

How Important is Spring Technology?

Heavy duty automatic belt tensioners are designed to absorb accessory drive vibrations that lead to excessive belt wear and noise problems.

How does a belt tensioner reduce vibrations? One of the solutions is in the spring technology.

Aftermarket tensioners are available with either flat or round springs. Theoretically, the flat spring is just as effective in providing a constant force as a round spring.

Mechanically, however, there are major differences that affect performance and service life.

Fatigue failure: Flat springs have more stress points along the spring edges that can weaken and crack, and lead to fatigue failure. Round springs have no stress points because spaces between the coils eliminate metal-to-metal contact. They are also quieter.

Contamination: Flat spring design is subject to failure due to contamination when dirt and grit become trapped between the coils. The flat spring will eventually “lock up” or seize, resulting in loss of tension for the drive system. Round springs are not affected by contamination because of the spacing between the coils.

Coil interference: The coils of a close-wrapped, flat spring rub against each other as they vibrate. This increases heat build-up which leads to component wear and failure. Flat spring tensioners use Teflon® tape as a lubricant to reduce friction between coil surfaces. However, heat, friction and contamination erode the tape over time. Round springs have no coil-to-coil contact. There is no friction and no noise.



Spacing between the coils of a round spring tensioner eliminates metal-to-metal contact, flex fatigue failure, noise, and contamination, which often causes a flat spring to “lock up” or seize the tensioner.



Flat spring designs trap dirt and grit between the coils. These contaminants wear away the Teflon separator tape and can seize the tensioner. Rust is often an early indication that the tensioner needs to be replaced.



How Does A Damping Mechanism Increase Tensioner and Belt Service Life?

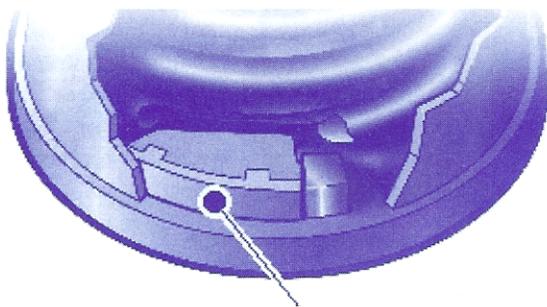
Heavy duty serpentine belt drive systems on diesel engines are subjected to violent pulsations and extreme shock loads.

Typical causes are on/off fan clutch systems that abruptly start and stop, high output generators, accessory loads and engine startup and shutdown.

To reduce tensioner vibration and belt drive stability problems, Gates has developed a robust and patented damping system.

Gates Green Stripe® DriveAlign® automatic belt tensioner is designed to resist extreme vibrations while providing stable damping.

During peak-to-peak vibration tests equivalent to 400,000 road miles, the tensioner withstood torsional spikes at 20 cycles/second for three times longer than other aftermarket products.



Gates patented damping mechanism

The tensioner's ability to absorb extreme vibration means that it has high damping levels so that tensioner motion, and fatigue of the inner round spring are reduced.

Here's how it works. The damping mechanism functions like a shock absorber. The torsional spring applies constant pressure to the damping mechanism, which diminishes the oscillation of the tensioner arm.

Reducing the tensioner arm motion provides proper belt alignment and tension for improved drive efficiency and service life of all the drive components, including bearings and pulleys. The damping mechanism also reduces belt vibration - or flutter - that is typical with diesel engines.

The end result is that Gates trouble-free DriveAlign tensioners reduce accessory drive maintenance.

