Why does belt tension matter?

Proper belt tension is a critical step when installing a belt. V-belts operate on friction; the friction is multiplied by the mechanical advantage of the wedging principle. Correct V-Belt tensioning is the single most important factor necessary for long, satisfactory operation. How you tension a belt at installation will determine how long the belt will run.

Too little tension results in slippage, excess heat, and premature belt & pulley wear. Too much tension results in excessive stress on belts, bearings, and shafts. However, there is still a wide range of tension which a belt will operate satisfactorily. The intent is to find this proper range for any V-Belt drive.

Tension loss occurs on all manufacturer’s belts. The highest quality belts still lose nearly 50% of installed tension, while lower quality belts lose over 70% of installed tension. You cannot “feel” the correct tension on a V-Belt. On a test given to over 200 experienced maintenance personnel, only 1% tensioned a belt correctly using the “feel” method. Most were at 7%-50% of correct tension.

Rolling or prying a belt on a drive gives one of two results, both lead to shortened belt life. Rolling causes low belt tension resulting in low belt life due to slip and heat build up. Prying a belt damages cables in the belt, leading to early belt failure.

Belt life varies greatly depending on not only how the belt is installed, but on how the belt is tensioned at installation.

Belt tensioning also affects bearing life. When a belt is loose it will slip, causing excess heat. This leads to hot bearings and lowered bearing life.
To get the most from your belt drive, pay proper attention to your V-Belt tensioning and pulley size.

Proper V-Belt Tensioning
All belts do not feel the same when properly tensioned due to different materials and tension cables used in their manufacturing processes. Therefore, one should not use “feel” to judge the correct tension of a belt. To more accurately tension V-Belt drives use the Force-Deflection Method shown below.

**Minimum Pulley Diameters**
The successful operation of a belt drive is highly dependent on the diameter of the pulleys involved. The ARPM (Association for Rubber Product Manufacturers) publishes minimum recommended pulley diameters for each belt profile. Using pulleys smaller than these recommended diameters will result in a dramatic increase in belt tension and will substantially decrease the overall belt life.