



Pulley Alignment Tension

Today's belt performs a specific job, transferring power from the crank pulley to all accessories in the Front End Accessory Drive system (FEAD). Power-hungry alternators, air conditioners, power steering and water pumps all try to rob the belt and keep it from transferring this power. To say the least, it's no small task to keep all these parts functioning properly, especially under extreme temperatures.

If regular preventive maintenance and inspection has been overlooked throughout the years or at some point an incorrect part has been installed, the system may suffer. The customer who just purchased a new Gates belt expecting a long, worry-free motoring experience, may see a failure soon after they replace their belts because their FEAD system was not properly inspected and cleaned before installation.

A belt must have three items in order for it to run correctly:

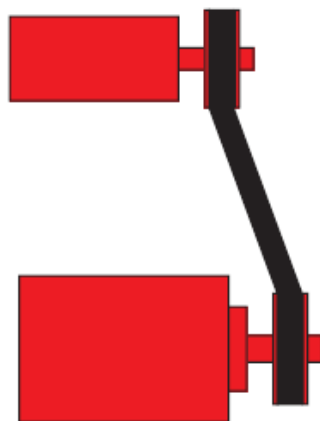
1. Pulleys – in good operating order free and clear of dirt grease and grime.
2. Alignment – proper alignment with any misalignment repaired *before* installation of the new belt.
3. Tension – if the belt does not have proper tension it will begin to slip, causing heat, resulting in premature failure and noise.

Pulleys

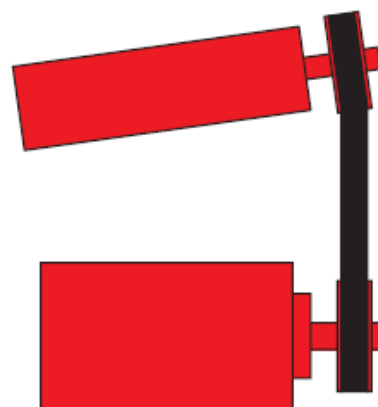
Just like V-belt pulleys, micro-ribbed pulleys should be inspected and cleaned before new belt installation. Any buildup of road dirt or oil residue in the grooves of the pulleys should first be removed with alcohol-based brake cleaner and a soft bristled brush. In fact, if there is oil on any of the pulleys and it has not been removed, as soon as the key is turned, the new belt will be coated and the failure starts all over again.

Alignment

There are two types of misalignment: parallel or angular.



Parallel misalignment



Angular misalignment





1. Parallel misalignment refers to pulleys that are outside the plane of other pulleys in the drive system but whose shafts remain parallel with the other components. Proper positioning of a pulley on a shaft will help ensure all pulleys are in a common plane.
2. Angular misalignment refers to pulleys which are within the drive system plane but are tilted because their shafts are not parallel.

Both misalignment conditions can create belt tracking problems, excessive wear, chirp noise and belt stability problems. Just a few degrees of misalignment can increase belt operating temperature by 30° F, reducing belt life by as much as 50 percent.

Misalignment noise occurs most frequently on the shortest spans in a drive, which often arise between a backside pulley and an adjacent grooved accessory pulley. Proper pulley alignment is particularly critical in these locations.



Use Gates DriveAlign® Laser Alignment Tool (Part #91006) to quickly identify pulley misalignment.

Another tip for identifying misalignment or slip is to spray water on a noisy belt. If the noise gets louder, the belt is slipping; if the water causes the noise to fade or go away completely, there is misalignment in the FEAD system.

Tension

In addition to misalignment, the other major cause of belt noise is improper tension, which can be caused by a number of factors:

- Insufficient installation tension
- No run in and retension when the belt is new (manually tensioned drives)
- No continuing tension maintenance
- Insufficient installation allowance in the drive





- Insufficient take-up allowance in the drive
- Change in drive center distance
- Pulley groove wear
- Belt sidewall wear
- Belt permanent elongation

Without proper tension, a belt will slip, the sidewalls will wear smooth and the belt will eventually harden through “heat-aging”, a process referred to as *glazing*. The more glazed the belt surface is, the more likely it is to be noisy and lack sufficient ability to transmit power.

The cause of belt noise is often referred to as belt “stretch”. However, the use of the term “stretch” is actually an inaccurate identification for what is, in fact, a loss of tension caused by one of the factors listed above. Belt deformation is usually not a sufficient reason for loss of tension.

Belts tensioned too high may not cause noise, but can shorten pulley bearing life from excessive hub loads. Too much tension can also result in excessive belt wear, increased belt temperatures, and premature belt failure.

Use Gates DriveAlign belt tensioners for OE fit, form and function. Gates recommends replacing tensioners and idler pulleys with every belt change.

To learn more, visit the [Professional Technician](#) section of Gates website.

