Taper Bush dimensions

Taper Bush Number	Taper Bush Code	Nominal Dia at the Larger End of Taper (mm)	Face Width (mm)	Minimum Bore (mm)	Maximum Bore (mm)
1008	TLB1008009 to TLB1008025	35.0	22	9	25
1108	TLB1108009 to TLB1108028	38.0	22	9	28
1210	TLB1210011 to TLB1210032	47.5	25	11	32
1215	TLB1215011 to TLB1215032	47.5	38	11	32
1310	TLB1310014 to TLB1310035	51.0	25	14	35
1610	TLB1610014 to TLB1610042	57.0	25	14	42
1615	TLB1615014 to TLB1615042	57.0	38	14	42
2012	TLB2012014 to TLB2012050	70.0	32	14	50
2517	TLB2517016 to TLB2517060	85.5	45	16	60
2525	TLB2525019 to TLB2525060	85.5	65	19	60
3020	TLB3020025 to TLB3020075	108.0	51	25	75
3030	TLB3030035 to TLB3030075	108.0	76	35	75
3525	TLB3525048 to TLB3525090	127.0	65	35	90
3535	TLB3535035 to TLB3535090	127.0	89	35	90
4040	TLB4040040 to TLB4040100	146.0	102	40	100
4545	TLB4545055 to TLB4545110	162.0	114	55	110
5050	TLB5050070 to TLB5050125	177.5	127	70	125

Taper Bush dimensions

Taper Bush Number	Bore	Weight approx Lbs	Weight approx Kgs	Bushing key seat	Shaft key seat
1108	1/2 to 9/16 5/8 to 7/8 15/16 to 1 1-1/16 to 1-1/8	0.33 0.27 0.22 0.17	0.15 0.12 0.10 0.08	1/8 x 1/16 3/16 x 3/32 1/4 x 1/8 1/4 x 1/16a	1/8 x 1/16 3/16 x 3/32 1/4 x 1/8 1/4 x 1/8
1210	1/2 to 9/16 5/8 to 7/8 15/16 to 1-1/4	0.61 0.55 0.49	0.28 0.25 0.22	1/8 x 1/16 3/16 x 3/32 1/4 x 1/8	1/8 x 1/16 3/16 x 3/32 1/4 x 1/8
1610	1/2 to 9/16 5/8 to 7/8 15/16 to 1-1/4 1-5/16 to 1-3/8 1-7/16 to 1-1/2 1-9/16 to 1-5/8	0.90 0.80 0.70 0.70 0.60 0.50	0.41 0.36 0.32 0.32 0.27 0.23	1/8 x 1/16 3/16x3/32 1/4 x 1/8 5/16 x 5/32 3/8 x 3/16 3/8 x 1/8a	1/8 x 1/16 3/16 x 3/32 1/4 x 1/8 5/16 x 5/32 3/8 x 3/16 3/8 x 3/16
1615	1/2 to 9/16 5/8 to 7/8 15/16 to 1-1/4 1-5/16 to 1-3/8 1-7/16 to 1-1/2 1-9/16 to 1-5/8	1.20 1.10 1.00 0.80 0.70 0.60	0.54 0.50 0.45 0.36 0.32 0.27	1/8 x 1/16 3/16 x 3/32 1/4 x 1/8 5/16 x 5/32 3/8 x 3/16 3/8 x 1/8a	1/8 x 1/16 3/16 x 3/32 1/4 x 1/8 5/16 x 5/32 3/8 x 3/16 3/8 x 3/16
2517	1/2 to 9/16 5/8 to 7/8 15/16 to 1-1/4 1-5/16 to 1-3/8 1-7/16 to 1-3/4 1-13/16 to 2-1/4 2-5/16 to 2-1/2	3.50 3.40 3.30 3.20 3.00 2.40 1.90	1.59 1.54 1.50 1.45 1.36 1.09 0.86	1/8 x 1/16 3/16 x 3/32 1/4 x 1/8 5/16 x 5/32 3/8 x 3/16 1/2 x 1/4 5/8 x 3/16a	1/8 x 1/16 3/16 x 3/32 1/4 x 1/8 5/16 x 5/32 3/8 x 3/16 1/2 x 1/4 5/8 x 5/16
3020	15/16 to 1-1/4 1-5/16 to 1-3/8 1-7/16 to 1-3/4 1-13/16 to 2-1/4 2-5/16 to 2-3/4 2-13/16 to 3	6.50 6.30 6.00 5.30 4.50 3.90	2.95 2.86 2.72 2.40 2.04 1.77	1/4 x 1/8 5/16 x 5/32 3/8 x 3/16 1/2 x 1/4 5/8 x 5/16 3/4 x 1/4a	1/4 x 1/8 5/16 x 5/32 3/8 x 3/16 1/2 x 1/4 5/8 x 5/16 3/4 x 3/8
3030	15/16 to 1-1/4 1-5/16 to 1-3/8 1-7/16 to 1-3/4 1-13/16 to 2-1/4 2-5/16 to 2-3/4 2-13/16 to 3	9.20 8.90 8.60 7.60 6.20 5.00	4.17 4.04 3.90 3.45 2.81 2.27	1/4 x 1/8 5/16 x 5/32 3/8 x 3/16 1/2 x 1/4 5/8 x 5/16 3/4 x 1/4a	1/4 x 1/8 5/16 x 5/32 3/8 x 3/16 1/2 x 1/4 5/8 x 5/16 3/4 x 3/8
3535	1-3/16 to 1-1/4 1-5/16 to 1-3/8 1-7/16 to 1-3/4 1-13/16 to 2-1/4 2-5/16 to 2-3/4 2-13/16 to 3-1/4 3-5/16 to 3-1/2	14.0 14.0 13.0 12.0 11.0 9.00 8.00	6.35 6.35 5.90 5.44 4.99 4.08 3.63	1/4 × 1/8 5/16 × 5/32 3/8 × 3/16 1/2 × 1/4 5/8 × 5/16 3/4 × 3/8 7/8 × 1/4a	1/4 × 1/8 5/16 × 5/32 3/8 × 3/16 1/2 × 1/4 5/8 × 5/16 3/4 × 3/8 7/8 × 7/16
4040	1-7/16 to 1-3/4 1-13/16 to 2-1/4 2-5/16 to 2-3/4 2-13/16 to 3-1/4 3-5/16 to 3-5/8 3-11/16 to 3-3/4 3-13/16 to 4	22.0 21.0 19.0 17.0 15.0 14.0 13.0	9.98 9.53 8.62 7.71 6.80 6.35 5.90	3/8 × 3/16 1/2 × 1/4 5/8 × 5/16 3/4 × 3/8 7/8 × 7/16 7/8 × 7/16 1 × 1/4a	3/8 × 3/16 1/2 × 1/4 5/8 × 5/16 3/4 × 3/8 7/8 × 7/16 7/8 × 7/16 1 × 1/2
4545	1-15/16 to 2-1/4 2-5/16 to 2-3/4 2-13/16 to 3-1/4 3-5/16 to 3-3/4 3-13/16 to 4-1/4 4-5/16 to 4-1/2	30.0 28.0 26.0 23.0 20.0 18.0	13.61 12.70 11.79 10.43 9.07 8.16	1/2 × 1/4 5/8 × 5/16 3/4 × 3/8 7/8 × 7/16 1 × 1/2 1 × 1/4a	1/2 × 1/4 5/8 × 5/16 3/4 × 3/8 7/8 × 7/16 1 × 1/2 1 × 1/2
5050	2-5/16 to 2-3/4 2-13/16 to 3-1/4 3-5/16 to 3-3/4 3-13/16 to 4-1/2 4-9/16 to 5	38.0 35.0 32.0 27.0 24.0	17.24 15.88 14.51 12.25 10.89	5/8 × 5/16 3/4 × 3/8 7/8 × 7/16 1 × 1/2 1-1/4 × 7/16a	5/8 × 5/16 3/4 × 3/8 7/8 × 7/16 1 × 1/2 1-1/4 × 5/8
6050	3-13/16 to 4-1/2 4-9/16 to 5-1/2 5-9/16 to 6	60.0 55.0 50.0	27.22 24.95 22.68	1 x 1/2 1-1/4 x 5/8 1-1/2 x 3/4	1 x 1/2 1-1/4 x 5/8 1-1/2 x 3/4
7060	4-9/16 to 5-1/2 5-9/16 to 6-1/2 6-9/16 to 7	85.0 75.0 65.0	38.56 34.02 29.48	1-1/4 x 5/8 1-1/2 x 3/4 1-3/4 x 3/4	1-1/4 x 5/8 1-1/2 x 3/4 1-3/4 x 3/4

a: Shallow key furnished for these sizes

Metric bores, keyway, keys & screws

Bush No.	Nominal Diameter at Larger End	Taper Bush Code	Bore Diameter (mm)	Keyway (mm) Width (w)	Keyway (mm) Depth (h)	Key (mm) Width (w)	Key (mm) Depth (h)	Screw Tightening Torque(Nm)	Screw Details Qty.	Screw Details Size
1008	35	TLB1008009 to TLB1008025	9 - 10	3	1.4	3	3	56	2	1/4"
			11 - 12	4	1.8	4	4			
			13 - 17	5	2.3	5	5			
			18 - 22	6	2.8	6	6			
			23 - 25	8	3.3	8	7			
1108	38	TLB1108009 to TLB1108028	9 - 10	3	1.4	3	3	56	2	1/4"
			11 - 12	4	1.8	4	4			
			13 - 17	5	2.3	5	5			
			18 - 22	6	2.8	6	6			
			23 - 28	8	3.3	8	7			
1210	47.5	TLB1210011 to TLB1210032	11 - 12	4	1.8	4	4	20	2	3/8"
			13 - 17	5	2.3	5	5			
			18 - 22	6	2.8	6	6			
			23 - 30	8	3.3	8	7			
			31 - 32	10	3.3	10	8			
1215	47.5	TLB1215011 to TLB1215032	11 - 12	4	1.8	4	4	20	2	3/8"
			13 - 17	5	2.3	5	5			
			18 - 22	6	2.8	6	6			
			23 - 30	8	3.3	8	7			
			31 - 32	10	3.3	10	8			
1310	51	TLB1310014 to TLB1310035	14 - 17	5	2.3	5	5	20	2	3/8"
			18 - 22	6	2.8	6	6			
			23 - 30	8	3.3	8	7			
			31 - 35	10	3.3	10	8			
1610	57	TLB1610014 to TLB1610042	14 - 17	5	2.3	5	5	20	2	3/8"
			18 - 22	6	2.8	6	6			
			23 - 30	8	3.3	8	7			
			31 - 38	10	3.3	10	8			
			39 - 42	12	3.3	12	8			
1615	57	TLB1615014 to TLB1615042	14 - 17	5	2.3	5	5	20	2	3/8"
			18 - 22	6	2.8	6	6			
			23 - 30	8	3.3	8	7			
			31 - 38	10	3.3	10	8			
			39 - 42	12	3.3	12	8			
2012	70	TLB2012014 to TLB2012050	14 - 17	5	2.3	5	5	31	2	7/16"
			18 - 22	6	2.8	6	6			
			23 - 30	8	3.3	8	7			
			31 - 38	10	3.3	10	8			
			39 - 44	12	3.3	12	8			
			45 - 50	14	3.8	14	9			
2517	85.5	TLB2517016 to TLB2517060	16 - 17	5	2.3	5	5	48	2	1/2"
			18 - 22	6	2.8	6	6			
			23 - 30	8	3.3	8	7			
			31 - 38	10	3.3	10	8			
			39 - 44	12	3.3	12	8			
			45 - 50	14	3.8	14	9			
			51 - 58	16	4.3	16	10			
			59 - 60	18	4.4	18	11			
2525	85.5	TLB2525019 to TLB2525060	19 - 22	6	2.8	6	6	48	2	1/2"
			23 - 30	8	3.3	8	7			
			31 - 38	10	3.3	10	8			
			39 - 44	12	3.3	12	8			
			45 - 50	14	3.8	14	9			
			51 - 58	16	4.3	16	10			
			59 - 60	18	4.4	18	11			

Metric bores, keyway, keys & screws

Bush No.	Nominal Diameter at Larger End	Taper Bush Code	Bore Diameter (mm)	Keyway (mm) Width (w)	Keyway (mm) Depth (h)	Key (mm) Width (w)	Key (mm) Depth (h)	Screw Tightening Torque(Nm)	Screw Details Qty.	Screw Details Size
3020	108	TLB3020025 to TLB3020075	25 - 30	8	3.3	8	7	90	2	5/8"
			31 - 38	10	3.3	10	8			
			39 - 44	12	3.3	12	8			
			45 - 50	14	3.8	14	9			
			51 - 58	16	4.3	16	10			
			59 - 65	18	4.4	18	11			
			66 - 75	20	4.9	20	12			
3030	108	TLB3030035 to TLB3030075	35 - 38	10	3.3	10	8	90	2	5/8"
			39 - 44	12	3.3	12	8			
			45 - 50	14	3.8	14	9			
			51 - 58	16	4.3	16	10			
			59 - 65	18	4.4	18	11			
			66 - 75	20	4.9	20	12			
3525	127	TLB3525048 to TLB3525090	35 - 38	10	3.3	10	8	113	3	1/2"
			39 - 44	12	3.3	12	8			
			45 - 50	14	3.8	14	9			
			51 - 58	16	4.3	16	10			
			59 - 65	18	4.4	18	11			
			66 - 75	20	4.9	20	12			
			76 - 86	22	5.4	22	14			
			86 - 90	25	5.4	25	14			
3535	127	TLB3535035 to TLB3535090	35 - 38	10	3.3	10	8	113	3	1/2"
			39 - 44	12	3.3	12	8			
			45 - 50	14	3.8	14	9			
			51 - 58	16	4.3	16	10			
			59 - 65	18	4.4	18	11			
			66 - 75	20	4.9	20	12			
			76 - 86	22	5.4	22	14			
			86 - 90	25	5.4	25	14			
4040	146	TLB4040040 to TLB4040100	40 - 44	12	3.3	12	8	170	3	5/8"
			45 - 50	14	3.8	14	9			
			51 - 58	16	4.3	16	10			
			59 - 65	18	4.4	18	11			
			66 - 75	20	4.9	20	12			
			76 - 86	22	5.4	22	14			
			86 - 96	25	5.4	25	14			
4545	162	TLB4545055 to TLB4545110	96 - 100	28	6.4	28	16	192	3	3/4"
			55 - 58	16	4.3	16	10			
			59 - 65	18	4.4	18	11			
			66 - 75	20	4.9	20	12			
			76 - 86	22	5.4	22	14			
			86 - 96	25	5.4	25	14			
5050	177.5	TLB5050070 to TLB5050125	96 - 110	28	6.4	28	16	271	3	7/8"
			70 - 75	20	4.9	20	12			
			76 - 86	22	5.4	22	14			
			86 - 96	25	5.4	25	14			
			96 - 110	28	6.4	28	16			
			111 - 125	32	7.4	32	18			

Note:

- Key ways are British standard metric B.S. 4235: Part 1:1972 and conform to I.S.O recommendations. Where a key is to be used it should be parallel and side fitting with top clearance. Depth of key way is measured at the center.
- Taper Bush with Imperial bores can also be supplied.

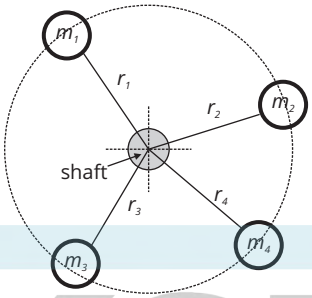
Pulley balancing

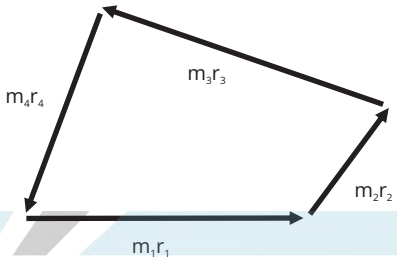
Static Balancing

Concept: When the Pulley is statically balanced, then the center of mass lies on the axis of rotation.
Cross-check: Rotate the Pulley to any angular position and leave it. If it is statically balanced, then the Pulley will retain its position.

Procedure:

a) You are provided with 4 different masses (in the from of bars) and thus "the shaft + 4 masses" constitutes your system.
b) As of now you assume that the center of mass of the bars is at equidistant from the axis of rotation.





c) Orient the masses on the shaft in such a way that center of mass = $\sum m_1r_1=0$
d) For that randomly orient masses m_1 and m_2 (i.e.2) and then analytically solve for getting orientation of 3 and 4 (i.e. 4).
e) Manually orient m_3 and m_4 at calculated angles '4' and then see if there is an unbalance, there will be most probably.) .
f) You then need to finely adjust the orientations of any two masses to make the system statically stable.

Dynamic balancing:

Dynamic balancing is highly recommended in the applications running at high speeds.

Concept: The Pulley is dynamically balanced, if net moment produced is zero.
Cross-check: When the Pulley is dynamically balanced, the system will not undergo vibration, if the Pulley is rotated.
Procedure:

a) Mount the Belt on the Pulley of the shaft
b) Current state is that your system is "statically balanced" (from previous part)
c) Considering the bearing near the Belt as your origin, you need to come up with the axial position of masses on the shaft "a_1" such that: Net moment = $\sum a_1 \times m_1r_1 = 0$
d) The procedure from this step onwards is analogous to that of Part A from steps "e" & "f", where the lengths of side of polygon is "$a_1m_1r_1$" instead of "m_1r_1 ". To check the unbalance, rotate the Pulley at various "rpms".

OR

Dynamic balancing can be calculated using below formula:
RPM=15,500 / $(DF)^{½}$, where 'D' is Pulley diameter in inches and 'F' is the Pulley face width in inches.

OR

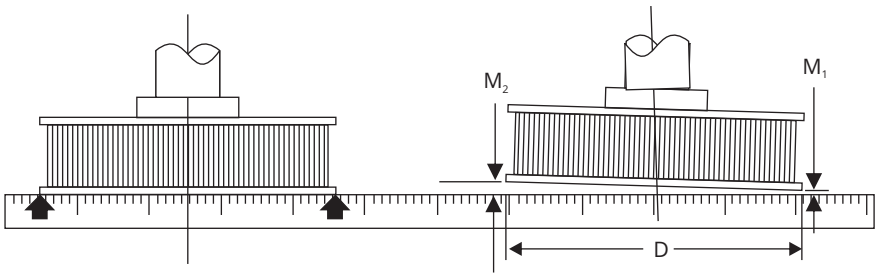
RPM=25.54 x 15,500 / $(DF)^{½}$, where 'D' is Pulley diameter in mm and 'F' is the Pulley face width in mm.

Resultant RPM is the maximum recommended operating RPM for a sheave or a Pulley with a single plane balance (static balancing).

Note: if a sheave or Pulley is to be operated at higher speed, two plane balancing is recommended.

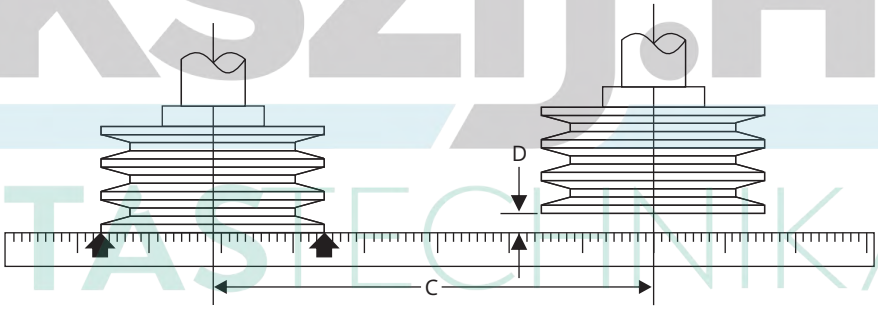
Pulley alignment inspection

Misalignment can either be quantified mathematically, or be compared to some general rules of thumb for quicker and easier results. While using a straight edge to project the plane of the outside face of the sheave or sprocket #1 with respect to sheave or sprocket #2, angular misalignment can be quantified as the difference in clearance between the straight edge and the outside surface of the sheave or sprocket #2 across the diameter.



$$\text{Misalignment} = \text{Tan}^{-1}\left[\frac{M_2 - M_1}{D}\right]$$

The angle of parallel misalignment can be quantified as the difference in clearance between the straight edge and the outer surfaces of the two sheaves or sprockets across the separation distance.



$$\text{Misalignment} = \text{Tan}^{-1}\left[\frac{D}{C}\right]$$

The total allowable misalignment recommended for V-Belts, in general, is 1/2-degree. While individual V-Belts are known to be capable of handling greater amounts of misalignment before becoming unstable, maintaining the misalignment to within 1/2-degree will maximize Belt life.

The total amount of misalignment recommended for synchronous, banded Belts and poly-V Belts is 1/4-degree. These drives are less tolerant of misalignment than conventional V-Belt drives, and must be aligned more accurately.

For V-Belt drives:

1/2-degree angle = approximately 1/10-inch per foot of distance traveled.

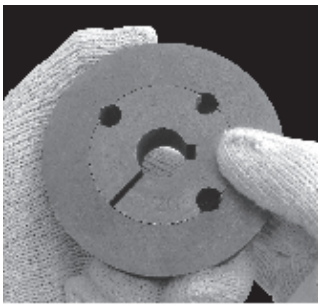
For synchronous, 60-degree angle, and V-ribbed drives:

1/4-degree angle = approximately 1/16-inch per foot of distance traveled.

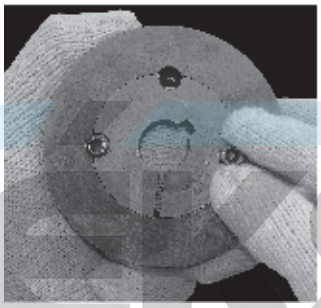
Installation procedure for Taper Bushes

To Install: Clean the shaft, remove oil stains, lacquer and visible dirt. Wipe it dry with a clean rag. Look for any burs on the shaft, or any deformity in the key-way before proceeding. Do not use oil or grease to lubricate the shaft. Follow steps 1 to 4 as shown in below pictures.

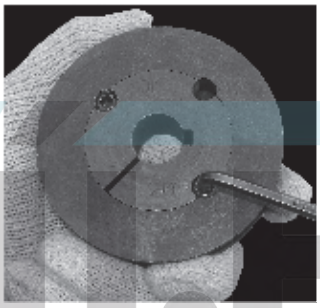
Step 1:
First insert the bush in the pulley.



Step 2:
Match the holes of pulleys with those of the bush.



Step 3:
Insert the set-screws manually, tighten them with fingers till possible.



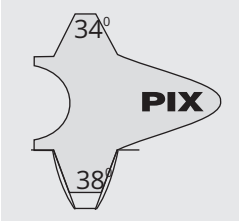
Step 4:
Tighten them further using allen-key. Tighten the screws alternately.

To remove: Carefully remove all the set-screws and insert the screw in the ejecting hole as shown in below picture.

Step 5:
Tighten the screw in the ejecting hole to release the bush.

Service equipment

PIX Pulley Gauges



PIX Pulley Gauges are especially designed for checking the profiles of the grooves in a pulley. They can be used in checking the grooves of both the conventional and dual section pulleys.

Procedure to check the grooves in a pulley

1. Identify the pulley gauge to be used according to the section and its diameter.
2. Measure the groove by inserting the gauge. Identify if any clearance lies between the side walls of the groove and the gauge.
3. Measure the clearance using a Feeler Gauge.