SRAM® LLC WARRANTY

EXTENT OF LIMITED WARRANTY

Except as otherwise set forth herein, SRAM warrants (i) Zipp® MOTO™ Rims to be free from defects in materials or workmanship for the lifetime of the product, and (ii) its other products to be free from defects in materials or workmanship for a period of two years after original purchase. This warranty only applies to the original owner and is not transferable. Claims under this warranty must be made through the retailer where the bicycle or the SRAM component was purchased. Original proof of purchase is required. Except as described herein, SRAM makes no other warranties, guaranties, or representations of any type (express or implied), and all warranties (including any implied warranties of reasonable care, merchantability, or fitness for a particular purpose) are hereby disclaimed.

LOCAL LAW

This warranty statement gives the customer specific legal rights. The customer may also have other rights which vary from state to state (USA), from province to province (Canada), and from country to country elsewhere in the world.

To the extent that this warranty statement is inconsistent with the local law, this warranty shall be deemed modified to be consistent with such law, under such local law, certain disclaimers and limitations of this warranty statement may apply to the customer. For example, some states in the United States of America, as well as some governments outside of the United States (including provinces in Canada) may:

a. Preclude the disclaimers and limitations of this warranty statement from limiting the statutory rights of the consumer (e.g. United Kingdom).

b. Otherwise restrict the ability of a manufacturer to enforce such disclaimers or limitations.

FOR AUSTRALIAN CUSTOMERS:

This SRAM limited warranty is provided in Australia by SRAM LLC, 1000 W. Fulton Market, 4th Floor, Chicago, IL, 60607, USA. To make a warranty claim please contact the retailer from whom you purchased this SRAM product. Alternatively, you may make a claim by contacting SRAM Australia, 6 Marco Court, Rowville 3178, Australia. For valid claims SRAM will, at its option, either repair or replace your SRAM product. Any expenses incurred in making the warranty claim are your responsibility. The benefits given by this warranty are additional to other rights and remedies that you may have under laws relating to our products. Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

LIMITATIONS OF LIABILITY

To the extent allowed by local law, except for the obligations specifically set forth in this warranty statement, in no event shall SRAM or its third party suppliers be liable for direct, indirect, special, incidental, or consequential damages.

LIMITATIONS OF WARRANTY

This warranty does not apply to products that have been incorrectly installed, adjusted, and/or maintained according to the respective SRAM user manual. The SRAM user manuals can be found online at sram.com, quarq.com, or zipp.com.

This warranty does not apply to damage caused by a crash, impact, abuse of the product, non-compliance with manufacturers specifications of usage or any other circumstances in which the product has been subjected to forces or loads beyond its design.

This warranty does not apply when the product has been modified, including, but not limited to any attempt to open or repair any electronic and electronic related components, including the motor, controller, battery packs, wiring harnesses, switches, and chargers.

This warranty does not apply when the serial number or production code has been deliberately altered, defaced or removed.

This warranty does not apply to damage to Zipp MOTO Rims outside of intended use (Trail/Enduro) situations or incurred in connection with Downhill/Dual Crown bicycles.

All Zipp MOTO Rim warranty claims will be evaluated by a SRAM/Zipp Authorized Service Location.

This warranty does not apply to normal wear and tear. Wear and tear parts are subject to damage as a result of normal use, failure to service according to SRAM recommendations and/or riding or installation in conditions or applications other than recommended.

WEAR AND TEAR PARTS ARE IDENTIFIED AS:

- Dust seals
- Bushings
- Air sealing o-rings
- Glide rings
- Rubber moving parts
- Foam rings
- Rear shock mounting hardware and main seals
- Upper tubes (stanchions)
- Stripped threads/bolts (aluminium, titanium, magnesium or steel)
- Brake sleeves
- Brake pads
- Chains
- Sprockets
- Cassettes
- Shifter and brake cables (inner and outer)
- Handlebar grips
- Shifter grips
- Jockey wheels
- Disc brake rotors
- Wheel braking surfaces
- Bottomout pads
- Bearings
- Pawls
- Transmission gears
- Spokes
- Free hubs
- Aero bar pads
- Corrosion
- Tools
- Motors
- Batteries
- Driver Bodies

Notwithstanding anything else set forth herein, the battery pack and charger warranty does not include damage from power surges, use of improper charger, improper maintenance, or such other misuse.

This warranty shall not cover damages caused by the use of parts of different manufacturers.

This warranty shall not cover damages caused by the use of parts that are not compatible, suitable and/or authorised by SRAM for use with SRAM components.

This warranty shall not cover damages resulting from commercial (rental) use.
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SAFETY FIRST!

We care about YOU. Please, always wear your safety glasses and protective gloves when servicing SRAM® products. Protect yourself! Wear your safety gear!
# Rim and Wheel Building Specifications

## 3ZERO MOTO

<table>
<thead>
<tr>
<th>Spec</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Recommended System Weight (Bike, Rider, and Equipment)</td>
<td>250 lbs / 120 kg</td>
</tr>
<tr>
<td>Max Tire Pressure</td>
<td>4.5 bar / 65 psi</td>
</tr>
<tr>
<td>Washers¹</td>
<td>Sapim HM</td>
</tr>
<tr>
<td>Spoke Count</td>
<td>32H</td>
</tr>
<tr>
<td>Replacement Spoke Length with MOTO Hubs</td>
<td><em>(27.5”) 280 mm REAR DS 282 mm FRONT DS AND REAR NDS 284 mm FRONT NDS (29”) 300 mm FRONT AND REAR DS 302 mm FRONT AND REAR NDS</em></td>
</tr>
<tr>
<td>Spoke Length for all other Hubs</td>
<td>When calculating spoke lengths, use the longest possible spoke length for your configuration.</td>
</tr>
<tr>
<td>Effective Rim Diameter (ERD)</td>
<td><em>(27.5”) 579 mm; 581 mm with washers (29”) 617 mm; 619 mm with washers</em></td>
</tr>
<tr>
<td>Minimum Spoke Gauge</td>
<td>2.0 mm / 1.65 mm / 2.0 mm</td>
</tr>
<tr>
<td>Recommended Spoke Pattern</td>
<td>3X</td>
</tr>
<tr>
<td>Recommended Spoke Tension</td>
<td>115 ±10 Kgf for the Front wheel non-drive side and Rear drive side. The tension for the other side is achieved by truing and centering the wheel.</td>
</tr>
<tr>
<td>Rim Profile</td>
<td>Front: Short Side toward drive side</td>
</tr>
</tbody>
</table>

¹Provided washers are required for use with 3ZERO MOTO when building a wheel

Not recommended for use with non-Boost hubs, i.e. 15X100, 12X142, or narrower hubs

Not recommended for use with split head nipples where the spoke does not assemble the entire length of the split portion of the nipple
**Front Hub Service**

We recommend that you have your ZIPP® wheels and hubs serviced by a qualified bicycle mechanic. Servicing ZIPP products requires knowledge of wheel components, as well as the use of specialized tools and lubricants.

Visit [www.zipp.com](http://www.zipp.com) for the latest ZIPP® Spare Parts catalog and technical information. For order information, please contact your local ZIPP distributor or dealer.

For recycling and environmental compliance information, please visit [www.sram.com](http://www.sram.com).

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**Component Removal**

Prior to service, remove the wheels from the bicycle according to the bicycle manufacturer's instructions and thoroughly clean the exterior of the product to avoid contamination of internal sealing part surfaces.

For additional information about ZIPP wheels and hubs, user manuals are available at [www.ZIPP.com](http://www.ZIPP.com).

**Parts, Tools, and Supplies**

<table>
<thead>
<tr>
<th>Parts</th>
<th>ZIPP Tools</th>
</tr>
</thead>
</table>
| • WHEEL BEARING KIT - FRONT - ZM1  
  Includes: (2) 23327 (23mm x 32mm x 7mm) | • ZIPP BEARING PRESS TOOL 23X32X7, FRONT HUB - ZM1 |

**Safety and Protection Supplies**

- Apron
- Clean, lint-free shop towels
- Nitrile Gloves

**Lubricants and Fluids**

- Isopropyl alcohol
- SRAM Butter grease

**Bicycle Tools**

- Park Tool® AV-5 Axle and Spindle Vise Insert
- Wheels Manufacturing® Press-1 Sealed Bearing Press Tool
- Sealer Bearing Puller with

**Common Tools**

- Bench vise
- Flat blade screwdriver

**SAFETY INSTRUCTIONS**

Always wear nitrile gloves when working with bicycle grease.
Exploded View - Front Hub

Front Hub End Caps

<table>
<thead>
<tr>
<th>Drive Side</th>
<th>Non-Drive Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thru Axle 15 mm x 100 mm</td>
<td>Thru Axle 15 mm x 100 mm</td>
</tr>
<tr>
<td>15mm x 110 mm (Torque Cap)</td>
<td></td>
</tr>
</tbody>
</table>

End Cap
Bearing
Axle
Hub Shell
Bearing
End Cap
NOTICE
Before beginning service, thoroughly clean the exterior of the product to avoid contamination of internal sealing part surfaces. When cleaning parts use isopropyl alcohol and a clean lint-free shop towel unless instructed otherwise.

End Cap Replacement

1. Clamp the Park Tool® AV-5 Axle and Spindle Vise tool into a vise. Clamp the flat edge of the end cap into the 36/14 slot of the AV-5 tool and pull up on the wheel. Repeat to remove the other end cap.

2. Press the end caps onto the axle.
Front Hub Bearing Removal

1. Clamp the Park Tool® AV-5 Axle and Spindle Vise tool into a vise. Clamp the flat edge of the end cap into the 36/14 slot of the AV-5 tool and pull up on the wheel. Repeat to remove the other end cap.

2. Use a soft face mallet to remove the axle and bearing from the hub. Remove the bearing from the axle and discard the bearing. Insert the axle through the open end of the hub. Use a soft face mallet to tap the axle and remove the second bearing. Remove the bearing from the axle and discard the bearing.

3. Clean the bearing bores with a shop towel.
Apply a thin layer of SRAM® Butter grease to the bearing bores on each side of the hub.

Install a new bearing (23327) into the non-drive side of the hub. *Bearings are symmetrical. Bearing orientation is not critical.*

Slide a SRAM Bearing Press 23327 tool onto the Press Tool threaded rod. Insert the threaded rod through the drive side of the hub shell. Slide the second SRAM Bearing Press 23327 tool onto the threaded rod.

Thread the Press Tool handle onto the threaded rod.

Turn the handle clockwise to press the bearing into the hub until it is hand-tight.

Do not overtighten the bearing.

Remove the tools.

Insert the axle through the drive side of the hub.
Install a new bearing (23327) onto the drive side end of the axle. 
*Bearings are symmetrical. Bearing orientation is not critical.*

Slide a SRAM™ Bearing Press 23327 tool onto the Press Tool threaded rod. Insert the threaded rod of the through the non-drive side of the hub shell. Slide the second SRAM Bearing Press 23327 tool onto the threaded rod.

Thread the Press Tool handle onto the threaded rod.

Turn the handle clockwise to press the bearing into the hub until it is hand-tight.

Do not overtighten the bearing.

Remove the tools.

**NOTICE**

To prevent damage when pressing the bearings into the front hub, make sure that the bearing press tools contact both the inner and outer bearing races, and not the hub shell.

Applying excessive force while installing the second bearing may result in damage to one or both bearings.

Press the end caps onto the axle.
Rear Hub and Driver Body Service

We recommend that you have your ZIPP® wheels and hubs serviced by a qualified bicycle mechanic. Servicing ZIPP products requires knowledge of wheel components, as well as the use of specialized tools and lubricants.

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Component Removal

Prior to service, remove the wheels from the bicycle according to the bicycle manufacturer's instructions and thoroughly clean the exterior of the product to avoid contamination of internal sealing part surfaces.

For additional information about ZIPP wheels and hubs, user manuals are available at [www.ZIPP.com](http://www.ZIPP.com).

Parts, Tools, and Supplies

Parts

- ZIPP WHEEL BEARING KIT - REAR - ZM1
  - (1) 6903 (17 mm x 30 mm x 7 mm)
  - (1) 63803 (17 mm x 28 mm x 7 mm)
- ZIPP WHEEL DRIVER BODY KIT - ZM1 - XD
- or
- ZIPP WHEEL DRIVER BODY KIT - 9/10 SPEED - ZM1

Safety and Protection Supplies

- Apron
- Clean, lint-free shop towels
- Nitrile Gloves
- Cotton Swabs

Lubricants and Fluids

- Isopropyl alcohol
- SRAM Butter grease

Common Tools

- Bench vise
- Flat blade screwdriver
- Plastic mallet
- Pick or tweezers

ZIPP Tools

- ZIPP BEARING PRESS TOOLS 6903/63803D28, REAR HUB - ZM1

Bicycle Tools

- Park Tool® AV-5 Axle and Spindle Vise Insert
- Wheels Manufacturing® Press-1 Sealed Bearing Press Tool
  - 6804 Bearing Press Adapter from Press-1 Kit
- Sealed Bearing Puller with 17 mm slotted attachment

SAFETY INSTRUCTIONS

Always wear nitrile gloves when working with bicycle grease.
Exploded View - Rear Hub

Rear Hub End Caps

<table>
<thead>
<tr>
<th>Thru Axle 12 mm x 142 mm/148 mm</th>
<th>Thru Axle 12 mm x 142 mm/148 mm XD</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Drive Side" /></td>
<td><img src="image2" alt="Drive Side" /></td>
</tr>
<tr>
<td><img src="image3" alt="Non-Drive Side" /></td>
<td><img src="image4" alt="Non-Drive Side" /></td>
</tr>
</tbody>
</table>
Rear Hub Bearing Removal

1. Pull outward on the driver body to remove the drive side end cap and driver body. Removal is the same for both XD and 10 speed driver bodies.

2. Remove the spacer tube from the axle.

3. Clamp the non-drive side end cap into the #5 slot of the Park Tool® AV-5 Axle and Spindle Vise, and pull up on the wheel to remove the non-drive side end cap.

4. Use a soft face mallet to tap the axle through the drive side of the hub and remove the non-drive side bearing and axle.
5 Insert the non-drive side of the axle through the non-drive side of the hub.

Use a soft face mallet to tap the axle through the non-drive side of the hub and remove the drive side bearing.

6 Clean the ratchet ring and hub internals with isopropyl alcohol, a shop towel, and cotton swabs. Do not remove the ratchet ring.

Set the rear hub aside until the driver body service is complete.
Driver Body Bearing Removal

10-Speed Driver Body Only: Use a small flat blade screwdriver to lift up the notched edge of the circlip, and remove the circlip from the driver body.

**CAUTION**
The circlip has sharp edges and can cause eye injury if it rapidly ejects from the driver body. Wear safety glasses.

2 Use a pick or tweezers to remove the pawls and leaf springs from the driver body.

3 Remove the driver body seal from the driver body.
Insert the 17 mm Bearing Puller slotted attachment through the outboard bearing. Align the slotted attachment with the bottom of the bearing, and expand it inside the bearing. Do not over tighten the slotted attachment. For more detailed assembly and usage, see the bearing puller manufacturer’s instructions. Thread the rod of the bearing puller into the attachment. Grip the slide hammer and forcefully pull away from the slotted attachment to remove the bearing from the driver body.

Remove the ID (inside diameter) spacer tube and the OD (outside diameter) spacer tube.
6 Insert the non-drive side end of the axle through the non-drive side of the driver body. Use a soft head mallet to tap the axle and the inboard bearing through the inboard and outboard bearing bores to remove the bearing.

7 Clean the driver body and pawl pockets with a shop towel and cotton swabs.
**Driver Body Bearing Installation**

**NOTICE**

To prevent damage when pressing the bearings into the driver body, make sure that the bearing press tool contacts both the inner and outer bearing races.

1. Apply a thin layer of SRAM® butter grease to the bearing bores.

2. Install a new bearing into the drive side of the driver body.
   
   *Bearings are symmetrical. Seal color orientation is not critical.*

3. Slide a 6804 bearing press adapter onto the threaded rod of the Bearing Press Tool. Insert the threaded rod through the non-drive side of the driver body. Slide the SRAM 63803 Bearing Press Tool onto the threaded rod.
   
   Thread the bearing press handle onto the threaded rod.
   
   Turn the handle clockwise to press the bearing past the outboard bearing bore and into the inboard bearing bore until it is hand-tight.
   
   Do not overtighten the bearing.
   
   Remove the bearing press tool.

**NOTICE**

The bearing must be pushed through the outboard bearing bore and seated into the inboard bearing bore.
4. Insert the OD spacer tube followed by the ID spacer tube into the driver body through the drive side.

5. Align the ID spacer tube with the inside race of the previously installed bearing. Install a new bearing into the drive side of the driver body. Bearings are symmetrical. Seal orientation is not critical.

6. Slide a 6804 bearing press adapter onto the threaded rod of the Bearing Press Tool. While holding the driver body vertically, insert the threaded rod through the non-drive side of the driver body. Slide the SRAM 63803 Bearing Press Tool onto the threaded rod.

   **NOTICE**
   The ID spacer tube can be crushed during bearing installation if it is not aligned with the inside race of each bearing. Hold the driver body vertically and press the bearing into the driver body to prevent the ID spacer tube from shifting side-to-side.

   Applying excessive force while installing the second bearing may result in damage to one or both bearings.

   **CAUTION**
   The circlip has sharp edges and can cause eye injury if it springs from the driver body. Wear safety glasses.

   9/10-Speed Driver Body Only: Use a small flat blade screwdriver to seat the circlip into the groove just above the drive side bearing.
8 Use your fingers to press the driver body seal, with the groove facing up, over the leaf spring and pawl carrier.

9 Using a grease syringe, apply a small amount of SRAM® Butter grease to the pawl pockets.

10 Insert the leaf springs into the spring slots. Orient the long edge of each spring along the inside of the carrier so that it points clockwise.

11 Insert the pawls into the pawl slots. You may need to use a pick or flat blade screwdriver to compress each leaf spring to assist with inserting the pawls. Orient the cambered edge (the edge that is slightly more curved) of each pawl along the outside of the carrier so that it points counter-clockwise.
Rear Hub Bearing Installation

NOTICE
To prevent damage when pressing the bearings into the rear hub, make sure that the bearing press tool contacts both the inner and outer races of the bearing.

1. Apply a thin layer of SRAM™ Butter grease to the bearing bores on either side of the hub.

2. Install a new bearing into the drive side of the hub. 
   *Bearings are symmetrical. Seal orientation is not critical.*

3. Slide a SRAM 63803 bearing press tool onto the threaded rod Bearing Press Tool. Insert the threaded rod through the non-drive side of the hub shell. Slide the SRAM 6903 Bearing Press Tool onto the threaded rod.
   - Thread the bearing press handle onto the threaded rod.
   - Turn the handle clockwise to press the bearing into the hub until it is hand-tight.
   - Do not overtighten the bearing.
   - Remove the bearing press tool.

4. Insert the drive side of the axle through the non-drive side of the hub.
5 Install a new bearing over the axle and into the non-drive side of the hub.

6 Slide a SRAM® 6903 bearing press tool onto the threaded rod of the Bearing Press Tool. Insert the threaded rod of the bearing press through the drive side of the hub shell. Slide the SRAM 63803 Bearing Press Tool onto the threaded rod.

Thread the bearing press handle onto the threaded rod.

Turn the handle clockwise to press the bearing into the hub until it is hand-tight.

Do not overtighten the bearing.

Remove the bearing press tool.

**NOTICE**

Applying excessive force while installing the second bearing may result in damage to one or both bearings.

7 Use the SRAM Butter grease syringe to dispense 1 gram of grease onto the ratchet ring.

8 Install the spacer tube onto the axle.
Install the driver body onto the axle and twist it counter-clockwise to seat the driver body and driver body seal.

Make sure the driver body seal is fully seated into the seal groove.

*The installation process is the same for 9/10 speed and XD™ driver bodies.*

Make sure both axle ends are dry and free of grease.

**XD Driver Body:** Press the end cap labeled XD™ onto the drive side axle end.
Press the remaining end cap onto the non-drive side axle end.
Installation is the same for both thru axle and quick release end caps.

**NOTICE**

The XD end cap must be installed onto the XD driver body.
## Rim Strip and Tubeless Tape Installation

We recommend that you have your ZIPP® wheels and hubs serviced by a qualified bicycle mechanic. Servicing ZIPP products requires knowledge of wheel components, as well as the use of specialized tools and lubricants.

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### Parts, Tools, and Supplies

<table>
<thead>
<tr>
<th>Parts</th>
<th>Bicycle Tools</th>
<th>Common Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zipp MOTO rim strip</td>
<td>Plastic tire lever</td>
<td>Scissors</td>
</tr>
<tr>
<td>Tubeless tape</td>
<td>Wheel truing stand</td>
<td>Small flashlight</td>
</tr>
<tr>
<td>Safety and Protection Supplies</td>
<td></td>
<td>Small knife</td>
</tr>
<tr>
<td>Apron</td>
<td></td>
<td>Screwdriver</td>
</tr>
<tr>
<td>Clean, lint-free shop towels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrile Gloves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubricants and Fluids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isopropyl alcohol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRAM Butter grease</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SAFETY INSTRUCTIONS

Always wear nitrile gloves when working with bicycle grease.
Rim Strip Installation

1. Remove any existing valve stem, rim strip, and tubeless tape from the rim. Install the wheel into a truing stand. Thoroughly clean the rim with isopropyl alcohol and a clean rag. Make sure that the rim is dry and free of alcohol.

2. Align the valve hole in the rim strip with the valve hole of the rim. The printed side of the rim strip should face the rim with the smooth non-printed side facing away.

**NOTICE**

It may be helpful to insert a round screwdriver into the valve hole to help hold the rim strip in place. Be careful to not damage the rim when inserting the screwdriver.

A plastic tire lever can be used to help pull the rim strip onto the rim.

Install the rim strip onto the rim, making sure it is centered in the channel and all spokes are covered.
1. Install the wheel into a truing stand. Apply the beginning section of tape between the two spoke holes that are 180 degrees opposite from the valve stem hole. Press 4-5 inches (10-13 cm) of tape into the channel of the tire bed.

2. Apply tension to the tape and rotate the wheel away from you until there are 2 complete layers of tape on the rim.

3. Cut the tape approximately 2 inches beyond the starting edge. Working around the circumference of the rim, press the tape into the edges of the rim with a plastic tire lever and the center of the rim with your finger, finishing at the cut edge of the tape.

**NOTICE**

- Do not use a tire lever to press the tape into the center channel of the rim. The spoke nipples can damage the tape causing air to leak.

- The tubeless tape must be seated into the channel to create an air tight seal. If the tape is not seated into the channel, the tire may leak air.
Valve Stem Installation

1. Shine a flashlight through the rim to illuminate the valve stem hole. Use a small knife to cut the tape from the valve stem hole.

2. Insert the valve stem through the rim.

**NOTICE**
For TyreWiz valve stems, please check that the o-rings are still in position after installation of the valve into the rim.

There are 2 MOTO valve stem designs:
- **Symmetrical Valve Block**: Install the Presta valve with the angled edges of the valve block parallel to the rim.
- **Asymmetrical Valve Block**: Install the valve so the profile of the rubber block matches the profile of the center channel of the rim.

Rear wheel: The steeper angle (A) is on the non-drive side.
Front wheel: the shallow angle (B) is on the non-drive side.
3 TyreWiz only: apply grease to the valve stem o-rings.

**NOTICE**

TyreWiz must not be installed onto the valve during sealant installation. Refer to the TyreWiz User Manual for detailed sealant installation instructions.

Install TyreWiz onto the valve stem and onto the rim. The profile of the rubber bumper should match the profile of the rim.

4 Install an o-ring onto the valve stem.

Thread the nut, with the recessed side facing the rim, onto the valve stem until it is finger tight.

**NOTICE**

Do not use any tool to tighten the nut.

5 Install the valve cap.

This concludes the Rim Strip and Tubeless Tape Installation. Install a tubeless compatible tire according to the manufacturer's instructions.
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