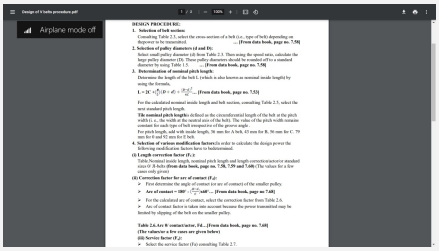
design procedure for v belt



belt drives unit 1

belts are used to transmit power bwtween two shafts by means of friction. this type of drives is called flexible drive cause a flexible belt is superimposed between the driving and driven shaft.

belt drive is not a positive drive. the common types of belt drives include, flat and v belts.
- flat belts transmit power over a considerable distance like in belt conveyors, whereas v belts are used in shorter distance rangelike in electric motors

representation of the belts

flat and v belts difference

Differences between flat belt drive and V-belt drive	
Flat Belt Drive	V-Belt Drive
1. Flat belts have a rectangular cross-section, where width of belt is much larger than thickness.	1. V-belts have a trapezoidal cross-section, where maximum width is almost same with the thickness.
2. The pulleys for flat belt drive is cylindrical type. These are simple in construction and thus cheaper.	2. Pulleys must contain V-slot in the periphery having slot angles compatible with that of the belt. Thus these pulleys are costlier.
3. Only one surface of the belt remains in contact with the pulley.	3. Two inclined surfaces continuously remain in contact with the pulley.
4. Flat belts can be used for transmitting power to a long center distance (even up to 15m).	4. V-belt drive is suitable for power transmission in short center distance (usually below 1m).
5. It can be used either in open belt configuration or in crossed belt configuration.	5. V-belt is always used in open belt configuration.
6. Slip between the belt and pulley occurs frequently in flat belt drive.	6. Due to higher friction force for wedge action, slip reduces, especially in low speed.
7. Flat belts are jointed (hinged), so their operation is noisy.	7. V-belts are endless, so their operation is quite.

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adv and dis of flat over v belt and vice versa

flat belts advantages	disadv-antages	v belts advantages
1. cheap and easy to maintain.	power transm-itting capacity is very low	forece of friction between the contact surfaces are high due to wedge action.

adv and dis of flat over v belt and vice versa (cont)

2. can be used as a clutch by making a simple provision of shifting the belt from a tight ot loose pullry and vice versa	disadv-antages velocity ratio is low	have short center distance
different velocities can be obtained	occupy more space due to larger dimensions	permits high speed reduction

adv and dis of flat over v belt and vice versa (cont)

they can be used for long center distances upto 15m efficiency is reduced	smooth and quiet operations at high speeds since v belts are endless
	drive is positive cause the slip is negligible due to wedge action

=> **wedge action**:
The biggest operational advantage of a V-belt is the wedging action into the sheave groove. This geometry multiplies the low tensioning force to increase friction force on the pulley sidewalls.

creep is high and efficiency

belt constructions

properties of belt materials

(i) The belt material should have high coefficient of friction with the pulleys.

(ii) The belt material should have high tensile strength to withstand belt tensions.

(iii) The belt material should have high wear resistance.

(iv) The belt material should have high flexibility and low rigidity in bending in order to avoid bending stresses while passing over the pulley

**leather belts have high coeffi- cient of friction and conseq- uently, high
power transmitting capacity.

*There is a specifi c term ‘ply’ of the belt. In order
to make a practical thick belt, the layers of belt
material are cemented together, These layers are called ‘plies’ of belt. Belts
are specifi ed according to the number of layers or
plies, e.g., single-ply, double-ply or triple-ply belts.
The power rating of the belt is also specifi ed per ply
of belt, **

joining belts

methdos for joining the belts

1. laced joints

2. cemented joints

3. metal fastners