A **Belt** is a looped strip of flexible material, used to mechanically link two or more rotating shafts. They may be used as a source of motion, to efficiently **transmit POWER**, or to track relative movement.

Belts are looped over pulleys.

---

**Belt Drive**

When a belt is used for power transmission it is called a **belt drive**. Belts are the cheapest utility for **power transmission** between shafts that may not be parallel. Power transmission is achieved by specially designed belts and pulleys. Belts run smoothly and with little noise, and cushion motor and bearings against load changes, but has less strength than gears or chains.

---

**Advantages**

- Cheap
- Allows misalignment (parallel shafts)
- Protects from overload
- Absorbs noise and vibrations
- Cushion load fluctuations
- Needs little maintenance
- High efficiency (90-98%, usually 95%),

**Disadvantages**

- Speed ratio is not constant (slip & stretch)
- Heat accumulation
- Speed limited – 2000 m/min,
- Power limited – 700 kW
- Endless belts needs special attention to install
Flat Belts

- Belt transfers torque by friction of the belt over a pulley.
- May need a tensioner.
- Traction related to angle of contact of belt on pulley.
- Is susceptible to slip.
- Belt made from leather, woven cotton, rubber, balata.

Flat Belts

- Better torque transfer possible compared to flat belt. Generally arranged with a number of matched vee belts to transmit power. Smooth and reliable. Made from hi-text woven textiles, polyurethane, etc.

The power transmitted by a belt

\[
P = \frac{(T_1 - T_2) \cdot v}{1000}
\]

where

- \(P\) = Max power transmitted kW
- \(T\) = Belt tension
- \(T_c\) = Belt tension due to centrifugal force
- \(\mu\) = Coefficient of Friction.
- \(\theta\) = Angle of belt lap
- \(v\) = Linear velocity of belt (m/s)

In the past belts were generally made from leather.

- Now belts are also manufactured from a wide range of elastomer including urethane, neoprene, hypalon, EPDM, and silicone.
- Stretch, semi-stretch, and no-stretch belts are available.
- Belts are often reinforced with textiles and fibres and metal reinforced belts are available.
- Belts can be provided with durable surface coatings and coatings providing anti-static properties.
Poly-Vee belts are toothed on the inside driving via grooved pulleys. This enables positive drive. Limited power capacity compared to chain and Vee belt derivatives. Does not require lubrication. Extensively used in low power applications.

**Timing/Synchronous BELTS**

Conveyor belts