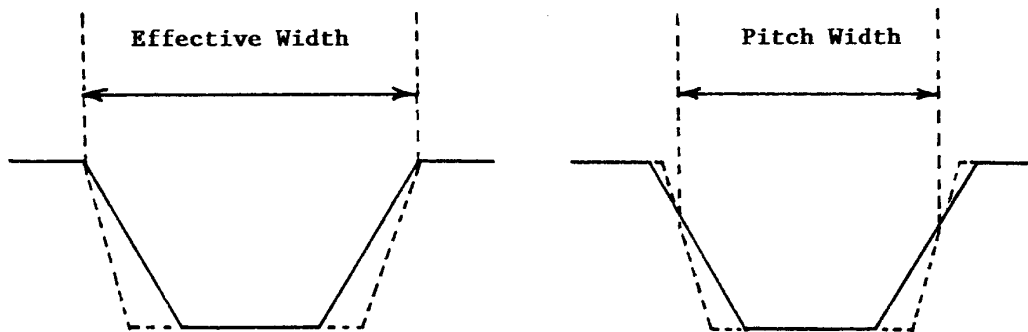




## Pitch Versus Effective (A History) PA NOTE

For many years the European V-belt industry designated and measured sheaves and belts by the pitch system. Under this system, the groove was defined by the pitch width which remained a constant as the groove angle varied as a function of diameter. The belt length, specified as pitch length, was defined as the length of the belt at the pitch zone of the sheave when the belt was under a specified tension. This system was also used originally in the USA as evident by the Classical belt standard (RMA IP-20).



As time went by, standardization groups in the USA recognized that it was not correct, from an engineering standpoint, to specify belt and sheave dimensions in the pitch system. So, the effective system, which was considered to be more practical, was established for the following reasons:

By definition, the sheave can have no pitch line or pitch diameter. Only when a belt is put in the sheave is a pitch line developed. The pitch line is governed by tensile cord location, construction and belt ride. The actual pitch zone of a belt can vary significantly depending upon the manufacturer and type of construction.

From a practical standpoint, to determine approximate belt length, it is much easier to physically determine the diameter of a sheave by measuring the outside diameter, and the length of the belt by measuring the outside circumference. These are values that can be readily measured with a tape, and the outside diameter of a standard groove (not deep groove) sheave coincides closely with the effective diameter.

If the width of the groove is specified, and at a location a significant distance from the top of the groove (as in the case of the pitch width), it is much more difficult to determine whether a sheave has grooves which are cut to a specified standard cross section. In contrast, the effective system is based on a groove width that is very close to the top width of the groove which can be readily measured with a rule to determine the cross section.



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Over the years many attempts were made by the USA standards groups to convince the rest of the world, through the International Organization for Standards (ISO), that the effective system was the only logical way to specify belts and sheaves. ISO recognized the fact that the pitch system was not correct and several standards were converted. However, some standards were considered to be too "entrenched" in the market place to consider retooling or changing belt/pulley size designation. As a compromise, the Datum system was established. This system utilizes the same belt and pulley dimension system, but reflects the fact that the true pitch diameter to outside diameter is a function of the belt construction and manufacturer.

The pitch system, as far as standardization is concerned, is being phased out of the picture as a method of geometrically specifying belts and sheaves. The Datum system offers a legitimate alternative but does not offer the advantages that the effective system does.