

Determining Pulley Speeds

Determining the spindle speeds using a 4 step pulley on a drill press

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What speed do I have here?

Can you tell me how to determine the spindle speeds I will get by using a 4-step pulley on my drill press?

- Dale Potts, Athens, Ohio

We sure can, Dale. However, to do this we will need to know a couple of things more than just the number of pulley steps. We also need to know the motor speed and the outside diameter or diameters of the drive or motor pulley. Also, 4-step pulleys are most often used in combination with a second 4-step pulley. Here's an example of the calculations, based on a motor speed of 1725 rpm, with the motor pulley and the spindle pulley having equal step diameters but inverted placement (see drawing below). We will assume the 4-step pulleys have step diameters of 2", 3", 4", and 5". Follow these steps to find the approximate spindle speeds:

1. Divide the diameter of the driving (or motor) pulley step by the corresponding step size of the pulley mounted on the drill press spindle:
 $2 \div 5 = 0.4$
 $3 \div 4 = 0.75$
 $4 \div 3 = 1.33$
 $5 \div 2 = 2.5$
2. Then, multiply the motor speed by the results of the above calculation to get the approximate spindle speed at each pulley step:
 $1725 \times 0.4 = 690 \text{ rpm}$
 $1725 \times 0.75 = 1293.75 \text{ rpm}$
 $1725 \times 1.33 = 2294.25 \text{ rpm}$
 $1725 \times 2.5 = 4312.5 \text{ rpm}$

