

1. Introduction

Welcome to wheel building with Berd Spokes! We are excited for you to try this exciting new technology, which offers superior performance to traditional metal spokes. Wheel building with Berd spokes is similar in many ways to building with metal spokes. The main differences are the way the hubs are laced and some parts of the tensioning process. While these steps are not difficult, they will take extra time at first. Practice will lead to more time-efficient wheelbuilding.

Berd spokes will stretch more than metal spokes during the wheelbuilding process. You can expect 5 to 7 mm of stretching as the spokes are brought up to tension. Because of this, Berd spokes will appear too short when when lacing the rim until tension is applied. Additionally, the spoke tension will decrease significantly over the first two days, so we have outlined the recommended process at the end of this manual. We hope you enjoy building with Berd spokes. Please contact us at any time for assistance.

Below are the contents of the builder's kit (required for building, available for purchase) and the consumables kit (included with each spoke order, free).

Berd Builder's Kit Contents



The corner rounding tool is used to remove sharp corners from J-bend hub holes.



The awl is used to open the spoke loop after pulling the loop through a hub hole.



The pulling tool is used to pull the wire loop and spoke through the hub hole.



The pushing tool is used to push the tangential insert onto the spoke.



The nipple wrench is used to turn the nipple when truing from the hub side of the rim.



The spoke holding tool is used to prevent spoke twisting while truing the wheel.

Berd Consumables Kit Contents



The grinding bit is used to remove sharp corners from radial straightpull hub holes or whenever the corner rounding tool is incompatible with a J-bend hub.



The polishing bit is used to polish hub holes after any corner rounding activity (i.e. corner rounding tool or grinding bit).



The wire loop is used to pull the spoke loop through the hub hole. It must be bent in half and the ends must be compressed to fit through the hub holes prior to use.



The rod is used to secure the loop in the hub after pulling the spoke through the hub hole - one rod is required for each spoke.



Berd wheel stickers should be applied after building to let everyone know the wheels were built with genuine Berd spokes.

1. Spoke length Calculation

Berd spoke lengths are different than metal spoke lengths. To calculate the correct lengths, our online spoke calculator must be used:

www.berdspokes.com/spoke-calculator

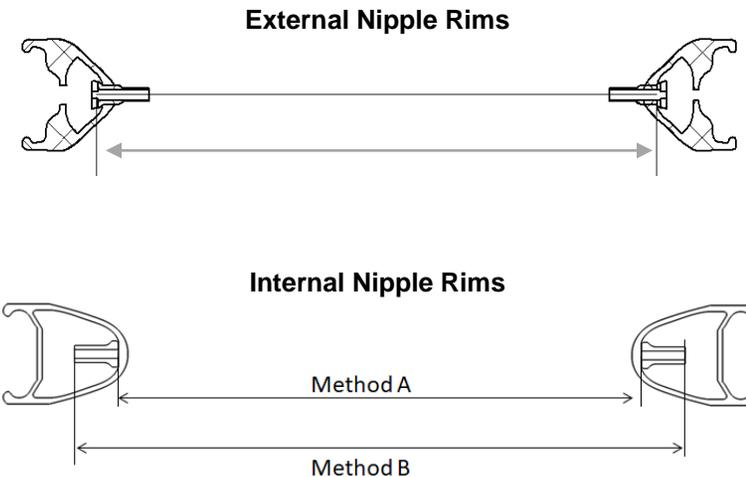
For external nipple rims:

- Measure to the distance between the bottom of the slot of standard 12mm external nipples on opposite sides of the rim [YouTube Video](#), **OR**
- Use Wheelsmith rim rods

For internal nipple rims:

- Method A: Measure the diameter of the internal spoke bed and add 18.5mm, **OR**
- Method B: Measure the distance between the ends of 10mm internal nipples on opposite sides of the rim and subtract 1.5mm.

Using other methods may result in an incorrect ERD and spokes that are the wrong length. Please measure ERD on **each** rim in multiple places and do not rely on manufacturer published values.



2. Hub Preparation

Standard hub machining leaves sharp corners which must be removed prior to installing Berd spokes. If not done properly, sharp corners can cause spoke fraying and wheels to go out of true.

For J-bend hubs:

- Use corner rounding tool (builder's kit), a polishing bit (consumables kit), and a drill to remove sharp corners from each side of each hub hole. [YouTube Video](#)

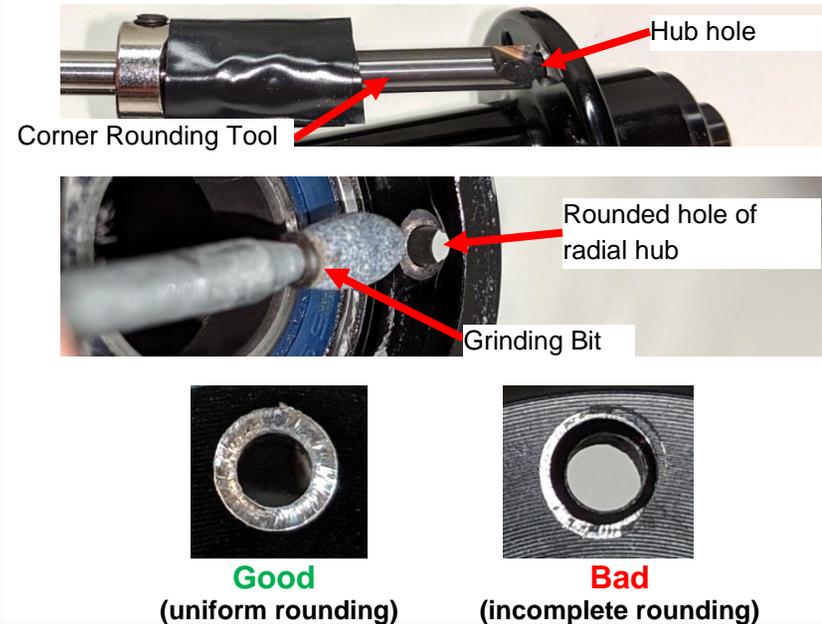
For tangential straightpull hubs:

- Install Berd tangential straightpull inserts (sold separately) when installing spokes (see step 3.2 below). No hub preparation required.

For radial straightpull hubs:

- Use the grinding bit and rubber bit (consumables kit) along with a power drill to round out and polish hub holes.

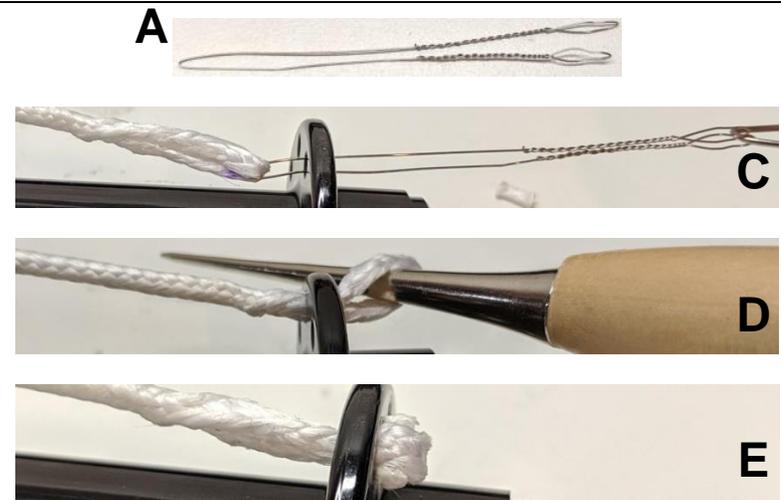
Hub preparation should leave a continuous, smooth surface as shown in the figure to the right. The area should appear silver and be polished with the polishing bit as seen in the 'good' figure to the right. In the 'bad' figure to the right, sharp corners can still be seen; the hole requires more work.



3.1 J-bend and radial straightpull hub lacing [YouTube Video](#)

Only lace hubs after hub modification (step 2) is complete

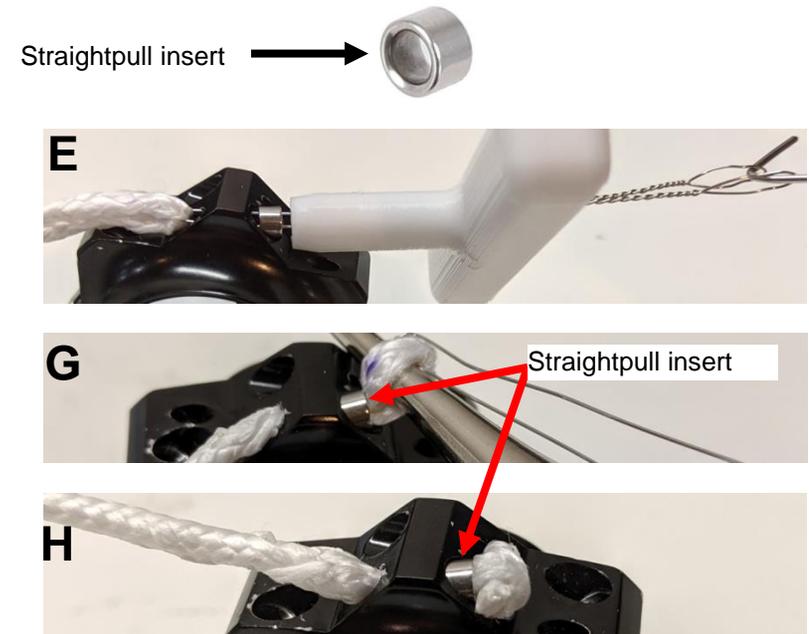
- Prepare a wire loop from the consumables kit by bending in half and flattening the ends to fit through the hub holes.
- Thread the wire loop through the spoke loop and pinch the spoke loop to hold the wire loop at the top, center position.
- Insert the wire loop through the hub hole and use the pulling tool (builder's kit) to pull the loop and spoke through the hole.
- Use the awl (builder's kit) to open the spoke loop and remove the wire loop.
- Insert the spoke rod into the spoke loop, and firmly pull the spoke to seat it into place. Check to make sure the rod is in the center of the spoke loop.



3.2 Tangential straightpull hub lacing [YouTube Video](#)

No hub modification is needed for tangential straightpull hub holes. However, if the back side of the hub hole is not tapered, use the grinding bit provided in the consumables kit with a power drill to remove the abrupt transition.

- Prepare a wire loop (consumables kit) by bending in half and flattening the ends to fit through a hub hole (see step 3.1, figure A).
- Thread the wire loop through the spoke loop and pinch the spoke loop to hold the wire loop at the top, center position.
- Insert the wire loop through the hub hole (see step 3.1, figure C).
- Place a tangential hub insert (sold separately) and the pushing tool (builder's kit) onto the wire loop.
- Use the pulling tool (builder's kit) to pull the loop and spoke through the hole.
- Use the pushing tool to push the insert fully onto the spoke loop and remove the pushing tool and pulling tool.
- Use the awl (builder's kit) to open the spoke loop and remove the wire loop.
- Insert the spoke rod into the spoke loop, and firmly pull the spoke to seat it into place. Check to make sure the rod is in the center of the spoke loop.



4. Rim lacing

Once hub lacing is complete, inspect all rods to make sure they are centered in the loop and the spokes are firmly seated. See 'good' and 'bad' figures to the right.

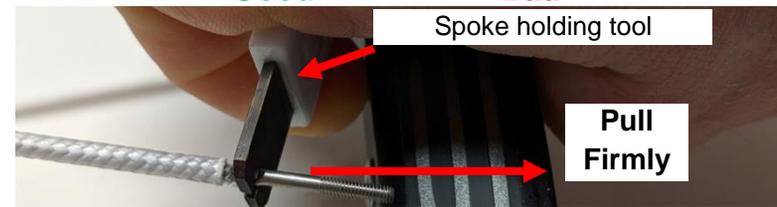
Begin lacing the spokes into the rim with the desired nipples. Self locking nipples such as Sapim Double Square Secure Lock are required. Only turn each nipple 2 full turns at first. This is important because Berd spokes start short and stretch as tension is increased. Adding more turns will make it difficult/impossible to complete lacing the rim. If lacing a spoke is still difficult, use the spoke holding tool (builder's kit) to pull on the spoke firmly to fully seat it in the hub and pull towards rim (see picture on right).



Good



Bad



5. Tensioning and truing [YouTube Video](#)

After lacing the spokes into the rim, confirm the lacing pattern and crosses.

- Because the nipples are only slightly engaged, start by turning each nipple three full turns using a park Tool SW-15. Use spoke holding tool to prevent twist.
- Recheck the rods and adjust as needed.
- Build measurable tension (1 - 5 on Park Tool TM-1) on all spokes, true the wheel, and get even tension on the spokes.
- Check the spokes for twist by looking down the length of the spokes.
- Tension the wheel to 100 kg (15 on a Park Tool) and dish properly.
- Check and equalize tension with a tension meter. True radially and laterally. Squeeze pairs of spokes and ensure the wheel remains true.

Wait overnight to allow tension to stabilize before proceeding to the next steps:

- Increase tension back to 100 kg (15 on a Park Tool meter) by first tightening the tight side (i.e., rear drive or front disc) to 100 kg then by tightening the other side to bring the wheel into proper dish.
- Check for equal tension and true radially and laterally. Squeeze pairs of spokes and ensure the wheel remains true.

Wait overnight again before the final truing steps:

- The tension will have stabilized to ~12 on a Park Tool meter. Inspect the wheels and make only very minor adjustments to equalize tension and true. If large adjustments are required, let the wheel sit another day.
- If Secure Lock nipples were not used for the build, add a drop of green Loctite to the tire side of each nipple.

Please contact sales@berdspokes.com with any questions.

