



BSCTools ERD Rim Rods

Instructions

BSCTools ERD Rim Rods are available in 500mm and 700mm lengths. Supplied as pairs.

Thanks to **Adrian Emilsen** of Melody Wheels for putting together this guide.

We ship worldwide but our wheel building tools are also available from Melody Wheels in Australia:
<https://www.bicyclespokes.com.au/>

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What is the Effective Rim Diameter? And how do you measure it?

What is the Effective Rim Diameter (ERD)?

The Effective Rim Diameter (ERD) is the internal diameter of a rim, with the inclusion of the thickness of the rim wall and the portion of the nipple head that encases the spoke. Measuring ERD is critical for two reasons. 1) It is required for calculating accurate spoke lengths. 2) It allows you to ensure that the rim is round and suitable to be built into a wheel.

Why is it important to make your own ERD measurements?

ERD measurements are required to calculate accurate spoke lengths. ERD measurements are often published by rim manufacturers and recorded in online databases. It is, however, good practice to measure your rim's ERD prior to embarking on a new build. This is because variations between actual and published dimensions do occur, and also the definition of what ERD measures is not entirely consistent between rim manufacturers. It is also worth noting that wheel builders can have different preferences relating to a 'correct' or 'optimal' thread engagement in a nipple. So investing time in measuring ERD before you get started is time well spent.

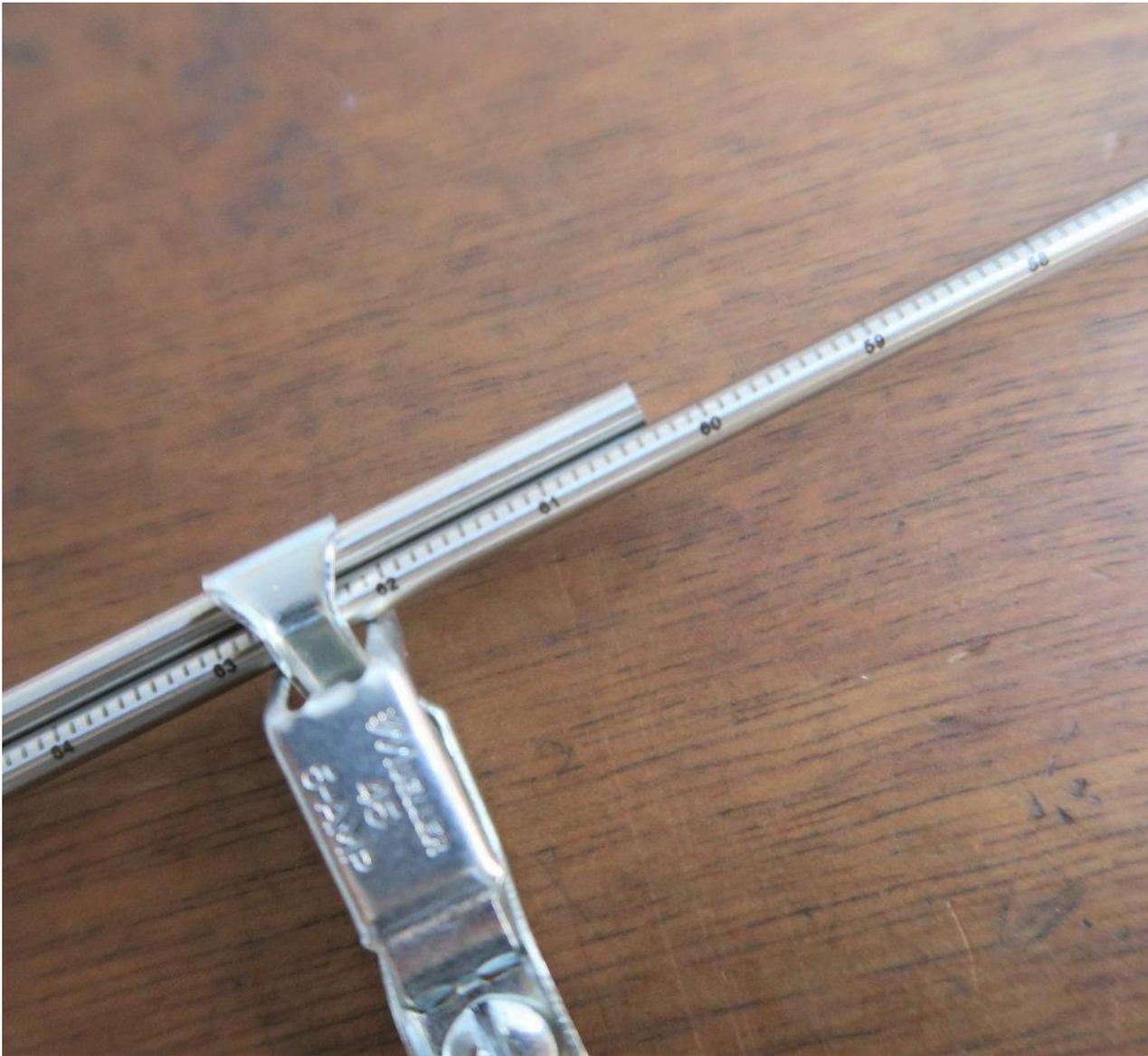
How to use the BSC ERD rods to Calculate ERD?

Firstly, measure the internal diameter of the rim along with the thickness of the rim wall (wheel builders call this the *Nipple Seat Diameter*). To do this, insert one BSC ERD rod into a spoke hole, then insert the second rod into the opposite spoke hole. Take care to ensure that the rods are located exactly opposite. Next, hold the ERD rods tautly together, clamp the rods in place if necessary, and note the marking on the rule where one rod terminates against the other. The scale is provided in millimetres on the BSC tool (with centimetre distances labelled). This is a good time to check the rim for roundness by moving the position of the ERD rods to different opposing rim holes.



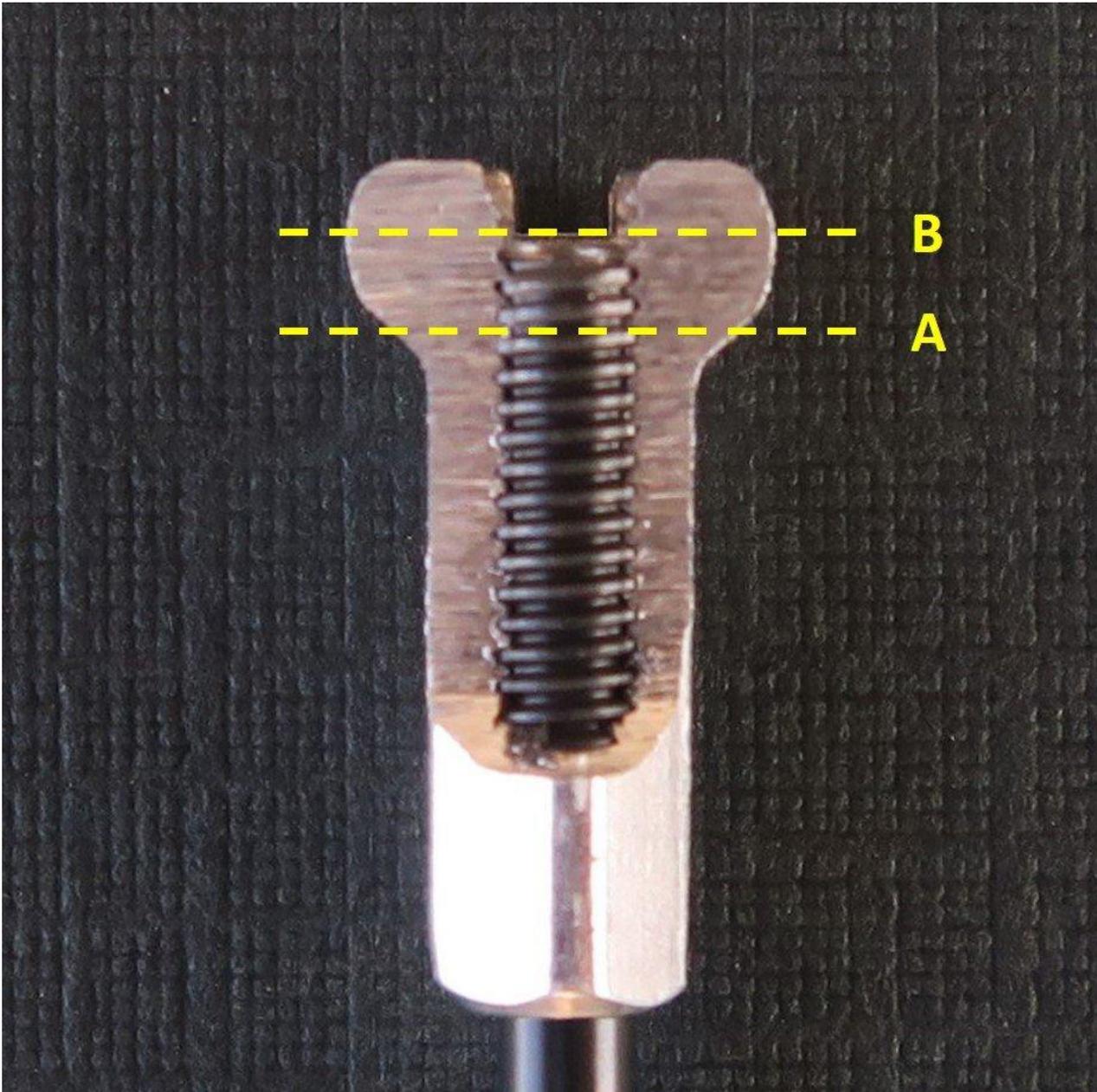
The BSC ERD Rim Rods shown correctly placed into the rim.

Please note the measurement marks on the BSC ERD rods are quite small. If you have difficulty reading them, you can use a ruler or callipers to measure the length of overlap. If using this approach, the nipple seat diameter will be the length of both rim rods (700mm for the BSC *large* tool and 500 mm for the BSC *small* tool) minus the rod overlap measurement. Using the two clamps provided will free your hands to make this measurement.



Close up of the BSC ERD Rim Rods at their termination. The reading on the scale bar (i.e. the Nipple Seat Diameter) is 603 mm.

Now you have the *Nipple Seat Diameter*, it is time to add an allowance for the small amount of spoke thread that sits inside the nipple head, and extends beyond the limit of the inner rim wall (we will call this the *Nipple Head Allowance*). In most cases a *Nipple Head Allowance* of 3.0 mm (1.5 mm for each side) is appropriate for regular 14 gauge nipples. So in the above example, the calculated ERD will be 606 mm (i.e. *Nipple Seat Diameter* (603 mm) + *Nipple Head Allowance* (3 mm))



The Nipple Head Allowance is the distance between dashed lines A and B. This typically accommodates about three threads across and measures around 1.5 mm.

The *Nipple Head Allowance* may need to be adjusted depending on the type of nipples used. For example different nipple gauges (such as 13G or 12G nipples), non-standard head-profiles (such as hex-head, double-square or Squorx), use of rim washers, or where a deeper nipple penetration (thread engagement) is desired. Conducting some sample measurements with the type of nipples that will be used is a good way to calculate any required adjustments.

A final word of caution on spoke lengths calculations

Calculating the ERD is an important measurement for accurate spoke length calculations, however there are many factors that need to be considered. Hub geometry, spoke elasticity, lacing patterns, and the choice of spoke length calculator, will affect the results. We like to use the following spoke length calculators.

<https://bikeschool.com/resources/spoke-calculator>

<https://www.wheelpro.co.uk/spokecalc/>