BTL Taper bushing

1008 - 5050
6050 - 12100

BTL Taper bushing produced by XME are made of GG25 cast iron. With precision machining , they are fixed with set screws imported from Japan and packed separately in nice cartons. They are truly the excellent choice for taper bushings.

Specifications for the series of BTL Taper Bushings:

1008-5050 items can be sold off the shelf based on the stock with immediate delivery. At the same time, we can make BS, UNC tap holes, inner bore and keyways for taper bushing in metric and standard calculations. They are very suitable to the European, U.S. and Japanese markets.

6050-12100 are produced against orders with prompt delivery. Bore and keyways of taper bushing can be in metric and standard dimensions according to BS and UNC standards.

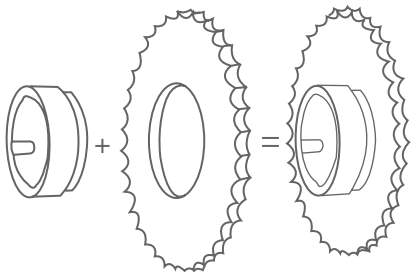
BTL Taper bushing

Taper bushing is a new type of component used for joining mechanical transmissions. It changed traditional designs. It's easy on and easy off, compact in construction and with high standardization .The grip is tightened through its taper surface. They have excellent concentricity and non clearance joint; its transmission efficiency can be increased.

The sizes of the taper bushings are designed in a standard series. The bore, keyway and thread are machined in accordance with ISO standards. It is interchangeable and the customers can make their own choice in accordance to their own purpose and usage . This new design is widely used.

Grey cast iron is the common material for BTL taper bushings. If high tensional bushing is required, ductile iron, steel and forged steel can be used. Bushing made of stainless steel can be used together with sprockets, clutches, gears and other transmission parts that are also made of stainless steel.

When taper bushings are used with other transmissions parts, the starting and frequent inversions will cause damages to the bore and keyway; degrade precision due to pressing loads. If the case is a severe one, the whole transmission part will be ruined.



This can be largely reduced if BTL taper bushings are used. In case the bore and keyway are damaged, it will resume service so long as you remove the old bushing and reassemble a new one in its place. The lifetime of the transmission part can be raised so the maintenance expenses are reduced.

BTL taper bushing includes: taper bushing itself and tightening screws (including packing).

The range for its uses can be enlarged if a weld on taper hub is used.

If more detailed information about taper bushing is required, please contact the manufacturer.

Taper bushing

Taper-lock bushing (abbreviated as “bushing”) is a new type of elastic components in shaft-hub connection and is widely used in belts, timing belts, sprockets, gears, bevels, couplings, rollers , sheaves and agitators, impellers, fan rotors and other products which need to be shaft mounted.

Its features are as follows:

1.Particularly secure fit on the shaft with excellent concentricity.

2.Without interference, elasticity clip allows for easy on and easy off and with low maintenance necessary.

3.Better shock resistance, long life time, and great reliability in the situation of frequent starting and inversions, heavy loads and other severe operating conditions.

4.It is widely used in many circumstances and offers wide array of mounting between all kinds of transmission components and different diameter shafts only by a few specifications. Easy standardization, easy separation and suitable for large scale of special productions can lower costs .

At present, traditional connection methods by key is widely used in mechanical transmissions. But its reliability is poor and its concentricity is also not very good, the installation is inconvenient and the keyway connection is easy to lose effectiveness under shock loads. Bushings have conquered all these defects completely so it has been propagated soon after the bushing was invented in the 1980’s and has become very popular in the U.S. Europe and Japan. We can surely say that bushing have taken the place of traditional key connections and is now a basic mechanical component all over the world.

1.Basic construction and working principle of bushing connections. Bushing mates with taper bore in transmission hub through 4 semi-taper angle surface. Its keyway is used to increase elasticity . The tightening press on the shaft is caused by tightened screws. The screw structure and quantity depends on the bushings’ type and specifications. When bushings and hubs are being on the shaft. Therefore, the torque will be transmitted through frictional force. Key connection will only be the subsidiary transmission part then. To conquer the bushing’s self-locking feature, screws used for installation have been set which will allow the bushing to be removed from the shaft.

2.Bushing structure selection. The bushing can be divided into three types which can be used according to the features.

2.1 General Bushing.

This kind of bushing can achieve hub connection without increasing the transmission components’ outside dimensions. It construction is very compact. Located in the hub, it looks even and beautiful at both ends. Using cap screws as setting screws, there is a semi screw on the hub to comply with the bushing. The bushing can be connected with taper bored standard transmission parts directly or through taper weld on hubs. This is the basic type and is most widely used.

2.2 Flange Type.

This type’s structure is simple and installation is easier. Using hex screws as the tightening screws, it’s easier to adopt loosening-resistance construction and is more reliable. But its dimension is a little larger than normal so its only suitable for use where there are low requirements on dimension or weight and where the hub is shorter.

2.3 Adapters.

Adapters for taper lock bushings are recommended for usage where the hub bore is straight. Especially to the roll bearing, always meet with care, closely mating with the shaft. Too much insertion can cause difficult installation and can easily cause damage to the finished surface.

If the adapter is used to connect with the bushing, all the questions will be solved then. But it should be told that using adapters will increase radial dimensions so this is more suitable where the shaft diameter is decided by the bearing dimensions not by the shaft itself. Select adapters’ type based on the bushings’ type.

BTL Taper bushing

3. Bushings' Type and Loading Capacity
3.1 General Type
3.1.1 Dimension series: this type is divided into three series according to its load bearing capacity and number of tapped holes.

1.Light Series: Type 1008-3030 has two untapped half holes for tightening screws and one semi tapped hole for unloading.
2.Medium Series: Type 3535-5050 has three half holes for tightening screws and two half tapped holes for unloading.
3.Heavy Series: Type 6050-120100 has four half holes for tightening screws and two half tapped holes for unloading.
3.1.2 Taper and nomenclatures. For each type of bushing there will be different standard shaft sizes for selection. Written in four numbers, e.g. 2517, the initial two are divided by ten indicating max bore of the bushing(in inches); the other two are divided by ten indicating length through bore (in inches). For example, the max bore of the bushing is 2.5 inches(2.5x 25.4mm) and length through the bore is 1.7 inches (1.7x25.4mm).
Written in six numbers, e.g. 120100, the initial three divided by ten indicates the max bore of the bushing (in inches) and the other three are divided by ten, indicating the length through bore (in inches). For example, 120 indicates that the max bore of the bushing is 12 inches (12x 25.4mm) where 100 indicates the length through bore is 10 inches (10x 25.4mm).
Written in five numbers, the initial three indicates through bore. For example,10085.
3.1.3 Rating load-bearing capacity. See torque capacity parameters for general type in the following table:

Bush.No	Torque Capacity		Bush.No	Torque Capacity	
	1bf.in	N.m		Lbf.in	N.m
1008	1,200	136	3535	44,800	5,060
1108	1,300	147	4040	77,300	8,740
1210 1215	3,600	407	4545	110,000	12,400
1310 1315	3,850	435	5050	126,000	14,200
1610	4,300	486	6050	282,000	31,900
1615			7060	416,000	47,000
2012	7,150	808	8065	456,000	51,500
2517 2525	11,600	1,310	10085	869,000	98,200
3020 3030	24,000	2,710	120100	1,520,000	172,000

1bf.in=0.113N.m

Taper bushing

It should be noted that bushings load bearing capacity has some relations with screw tightening torque and shaft size. In this catalogue, the related tightening torque has been given. The load bearing capacity increases as the shaft increases. Please consult with the factory if more detail is needed.

3.2 Flange type (Q Bushing)

3.2.1 Dimension Series: Q Bushings can be divided into two series according to whether they can be reversed mounted or not.

1).Reversible Mounting Series: Type JA-J.
There are three screws and three bores on the flange.
2).Un-reversible Mounting Series: Type M-W. Only with four tapped holes on the flange, with no untapped holes.

3.2.2 Type and load-bearing capacity According to the dimensions and load bearing capacity, Q bushings have thirteen specifications. See torque capacity and related screw tightening torque in the table below:

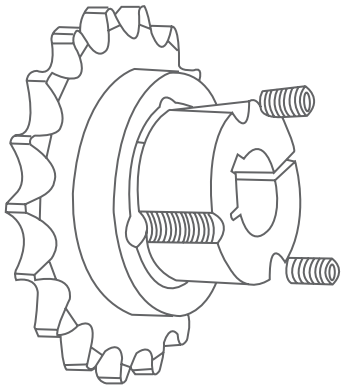
Bush.No	Torque Capacity		Screw Tightening Torque	
	1bf.in	N.m	Lbf.in	N.m
JA	1,000	113	54	6.1
SH	3,500	396	108	12.2
SDS	5,000	565	108	12.2
SK	7,000	791	180	20.3
SF	11,000	1,243	360	40.8
E	20,000	2,260	720	81.4
F	30,000	3,390	900	102
J	45,000	5,090	1,620	183
M	85,000	9,600	2,700	305
N	150,000	17,000	3,600	408
P	250,000	28,300	5,400	610
W	375,000	42,400	7,200	814
S	625,000	70,600	9,000	1,020

4.Selection

After selecting bushing type according to the bushings' features under different usage conditions, the selection of the type mainly depends on the torque and loading force. See loading coefficient K for bushing connection below:

K	Load type
1.0	light loading start,work even
1.5	light loading start,work uneven
2.0	medium loading start,work even or uneven
2.5	light or heavy loading start,medium shock
3.0	lighty or heavy loading start,heavy shock or rotating

Taper bushing



BUSH NO	SCREW TIGHTENING TORQUES(Nm)	SCREW	
		QUANTITY	SIZE
1008 1108	5.6	2	1/4" BSW
1210 1215	20	2	3/8" BSW
1310 1315	20	2	3/8" BSW
1610 1615	20	2	3/8" BSW
2012	31	2	7/16" BSW
2517	48	2	1/2" BSW
3020 3030	90	2	5/8" BSW
3535	112	3	1/2" BSW
4040	170	3	5/8" BSW
4545	192	3	3/4" BSW
5050	271	3	7/8" BSW

The BTL Taper Bushings are a registered patent product. Any production and sales should be authorized and permitted.

BTL TAPER BUSHING
INSTALLATION INSTRUCTIONS

TO ASSEMBLE:

1. Clean and degrease the bore and taper surfaces of the bush and the tapered bore of the pulley. Insert the bush into the pulley hub and line up holes (half thread holes must line up with half unloading holes).

2. Lightly oil the grub screws (bush size 1008-3030) or oil the cap screws (bush size to 5050) and screw them in but do not tighten yet.

3. Clean and degrease the shaft. Fit pulley with taper bush on shaft and place in your desired position.

4. When using a key, it should first be fitted in the shaft keyway. There should be a top clearance between the key and the keyway bore.

5. Using a hexagon socket wrench (DIN911) gradually tighten the grub cap screws in accordance with the torques listed in the schedule.

6. When the drive has been operating under-load for a short period of time (roughly half an hour), check and ensure that the screws remained at the appropriate tightening torque.

7. In order to eliminate the ingress of dirt, fill all empty holes with grease.

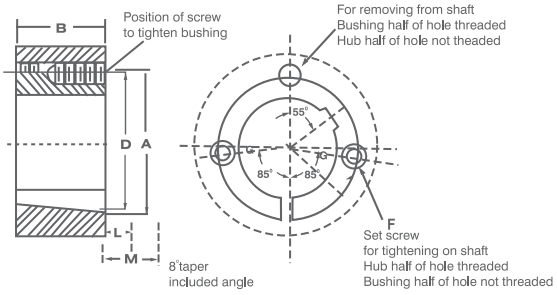
REMOVAL

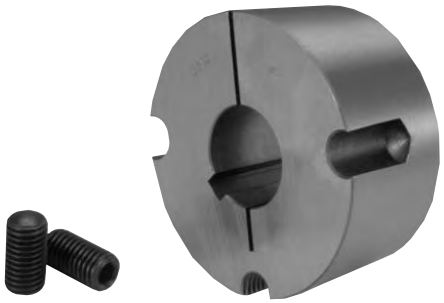
1.Loosen and remove all screws and place them in the holes of the bushing.
2.Tighten the screws alternatively till the hub's grip on the bushing is loosened. The inner bore of the bushing can be slid on the shaft.
3.Remove the bushing from the shaft.

Special Note

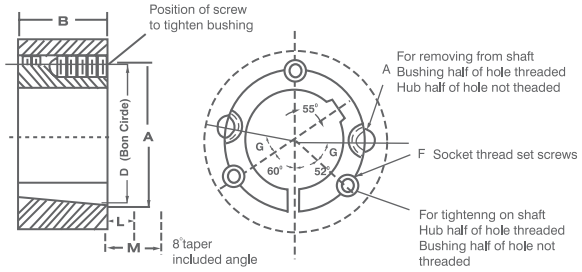
BTL Taper Bushings are made of GG25 case iron. We can also offer other materials according to customers' requirements.
We can do surface coating according to the customer' requirements (i.e. painting, black phosphate, black oxidizing, etc.).
Each part is individually boxed.
BTL Bushing come with high quality screws made in Japan.

Taper bushing





3535 thru 5050 sizes



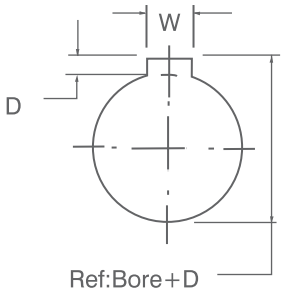
Dimensions for 1008 thru 3030 BTL Taper Bushings

BUSH NO	A	B	D	Set Screws
1008	1.386	7/8	1 21/64	1/4x1/2
1108	1.511	7/8	1 29/64	1/4x1/2
1210	1 7/8	1	1 3/4	3/8x5/8
1215	1 7/8	1 1/2	1 3/4	3/8x5/8
1310	2	1	1 7/8	3/8x5/8
1610	2 1/4	1	2 1/8	3/8x5/8
1615	2 1/4	1 1/2	2 1/8	3/8x5/8
2012	2 3/4	1 1/4	2 5/8	7/16x7/8
2517	3 3/8	1 3/4	3 1/4	1/2x1
2525	3 3/8	2 1/2	3 1/4	1/2x1
3020	4 1/4	2	4	5/8x1 1/4
3030	4 1/4	3	4	5/8x1 1/4

Dimensions for 1008 thru 5050 BTL Taper Bushings

BUSH NO	A	B	D	Set Screws	G
3535	5	3 1/2	4.83	1/2x1 1/2	40°
4040	5 3/4	4	5.54	5/8x1 3/4	40°
4545	6 3/8	4 1/2	6.13	3/4x2	40°
5050	7	5	6.72	7/8x2 1/4	37°

Two screws required
Three screws required



MM Bore Key way dimensions conform to ISO standard
Depth measured at centerline

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Taper bushing KEYWAY

A

DIN 6885
JIS B 1301-1976
UNI 6604-1969
GB 1095-1979

Bush No	Bore	Bushing Keyway
1008	10	3x1.40
	11 12	4x1.80
	14 16	5x2.30
	18 19 20 22	6x2.80
	24	8x2.00
△	25	8x1.30
1180	10	3x1.40
	11 12	4x1.80
	14 16	5x2.30
	18 19 20 22	6x2.80
	24 25	8x3.30
△	28	8x2.00
1210	11 12	4x1.80
	14 16	5x2.30
	18 19 20 22	6x2.80
	24 25 28 30	8x3.30
	32	10x3.30
1215	11 12	4x1.80
	14 16	5x2.30
	18 19 20 22	6x2.80
	24 25 28 30	8x3.30
	32	10x3.30
1310	14 16	5x2.30
	18 19 20 22	6x2.80
	24 25 28 30	8x3.30
	32 35	10x3.30

Bush No	Bore	Bushing Keyway
1610	14 16	5x2.30
	18 19 20 22	6x2.80
	24 25 28 30	8x3.30
	32 35 38	10x3.30
	40	12x3.30
△	42	12x2.20
1615	14 16	5x2.30
	18 19 20 22	6x2.80
	24 25 28 30	8x3.30
	32 35 38	10x3.30
	40	12x3.30
△	42	12x2.20
2012	18 19 20 22	6x2.80
	24 25 28 30	8x3.30
	32 35 38	10x3.30
	40 42	12x3.30
	45 48 50	14x3.80

Bush No	Bore	Bushing Keyway
2517	20 22	6x2.80
	24 25 28 30	8x3.30
	32 35 38	10x3.30
	40 42	12x3.30
	45 48 50	14x3.80
	55	16x4.30
	60	18x4.40
2525	20 22	6x2.80
	24 25 28 30	8x3.30
	32 35 38	10x3.30
	40 42	12x3.30
	45 48 50	14x3.80
	55	16x4.30
	60	18x4.40

Bush No	Bore	Bushing Keyway
3020	25 28	8x3.30
	30 32 35 38	10x3.30
	40 42	12x3.30
	45 48 50	14x3.80
	55	16x4.30
	60 65	18x4.40
	70 75	20x4.90
3030	25 28 30	8x3.30
	32 35 38	10x3.30
	40 42	12x3.30
	45 48 50	14x3.80
	55	16x4.30
	60 65	18x4.40
	70 75	20x4.90

Bush No	Bore	Bushing Keyway
3535	35 38	10x3.30
	40 42	12x3.30
	45 48 50	14x3.80
	55	16x4.30
	60 65	18x4.40
	70 75	20x4.90
	80 85	22x5.40
	90	25x5.40
4040	40 42	12x3.30
	45 48 50	14x3.80
	55	16x4.30
	60 65	18x4.40
	70 75	20x4.90
	80 85	22x5.40
	90 95	25x5.40
	100	28x6.40

Bush No	Bore	Bushing Keyway
4545	55	16x4.30
	60 65	18x4.40
	70 75	20x4.90
	80 85	22x5.40
	90 95	25x5.4
	100 105 110	28x6.40
5050	60 65	18x4.40
	70 75	20x4.90
	80 85	22x5.40
	90 95	25x5.40
	100 105 110	28x6.40
	115 120 125	32x7.40

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Taper bushing KEYWAY

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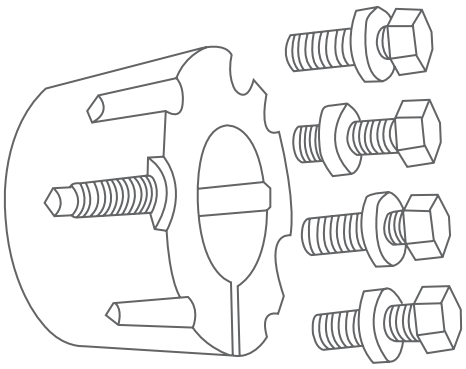
B.S.46:Part:1958
KEYS AND KEYWAYS

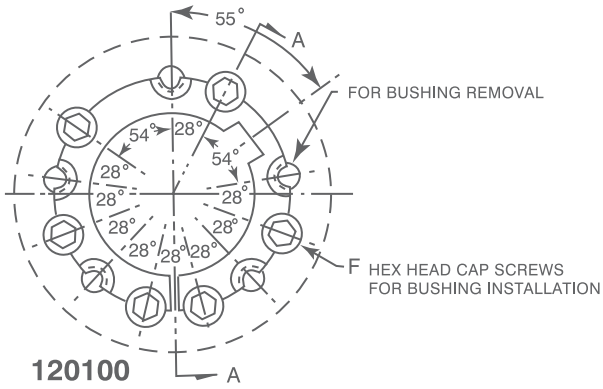
Bush No	Bore	Keyway WIDTH	Keyway DEPTH
1008 △	1/2	0.125	0.062
	9/16 5/8 11/16 3/4	0.187	0.093
	13/16 7/8	0.25	0.125
	15/16 1	0.25	0.062
1108 △	1/2	0.125	0.062
	9/16 5/8 11/16 3/4	0.187	0.093
	13/16 7/8 15/16 1	0.25	0.125
	1 1/16 1 1/8	0.312	0.078
1210	1/2	0.125	0.062
	9/16 5/8 11/16 3/4	0.187	0.093
	13/16 7/8 15/16 1	0.25	0.125
	1-1/16 1-1/8 1-3/16 1-1/4	0.312	0.125
1215	1/2	0.125	0.062
	9/16 5/8 11/16 3/4	0.187	0.093
	13/16 7/8 15/16 1	0.25	0.125
	1 1/16 1 1/8 1 3/16 1 1/4	0.312	0.125
1310	1/2	0.125	0.062
	9/16 5/8 11/16 3/4	0.187	0.093
	13/16 7/8 15/16 1	0.25	0.125
	1 1/16 1 1/8 1 3/16 1 1/4	0.312	0.125
	1 5/16 1 3/8	0.375	0.125
1610 △	1/2	0.125	0.062
	9/16 5/8 11/16 3/4	0.187	0.093
	13/16 7/8 15/16 1	0.25	0.125
	1 1/16 1 1/8 1 3/16 1 1/4	0.312	0.125
	1 5/16 1 3/8 1 7/16 1 1/2	0.375	0.125
	1 9/16 1 5/8	0.437	0.125
1615 △	1/2	0.125	0.062
	9/16 5/8 11/16 3/4	0.187	0.093
	13/16 7/8 15/16 1	0.25	0.125
	1 1/16 1 1/8 1 3/16 1 1/4	0.312	0.125
	1 5/16 1 3/8 1 7/16 1 1/2	0.375	0.125
	1 9/16 1 5/8	0.437	0.125
2012 △	1/2	0.125	0.062
	9/16 5/8 11/16 3/4	0.187	0.093
	13/16 7/8 15/16 1	0.25	0.125
	1 1/16 1 1/8 1 3/16 1 1/4	0.312	0.125
	1 5/16 1 3/8 1 7/16 1 1/2	0.375	0.125
	1 9/16 1 5/8 1 11/16 1 3/4	0.437	0.156
	1 13/16 1 7/8	0.50	0.156
	1 15/16 2	0.50	0.125
2517 △	1/2	0.125	0.062
	5/8 11/16 3/4	0.187	0.093
	13/16 7/8 15/16 1	0.25	0.125
	1 1/16 1 1/8 1 3/16 1 1/4	0.312	0.125
	1 5/16 1 3/8 1 7/16 1 1/2	0.375	0.125
	1 9/16 1 5/8 1 11/16 1 3/4	0.437	0.156
	1 13/16 1 7/8 1 15/16 2	0.50	0.156
	2 1/16 2 1/8 2 3/16 2 1/4	0.625	0.218
	2 5/16 2 3/8 2 7/16 2 1/2	0.625	0.187
2525 △	3/4	0.187	0.093
	7/8 1	0.25	0.125
	1 1/8 1 3/16 1 1/4	0.312	0.125
	1 3/8 1 7/16 1 1/2	0.375	0.125
	1 5/8 1 11/16 1 3/4	0.437	0.156
	1 13/16 1 7/8 1 15/16 2	0.50	0.156
	2 1/8 2 3/16 2 1/4	0.625	0.218
	2 5/16 2 3/8 2 7/16 2 1/2	0.625	0.187
3020 △	7/8 15/16 1	0.25	0.125
	1 1/8 1 3/16 1 1/4	0.312	0.125
	1 5/16 1 3/8 1 7/16 1 1/2	0.375	0.125
	1 9/16 1 5/8 1 11/16 1 3/4	0.437	0.156
	1 13/16 1 7/8 1 15/16 2	0.50	0.156
	2 1/16 2 1/8 2 3/16 2 1/4 2 5/16 2 3/8 2 7/16 2 1/2	0.625	0.218
	2 5/8 2 11/16 2 3/4	0.75	0.250
	2 13/16 2 7/8 2 15/16 3	0.75	0.218
3030 △	15/16 1	0.25	0.125
	1 1/8 1 3/16 1 1/4	0.312	0.125
	1 5/16 1 3/8 1 7/16 1 1/2	0.375	0.125
	1 9/16 1 5/8 1 11/16 1 3/4	0.437	0.156
	1 13/16 1 7/8 1 15/16 2	0.50	0.156
	2 1/16 2 1/8 2 3/16 2 1/4 2 5/16 2 3/8 2 7/16 2 1/2	0.625	0.218
	2 5/8 2 11/16 2 3/4	0.75	0.250
	2 7/8 2 15/16 3	0.75	0.218
3535 △	1 3/16 1 1/4	0.312	0.125
	1 3/8 1 7/16 1 1/2	0.375	0.125
	1 5/8 1 11/16 1 3/4	0.437	0.156
	1 7/8 1 15/16 2	0.50	0.156
	2 1/8 2 3/16 2 1/4 2 5/16 2 3/8 2 7/16 2 1/2	0.625	0.218
	2 5/8 2 11/16 2 3/4 2 7/8 2 15/16 3	0.75	0.25
	3 1/8 3 3/16 3 1/4	0.875	0.312
	3 5/16 3 3/8 3 7/16 3 1/2	0.875	0.25
4040 △	1 7/16 1 1/2	0.375	0.125
	1 5/8 1 11/16 1 3/4	0.437	0.156
	1 7/8 1 15/16 2	0.50	0.156
	2 1/8 2 3/16 2 1/4 2 3/8 2 7/16 2 1/2	0.625	0.218
	2 5/8 2 11/16 2 3/4 2 7/8 2 15/16 3	0.75	0.25
	3 1/8 3 3/16 3 1/4 3 3/8 3 7/16 3 1/2	0.875	0.312
	3 5/8 3 11/16	1.0	0.375
	3 3/4 3 7/8 3 15/16 4	1.0	0.25
	4 7/16	1.25	0.25
4545 △	1 15/16 2	0.50	0.156
	2 3/16 2 3/8 2 7/16	0.625	0.218
	2 5/8 2 3/4 2 7/8 2 15/16 3	0.75	0.25
	3 1/8 3 3/16 3 1/4 3 3/8 3 7/16 3 1/2	0.875	0.312
	3 5/8 3 3/4 3 7/8 3 15/16 4	1.0	0.375
	4 1/8 4 3/16	1.25	0.437
	4 1/4 4 3/8 4 7/16 4 1/2 4 3/4	1.25	0.25
5050 △	2 7/16	0.625	0.218
	2 15/16	0.75	0.25
	3 3/8 3 7/16	0.875	0.312
	3 5/8 3 3/4 3 7/8 3 15/16 4	1.0	0.375
	4 1/4 4 3/8 4 7/16 4 1/2	1.25	0.437
	4 7/8 4 15/16 5	1.25	0.312

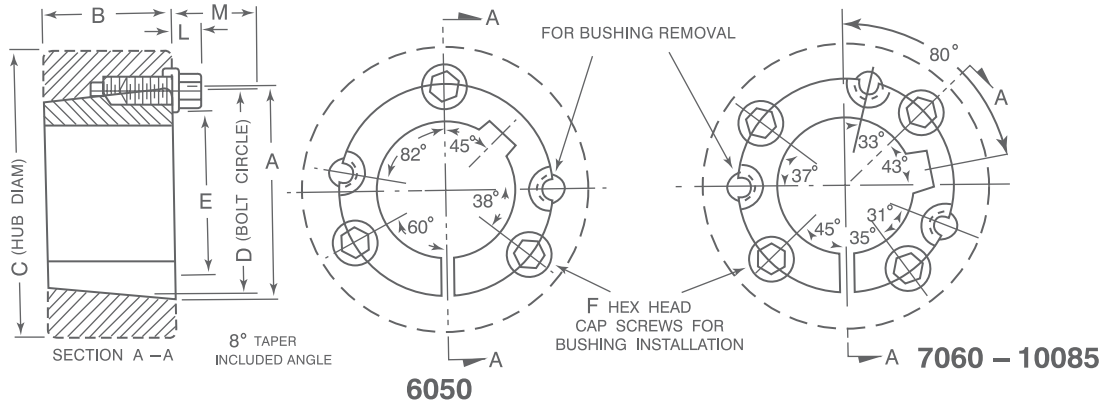
Taper bushing

TAPER BUSHING DIMENSIONS(Con t.)

6050 thru 120100 Sizes







Dimensions for 6050 thru 120100 BTL Taper Bushings

Bush.No.	A	B	D	Socket Head Cap Screws	E	L	M
6050	9 1/4	5	9	3-1 1/4x3 1/2	6 3/4	1 5/8	4 3/8
7060	10 1/4	6	10	4-1 1/4x3 1/2	7 3/4	1 5/8	4 3/8
8065	11 1/4	6 1/2	11	4-1 1/4x3 1/2	8 3/4	1 5/8	4 3/8
10085	14 3/4	8 1/2	14 1/2	4-1 1/2x4 1/4	11 3/4	2	5 3/8
120100	17 1/4	10	17	6-1 1/2x4 1/4	14 1/4	2	5 3/8

Dimensions forTAPER Bushings Metric.Inches Bore

Bush.No	inches bore		metric bore	
	Min.	Max.	Min.	Max.
6050	4 7/16	6	80	150
7060	4 15/16	7	90	175
8065	5 7/16	8	110	200
10085	7	10	175	250
12100	8	12	200	300

Bore and keyway dimensions conform to ISO standard recommendation R773. for "free" fit

Instruction is sheet packed into each bushing box.