

Spinning Wheel Ratios

Most spinning wheels are equipped with the capability for different speeds, expressed as ratios. These usually take the form of different sizes of whorls on your bobbin or flyer. Knowing how to use the ratios available to you can make a big difference in your spinning speed, as well as helping you get the thickness and effect you would like.

What are spinning wheel ratios? Ratios are expressed as a pair of numbers and the higher the first number is the more revolutions the flyer makes for each turn of the drive wheel. So for every 1 revolution of the wheel's large drive wheel, the flyer and bobbin turn 5 times for a 5:1 ratio and 10 times for a 10:1 ratio. Different ratios are usually achieved with different sized whorls on the bobbin or flyer: the largest whorls are the slowest, turning the flyer fewer than 10 times per revolution of the drive wheel. The smallest whorls are the fastest, with ratios up to 20:1 or higher.

How to determine your spinning wheel ratios. If you have a new wheel, the ratios available should be included in the documentation. If you don't know what the ratios on your wheel are: tie a piece of bright yarn to one arm of your flyer and hold the flyer level. Turn the drive wheel so the crank is pointing straight up (12 o'clock). Then slowly turn the drive wheel once with your hand, counting the number of times the marked arm on the flyer turns -- note that partial revolutions count too! This number is your ratio. Repeat for each whorl on your wheel.

Ratios and twist. What impact do the various ratios actually have on your spinning? As you treadle, the flyer spins, sending twist into your drafting zone and turning it into yarn. The smaller the whorl you use, the higher the ratio and the faster twist travels into your yarn. To achieve the same amount of twist on a slower ratio (larger whorl), you would have to treadle more times and/or faster before allowing the section to wind onto the bobbin. Note that faster isn't always better, though!

When should I use a higher ratio? If you want a thinner, high-twist yarn, use a higher ratio (smaller whorl). This includes firm sock yarns and lace-weight yarn. Many spinning wheel manufacturers have high speed flyers with even smaller whorls for maximum twist and speed; these are usually marketed as 'lace' flyers. In general, thinner yarns need more twist to hold them together. Some fibres need more twist to hold them together than others: silk and slippery fibres that lack wool's 'grabby' cuticle need more twist so that they don't slide apart under tension. Shorter-stapled fibres such as cotton also need a lot of twist. Since you want lots of twist to go into your fibres quickly, use a higher ratio (smaller whorl) for these types of fibres.

When should I use a lower ratio? Use a lower ratio and larger whorl to spin a thicker yarn with a little less twist, such as soft singles. Bulkier yarns generally require less twist to hold together and less twist helps achieve a soft hand in the finished yarn. A lower ratio is also great for when you're learning to spin, trying out a new fibre or just want to take things a little slower.

Plying ratios. The ratio you use for plying will depend on what kind of effect you are looking for in your finished yarn. You can use a larger whorl/low ratio for softer singles that you then ply together tightly with a smaller whorl/higher ratio, or vice versa. Sample to get the yarn you want.

Twists Per Inch. The ratio between the drive wheel and the flyer determines the speed of the wheel and how many twists per inch (tpi) goes into the yarn. E.g. if you want to spin a medium yarn with 10 tpi, place the drive band in the groove of the whorl size closest to 10:1 and 1 revolution of the drive wheel will put 10 twists in one inch of the yarn. This means that, if you draft one inch of fibre and hold it for one revolution of the wheel before drafting another inch of fibre and letting the yarn wind onto the bobbin, you will consistently spin a 10 tpi yarn. If you wanted 5 tpi you would draft 2 inches of fibre to one wheel revolution. But if you treadle 2 revolutions in 2 inches, you will still be spinning a 10 tpi yarn. This is the way you control the amount of twist in the yarn.