

Pulley Systems - Pulley Belts

A belt is a continuous flexible band which normally connects two pulleys. It can be made from a number of different materials, and shapes depending on their use.

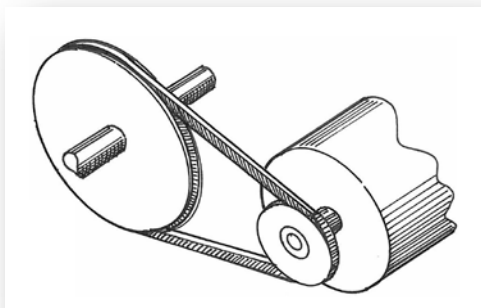
Pulley systems use a belt to transmit motion and force from the driver shaft to the driven shaft. (These examples are from the National slate museum in Llanberis.)

Belts come in a variety of types:

- V- Belts
- Linked Belts
- Round Belts
- Multiple Belts
- Toothed Belts
- Belt tension

V-Belts

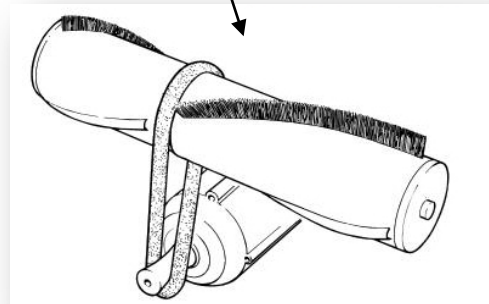
The continuous V – Belt is the one most often used. It fits tightly into the groove on the pulley wheels to keep slipping to a minimum. V – belts come in a variety of width and thicknesses. The diagram shows some of the more common shapes and shows two alternative methods of construction. Construction 2 allows the belt to bend around the pulley more easily which means it will last longer.



Round Belts

Round belts are used where small forces are involved or where the belt has to twist. The diagram shows a round belt used to drive the brushes of a vacuum cleaner. Note that the driver and driven shafts are at 90° to each other. A V-belt would not stay on if used like this, but the round belt does the job very well.

Round belts are also used **on sewing machines** and **floor cleaners** where only small forces are involved.



Multiple Belts

The forces acting on a belt are often at their highest when a machine starts up. Where large forces are involved, more than one belt has to be used. By using several V-belts alongside each other the forces are shared. It is important that the belts are exactly the same length. If they are not, some belts will be taking much more of the load than others, and so are more likely to break.



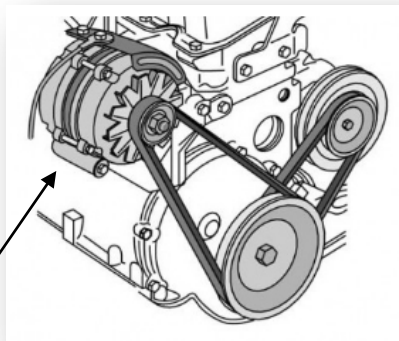
Toothed Belts

One of the problems with belt drives is that the belts can slip, causing the driven shaft to rotate slower than expected. Where it is vital that the rotation of the driven shaft is kept in sequence with the driver shaft, a toothed belt can be used. They are used for such things as timing when the valves open and close in a car engine or for moving the pen of a graphic plotter accurately.



Belt Tensioning

Whatever kind of belt is used, it must be tensioned correctly, not too tight and not too slack. If it is too tight, it will apply bending forces to the pulley shafts. If it is too slack it will slip or come off the pulleys. Most systems are tensioned by having the position of one of the pulleys adjustable.



The pulley on the end of the crank shaft drives a fan pulley and an “Alternator” pulley. The **tension** is achieved by moving the alternator away from the engine pulling the belt tight. The alternator is then locked in position by means of a locking bolt.