



thin section bearing design guide

HiTECH DIVISION





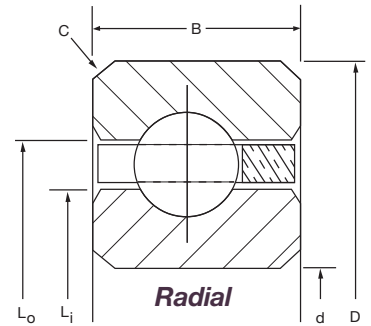
In a Thin Section Bearing NHBB can achieve bore-to-cross section ratios as high as 20:1.

The HiTech Solution:

Ideal for a Wide Range of Applications

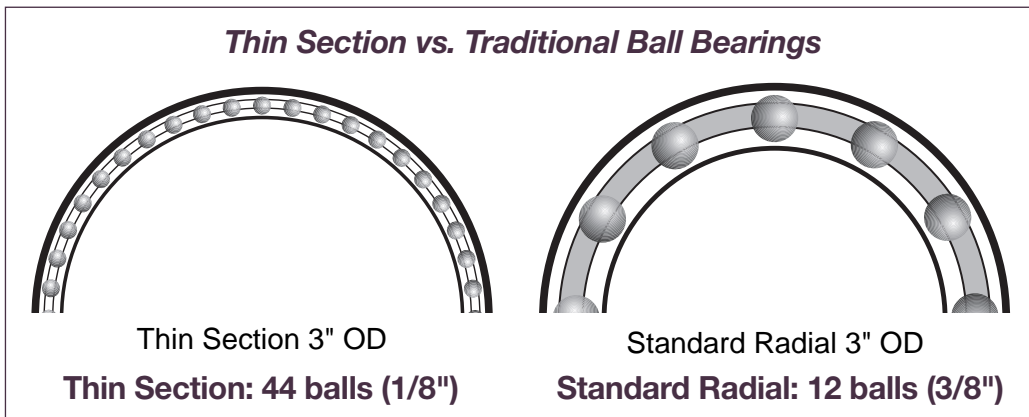
Thin Section Bearings are used when bearing weight or size needs to be kept to a minimum. They are used in robotics, inspection equipment, medical devices and semiconductor manufacturing equipment.

The aerospace and defense markets also often use these bearings in aircraft flight control systems, helicopter rotor swash plates, missiles and other navigational guidance systems.

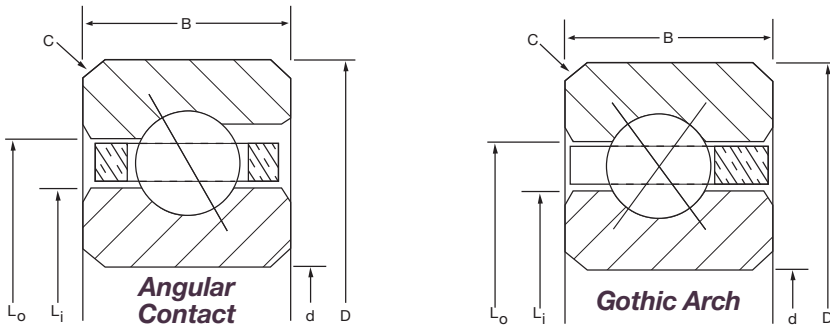
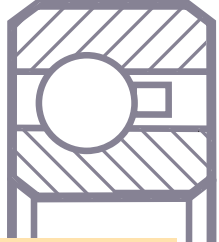


Thin Section at a Glance

- Large number of small diameter balls for greater stiffness (less deflection).
- Less weight and space, compared to heavier (standard) section parts.
- As size grows, cross-section increases (up to 1/2" at 11.000" OD).
- Conforms to roundness of shafts or housings.
- Distributing the load over a greater number of small diameter balls contributes to lower starting and running torque.



Maximize Your Options.



The NHBB Advantage

- NHBB HiTech's extensive experience in a broad range of demanding applications and precision products is critical in meeting the unique requirements of thin section bearings.
- We work closely with each customer to determine the best design in terms of cages, shield or seal enclosures, ring and ball materials and lubricants.
- We also have expertise meeting demands of specific applications including speeds, loads, life, torque requirements, temperature and other environmental conditions.
- HiTech makes recommendations based around standard thin section designs with custom features as needed to deliver cost-effective bearing solutions.

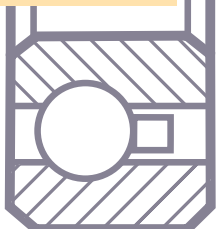
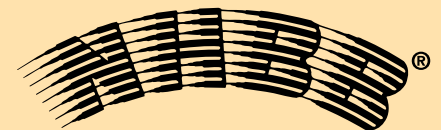
Which Thin Section is Right for You?

As with any bearing, consideration must be given to the trade-off in performance characteristics when selecting or designing Thin Section Bearings. Radial and Angular Contact designs are available as well as a unique type commonly referred to as Gothic Arch, which offers the stiffness of a duplex bearing set in the space of a single bearing. This is achieved by having four points of contact between the special bearing races and the balls.

Loads, speeds, duty-cycle, assembly precision and friction torque all can influence the decision regarding which design is to be considered. Your local NHBB sales engineer can help you make the best choice regarding Thin Section Bearings.

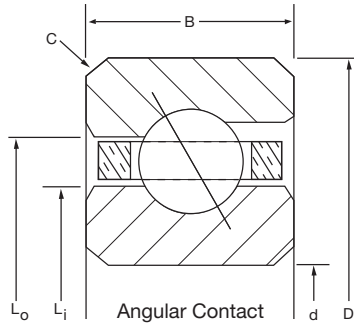
Maintaining Precision Roundness: Meeting the Manufacturing Challenge

Thin Section Bearing manufacturing is a challenge, requiring both skill and experience from design to production. For example, during manufacture, bearing rings are exposed to extreme temperatures during the heat treatment operation followed by quenching to cool the materials. Hardening temperatures, depending on the bearing's material type, can be in excess of 2000°F. These processes, performed with very specialized heat treatment systems, have been carefully planned and are under tight QC standards in order to minimize out-of-roundness (especially critical with larger parts) while maintaining face flatness.





Angular Contact Configuration



Ref	Basic P/N	Bore d	O.D. D	Width B	Land Diameter		Minimum Corner Chamfer C	Ball Complement		Load Ratings (lbs)		
					L _i	L _o		No. Z	Size D _b	Radial Capacity		Thrust Capacity
										Dynamic	Static	Static
1/8	MERI-1878	0.8750	1.1250	0.1562 ⁽¹⁾	0.961	1.049	.010	32	1/16	200	172	245
1/8	MERI-2117	1.0620	1.3125	0.1562 ⁽¹⁾	1.144	1.231	.010	38	1/16	215	208	290
1/8	MERI-2420	1.2500	1.5000	0.1562 ⁽¹⁾	1.320	1.402	.010	44	1/16	228	243	340
1/8	MERI-2622	1.3750	1.6250	0.1562 ⁽¹⁾	1.457	1.543	.010	49	1/16	240	272	380
1/8	MERI-2824	1.5000	1.7500	0.1562 ⁽¹⁾	1.582	1.667	.010	53	1/16	248	296	410
1/8	MERI-3026	1.6250	1.8750	0.1562 ⁽¹⁾	1.707	1.793	.010	57	1/16	255	319	440
1/4	MERI-4032	2.0000	2.5000	0.2500	2.187	2.313	.025	36	1/8	1060	1260	1115
5/16	MERI-4232	2.0000	2.6250	0.3125	2.234	2.391	.040	31	5/32	1500	1670	1500
1/4	MERI-4840	2.5000	3.0000	0.2500	2.687	2.813	.025	44	1/8	1150	1560	1365
5/16	MERI-5040	2.5000	3.1250	0.3125	2.734	2.891	.040	38	5/32	1640	2080	1840
1/4	MERI-5648	3.0000	3.5000	0.2500	3.187	3.313	.025	52	1/8	1230	1860	1615
5/16	MERI-5848	3.0000	3.6250	0.3125	3.234	3.391	.040	44	5/32	1740	2440	2135
3/8	MERI-6048	3.0000	3.7500	0.3750	3.281	3.469	.040	37	3/16	2240	2920	2580
1/4	MERI-6052	3.2500	3.7500	0.2500	3.437	3.563	.025	56	1/8	1270	2020	1740
5/16	MERI-6252	3.2500	3.8750	0.3125	3.484	3.641	.040	47	5/32	1780	2620	2280
3/8	MERI-6452	3.2500	4.0000	0.3750	3.531	3.719	.040	40	3/16	2320	3180	2790
1/4	MERI-6456	3.5000	4.0000	0.2500	3.687	3.813	.025	60	1/8	1310	2170	1865
5/16	MERI-6656	3.5000	4.1250	0.3125	3.734	3.891	.040	51	5/32	1850	2850	2475
3/8	MERI-6856	3.5000	4.2500	0.3750	3.781	3.969	.040	43	3/16	2390	3430	3005
1/4	MERI-6860	3.7500	4.2500	0.2500	3.937	4.063	.025	64	1/8	1340	2320	1990
5/16	MERI-7060	3.7500	4.3750	0.3125	3.984	4.141	.040	54	5/32	1890	3030	2620
3/8	MERI-7260	3.7500	4.5000	0.3750	4.031	4.219	.040	46	3/16	2460	3680	3215
1/4	MERI-7264	4.0000	4.5000	0.2500	4.187	4.313	.025	68	1/8	1380	2470	2115
5/16	MERI-7464	4.0000	4.6250	0.3125	4.234	4.391	.040	58	5/32	1950	3260	2815
3/8	MERI-7664	4.0000	4.7500	0.3750	4.281	4.469	.040	49	3/16	2530	3940	3425
1/2	MERI-8064	4.0000	5.0000	0.5000	4.375	4.625	.060	36	1/4	3690	5060	4465
1/4	MERI-7668	4.2500	4.7500	0.2500	4.437	4.563	.025	72	1/8	1410	2620	2240
5/16	MERI-7868	4.2500	4.8750	0.3125	4.484	4.641	.040	61	5/32	1990	3440	2965
3/8	MERI-8068	4.2500	5.0000	0.3750	4.531	4.719	.040	52	3/16	2600	4190	3635
1/2	MERI-8468	4.2500	5.2500	0.5000	4.625	4.875	.060	38	1/4	3780	5360	4715

Notes:

(1) Open width shown, shielded width is 0.1960".



Angular Contact Configuration

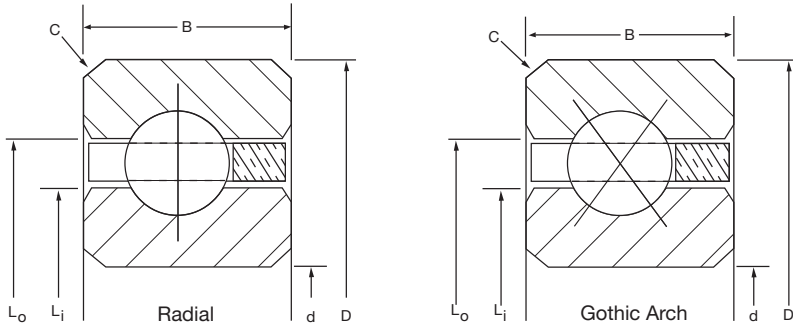
- Provides greatest thrust load capacity (unidirectional).
- OD from 1.125" to 11".
- Bore sizes up to 10".
- Contact Applications Engineering for custom specifications.



Ref	Basic P/N	Bore d	O.D. D	Width B	Land Diameter		Minimum Corner Chamfer C	Ball Complement		Load Ratings (lbs)		
					L _i	L _o		No. Z	Size D _b	Radial Capacity		Thrust Capacity
										Dynamic	Static	Static
1/4	MERI-8072	4.5000	5.0000	0.2500	4.687	4.813	.025	75	1/8	1410	2730	2335
5/16	MERI-8272	4.5000	5.1250	0.3125	4.734	4.891	.040	64	5/32	2030	3620	3110
3/8	MERI-8472	4.5000	5.2500	0.3750	4.781	4.969	.040	55	3/16	2660	4440	3845
1/2	MERI-8872	4.5000	5.5000	0.5000	4.875	5.125	.060	40	1/4	3860	5660	4965
1/4	MERI-8476	4.7500	5.2500	0.2500	4.937	5.063	.025	80	1/8	1470	2920	2490
5/16	MERI-8676	4.7500	5.3750	0.3125	4.984	5.141	.040	68	5/32	2090	3850	3305
3/8	MERI-8876	4.7500	5.5000	0.3750	5.031	5.219	.040	58	3/16	2720	4700	4060
1/2	MERI-9276	4.7500	5.7500	0.5000	5.125	5.375	.060	42	1/4	3940	5960	5215
1/4	MERI-8880	5.0000	5.5000	0.2500	5.187	5.313	.025	84	1/8	1500	3070	2615
5/16	MERI-9080	5.0000	5.6250	0.3125	5.234	5.391	.040	71	5/32	2120	4030	3450
3/8	MERI-9280	5.0000	5.7500	0.3750	5.281	5.469	.040	61	3/16	2780	4950	4270
1/2	MERI-9680	5.0000	6.0000	0.5000	5.375	5.625	.060	44	1/4	4010	6270	5465
5/16	MERI-9888	5.5000	6.1250	0.3125	5.734	5.891	.040	78	5/32	2210	4440	3795
3/8	MERI-10088	5.5000	6.2500	0.3750	5.781	5.969	.040	66	3/16	2860	5380	4620
1/2	MERI-10488	5.5000	6.5000	0.5000	5.875	6.125	.060	48	1/4	4160	6870	5965
5/16	MERI-10696	6.0000	6.6250	0.3125	6.234	6.391	.040	85	5/32	2290	4850	4135
3/8	MERI-10896	6.0000	6.7500	0.3750	6.281	6.469	.040	72	3/16	2970	5890	5045
1/2	MERI-11296	6.0000	7.0000	0.5000	6.375	6.625	.060	52	1/4	4300	7470	6465
5/16	MERI-114104	6.5000	7.1250	0.3125	6.734	6.891	.040	91	5/32	2350	5210	4430
3/8	MERI-116104	6.5000	7.2500	0.3750	6.781	6.969	.040	78	3/16	3080	6390	5465
1/2	MERI-120104	6.5000	7.5000	0.5000	6.875	7.125	.060	56	1/4	4440	8070	6965
3/8	MERI-124112	7.0000	7.7500	0.3750	7.281	7.469	.040	83	3/16	3150	6820	5815
1/2	MERI-128112	7.0000	8.0000	0.5000	7.375	7.625	.060	60	1/4	4560	8680	7470
3/8	MERI-132120	7.5000	8.2500	0.3750	7.781	7.969	.040	89	3/16	3250	7330	6240
1/2	MERI-136120	7.5000	8.5000	0.5000	7.875	8.125	.060	64	1/4	4690	9280	7970
3/8	MERI-140128	8.0000	8.7500	0.3750	8.281	8.469	.040	95	3/16	3340	7840	6660
1/2	MERI-144128	8.0000	9.0000	0.5000	8.375	8.625	.060	68	1/4	4810	9880	8470
1/2	MERI-152136	8.5000	9.5000	0.5000	8.875	9.125	.060	72	1/4	4920	10490	8970
1/2	MERI-160144	9.0000	10.0000	0.5000	9.375	9.469	.060	76	1/4	5040	11090	9470
1/2	MERI-168152	9.5000	10.5000	0.5000	9.875	10.125	.060	80	1/4	5140	11690	9970
1/2	MERI-176160	10.0000	11.0000	0.5000	10.375	10.469	.060	84	1/4	5250	12300	10470



Radial and Gothic Arch Configurations



Ref	Basic P/N ⁽¹⁾	Bore d	O.D. D	Width B	Land Diameter		Minimum Corner Chamfer C	Ball Complement		Load Ratings (lbs)			
					Li	L0		No. Z	Size Db	Radial Capacity		Thrust Capacity	Moment Capacity
										Dynamic	Static	Static	Static ⁽²⁾
1/8	RI-1878	0.8750	1.1250	0.1562 ⁽⁴⁾	0.961	1.049	.010	24	1/16	165	129	150	(3)
1/8	RI-2117	1.0620	1.3125	0.1562 ⁽⁴⁾	1.144	1.231	.010	28	1/16	175	153	177	(3)
1/8	RI-2420	1.2500	1.5000	0.1562 ⁽⁴⁾	1.320	1.402	.010	32	1/16	185	177	205	(3)
1/8	RI-2622	1.3750	1.6250	0.1562 ⁽⁴⁾	1.457	1.543	.010	36	1/16	195	200	232	(3)
1/8	RI-2824	1.5000	1.7500	0.1562 ⁽⁴⁾	1.582	1.667	.010	38	1/16	199	212	246	(3)
1/8	RI-3026	1.6250	1.8750	0.1562 ⁽⁴⁾	1.707	1.793	.010	42	1/16	208	235	273	(3)
1/4	RI-4032	2.0000	2.5000	0.2500	2.187	2.313	.025	30	1/8	805	850	1160	755
5/16	RI-4232	2.0000	2.6250	0.3125	2.234	2.391	.040	25	5/32	1125	1090	1565	1040
1/4	RI-4840	2.5000	3.0000	0.2500	2.687	2.813	.025	36	1/8	865	1035	1395	1110
5/16	RI-5040	2.5000	3.1250	0.3125	2.734	2.891	.040	30	5/32	1210	1330	1855	1510
1/4	RI-5648	3.0000	3.5000	0.2500	3.187	3.313	.025	43	1/8	930	1245	1680	1505
5/16	RI-5848	3.0000	3.6250	0.3125	3.234	3.391	.040	33	5/32	1235	1485	2145	2060
3/8	RI-6048	3.0000	3.7500	0.3750	3.281	3.469	.040	30	3/16	1680	1925	2505	2440
1/4	RI-6052	3.2500	3.7500	0.2500	3.437	3.563	.025	45	1/8	945	1310	1820	1770
5/16	RI-6252	3.2500	3.8750	0.3125	3.484	3.641	.040	36	5/32	1285	1625	2285	2410
3/8	RI-6452	3.2500	4.0000	0.3750	3.531	3.719	.040	32	3/16	1725	2065	3260	3240
1/4	RI-6456	3.5000	4.0000	0.2500	3.687	3.813	.025	49	1/8	980	1430	1855	2020
5/16	RI-6656	3.5000	4.1250	0.3125	3.734	3.891	.040	40	5/32	1355	1815	2435	2790
3/8	RI-6856	3.5000	4.2500	0.3750	3.781	3.969	.040	33	3/16	1780	2140	3385	3610
1/4	RI-6860	3.7500	4.2500	0.2500	3.937	4.063	.025	52	1/8	1005	1525	1970	2350
5/16	RI-7060	3.7500	4.3750	0.3125	3.984	4.141	.040	42	5/32	1380	1910	2550	3210
3/8	RI-7260	3.7500	4.5000	0.3750	4.031	4.219	.040	35	3/16	1770	2280	3505	4110
1/4	RI-7264	4.0000	4.5000	0.2500	4.187	4.313	.025	55	1/8	1025	1615	2090	2605
5/16	RI-7464	4.0000	4.6250	0.3125	4.234	4.391	.040	45	5/32	1420	2055	2725	3600
3/8	RI-7664	4.0000	4.7500	0.3750	4.281	4.469	.040	36	3/16	1780	2350	3620	4430
1/2	RI-8064	4.0000	5.0000	0.5000	4.375	4.625	.060	28	1/4	2710	3205	4905	6810
1/4	RI-7668	4.2500	4.7500	0.2500	4.437	4.563	.025	57	1/8	1040	1675	2055	2890
5/16	RI-7868	4.2500	4.8750	0.3125	4.484	4.641	.040	46	5/32	1425	2110	3250	4010
3/8	RI-8068	4.2500	5.0000	0.3750	4.531	4.719	.040	38	3/16	1820	2490	3840	4970
1/2	RI-8468	4.2500	5.2500	0.5000	4.625	4.875	.060	30	1/4	2795	3450	5115	7330

Notes:

- (1) For Gothic Arch configuration, add "G" Prefix.
 (2) Moment loads applicable to Gothic Arch Bearings only.
 (3) Contact Applications Engineering.
 (4) Open width shown, shielded width is 0.1960".



Radial and Gothic Arch Configurations

- Gothic Arch: (4-point ball-to-race contact) provides for reduced internal free play in axial and radial directions.
- Radial: accepts moderate radial and thrust loads at lower speeds.
- All bearings listed are available in Radial and Gothic Arch configurations.
- Contact Applications Engineering for custom specifications.



Ref	Basic P/N ⁽¹⁾	Bore d	O.D. D	Width B	Land Diameter		Minimum Corner Chamfer C	Ball Complement		Load Ratings (lbs)			
					L _i	L _o		No. Z	Size D _b	Radial Capacity		Thrust Capacity	Moment Capacity
										Dynamic	Static	Static	Static ⁽²⁾
1/4	RI-8072	4.5000	5.0000	0.2500	4.687	4.813	.025	60	1/8	1060	1770	2165	3230
5/16	RI-8272	4.5000	5.1250	0.3125	4.734	4.891	.040	48	5/32	1445	2205	3480	4510
3/8	RI-8472	4.5000	5.2500	0.3750	4.781	4.969	.040	40	3/16	1860	2630	4060	5590
1/2	RI-8872	4.5000	5.5000	0.5000	4.875	5.125	.060	32	1/4	2880	3690	5500	8290
1/4	RI-8476	4.7500	5.2500	0.2500	4.937	5.063	.025	64	1/8	1090	1890	2275	3580
5/16	RI-8676	4.7500	5.3750	0.3125	4.984	5.141	.040	51	5/32	1485	2345	3630	4980
3/8	RI-8876	4.7500	5.5000	0.3750	5.031	5.219	.040	43	3/16	1925	2835	4280	6110
1/2	RI-9276	4.7500	5.7500	0.5000	5.125	5.375	.060	33	1/4	2905	3820	5705	9010
1/4	RI-8880	5.0000	5.5000	0.2500	5.187	5.313	.025	66	1/8	1100	1955	2385	3990
5/16	RI-9080	5.0000	5.6250	0.3125	5.234	5.391	.040	55	5/32	1540	2535	3850	5580
3/8	RI-9280	5.0000	5.7500	0.3750	5.281	5.469	.040	46	3/16	1990	3040	4490	6760
1/2	RI-9680	5.0000	6.0000	0.5000	5.375	5.625	.060	35	1/4	2985	4065	6090	10080
5/16	RI-9888	5.5000	6.1250	0.3125	5.734	5.891	.040	58	5/32	1560	2685	4235	6700
3/8	RI-10088	5.5000	6.2500	0.3750	5.781	5.969	.040	49	3/16	2030	3250	4930	8110
1/2	RI-10488	5.5000	6.5000	0.5000	5.875	6.125	.060	37	1/4	3030	4320	6680	12090
5/16	RI-10696	6.0000	6.6250	0.3125	6.234	6.391	.040	63	5/32	1615	2925	4605	7815
3/8	RI-10896	6.0000	6.7500	0.3750	6.281	6.469	.040	53	3/16	2095	3530	5370	9570
1/2	RI-11296	6.0000	7.0000	0.5000	6.375	6.625	.060	41	1/4	3180	4810	7275	14160
5/16	RI-114104	6.5000	7.1250	0.3125	6.734	6.891	.040	68	5/32	1670	3165	4990	9140
3/8	RI-116104	6.5000	7.2500	0.3750	6.781	6.969	.040	55	3/16	2110	3675	5810	11150
1/2	RI-120104	6.5000	7.5000	0.5000	6.875	7.125	.060	44	1/4	3275	5185	7865	16310
3/8	RI-124112	7.0000	7.7500	0.3750	7.281	7.469	.040	59	3/16	2170	3950	6250	12810
1/2	RI-128112	7.0000	8.0000	0.5000	7.375	7.625	.060	47	1/4	3360	5555	8455	18960
3/8	RI-132120	7.5000	8.2500	0.3750	7.781	7.969	.040	63	3/16	2230	4230	6695	14530
1/2	RI-136120	7.5000	8.5000	0.5000	7.875	8.125	.060	50	1/4	3445	5930	9050	21320
3/8	RI-140128	8.0000	8.7500	0.3750	8.281	8.469	.040	67	3/16	2285	4510	7135	16510
1/2	RI-144128	8.0000	9.0000	0.5000	8.375	8.625	.060	53	1/4	3530	6300	9640	24040
1/2	RI-152136	8.5000	9.5000	0.5000	8.875	9.125	.060	56	1/4	3610	6670	10230	27800
1/2	RI-160144	9.0000	10.0000	0.5000	9.375	9.469	.060	60	1/4	3730	7165	10820	30110
1/2	RI-168152	9.5000	10.5000	0.5000	9.875	10.125	.060	63	1/4	3800	7535	11400	34020
1/2	RI-176160	10.0000	11.0000	0.5000	10.375	10.469	.060	66	1/4	3875	7910	11990	36870

Notes:

- (1) For Gothic Arch configuration, add "G" Prefix.
 (2) Moment loads applicable to Gothic Arch Bearings only.

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