



UNDERSTANDING DRIVE LOSS

Defining Drive Loss

Drive loss is the loss of energy dissipated in the form of heat. The heat is created by the flexing of drive belts around the pulleys and the belts slipping on the pulleys during operation. This energy, or drive loss, subtracts from the total power delivered by the motor. Expressed in a single formula; Total Motor Break Horsepower = Fan BHP + Drive Loss.

Why Drive Loss is Important

Drive loss must be considered when selecting the motor for a particular fan performance point. On a belt drive fan, the motor must be sized to deliver the amount of horsepower shown in the published fan performance data **PLUS** the amount of horsepower required to overcome drive loss. For a fractional horsepower fan, this drive loss often exceeds 10% of the fan horsepower.

Some Causes of Higher Drive Losses

Multiple belts on small diameter pulleys are less efficient than fewer belts on larger diameter pulleys. As these minimum pulley diameters are approached, the drive loss becomes greater.

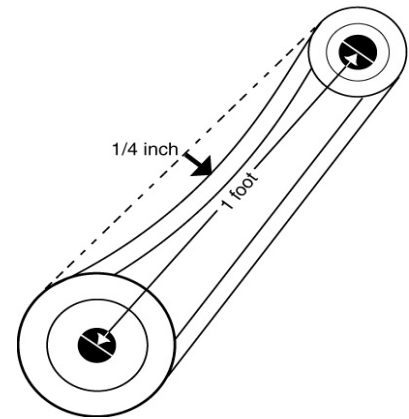


Figure 1 - Proper Belt Tension

How Belt Drive Fans Are Tested

Most belt drive fans are AMCA tested and rated without motors, pulleys and belts. In the test laboratory, the fan shaft is direct connected and driven by a dynamometer. This is a torque device having an accuracy + or - 0.2% and is used to determine the horsepower consumed during the fan test. The speed is measured with a revolution counter. Because belt drive fans are normally tested less motors and drives, no drive loss is taken into account in published performance data.

Compute A Fan

Many fan catalogs and computer selection programs do not include drive loss, or consider it only as a minimum fixed percentage. Cook's Compute A Fan selection program calculates drive loss utilizing the recommendations in AMCA Publication 203-90. This chart can be viewed in the help section of the program. Compute A Fan calculates a realistic drive loss percentage based on the horsepower of the fan selected. The program allows the user to specify drive loss at low, medium or high levels. When medium drive loss is selected, Compute A Fan provides a realistic estimate of drive loss, allowing the user to make an informed selection.

Other causes of high drive losses are loose belts (see Figure 1) or misaligned pulleys (see Figure 2).

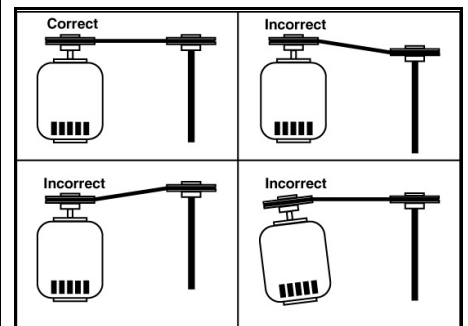


Figure 2 - Pulley Alignment