



Installation And Storage Of Synchronous Belt Drives PA NOTE

This bulletin describes the correct procedures for installing, storing and maintaining all types of synchronous belts. The basic steps for installing a synchronous belt drive are the same, regardless of belt type or size. Gates catalogs 17595 (Poly Chain® GT® Drives), 17190 (PowerGrip® HTD® Systems for Industrial Drives), and 17181 (PowerGrip® Timing Belt Systems for Industrial Drives) include detailed information on properly designing synchronous belt drives.[Also new PowerGrip Belt Systems, 17195.]

Installing the Sprockets

Before installing the hardware, check the shafts and tapered surfaces of the bushing and sprocket for contaminants. Any rust, dirt, oil, or grease should be removed from the mating surfaces. Lubricants should never be used when installing the sprockets or pulleys. If a lubricant is used, bursting pressures may be generated, resulting in damage to the hub of the sprocket.

With the key installed in its keyseat, slide the bushing into place on the shaft. If the bushing is difficult to install on the shaft, a screwdriver blade can be carefully wedged into the bushing's saw cut. If a bored-to-size sprocket is used, it can be installed on the shaft with the keyway in place.

With the bushing on the shaft, loosely insert the bolts through the sprocket and into the bushing flange. The sprocket may be reverse mounted by inserting the bolts through the bushing and into the hub (QD bushing sizes JA through J only). Do not use any type of lubricant on the bolts, bushings or sprocket.

With the sprocket and bushing loosely assembled, initially align the assemblies.

The bushing bolts can now be tightened evenly and progressively around the bolt circle. Tighten the bolts using a torque wrench to the recommended torque values for the appropriate bushing size. It is important to use a torque wrench to insure that the sprocket is seated properly on the bushing, which will help minimize the wobble and eccentricity of the sprocket. The recommended values are listed in the table on next page.

Bushing	Bolts(in)	Torque
---------	-----------	--------



GatesFacts™ Technical Information Library

Gates Compass™ Power Transmission CD-ROM version 1.2

The Gates Rubber Company
Denver, Colorado USA

Style	Qty	Size	Wrench Force(ft-lbs)
QT	2	1/4 x 3/4	6
JA	3	10-24 x 1	5
SH &SHDS	3	1/4 x 1 3/8	9
SD	3	1/4-20 x 1 7/8	9
SK	3	5/16-18 x 2	15
SF	3	3/8-16 x 2	30
E	3	1/2-13 x 2 3/4	60
F	3	9/16-12 x 3 3/8	75
J	3	5/8-11 x 4 1/2	135
M	4	3/4-10 x 8 3/4	225
N	4	7/8-9 x 8	300
P	4	1-8 x 9 1/2	450
W	4	1 1/8 x 11 1/2	600
S	5	1 1/4-7 x 15 1/2	750

Note that there should be at least a 1/8" to 1/4" gap between the sprocket hub and the bushing flange. This is normal under recommended installed conditions. Do not attempt to tighten the bolts to eliminate this gap.

If a bored-to-size sprocket with a conventional rectangular key is used, it can be installed on the shaft with the key in place. Be sure to install and tighten the set screws.

Depending on the bore size, some Poly Chain® GT® bored-to-size sprockets may use a Gib key rather than a conventional rectangular key. A Gib key differs in shape and installation procedures from a conventional key. A Gib key has a slight taper on one surface. When the key is inserted, the taper creates a wedging action that clamps the sprocket to the shaft. [Gib keys were eliminated in the 1980's.]

Every bored-to-size Poly Chain® GT® sprocket that uses a Gib key comes with an installation kit. The kit contains a packet of "Never Seez" (TM Bostik, Inc.) (noncorrosive) material and two color coded shims. The first step when installing a Gib key is to apply the Never Seez material to the entire key and insert the key into the keyway of the shaft/sprocket assembly. The key should be lightly tapped until firmly seated. If the gap between the hub face and the key head is less than 1/16", remove the Gib key and place the shim stock between the key and shaft keyway. Reinstall the key as above, checking the clearance between the key head and hub face. It may be necessary to



repeat the above steps, adding shim material until the gap is more than 1/16" when the key is firmly seated. Once the sprocket is secured, the set screw can be tightened.

When installing a Gib key, avoid using excessive force to seat the key. If too much force is applied to the key, the sprocket hub may be split.

Recheck Alignment

The alignment should be checked once again. Remember that the maximum recommended misalignment for a synchronous drive is 1/4°. A suitable straight edge should be used. When using a straight edge, check for two points of contact on each sprocket. This will easily identify parallel misalignment. Check for both angular and parallel misalignment. See Figure 1 on page 3.

Angular misalignment can be more difficult to identify, but can be done by checking alignment in both directions. First, place the straight edge across the face of the driveR and check the alignment of the driveN. Then place the straight edge across the face of the driveN and check the driveR alignment. This procedure will identify both parallel and angular misalignment. If the alignment appears to be incorrect, loosen the bolts and adjust the sprocket assembly's position. This procedure may have to be repeated to achieve the desired alignment. At this point, complete the sprocket installation by a final tightening of the bolts for a bushed sprocket or of the set screws for a bored to size sprocket.

Installing and Tensioning the Belt

Now that the sprockets are in position, the belt can be installed. Adjust the center distance or idler position so the belt can be easily slipped over the sprockets or pulleys. The belt should never be pried onto the drive. If the belt is pried onto the drive, the tensile member could incur unseen damage, resulting in premature belt failure. With the belt installed on the drive, take up the belt length with either shaft adjustment or an idler.

The proper belt tensioning values can be calculated by using the appropriate drive design catalog. Once the required tension values are known, begin by tightening the drive to an approximate initial tension. Measure the belt tension using either a pencil type tension tester or a spring scale. Compare the force required to deflect the belt 1/64" per inch of span to the recommended belt tension. If the force is higher than recommended, loosen the drive. If the force is lower than the recommended tensioning force, tighten the drive. Continue to adjust and check until the measured force falls between the minimum and maximum recommended tensioning forces.

Any drive guards or machine components should now be reinstalled. At this point, the drive should be ready for operation. Run in the drive briefly, carefully looking and listening for any unusual signs.

Belt Storage



GatesFacts™ Technical Information Library

Gates Compass™ Power Transmission CD-ROM version 1.2



The Gates Rubber Company
Denver, Colorado USA

To achieve maximum belt performance, proper belt storage procedures should always be practiced. If the belts are not properly stored, their performance can be adversely affected.

Before we discuss proper storage procedures, let's examine some methods of storage to avoid.

- 1) Do not store belts on floors unless they are protected by the appropriate packaging.
- 2) Do not store near windows where the belts may be exposed to direct sunlight or moisture.
- 3) Do not store near electrical devices that may generate ozone (transformers, electric motors, etc.).
- 4) Do not store in areas where solvents or chemicals may be present in the atmosphere.

Synchronous belts up to 120 inches are normally stored in a "nested" configuration. "Nests" are formed by laying a belt on its side and placing as many belts inside the first belt as possible without undue force. The nests can be stacked when they are tight and rotated 180° from the nest below.

Synchronous belts over 120 inches long may be rolled up for storage and shipment. The rolls can then be stacked for storing purposes. Small bend radii which could damage the belts should be avoided.

Poly Chain GT belts are individually boxed which makes storage on shelves very convenient. This also protects the belt.

Per RMA Bulletin No. IP-3-4/1997, when proper storage procedures are followed, and the belt is stored at temperatures less than 85 °F and relative humidities below 70%, the belt's quality should not significantly change within 8 years. If the storage temperature exceeds 85 °F, the storage limit for normal belt service levels will be significantly reduced.

Preventive Maintenance

An excellent publication, "Belt Preventive Maintenance Manual", form #14995, is available from Gates. It includes detailed discussion of many subjects, including failure analysis and troubleshooting problem drives.