Distance of one or both gears is made less than dimension specified, the teeth may bind. Excessive wear or breakage can result. Drawing below shows gears mounted incorrectly with the Mounting Distance too short for one gear.

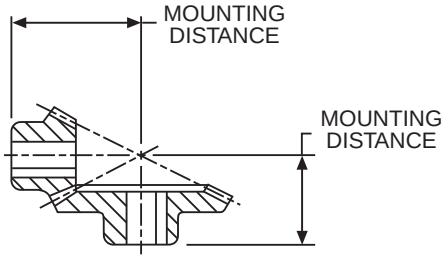


Incorrect

If Mounting Distance of either gear is made longer than dimension specified, as shown in drawing below, the gears will not be in full mesh on a common pitch line and may have excessive backlash. Excessive backlash or play, if great enough, can cause a sudden impulse or shock load in starting or reversing which might cause serious tooth damage.







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MITER AND BEVEL BEARS TOOTH STRENGTH (Straight Tooth)

The beam strength of Miter and Bevel gears (straight tooth) may be calculated using the Lewis Formula revised to compensate for the differences between Spur and Bevel gears. Several factors are often combined to make allowance for the tooth taper and the normal overhung mounting of Bevel gears.

$$W = \frac{SFY}{P}\left(\frac{600}{600+V}\right).75$$

W = Tooth Load, Lbs. (along the Pitch Line)
S = Safe Material Stress (static) Lbs. per Sq. In. (Table 1)
F = Face Width, In.
Y = Tooth Form Factor (Table I)
P = Diametral Pitch
D = Pitch Diameter
V = Pitch Line Velocity, Ft. per Min. = .262 x D x RPM

TABLE I VALUES OF SAFE STATIC STRESS (s)

Material	(s) Lb. per Sq. In.
Plastic	5000
Bronze	10000
Cast Iron	12000
Steel .20 Carbon (Untreated)	20000
Steel .20 Carbon (Case-hardened)	25000
Steel .40 Carbon (Untreated)	25000
Steel .40 Carbon (Heat-treated)	30000
Steel .40 C. Alloy (Heat-treated)	40000

TABLE II TOOTH FORM FACTOR (Y)

20°P.A.—LONG ADDENDUM PINIONS SHORT ADDENDUM GEARS

No. Teeth Pinion	Ratio 1 Pin.	1 Gear	1.5 Pin.	1.5 Gear	2 Pin.	2 Gear	3 Pin.	3 Gear	4 Pin.	4 Gear	6 Pin.	6 Gear
12	—		—	—	.345	.283	.355	.302	.358	.305	.361	.324
14	—		.349	.292	.367	.301	.377	.317	.380	.323	.405	.352
16	.333		.367	.311	.386	.320	.396	.333	.402	.339	.443	.377
18	.342		.383	.328	.402	.336	.415	.346	.427	.364	.474	.399
20	.352		.402	.339	.418	.349	.427	.355	.456	.386	.500	.421
24	.371		.424	.364	.443	.368	.471	.377	.506	.405	—	—
28	.386		.446	.383	.462	.386	.509	.396	.543	.421	—	—
32	.399		.462	.396	.487	.402	.540	.412	—	—	—	—
36	.408		.477	.408	.518	.415	.569	.424	—	—	—	—
40	.418		—	—	.543	.424	.594	.434	—	—	—	—

HORSEPOWER AND TORQUE

Max. allowable torque (T) that should be imposed on a gear will be the safe tooth load (W) multiplied by $\frac{D}{2}$ or $T = \frac{W \times D}{2}$

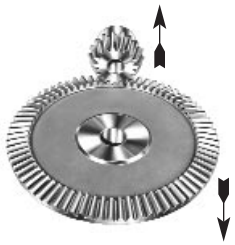
The safe horsepower capacity of the gear (at a given RPM) can be calculated from $HP = \frac{T \times RPM}{63{,}025}$ or directly from (W) and (V);

$$HP = \frac{WV}{33{,}000}$$

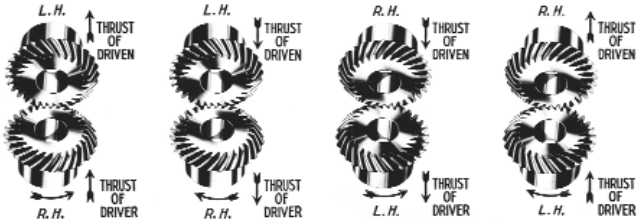
For a known HP, $T = \frac{63025 \times HP}{RPM}$

THRUST

The axial thrust loads developed by straight tooth miter and bevel gears always tend to separate the gears.



For Spiral Bevel and Miter Gears, the direction of axial thrust loads developed by the driven gears will depend upon the hand and direction of rotation. Stock Spiral Bevel pinions cut Left Hand only, Gears Right Hand only.



The magnitude of the thrust may be calculated from the formulae below, based on calculated HP, and an appropriate Thrust Bearing selected.

Straight Bevels and Miters

$$\text{Gear Thrust} = \frac{126{,}050 \times HP}{RPM \times \text{Pitch Diameter}} \times \tan\alpha \cos\beta$$

$$\text{Pinion Thrust} = \frac{126{,}050 \times HP}{RPM \times \text{Pitch Diameter}} \times \tan\alpha \sin\beta$$

Spiral Bevels and Miters

Thrust values for Pinions and Gears are given for four possible combinations.

R.H. SPIRAL, CLOCKWISE	$T_P = \frac{126{,}050 \times HP}{RPM \times D}\left(\frac{\tan\alpha \sin\beta}{\cos\gamma} - \tan\gamma \cos\beta\right)$
L.H. SPIRAL, C. CLOCKWISE	$T_G = \frac{126{,}050 \times HP}{RPM \times D}\left(\frac{\tan\alpha \cos\beta}{\cos\gamma} + \tan\gamma \sin\beta\right)$
L.H. SPIRAL, CLOCKWISE	$T_P = \frac{126{,}050 \times HP}{RPM \times D}\left(\frac{\tan\alpha \sin\beta}{\cos\gamma} + \tan\gamma \cos\beta\right)$
R.H. SPIRAL, C. CLOCKWISE	$T_G = \frac{126{,}050 \times HP}{RPM \times D}\left(\frac{\tan\alpha \cos\beta}{\cos\gamma} + \tan\gamma \sin\beta\right)$

α = Tooth Pressure Angle

β = 1/2 Pitch Angle

$$\text{Pitch Angle} = \tan^{-1}\left(\frac{N_P}{N_G}\right)$$

γ = Spiral Angle = 35°

WORMS AND WORM GEARS

Boston standard stock Worms and Worm Gears are used for the transmission of motion and/or power between non-intersecting shafts at right angles (90°). Worm Gear drives are considered the smoothest and quietest form of gearing when properly applied and maintained. They should be considered for the following requirements:

HIGH RATIO SPEED REDUCTION
LIMITED SPACE
RIGHT ANGLE (NON-INTERSECTING) SHAFTS
GOOD RESISTANCE TO BACK DRIVING

General nomenclature having been applied to Spur and Helical gear types, may also be applied to Worm Gearing with the addition of Worm Lead and Lead Angle, Number of Threads (starts) and Worm Gear Throat diameter.

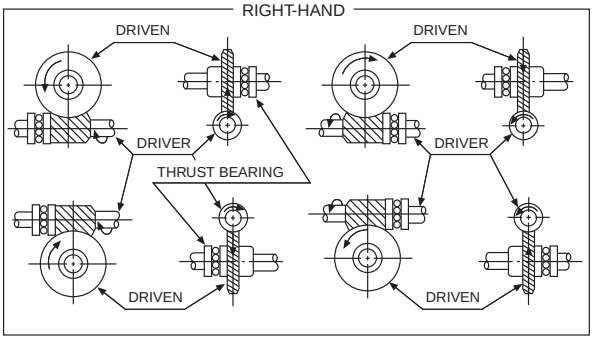
HOW TO TELL A LEFT-HAND OR RIGHT-HAND WORM OR WORM GEAR

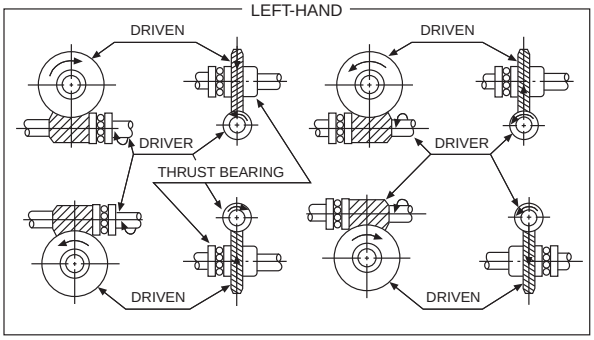
Threads of LEFT-HAND lean to the Left when standing on either end:

Threads of RIGHT-HAND lean to the Right when standing on either end:

THRUST LOADS

As is true with Helical and Bevel gearing, Worm gearing, when operating, produces Thrust loading. The Chart below indicates the direction of thrust of Worms and Worm Gears when they are rotated as shown. To absorb this thrust loading, bearings should be located as indicated.





EFFICIENCY

The efficiency of a worm gear drive depends on the lead angle of the worm. The angle decreases with increasing ratio and worm pitch diameter. For maximum efficiency the ratio should be kept low.

Due to the sliding action which occurs at the mesh of the Worm and Gear, the efficiency is dependent on the Lead Angle and the Coefficient of the contacting surface. A common formula for estimating efficiency of a given Worm Gear reduction is:

$$\text{EFFICIENCY} = E = \frac{\text{Tan}\gamma\ (1 - f\ \text{tan}\gamma)}{f + \text{tan}\gamma}$$

where γ = Worm Lead Angle
f = Coefficient of Friction

For a Bronze Worm Gear and hardened Steel Worm, a Coefficient of Friction in the range of .03/.05 may be assumed for estimated value only.

WORMS AND WORM GEARS

WORM AND WORM GEAR FORMULAS

To Obtain	Having	Formula
Circular Pitch (p)	Diametral Pitch (P)	$p = \frac{3.1416}{P}$
Diametral Pitch (P)	Circular Pitch (p)	$P = \frac{3.1416}{p}$
Lead (of Worm) (L)	Number of Threads in Worm & Circular Pitch (p)	L = p(No. of Threads)
Addendum (a)	Diametral Pitch (P)	$a = \frac{1}{P}$
Pitch Diameter (D) of Worm (D_W)	Outside Diameter (d_o) & Addendum (a)	$D_W = d_o - 2a$
Pitch Diameter of Worm Gear (D_G)	Circular Pitch (p) & Number of Teeth (N)	$D_G = \frac{N_{Gp}}{3.1416}$
Center Distance Between Worm & Worm Gear (CD)	Pitch Diameter of Worm (d_w) & Worm Gear (D_G)	$CD = \frac{d_w + D_G}{2}$
Whole Depth of Teeth (h_T)	Circular Pitch (p)	$h_T = .6866\ p$
	Diametral Pitch (P)	$h_T = \frac{2.157}{P}$
Bottom Diameter of Worm (D_r)	Whole Depth (h_T) & Outside Diameter (d_w)	$d_r = d_o - 2h_T$
Throat Diameter of Worm Gear (D_T)	Pitch Diameter of Worm Gear (D) & Addendum (a)	$D_T = D_G + 2a$
Lead Angle of Worm (γ)	Pitch Diameter of Worm(D) & The Lead (L)	$\gamma = \tan^{-1}\left(\frac{L}{3.1416d}\right)$
Ratio	No. of Teeth on Gear (N_G) and Number of Threads on Worm	$Ratio = \frac{N_G}{\text{No. of Threads}}$
Gear O.D. (D_O)	Throat Dia. (D_T) and Addendum (a)	$D_O = D_T + .6a$

SELF-LOCKING ABILITY

There is often some confusion as to the self-locking ability of a worm and gear set. Boston worm gear sets, under no condition should be considered to hold a load when at rest. The statement is made to cover the broad spectrum of variables effecting self-locking characteristics of a particular gear set in a specific application. Theoretically, a worm gear will not back drive if the friction angle is greater than the worm lead angle. However, the actual surface finish and lubrication may reduce this significantly. More important, vibration may cause motion at the point of mesh with further reduction in the friction angle.

Generally speaking, if the worm lead angle is less than 5°, there is reasonable expectation of self-locking. Again, no guarantee should be made and customer should be advised. If safety is involved, a positive brake should be used.

WORM GEAR BACK-DRIVING

This is the converse of self-locking and refers to the ability of the worm gear to drive the worm. The same variables exist, making it difficult to predict. However, our experience indicates that for a hardened worm and bronze gear properly manufactured, mounted and lubricated, back-driving capability may be expected, if the lead angle is greater than 11°. Again, no guarantee is made and the customer should be so advised.

RATING

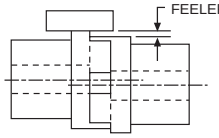
The high rate of sliding friction that takes place at the mesh of the Worm and Gear results in a more complex method of rating these Gears as opposed to the other Gear types. Material factors, friction factors and velocity factors must all be considered and applied to reflect a realistic durability rating.

COUPLINGS

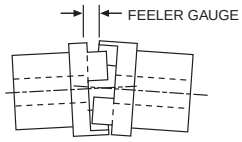
ALIGNMENT

Alignment of Boston couplings should be performed by the following steps to meet lateral and angular misalignment specifications below.

1. Align shafts and supports to give minimum lateral and angular misalignment.
2. Assemble coupling halves to shaft.
3. Slide couplings together and check lateral misalignment using straight edge and feeler gauge over coupling outside diameter (On BF Series couplings, spider must be removed.) This should be within specifications below.
4. Lock couplings on shaft and check distance using feeler gauges between drive lug on one half and space between on other coupling half. Rotate coupling and check gap at a minimum of 3 other coupling positions. The difference between any two readings should be within specifications below.



LATERAL MISALIGNMENT



ANGULAR MISALIGNMENT

MISALIGNMENT TOLERANCES

Coupling Series	Lateral	Angular
FC—Bronze Insert FC—Urethane Insert FC—Rubber Insert	.001 .002 .002	See Chart below
BF	.002	1-1/2°
BG (Shear Type)	1/32	2°
FA	.002	2°
FCP (Plastic)	.003	3°

FC SERIES ANGULAR MISALIGNMENT

Chart reflects maximum angular misalignment of 1-1/2° for rubber, 1° for urethane and 1/2° for bronze.

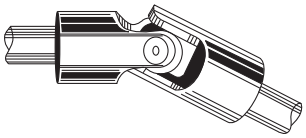
MAXIMUM READING DIFFERENTIAL

Size	Rubber	Insert Urethane	Bronze
FC12	.033	.022	.011
FC15	.039	.026	.013
FC20	.053	.035	.018
FC25	.066	.044	.022
FC30	.078	.052	.026
FC38	.097	.065	.032
FC45	.117	.078	.039

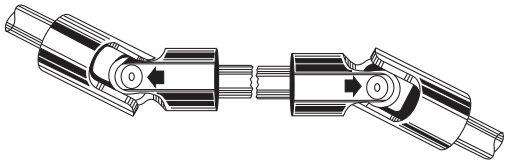
UNIVERSAL JOINTS

MOUNTING

A single universal joint (rotating at uniform speed) operating at an angle will introduce periodic variations of angular velocity to the driven shaft. These cyclic speed fluctuations (two per revolution) cause vibration, higher shaft stresses and bearing loads which will be more severe with larger angles of operation.



The detrimental effects of these rotational deviations can be reduced, and uniform speed restored by using two joints (and an intermediate shaft) to connect shafts at an angle or misaligned in a parallel direction.



For connecting shafts in the same plane the joints should be arranged to operate at equal angles and with the bearing pins of the yokes on the intermediate shaft in line with each other.

LUBRICATION

PIN and BLOCK TYPE

These universal joints are not lubricated when shipped.

Many applications are considered severe when in harsh environments and when a combination of speed, dirt contamination and inaccessible locations make it impractical to maintain proper lubrication.

It is in these instances when the Boot Kits become a desirable alternative. For satisfactory performance, all booted joints should be used with a LITH-EP-000 grease for an ambient temperature range of 40° to 225°F.

VOLUME OF LUBRICATION FOR BOOTED JOINTS

Size	Volume (Ozs.)	Size	Volume (Ozs.)	Size	Volume (Ozs.)
37	.4	100	2.0	250	25.0
50	.5	125	3.5	300	30.0
62	.75	150	4.5	400	50.1
75	1.0	175	7.0		
87	1.5	200	15.0		

Note: Joints should be initially lubricated with a 90 weight oil before being packed with grease.

FORGED AND CAST TYPE

Universal Joints are not lubricated when shipped.
Lubricate these joints with a Lith EP-2 grease or equivalent. The center cross of these joints holds a generous supply of lubricant which is fed to the bearings by centrifugal action. Light-duty, low-angle operation may require only occasional lubrication. For high-angle, high-speed operation or in extreme dirt or moist conditions, daily regreasing may be required.

GENERAL

MOUNTING

SPUR & HELICAL

For proper functioning gears, gears must be accurately aligned and supported by a shaft and bearing system which maintains alignment under load. Deflection should not exceed .001 inch at the tooth mesh for general applications. The tolerance on Center Distance normally should be positive to avoid possibility of gear teeth binding. Tolerance value is dependent on acceptable system backlash. As a guide for average application, this tolerance might vary from .002 for Boston Gear's fine pitch gears to .005 for the coarsest pitch.

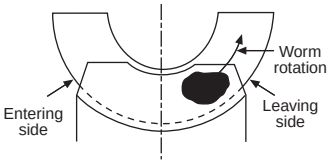
WORMS AND WORM GEAR

It is important that the mounting assures the central plane of the Worm gear passes essentially through the axis of the Worm. This can be accomplished by adjusting the Worm Gear axially. Boston Worm Gears are cut to close tolerancing of the Center Line of the Gear tooth to the flush side of the Gear. When properly mounted Worm Gears will become more efficient after initial break-in period.

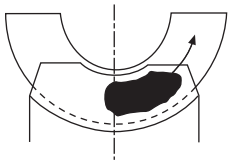
HOW WORM GEARS "ADJUST" THEMSELVES

The gear in a worm gear reducer is made of a soft bronze material. Therefore, it can cold-work and wear-in to accommodate slight errors in misalignment.

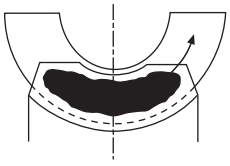
Evolution of Contact in a Worm Gear



Initially, contact is concentrated on the leaving side of the worm.



After several hours or running under load, gear has cold-worked to spread area of contact.



After many hours of operation, contact has spread to cover the entire working area of the tooth.

ALTERATIONS

Boston Gear Service Centers are equipped to alter catalog sprockets (rebore, keyway, setscrew, etc.). For customers, choosing to make their own alterations, the guidelines listed below should be beneficial. Alterations to hardened gears should not be made without consultation with factory.

In setting up for reboring the most important consideration is to preserve the accuracy of concentricity and lateral runout provided in the original product. There are several methods for accomplishing this. One procedure is: mount the part on an arbor, machine hub diameter to provide a true running surface, remove from arbor and chuck on the hub diameter, check face and bore runout prior to reboring. As a basic rule of thumb, the maximum bore should not exceed 60% of the Hub Diameter and depending on Key size should be checked for minimum wall thickness. A minimum of one setscrew diameter over a keyway is considered adequate.

Boston Gear offers a service for hardening stock sprockets. This added treatment can provide increased horsepower capacity with resultant longer life and/or reduction in size and weight.

Customers wishing to do the hardening operation should refer to "Materials" below for information.

LUBRICATION

The use of a straight mineral oil is recommended for most worm gear applications. This type of oil is applicable to gears of all materials, including non-metallic materials.

Mild E.P. (Extreme Pressure) lubricants may be used with Iron and Steel Gears. E.P. lubricants normally should be selected of the same viscosity as straight mineral oil, E.P. lubricants are not recommended for use with brass or bronze gears.

SAE80 or 90 gear oil should be satisfactory for splash lubricated gears. Where extremely high or low speed conditions are encountered, consult a lubricant manufacturer. Oil temperature of 150°F should not be exceeded for continuous duty applications. Temperatures up to 200°F can be safely tolerated for short periods of time.

Many specialty lubricants have been recently developed to meet the application demands of today's markets, including synthetics and both high and low temperature oils and greases. In those instances where Bath or Drip Feed is not practical, a moly-Disulphide grease may be used successfully, for low speed applications.

GENERAL

MATERIALS

Boston Gear stock steel gears are made from a .20 carbon steel with no subsequent treatment. For those applications requiring increased wearability. Case-hardening produces a wear resistant, durable surface and a higher strength core. Carburizing and hardening is the most common process used. Several proprietary nitriding processes are available for producing an essentially distortion-free part with a relatively shallow but wear-resistant case. Boston stock worms are made of either a .20 or .45 carbon steel. Selection of material is based on size and whether furnished as hardened or untreated.

Stock cast iron gears are manufactured from ASTM-CLASS 30 cast iron to Boston Gear specifications. This provides a fine-grained material with good wear-resistant properties.

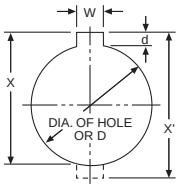
Bronze worm and helical gears are produced from several alloys selected for bearing and strength properties. Phosphor bronze is used for helicals and some worm gears (12P and coarser). Finer pitch worm gears are made from several different grades of bronze, dependent on size.

Non-metallic spur Gears listed in this Catalog are made from cotton reinforced phenolic normally referred to as Grade “C.”

Plastic Gears listed are molded from either Delrin®, Acetal or Minlon®.

STANDARD KEYWAYS AND SETSCREWS

Diameter of Hole	Standard		Recommended Setscrew
	W	d	
5/16 to 7/16”	3/32”	3/64”	10-32
1/2 to 9/16	1/8	1/16	1/4-20
5/8 to 7/8	3/16	3/32	5/16-18
15/16 to 1-1/4	1/4	1/8	3/8-16
1-5/16 to 1-3/8	5/16	5/32	7/16-14
1-7/16 to 1-3/4	3/8	3/16	1/2-13
1-13/16 to 2-1/4	1/2	1/4	9/16-12
2-5/16 to 2-3/4	5/8	5/16	5/8-11
2-13/16 to 3-1/4	3/4	3/8	3/4-10
3-5/16 to 3-3/4	7/8	7/16	7/8-9
3-13/16 to 4-1/2	1	1/2	1-8
4-9/16 to 5-1/2	1-1/4	7/16	1-1/8-7
5-9/16 to 6-1/2	1-1/2	1/2	1-1/4-6



FORMULA:

$X = \sqrt{(D/2)^2 - (W/2)^2} + d + D/2$

$X' = 2X - D$

EXAMPLE:

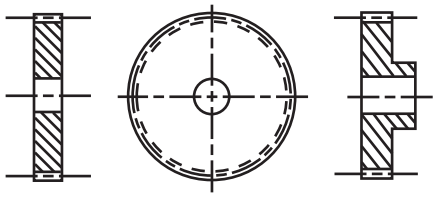
Hole 1”; Keyway 1/4” wide by 1/8” deep.

$X = \sqrt{(1/2)^2 - (1/8)^2} + 1/8 + 1/2 = \mathbf{1.109”}$

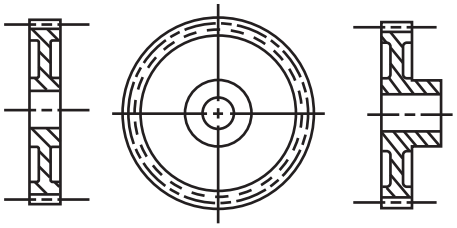
$X' = 2.218 - 1.000 = \mathbf{1.218”}$

STYLES

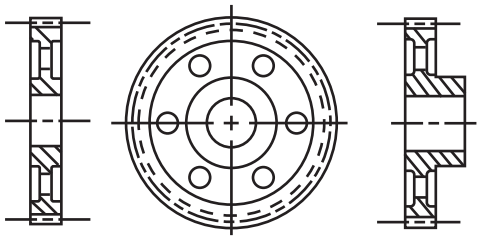
Boston Spur, Helical, and Worm Gears are carried in Plain, Web, or Spoke styles, as illustrated.



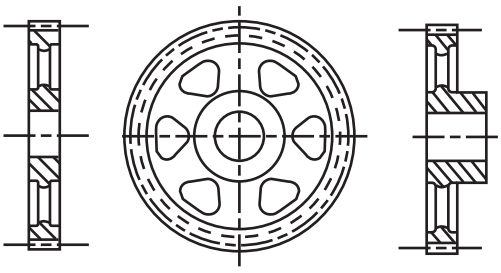
PLAIN – A



WEB – B



WEB WITH
LIGHTNING HOLES – C



SPOKE – D

HOW TO FIGURE HORSEPOWER AND TORQUE

TO OBTAIN	HAVING	FORMULA
Velocity (V) Feet Per Minute	Pitch Diameter (D) of Gear or Sprocket – Inches & Rev. Per Min. (RPM)	V = .2618 x D x RPM
Rev. Per Min. (RPM)	Velocity (V) Ft. Per Min. & Pitch Diameter (D) of Gear or Sprocket—Inches	$RPM = \frac{V}{.2618 \times D}$
Pitch Diameter (D) of Gear or Sprocket — Inches	Velocity (V) Ft. Per Min. & Rev. Per Min. (RPM)	$D = \frac{V}{.2618 \times RPM}$
Torque (T) In. Lbs.	Force (W) Lbs. & Radius (R) Inches	T = W x R
Horsepower (HP)	Force (W) Lbs. & Velocity (V) Ft. Per Min.	$HP = \frac{W \times V}{33000}$
Horsepower (HP)	Torque (T) In. Lbs. & Rev. Per Min. (RPM)	$HP = \frac{T \times RPM}{63025}$
Torque (T) In. Lbs.	Horsepower (HP) & Rev. Per Min. (RPM)	$T = \frac{63025 \times HP}{RPM}$
Force (W) Lbs.	Horsepower (HP) & Velocity (V) Ft. Per Min.	$W = \frac{33000 \times HP}{V}$
Rev. Per Min. (RPM)	Horsepower (HP) & Torque (T) In. Lbs.	$RPM = \frac{63025 \times HP}{T}$

POWER is the rate of doing work.

WORK is the exerting of a FORCE through a DISTANCE. ONE FOOT POUND is a unit of WORK. It is the WORK done in exerting a FORCE OF ONE POUND through a DISTANCE of ONE FOOT.

THE AMOUNT OF WORK done (Foot Pounds) is the FORCE (Pounds) exerted multiplied by the DISTANCE (Feet) through which the FORCE acts.

THE AMOUNT OF POWER used (Foot Pounds per Minute) is the WORK (Foot Pounds) done divided by the TIME (Minutes) required.

$$\text{POWER (Foot Pounds per Minute)} = \frac{\text{WORK (Ft. Lbs.)}}{\text{TIME (Minutes)}}$$

POWER is usually expressed in terms of HORSEPOWER.

HORSEPOWER is POWER (Foot Pounds per Minute) divided by 33000.

$$\text{HORSEPOWER (HP)} = \frac{\text{POWER (Ft. Lbs. per Minute)}}{33000}$$

$$= \frac{\text{WORK (Ft. Pounds)}}{33000 \times \text{TIME (Min.)}}$$

$$= \frac{\text{FORCE (Lbs.)} \times \text{DISTANCE (Feet)}}{33000 \times \text{TIME (Min.)}}$$

$$= \frac{\text{FORCE (Lbs.)} \times \text{DISTANCE (Feet)}}{33000 \times \text{TIME (Min.)}}$$

Cut on Dotted Lines
and Keep for Quick Reference

APPLICATION FORMULAS

1 hp = 36 lb-in. @ 1750 rpm
1 hp = 3 lb-ft. @ 1750 rpm

$$hp = \frac{\text{Torque (lb.-in.)} \times rpm}{63{,}025}$$

$$hp = \frac{\text{Force (lb)} \times \text{Velocity (ft/min.)}}{33{,}000}$$

Velocity (ft/min.) = 0.262 x Dia. (in.) x rpm
Torque (lb.-in) = Force (lb) x Radius (in.)

$$\text{Torque (lb.-in.)} = \frac{hp \times 63{,}025}{rpm}$$

$$\text{Mechanical Efficiency} = \frac{\text{Output hp}}{\text{Input hp}} \times 100\%$$

$$\text{Output hp} = \frac{\text{OT (lb-in.)} \times \text{Output rpm}}{63{,}025}$$

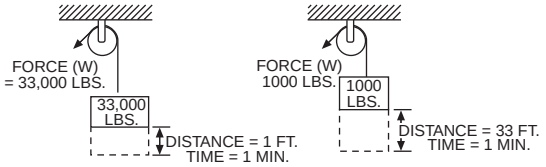
OT = Input Torque x Ratio x Efficiency
OT = Output Torque

$$\text{Output rpm} = \frac{\text{Input rpm}}{\text{Ratio}}$$

$$OHL = \frac{2\,TK}{D}$$

OHL = Overhung Load (lb)
T = Shaft Torque (lb-in.)
D = PD of Sprocket, Pinion or Pulley (in.)
K = Overhung Load Factor
Overhung Load Factors:
Sprocket or Timing Belt 1.00
Pinion & Gear Drive 1.25
Pulley & V-Belt Drive 1.50
Pulley & Flat Belt Drive 2.50
Variable Pitch Pulley 3.50
kW = hp x 0.7457
in. = mm/25.4
Temp. °C = (°F - 32) x 0.556
Temp. °F = (°C x 1.8) + 32
Torque (lb-in.) = 86.6 x kg•m
Torque (lb-in.) = 8.85 x N•m
Torque (lb-in.) = 88.5 x daN•m

ILLUSTRATION OF HORSEPOWER



$$HP = \frac{33{,}000 \times 1}{33{,}000 \times 1} = 1\ HP \qquad HP = \frac{1000 \times 33}{33{,}000 \times 1} = 1\ HP$$

TORQUE (T) is the product of a FORCE (W) in pounds, times a RADIUS (R) in inches from the center of shaft (Lever Arm) and is expressed in Inch Pounds.

T=WR=300 x 1=300 In. Lbs. T=WR=150 x 2=300 In. Lbs.

If the shaft is revolved, the FORCE (W) is moved through a distance, and WORK is done.

$$\text{WORK (Ft. Pounds)} = W \times \frac{2\pi R}{12} \times \text{No. of Rev. of Shaft.}$$

When this WORK is done in a specified TIME, POWER is used.

$$\text{POWER (Ft. Pounds per Min.)} = W \times \frac{2\pi R}{12} \times RPM$$

Since (1) HORSEPOWER = 33,000 Foot Pounds per Minute

$$\text{HORSEPOWER (HP)} = W \times \frac{2\pi R}{12} \times \frac{RPM}{33{,}000} = \frac{WxRxRPM}{63{,}025}$$

but TORQUE (Inch Pounds) = FORCE (W) X RADIUS (R)

$$\text{Therefore HORSEPOWER (HP)} = \frac{\text{TORQUE (T)} \times RPM}{63{,}025}$$

APPLICATION CLASSIFICATION FOR VARIOUS LOADS

Type of Machine To Be Driven	Chart I For All Drives — Service Factor Loading		
	Not More Than 15 Mins. in 2 Hrs.	Not More Than 10 Hrs. per Day	More Than 10 Hrs. Per Day
AGITATORS			
Pure Liquid	0.80	1.00	1.25
Semi-Liquids, Variable Density	1.00	1.25	1.50
BLOWERS			
Centrifugal and Vane	0.80	1.00	1.25
Lobe	1.00	1.25	1.50
BREWING AND DISTILLING			
Bottling Machinery	0.80	1.00	1.25
Brew Kettles–Continuous Duty	—	—	1.25
Cookers – Continuous Duty	—	—	1.25
Mash Tubs – Continuous Duty	—	—	1.25
Scale Hopper – Frequent Starts	—	1.25	1.50
CAN FILLING MACHINES	—	1.00	—
CANE KNIVES	—	1.50	—
CAR DUMPERS	—	1.75	—
CAR PULLERS	—	1.25	—
CLARIFIERS	—	1.00	1.25
CLASSIFIERS	—	1.25	1.50
CLAY WORKING MACHINERY			
Brick Press & Briquette Machine	—	1.75	2.00
Extruders and Mixers	1.00	1.25	1.50
COMPRESSORS			
Centrifugal	—	1.00	1.25
Lobe–Reciprocating, Multi-Cycle	—	1.25	1.50
Reciprocating – Single Cycle	—	1.75	2.00
CONVEYORS— UNIFORMLY LOADED & FED			
Apron	—	1.00	1.25
Assembly-Belt – Bucket or Pan	—	1.00	1.25
Chain – Flight	—	1.00	1.25
Oven – Live Roll – Screw	—	1.00	1.25
CONVEYORS—HEAVY DUTY NOT UNIFORMLY FED			
Apron	—	1.25	1.50
Assembly-Belt – Bucket or Pan	—	1.25	1.50
Chain – Flight	—	1.25	1.50
Live Roll	—	—	—
Oven – Screw	—	1.25	1.50
Reciprocating – Shaker	—	1.75	2.00
CRANES AND HOISTS			
Main Hoists			
Bridge and Trolley Drive	*	1.00	1.25
CRUSHER			
Ore, Stone	—	1.75	2.00
Sugar	—	1.50	1.50

Type of Machine To Be Driven	Chart I For All Drives — Service Factor Loading		
	Not More Than 15 Mins. in 2 Hrs.	Not More Than 10 Hrs. per Day	More Than 10 Hrs. Per Day
ELEVATORS			
Bucket – Uniform Load	—	1.00	1.25
Bucket – Heavy Load	—	1.25	1.50
Centrifugal Discharge	—	1.25	1.50
Freight	—	1.25	1.50
Gravity Discharge	—	1.00	1.25
FANS			
Centrifugal – Light (Small Diam.)	—	1.00	1.25
Large Industrial	—	1.25	1.50
FEEDERS			
Apron – Belt – Screw	—	1.25	1.50
Disc	—	1.00	1.25
Reciprocating	—	1.75	2.00
FOOD INDUSTRY			
Beet Slicer	—	1.25	1.50
Cereal Cooker	—	1.00	1.25
Dough Mixer – Meat Grinder	—	1.25	1.50
GENERATORS (NOT WELDING)	—	1.00	1.25
HAMMER MILLS	—	1.75	2.00
HOISTS			
Heavy Duty	—	1.75	2.00
Medium Duty and Skip Type	—	1.25	1.50
LAUNDRY TUMBLERS	—	1.25	1.50
LINE SHAFTS			
Uniform Load	—	1.00	1.25
Heavy Load	—	1.25	1.50
MACHINE TOOLS			
Auxiliary Drive	—	1.00	1.25
Main Drive – Uniform Load	—	1.25	1.50
Main Drive – Heavy Duty	—	1.75	2.00
METAL MILLS			
Draw Bench Carriers & Main Drive	—	1.25	1.50
SLITTERS	—	1.25	1.50
TABLE CONVEYORS — NON REVERSING			
Group Drives	—	1.25	1.50
Individual Drives	—	1.75	2.00
Wiring Drawing, Flattening or Winding	—	1.25	1.50
MILLS ROTARY TYPE BALL AND ROD			
Spur Ring Gear and Direct Connected	—	—	2.00
Cement Kilns, Pebble	—	—	1.50
Dryers and Coolers	—	—	1.50
Plain and Wedge Bar	—	—	1.50
Tumbling Barrels	—	—	2.00

*Consult manufacturer.

APPLICATION CLASSIFICATION FOR VARIOUS LOADS (Continued)

Type of Machine To Be Driven	Chart I For All Drives — Service Factor Loading		
	Not More Than 15 Mins. in 2 Hrs.	Not More Than 10 Hrs. per Day	More Than 10 Hrs. Per Day
AGITATORS			
Pure Liquid	0.80	1.00	1.25
Semi-Liquids, Variable Density	1.00	1.25	1.50
BLOWERS			
Centrifugal and Vane	0.80	1.00	1.25
Lobe	1.00	1.25	1.50
BREWING AND DISTILLING			
Bottling Machinery	0.80	1.00	1.25
Brew Kettles–Continuous Duty	—	—	1.25
Cookers – Continuous Duty	—	—	1.25
Mash Tubs – Continuous Duty	—	—	1.25
Scale Hopper – Frequent Starts	—	1.25	1.50
CAN FILLING MACHINES	—	1.00	—
CANE KNIVES	—	1.50	—
CAR DUMPERS	—	1.75	—
CAR PULLERS	—	1.25	—
CLARIFIERS	—	1.00	1.25
CLASSIFIERS	—	1.25	1.50
CLAY WORKING MACHINERY			
Brick Press & Briquette Machine	—	1.75	2.00
Extruders and Mixers	1.00	1.25	1.50
COMPRESSORS			
Centrifugal	—	1.00	1.25
Lobe–Reciprocating, Multi-Cycle	—	1.25	1.50
Reciprocating – Single Cycle	—	1.75	2.00
CONVEYORS— UNIFORMLY LOADED & FED			
Apron	—	1.00	1.25
Assembly-Belt – Bucket or Pan	—	1.00	1.25
Chain – Flight	—	1.00	1.25
Oven – Live Roll – Screw	—	1.00	1.25
CONVEYORS—HEAVY DUTY NOT UNIFORMLY FED			
Apron	—	1.25	1.50
Assembly-Belt – Bucket or Pan	—	1.25	1.50
Chain – Flight	—	1.25	1.50
Live Roll	—	—	—
Oven – Screw	—	1.25	1.50
Reciprocating – Shaker	—	1.75	2.00
CRANES AND HOISTS			
Main Hoists			
Bridge and Trolley Drive	*	1.00	1.25
CRUSHER			
Ore, Stone	—	1.75	2.00
Sugar	—	1.50	1.50

Type of Machine To Be Driven	Chart I For All Drives — Service Factor Loading		
	Not More Than 15 Mins. in 2 Hrs.	Not More Than 10 Hrs. per Day	More Than 10 Hrs. Per Day
ELEVATORS			
Bucket – Uniform Load	—	1.00	1.25
Bucket – Heavy Load	—	1.25	1.50
Centrifugal Discharge	—	1.25	1.50
Freight	—	1.25	1.50
Gravity Discharge	—	1.00	1.25
FANS			
Centrifugal – Light (Small Diam.)	—	1.00	1.25
Large Industrial	—	1.25	1.50
FEEDERS			
Apron – Belt – Screw	—	1.25	1.50
Disc	—	1.00	1.25
Reciprocating	—	1.75	2.00
FOOD INDUSTRY			
Beet Slicer	—	1.25	1.50
Cereal Cooker	—	1.00	1.25
Dough Mixer – Meat Grinder	—	1.25	1.50
GENERATORS (NOT WELDING)	—	1.00	1.25
HAMMER MILLS	—	1.75	2.00
HOISTS			
Heavy Duty	—	1.75	2.00
Medium Duty and Skip Type	—	1.25	1.50
LAUNDRY TUMBLERS	—	1.25	1.50
LINE SHAFTS			
Uniform Load	—	1.00	1.25
Heavy Load	—	1.25	1.50
MACHINE TOOLS			
Auxiliary Drive	—	1.00	1.25
Main Drive – Uniform Load	—	1.25	1.50
Main Drive – Heavy Duty	—	1.75	2.00
METAL MILLS			
Draw Bench Carriers & Main Drive	—	1.25	1.50
SLITTERS	—	1.25	1.50
TABLE CONVEYORS — NON REVERSING			
Group Drives	—	1.25	1.50
Individual Drives	—	1.75	2.00
Wiring Drawing, Flattening or Winding	—	1.25	1.50
MILLS ROTARY TYPE BALL AND ROD			
Spur Ring Gear and Direct Connected	—	—	2.00
Cement Kilns, Pebble	—	—	1.50
Dryers and Coolers	—	—	1.50

*Consult manufacturer.

This list is not all-inclusive and each application should be checked to determine if any unusual operating conditions will be encountered.

TERMS AND CONDITIONS

ALL QUOTATIONS AND SALES BY BOSTON GEAR, THE CONTRACTING PARTY HERETO, A DIVISION OF IMO INDUSTRIES INC. HEREAFTER CALLED "COMPANY" ARE MADE ON THE FOLLOWING TERMS AND CONDITIONS.

1. QUOTATIONS and THEIR ACCEPTANCE

Unless otherwise specified, quotations on stock products are for immediate acceptance, subject to prior sales. Quotations on special products are made subject to acceptance within thirty (30) days from date thereof, but in making such quotations, the Company reserves the right to change or cancel them at any time prior to the receipt of the customers' written acceptance. All quotations for special products are based upon supplying up to plus or minus 5% of quantity ordered unless otherwise stated in the quotation. All quotations are made F.O.B. shipping point.

2. PRICES

Prices are in accordance with current Company price lists, are based on quantity specified and are subject to minimum order requirements of the Company. In the event the Company consents to the cancellation or suspension of orders, it shall be entitled to charge for work done and material ordered or used up to the time of giving its written consent to such cancellation or suspension. When work is to be done on material furnished by the customer, prices are based on the quantity specified being delivered by the customer at one time within a reasonable time after acceptance of order. Quotations will be made on special products of all types or on cutting only. Prices, specifications, and terms and conditions, as well as all statements appearing in the Company's catalogs and advertisements, and made elsewhere by the Company are subject to change without notice. Changes by the customer in specifications or delivery requirements will be subject to change in price. Whenever the net price of an order amounts to less than $25.00, a minimum charge of $25.00 will be made.

3. CREDIT TERMS

To those customers and prospective customers whose credit is satisfactory to the Company, terms are net thirty (30) days, from date of invoice, with the option of paying semi-monthly. The Company may at any time when, in its opinion, the financial condition of the customer or prospective customer warrants it, either alter or suspend credit, or discontinue deliveries, and render a charge covering the value of any partially finished special products which are then being manufactured for the customer. In those instances where credit is not established, and in cases where satisfactory references are not given, the terms are cash with order. For special products in those instances where credit is not established to the satisfaction of the Company, a deposit of at least 50% of total value of the order is required. Remittances should be made by check or money order, payable to Boston Gear, 14 Hayward St., Quincy, Massachusetts 02171, U.S.A. Delays in transportation shall not exceed the terms of payment.

4. MATERIAL FURNISHED by THE CUSTOMER

Unless otherwise specified, quotations are based on material furnished by the customer being of ordinary hardness, normal allowance for finish, uniform specification, and machine work being of ordinary commercial accuracy. If material furnished by the customer involves the Company in expense not contemplated by the contract, the customer will be charged for all such additional expense. If serious defects are found in the material furnished by the customer, the customer will be charged for the actual work done. The Company assumes no responsibility for, and will not be liable for loss of or damage to samples, blueprints, diagrams, and other material of any nature submitted or furnished by the customer or prospective customer, provided the Company has exercised reasonable care in the handling of the same. The Company does not assume transportation and insurance costs on any of the foregoing items. In all cases where the customer or prospective customer makes no statement in writing, concerning the disposition of any of the foregoing material when submitted, the Company reserves the right to dispose of such material according to its best judgment.

5. DIMENSIONS

When dimensions of rims, bores, and hubs are not clearly specified, quotations are based on ordinary dimensions. Before the customer's blanks are accepted by the Company for cutting, the diameter, holes, rims, and ends of holes must be finished; for bevel gears, hubs, must be of uniform length. There should also be an allowance of extra blanks to cover possible spoilage. Unless otherwise specified, dimensions are in inches.

6. SAMPLES

In no case are samples furnished free. If agreed to by the Company, a few products in advance of a regular quantity order will be furnished but only at an agreed upon price over the regular quantity price.

7. TAXES

If any tax is at any time levied or imposed by the federal or any state or local government, or any other taxing authority, upon the products covered hereby, or in respect of the production, processing, manufacture, storage, sale, use, or consumption thereof, or, in the case of goods delivered at the Company's expense, upon the transportation thereof, including freight charges thereon, the amount of such tax shall be added to the purchase price above specified and shall be borne by the customer. The Company will accept a valid exemption certificate from the customer if applicable; however, if any exemption certificate previously accepted it not recognized by the taxing authority involved and the Company is required to pay the tax covered by such exemption certificate, the customer shall be required to promptly reimburse the Company for the taxes so paid.

8. SHIPMENTS

All shipments are made F.O.B. shipping point (subject to freight allowance under conditions stated in separate price schedules). When ordering, the customer's desired method of shipment must be clearly stated. Where instructions for shipping do not appear on the order, shipment will be made according to the Company's best judgment. Full risk of loss (including transportation delays and losses) shall pass the customer upon delivery of the products to F.O.B. point. Unless otherwise instructed, all Parcel Post shipments are insured at the customers' expense. Parcel Post shipments without insurance are at the customer's risk. Deliveries by Messenger Service to a terminal are made at the customer's risk and expense. Partial shipments shall be permitted and the Company may invoice each shipment separately.

TERMS AND CONDITIONS

ALL QUOTATIONS AND SALES BY BOSTON GEAR, THE CONTRACTING PARTY HERETO, A DIVISION OF IMO INDUSTRIES INC. HEREAFTER CALLED "COMPANY" ARE MADE ON THE FOLLOWING TERMS AND CONDITIONS.

9. REFUSAL of SHIPMENT

In case of the refusal or inability of the customer to accept any shipment in accordance with the terms of the order, the customer shall be liable for freight, express, storage, extra cost of handling and all other expenses incurred by the Company as a result of such refusal or inability.

10. DELAY or NONPERFORMANCE

The Company shall not be liable for any delay or loss of any nature or failure in performance due to or caused by fire, flood, strike, or other differences with workmen, accidents, labor or material or transportation shortages, war (declared or undeclared), insurrection, riot, or by any governmental orders or regulations, legal interferences or prohibitions, defaults on the part of suppliers or other causes beyond the Company's reasonable control.

11. CLAIMS and REJECTED MATERIAL

Any products which have been altered or damaged are not returnable except with the Company's written consent. To reject products on inspection as defective, customer must notify the Company in writing within ten (10) days from receipt of the products. Before allowing or rejecting claim, the Company shall then have the option of reinspection at the customer's plant or its own. Defects that do not impair service shall not be a cause for rejection. The Company shall have the right to replace within a reasonable time any product or products which in its opinion do not conform to the order. No claim will be allowed for any products damaged by the customer or damaged in transit. Expenses incurred in connection with claims for which the Company is not liable, will be charged to the customer. The Company will not be responsible for any work done to correct errors unless such work is authorized by the written consent of the Company. The Company assumes no liability for any claim for infringement of any foreign or domestic patent.

12. LIMITED WARRANTY

The Company warrants that products manufactured or sold by it shall be free from defects in material and workmanship. Any products which shall within two (2) years of delivery, be proved to the Company's satisfaction to have been defective at the time of delivery in these respects will be replaced or repaired by the Company at its option. Freight is the responsibility of the customer. The Company's liability under this limited warranty is limited to such replacement or repair and it shall not be held liable in any form of action for direct or consequential damages to property or person. The foregoing limited warranty is expressly made in lieu of all other warranties whatsoever, express, implied and statutory and including without limitation the implied warranties of merchantability and fitness.

No employee, agent, distributor, or other person is authorized to give additional warranties on behalf of Boston Gear, nor to assume for Boston Gear any other liability in connection with any of its products, except an officer of Boston Gear by a signed writing.

13. WAIVER of BREACH

No waiver by the Company of any breach of these provisions shall constitute a waiver of any other breach.

14. CONSEQUENTIAL DAMAGES

The Company shall not be liable to the customer or others claiming through the customer for special or consequential charges for any reason whatsoever.

15. LAWS

To the best of the Company's knowledge and belief it is in compliance with all local, state and federal laws. All orders are subject to the condition that the Company's obligation under such local, state and federal laws and Executive Orders, Rules and Regulations issued thereunder, whether now in force or hereafter made effective, shall be no greater as a result of this agreement and no greater than required by such laws and the Company expressly disclaims assumptions of any of the customer's obligations under such laws.

16. GENERAL

Any terms and conditions of a customer's order which are inconsistent with or additional to the terms and conditions hereof shall not be binding on the Company and shall not be considered applicable to any sale or shipment of the Company's products. All such terms and conditions are hereby expressly rejected. No waiver, alteration or modification of any of the Company's terms and conditions shall be binding on the Company unless made in writing and agreed to by a duly authorized official of the Company.

17. PRINTERS, STENOGRAPHIC, and CLERICAL ERRORS

The Company is not responsible for printers' errors made in any of its publications and other forms of printed matter, or for any stenographic and clerical errors. All such errors are subject to correction.

18. REDUCER EXPRESS

A) Quantities of reducers covered as part of this program are a maximum of:
   6 pieces for any 710–726 or 221–231
   2 pieces for any 732–760 or 239–247

B) Bost-Kleen, Stainless Bost-Kleen and modified reducers are not included as part of this program.

C) Boston Gear will utilize any major courier to handle air shipments.

D) Consult Boston Gear for details.

19. GUARANTEED SAME DAY SHIPMENT

- Products must be available from stock.
- Does not apply to WOG or scheduled release shipments.
- Same day shipment available Monday through Friday excluding U.S. holidays. For emergency service, please call 606-525-8021.
- In the event your freight carrier is unable to meet your requirements, we reserve the right to substitute a carrier of equivalent quality.
- If a shipment is missed and Boston Gear pays the freight, we'll pay for the freight charges as they were originally specified on the order.
- Brokerage and export fees still apply to shipments outside the U.S.
- For those distributors in Eastern or Central time zones, after 5 p.m. local time, please call 310-802-3834 or fax 310-802-0153 to place your order.
- Video Terminal Orders entered up to 8 p.m. ET will be shipped the same day.

INDEX TO CATALOG NUMBERS

*Initial numbers, larger numbers arranged according to size.

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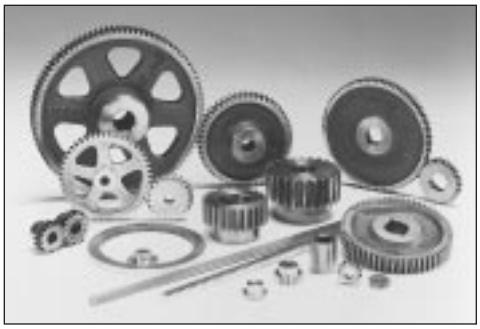
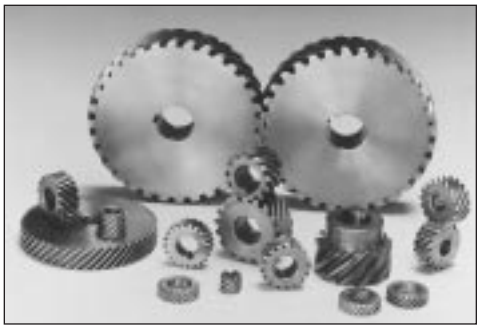
NOTES



SPUR GEARS

Boston spur gears are designed to transmit motion or power between parallel shafts. Configurations include spur, rack, pinion wire, stem pinions and internal gears; most with a selection of bores, keyways and setscrews. Fine-pitch gears are available in plastic, brass, stainless steel and steel. Heavier pitch spurs are available in steel and cast iron. Styles include plain, web, web with lightening holes or spoked. Change gears have consecutive numbers of teeth for a variety of ratios.



HELICAL GEARS

Boston's helical gears are stocked both right and left hand, made with a 45° helix angle. They are designed to transmit motion or power between non-intersecting shafts which are positioned either parallel or at 90° to each other. Because these gears are top-hobbed, there is extremely close concentricity between the pitch diameter and the outside diameter.

BEVEL AND MITER GEARS

Boston miter and bevel gears are designed for transmission of motion or power between intersecting shafts positioned at a right angle. Most Boston straight-tooth miter and bevel gears have generated teeth with Coniflex® tooth form, for superior control of tooth contract and quiet operation. Spiral tooth gears are available for high-speed applications.

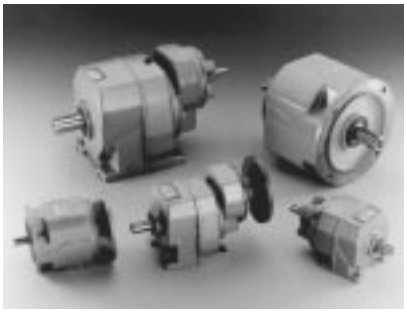
®Trademark of the Gleason Works.

WORM AND WORM GEARS

Boston worm and worm gears provide an effective answer for such power transmission applications as high-ratio speed reduction, limited space, right-angle shafts and non-intersecting shafts. When properly applied, they are the smoothest and quietest form of gearing. Steel worms and cast iron or bronze worm gears have throated teeth are available in single, double or quadruple threads, 48 to 3 diametral pitch. Acetal worms and worm gears are available in 48, 32 and 24 diametral pitches.

Boston Gear speed reducers.

700 Series single-reduction worm gear speed reducers feature integral hardened worms and bronze worm gears. Through-bore housings assure true shaft positioning, proper mating of worm and gear, and perfect alignment under maximum stress conditions. Oversize roller and ball bearings allow greater overhung and thrust loads.



800 Series contains a broad selection of compact, heavy-duty helical gear drives, with long life performance features and simplified maintenance. Models include double and triple reduction units in flanged or foot mounted arrangements.

Right-angle gear drives are available with single or double output shafts and are designed for high capacity and efficiency, quiet operation, and long service life. Bevel or spiral bevel gears are made of hardened alloy steel, with oversized bearings and high-quality oil seals.

W700 Series double-reduction worm gear speed reducers offer a broad range of reduction ratios, with integral hardened worms and bronze worm gears used throughout. Mounting surfaces are machined parallel for correct alignment of all drive components. Precision through-bore housings assure true shaft positioning with proper mating of worms and gears.

200 Optimount Series helical gear speed reducers contain gears and pinions made of heat-treated alloy steel or close-grain cast iron, with ball or tapered roller bearings. Rugged housings are precision-machined to assure accurate and permanent gear alignment.

Bost-Kleen 700 Series, designed for the food processing and other applications where the reducers are constantly exposed to an environment requiring high pressure wash down to maintain cleanliness. Single reduction worm gear speed reducers are certified by the Baking Industry Sanitation Standards Committee (BISSC) to assure contamination free operation.

Boston Gear speed reducers.

700 Series single-reduction worm gear speed reducers feature integral hardened worms and bronze worm gears. Through-bore housings assure true shaft positioning, proper mating of worm and gear, and perfect alignment under maximum stress conditions. Oversize roller and ball bearings allow greater overhung and thrust loads.

600A Series in-line helical and right-angle helical/bevel speed reducers are available in single, double, triple, and quadruple reductions. They provide operating efficiency as high as 98%, for significant savings in required motor horsepower and electrical consumption. First-reduction pinion and gear teeth are precision ground after hardening. Intermediate and output pinions and gear teeth are shaved prior to hardening. These steps provide maximum strength and smooth, quiet operation.

Right-angle gear drives are available with single or double output shafts and are designed for high capacity and efficiency, quiet operation, and long service life. Bevel or spiral bevel gears are made of hardened alloy steel, with oversized bearings and high-quality oil seals.

W700 Series double-reduction worm gear speed reducers offer a broad range of reduction ratios, with integral hardened worms and bronze worm gears used throughout. Mounting surfaces are machined parallel for correct alignment of all drive components. Precision through-bore housings assure true shaft positioning with proper mating of worms and gears.

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Boston Gear — Your Single Source for Motion Control Products

Boston Gear provides the Industry's widest range of coordinated power transmission components at the most efficient cost. You get one-source dependability, one-source convenience when you look to Boston Gear Distributors for:

Speed Reducers/Gear Drives – Worm gear, in-line helical and right-angle helical/worm speed reducers; right-angle gear drives.

Stock Gears – Gears and gear sets for parallel and right angle shafting: spur, helical, bevel and miter gears: worms and worm gears.

Bearings & Shaft Accessories – Self-lubricating and solid bronze bearings; anti-friction ball bearings, mounted bearings, flanged cartridges, rod ends, spherical roller bearings, linear ball bearings and engineering grade thermoplastic bearings. ANSI standard roller chain, sprockets, shaft couplings, universal joints, collars, bushings and washers.

Electrical Products – Ratiotrol AC and DC adjustable speed motor controllers, AC and DC motors, clutches, brakes, and accessories.

Fluid Power Products – Pneumatic and hydraulic cylinders, pneumatic filter/regulator/lubricator (FRL) assemblies, directional control valves, air motors and accessories.

Mechanical Clutches – Friction torque limiters, single and multiple position, automatic and manual reset. Thirteen series to suit an infinite array of applications.

Boston Gear Distributors offer competent selection advice, local product stocks and electronic order processing through our dedicated On-Line Distributor Information System. For the name and location of your local Distributor, contact Boston Gear.

Call toll-free: 888-999-9860 for nearest Distributor

Boston Gear

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