WCP Roller System - User Guide (Rev1)

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Guide Notes

This guide is designed to help teams use and integrate the WCP Rollers & Hubs into their robots. Please email support@wcproducts.net for any questions.

What is the WCP Roller System?

The WCP Roller system is a collection of parts in order to make unique rollers. Some goals of the system are:

1. Easy to Install
2. Least amount of effort to assemble
3. COTs solution that adapts to most FRC Games
4. Affordable & Versatile

This system is heavily modeled after the system FRC Team 254 used from 2014-2016.

1. Design Notes

The Following pages will explain tools needed to assemble the rollers and other various tidbits of information.

1.1 Tools Needed

To assemble and create rollers, Teams will need:

1. 3/16" Allen Wrench
    1. McMaster Carr P/N: 7122A22

2. Loctite GlueStick: Red 268
    1. McMaster Carr P/N: 1004A22
    2. Image Shown Below

Optional Tools For Assembly:

1. Arbor Press
2. 1.125 Reamer and or Drill (Recommended Purchase)
    1. McMaster Carr P/N: 3087A44 (Reamer, **will not fit in standard drill)**
    2. McMaster Carr P/N: 2933A44 or 8871A33 (Drill with 1/2" Shank)

1.2 Rollers & Hubs

The WCP System Consists of a few key components:

1. Hubs for Roller Tubing are designed to be a **tight press fit (same size as a FR8 standard bearing)**. If teams would like a looser fit they can either finish the tubing via a 1.125" Reamer or purchase a 1.125" step drill or Drill. Below are part numbers available on the WCP site for purchase for hubs:
    1. WCP-0101: WCP Roller Plug - 1/2" Hex Straight
    2. WCP-0102: WCP Roller Plug - 1/2" Hex w/ 5/16-18 Threaded Hole
    3. WCP-0103: WCP Roller Plug - Plain w/ 5/16-18 Threaded Hole

2. Shoulder bolts are required for most setups, they are used so teams can install and remove rollers with ease. When using shoulder bolts teams will either need to apply red loctite mentioned in section 1.1 or use shoulder bolts with a Nylon Patch. The WCP shoulder bolts **DO NOT** come with a Nylon Patch. This is to keep costs down for teams. It is recomended to ensure that shoulder bolts are tight and have some form of glue to keep them from vibrating out.
    1. WCP-0106: WCP Roller Shoulder Bolt (2-Pack)

3. 3/8" Round Bearings are an integral part and are used with the shoulder bolts. Note, a **flanged bearing** is recommended and available for purchase through the WCP site. This can be purchased from VEXpro as well.
    1. 217-2733: Flanged Bearing - 3/8" Round ID x 0.875" OD

4. Plates for mounting the rollers are available through the WCP site. End and Center plates are available which allow for two different mounting options. Both mounting plates are compatible with the VersaFrame system.
    1. WCP-0104: WCP Roller End Plate (2-Pack)
    2. WCP-0105: WCP Roller Center Plate (2-Pack)

Hub Design

The hubs are designed to be a **tight press fit** into the tubing. The tubing is normal tubing and has a very wide tolerance. If teams would like a looser and or slip fit of the hub. Simply take a 1.125" reamer and ream the tube or use a 1.125 drill/step drill. This will allow for a loose fit and teams can then use the tapped holes to secure the the hub to the tube. We

recommended teams use a #10-32 x .25"-.375" Long bolt to interface the the hub to the tube. We **DO NOT** recommend the use of a hammer to insert the plugs

Roller Material for the 1.25" Tube

The 1.25" OD Tube is not designed to be grippy or to move objects by itself. We recommend a few components below:

1. Mcmaster Carr - PolyUrethane Tubing with a 1" ID (Note this is a stretch Fit and will require lubrication or compressed air)
    1. https://www.mcmaster.com/#standard-polyurethane-hollow-tubing/=15rfnc6

2. McMaster Carr - Latex Tubing with a 1" ID (Note this is a stretch Fit and will require lubrication or compressed air)
    1. https://www.mcmaster.com/#latex-tubing/=15rfntt

3. VEXpro Wedgetop and RoughTop Tread
    1. http://www.wcproducts.net/wheel-tread

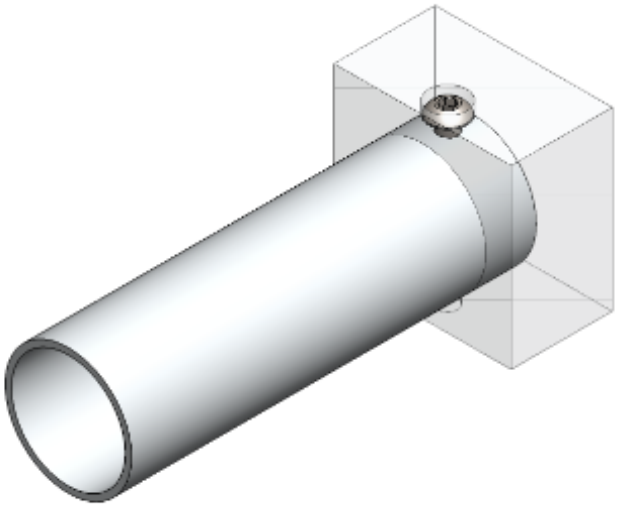
1.3 Drilling Holes in the Tube

Drilling the Holes Properly to line up the Tube with the Hub

The task of making the holes in the tube for the hubs to line up may seem like a tough task. In order to make this easier we have created a 3dprintable or machinable jig as shown below. The Jig and example will be posted under the Roller & Hubs -> Tech Specs -> Documents and Downloads. To use the Jig:

1. Print or Machine the Jig, teams will need to tolerance and adjust the jig depending on what they have inhouse.
2. Clamp the jig to the table of a drill press, chuck a .196 or center drill into the drill press.
3. Place the tube until it hits the back stop of the jig
4. Drill the hole or centerdrill.
5. Flip the jig and place a bolt on the couterbore side. This will locate the tube such that the other hole will be 180 degrees. Teams can thread the hole so that the bolt does not pop back out and holds the tube in place slightly better.
6. Repeat Steps 3-4 for 2nd Hole.

Note: We recommend using a bolt or some thing the same diameter as the hole to help align it. In our example we use a #10-32 x .250" Bolt. Also, we recommend the top of the hole to be between .196 to .22. The tighter the hole, the harder to align.



2. Possible Implementations

The next few pages will show various ways to setup rollers.

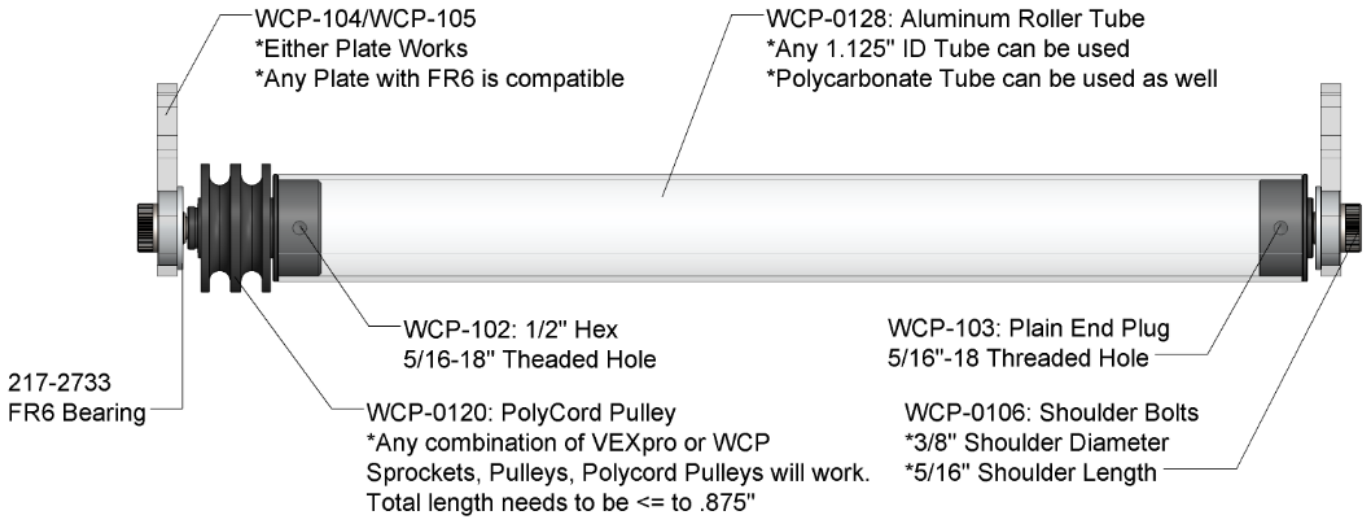
2.1 Roller Example #1

Notes:

1. The tube needs some grip material added to it. Please look under Section 1.2 to see some suggested options.
2. Each Shoulder bolt will need red loctite applied to it, please look under Section 1.2 for suggested p/n.

Design Information:

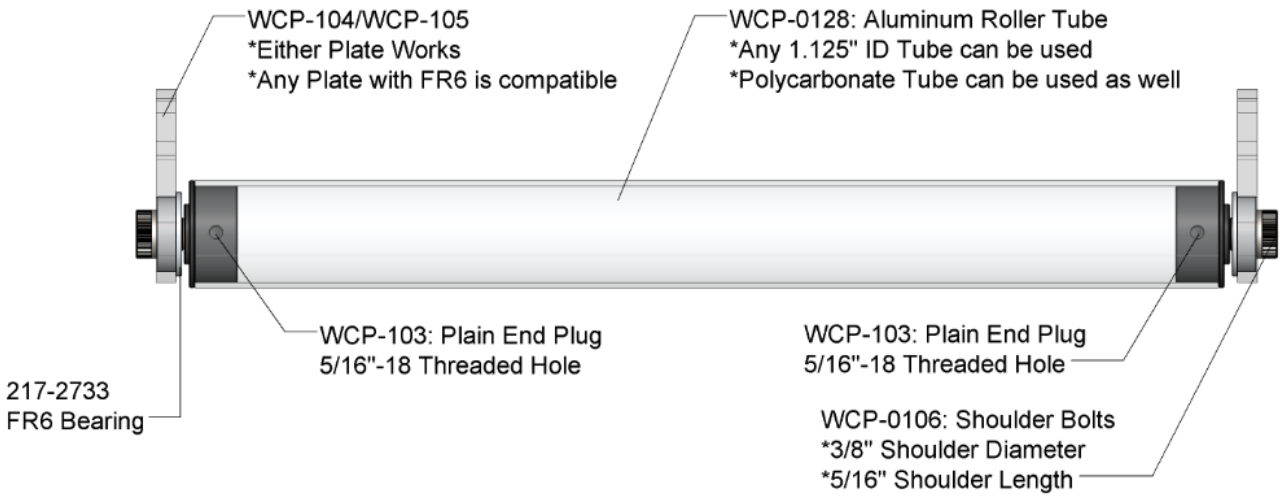
1. This setup allows teams to drive a roller via pulleys, sprockets and polycord pulleys. Teams can use multiple sprockets and or pulleys, the key trick here is to use parts no longer than .875" combined length.
    1. Example: Team 1323 would like to use 2 Vexpro 18T sprockets. Each sprocket is .361" Wide. The total combined width for two sprockets is .722" wide. This is acceptable and will fit on the WCP-0102 plug.



2.2 Roller Example #2

Notes:

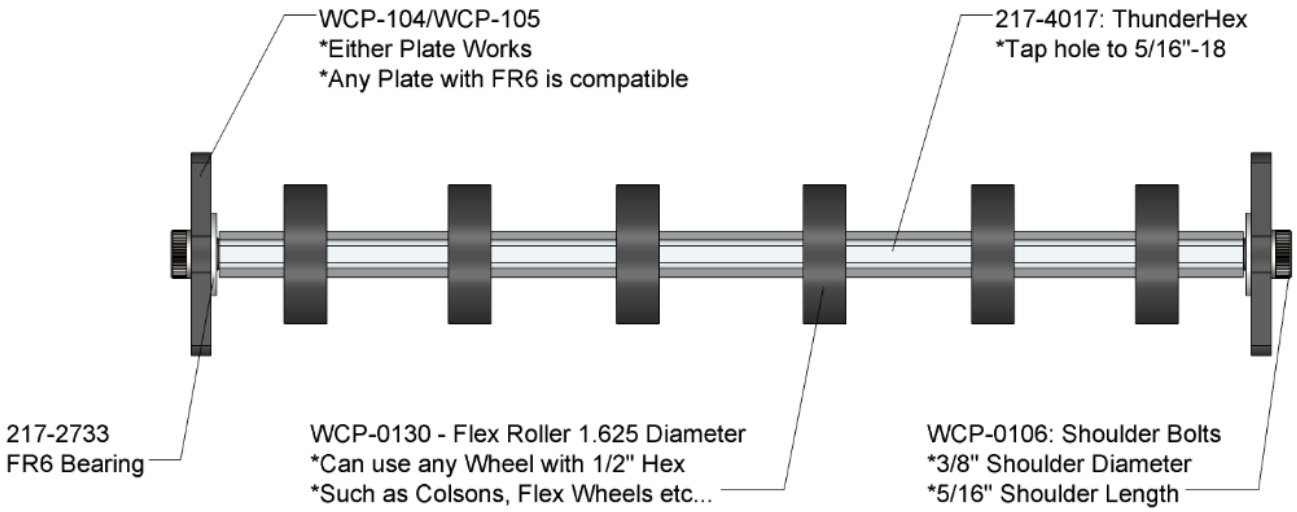
1. The tube needs some grip material added to it. Please look under Section 1.2 to see some suggested options.
2. Each Shoulder bolt will need red loctite applied to it, please look under Section 1.2 for suggested p/n.



2.3 Roller Example #3

Notes:

1. The hex can accept any sort of 1/2" hex roller wheel
2. Teams can use surgical tubing or polyurethane sleeves over the 1/2" hex as well.
3. Each Shoulder bolt will need red loctite applied to it, please look under Section 1.2 for suggested p/n.



2.4 Roller Example #4

Notes:

1. The tube needs some grip material added to it. Please look under Section 1.2 to see some suggested options.
2. This setup does not require shoulder bolts and teams can use either 1/2" Hex or 1/2" ThunderHex.
3. It is suggested to use the hex plug on one side only and do use a bearing on the other side. This is recommended to keep costs down and to make it easier to line up.