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## Defining V-Belt Lengths

### PA NOTE

Specifying the length of a belt can be confusing. Although we normally recommend using effective length-outside, inside, pitch and nominal length are used frequently. Each of these terms are explained.

1. **Outside Belt Length:** The outside length of a belt is usually measured with a tape under no tension. Its validity is questionable since some belts have an arched top whereas others are flat. This would give different readings for the two belts. It can be used only as an approximation.
2. **Inside Belt Lengths:** The inside length is measured with flat pulleys or a tape measure. As with the outside length, the inside length varies with the manufacturer. This length should not be used.
3. **Belt Pitch Length:** The pitch length of a belt is the length at the pitch diameter of the sheaves being used. Classical industrial belts are specified in terms of pitch length. The pitch length is obtained by adding the pitch circumference of one sheave to twice the center distance between two equal diameter sheaves at a specified tension. [More recently changed to datum length.]

The belt pitch length is normally the length at the belt pitch line. This line is generally located at the neutral axis near the cord line and varies with cross section and construction. The pitch of the belt and sheave is actually a theoretical point that relates to the more accurate, reliable, and useable effective diameter and effective length.

4. **Belt Effective Length:** The effective length of a belt is the length about the effective outside diameter of a sheave at a specified tension. The effective outside diameter of a sheave is measured where the groove top width is a dimension as specified by RMA, ASAE or SAE standards.

The effective length is obtained by adding the effective outside circumference of one sheave to twice the center distance between the two standard measuring sheaves at the standard measuring tension.

5. **Nominal Belt Length.** The nominal length is used to refer to the length and cross section of a specific belt. For example, an A-38 has a nominal length of 38 inches; a 4L440 has a nominal length of 44 inches; and a 3V300 has a nominal length of 30 inches. The nominal length is used for designation purposes and exists in name only.

With all the terms used, it is easy to see how identifying the proper belt can become rather difficult. The Gates Rubber Company uses effective length for all internal designation when measuring V-belts. In other words, using accepted standard measuring devices and sheaves, we get the true effective length of a belt. Additional details on belt measurements or procedures are available through V-Belt Product Application.