

**ZIP**P

# Wheel and Hub Specifications



SPOKE LENGTH, TENSIONS, RIM ERD, HUB DIMENSIONS,  
AND TECHNICAL SPECIFICATIONS

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|----------------------------------------------------|----|
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|----------------------------------------------------|----|

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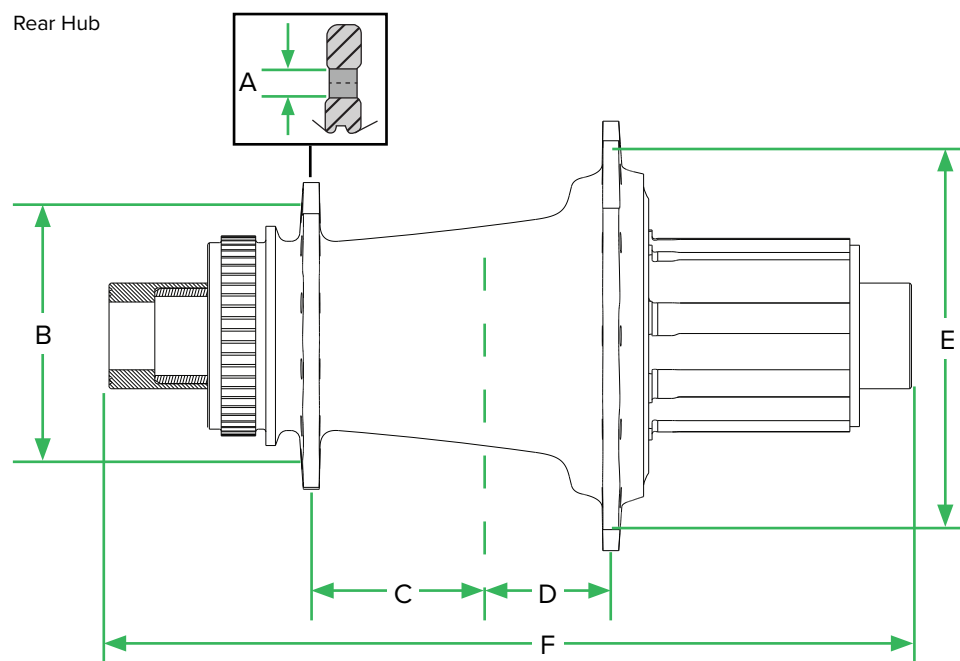
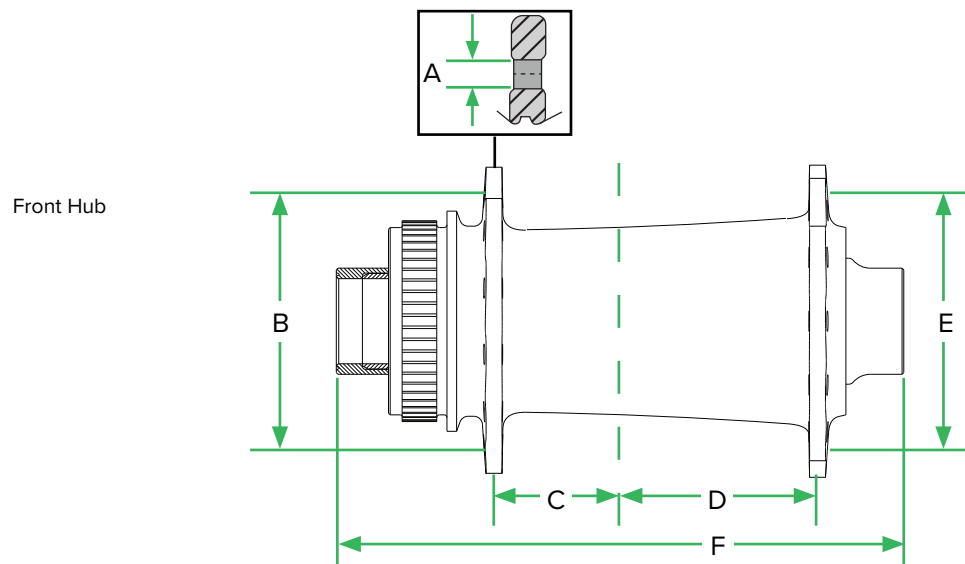
For SRAM Warranty information, visit: [www.sram.com/warranty](http://www.sram.com/warranty).

For SRAM Trademark information, visit: [www.sram.com/website-terms-of-use](http://www.sram.com/website-terms-of-use)

## Hub Dimensions - Road Disc Brake Hubs

|                                 | Cognition<br>Disc Brake |      |                 |      | 76 / 176<br>Disc Brake |      |
|---------------------------------|-------------------------|------|-----------------|------|------------------------|------|
|                                 | Front                   | Rear | Front           | Rear | Front                  | Rear |
| Spoke Count                     | 20                      | 20   | 24              | 24   | 24                     | 24   |
| A - Spoke hole diameter         | 2.6                     | 2.6  | 2.6             | 2.6  | 2.7                    | 2.7  |
| B - Pitch Circle Diameter - NDS | 45                      | 45   | 45              | 45   | 45                     | 53   |
| C - Center to Flange - NDS      | 22.2                    | 35.2 | 22.2            | 35.2 | 21.8                   | 30.9 |
| D - Center to Flange - DS       | 34.8                    | 17.8 | 34.8            | 17.8 | 34.3                   | 18.2 |
| E - Pitch Circle Diameter - DS  | 45                      | 66   | 45              | 66   | 45                     | 54   |
| F - Over Locknut Dimension      | 100                     | 142  | 100             | 142  | 100                    | 142  |
| Max Spoke Tension*              | 125 kgf / 1225N         |      | 125 kgf / 1225N |      | -                      |      |
| Allowable lacing pattern DS     | 2x,<br>radial           | 2x   | 2x              | 2x   | -                      |      |
| Allowable lacing pattern NDS    | 2x                      | 2x   | 2x              | 2x   | -                      |      |

Radial lacing reduces the allowable spoke tension to 110 KGF / Max



\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

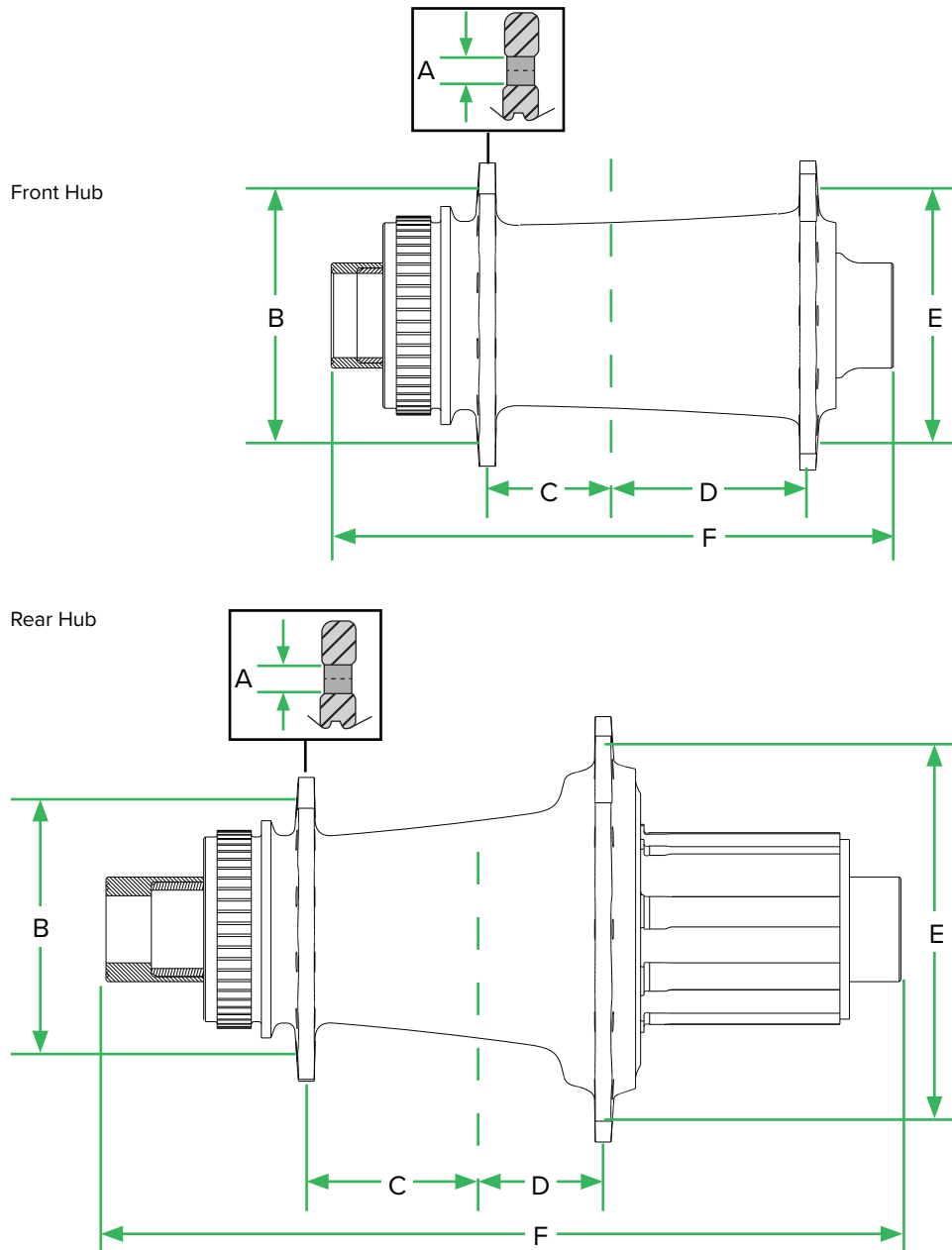
|                                 | ZR1<br>Disc Brake |      |                 |      |        |        |
|---------------------------------|-------------------|------|-----------------|------|--------|--------|
|                                 | Front             | Rear | Front           | Rear | Front  | Rear   |
| Spoke Count                     | 20                | 20   | 24              | 24   | 28     | 28     |
| A - Spoke hole diameter         | 2.7               | 2.7  | 2.7             | 2.7  | 2.7    | 2.7    |
| B - Pitch Circle Diameter - NDS | 44.3              | 50   | 44.3            | 50   | 44.3   | 50     |
| C - Center to Flange - NDS      | 21.6              | 34.4 | 21.6            | 34.4 | 21.6   | 34.4   |
| D - Center to Flange - DS       | 34.3              | 18.1 | 34.3            | 18.1 | 34.3   | 18.1   |
| E - Pitch Circle Diameter - DS  | 41.8              | 60.5 | 41.8            | 60.5 | 41.8   | 60.5   |
| F - Over Locknut Dimension      | 100               | 142  | 100             | 142  | 100    | 142    |
| Max Spoke Tension*              | 125 kgf / 1225N   |      | 125 kgf / 1225N |      |        |        |
| Allowable lacing pattern DS     | 2x, radial        | 2x   | 2x              | 2x   | 2x, 3x | 2x, 3x |
| Allowable lacing pattern NDS    | 2x                | 2x   | 2x              | 2x   | 2x, 3x | 2x, 3x |

#### ZR1 Disc Brake Hub Wheel Building requirements and restrictions

2-cross spoke lacing may only be used with 24 or 20 hole hubs.

3-cross spoke lacing may only be used with 28 hole hubs.

Radial lacing reduces the allowable spoke tension to 110 KGF/ Max



\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

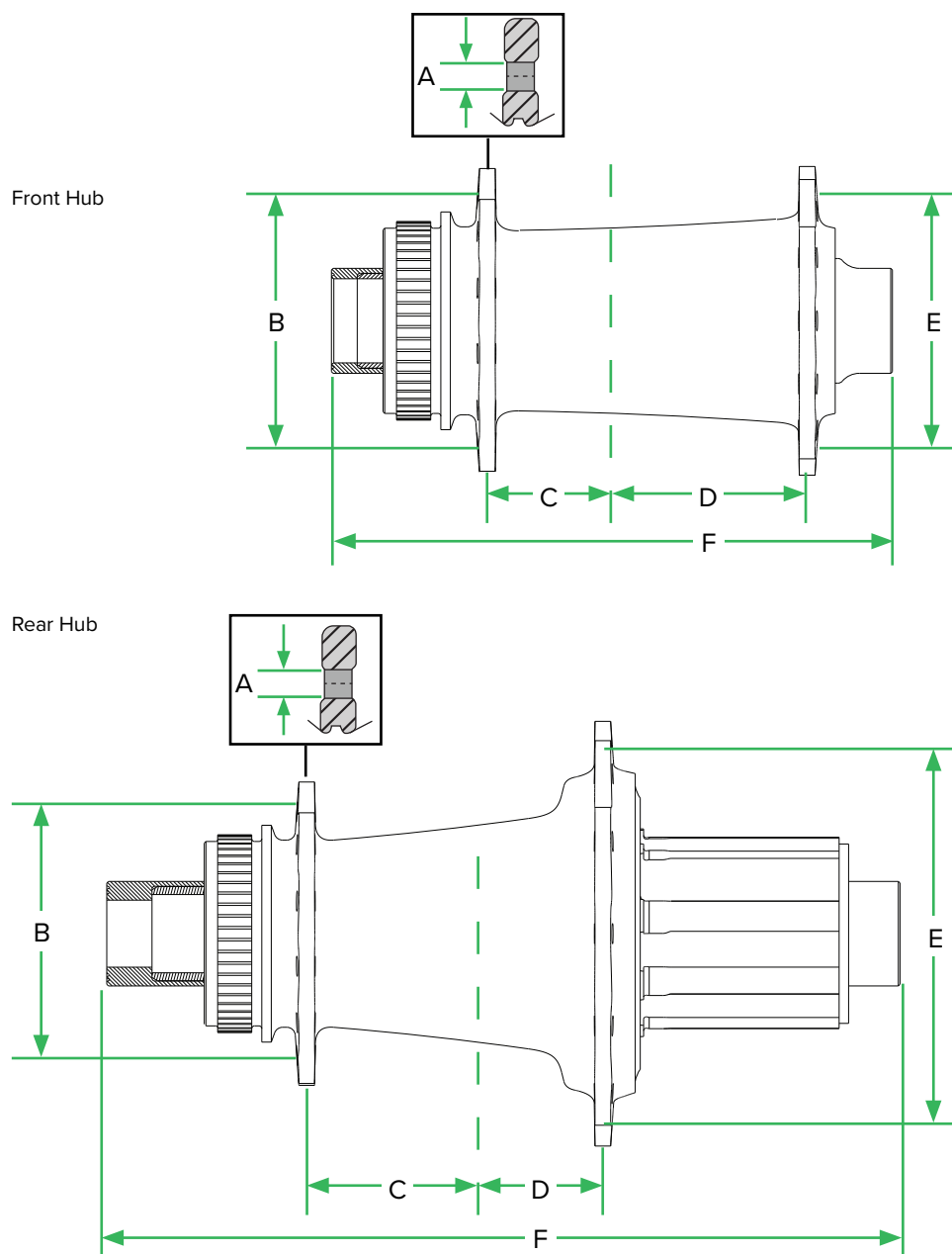
|                                 | ZR1 SL<br>Disc Brake |      |                 |      |        |        |
|---------------------------------|----------------------|------|-----------------|------|--------|--------|
|                                 | Front                | Rear | Front           | Rear | Front  | Rear   |
| Spoke Count                     | 20                   | 20   | 24              | 24   | 28     | 28     |
| A - Spoke hole diameter         | 2.6                  | 2.6  | 2.6             | 2.6  | 2.6    | 2.6    |
| B - Pitch Circle Diameter - NDS | 44.3                 | 48.5 | 44.3            | 48.5 | 44.3   | 48.5   |
| C - Center to Flange - NDS      | 21.8                 | 33.6 | 21.8            | 33.6 | 21.8   | 33.6   |
| D - Center to Flange - DS       | 34.4                 | 18.1 | 34.4            | 18.1 | 34.4   | 18.1   |
| E - Pitch Circle Diameter - DS  | 37.8                 | 60.5 | 37.8            | 60.5 | 37.8   | 60.5   |
| F - Over Locknut Dimension      | 100                  | 142  | 100             | 142  | 100    | 142    |
| Max Spoke Tension*              | 125 kgf / 1225N      |      | 125 kgf / 1225N |      |        |        |
| Allowable lacing pattern DS     | 2x, radial           | 2x   | 2x              | 2x   | 2x, 3x | 2x, 3x |
| Allowable lacing pattern NDS    | 2x                   | 2x   | 2x              | 2x   | 2x, 3x | 2x, 3x |

#### ZR1 SL Disc Brake Hub Wheel Building requirements and restrictions

2-cross spoke lacing may only be used with 24 or 20 hole hubs.

3-cross spoke lacing may only be used with 28 hole hubs.

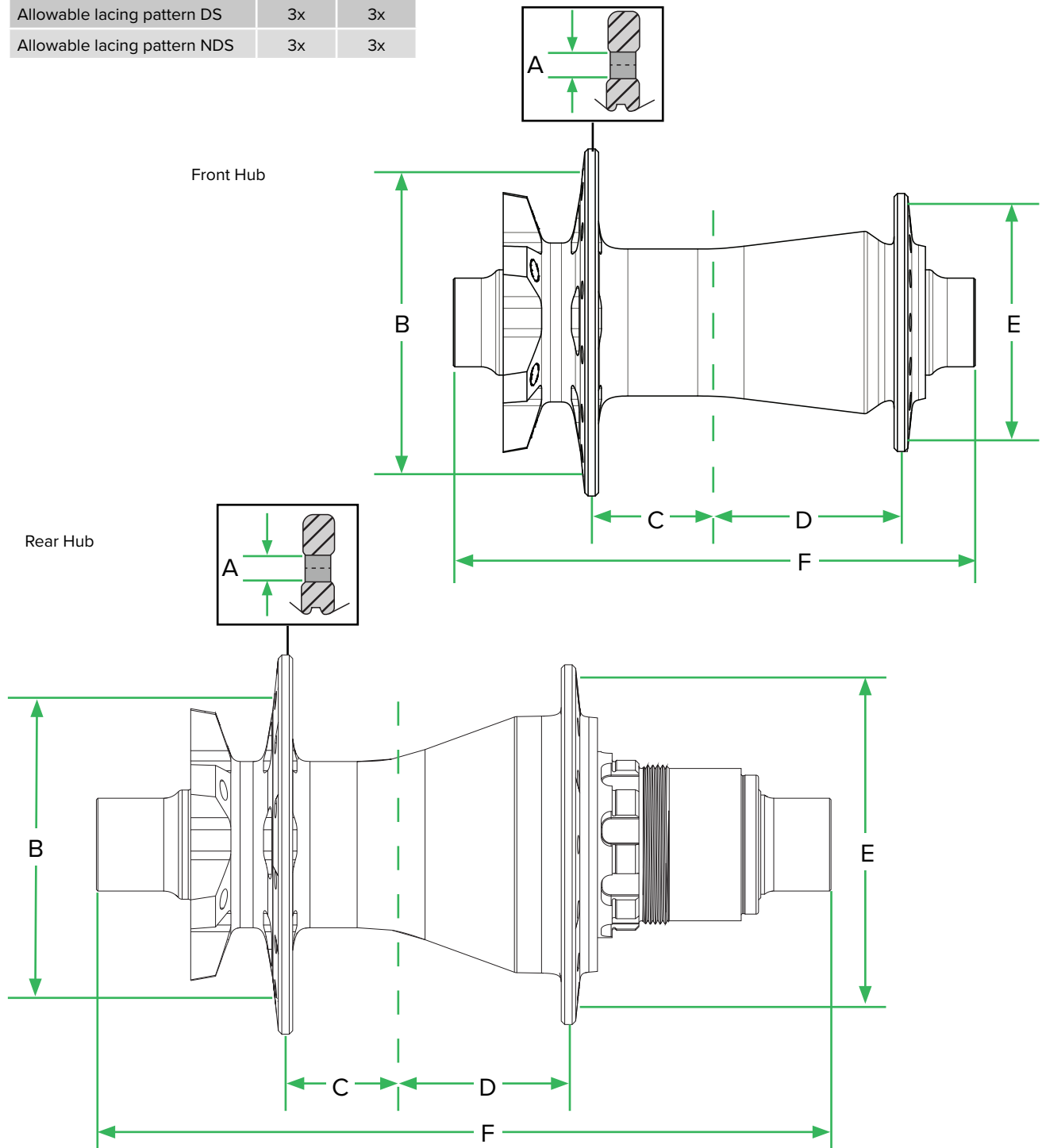
Radial lacing reduces the allowable spoke tension to 110 KGF/ Max



\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

## Hub Dimensions - MTB Disc Brake Hubs

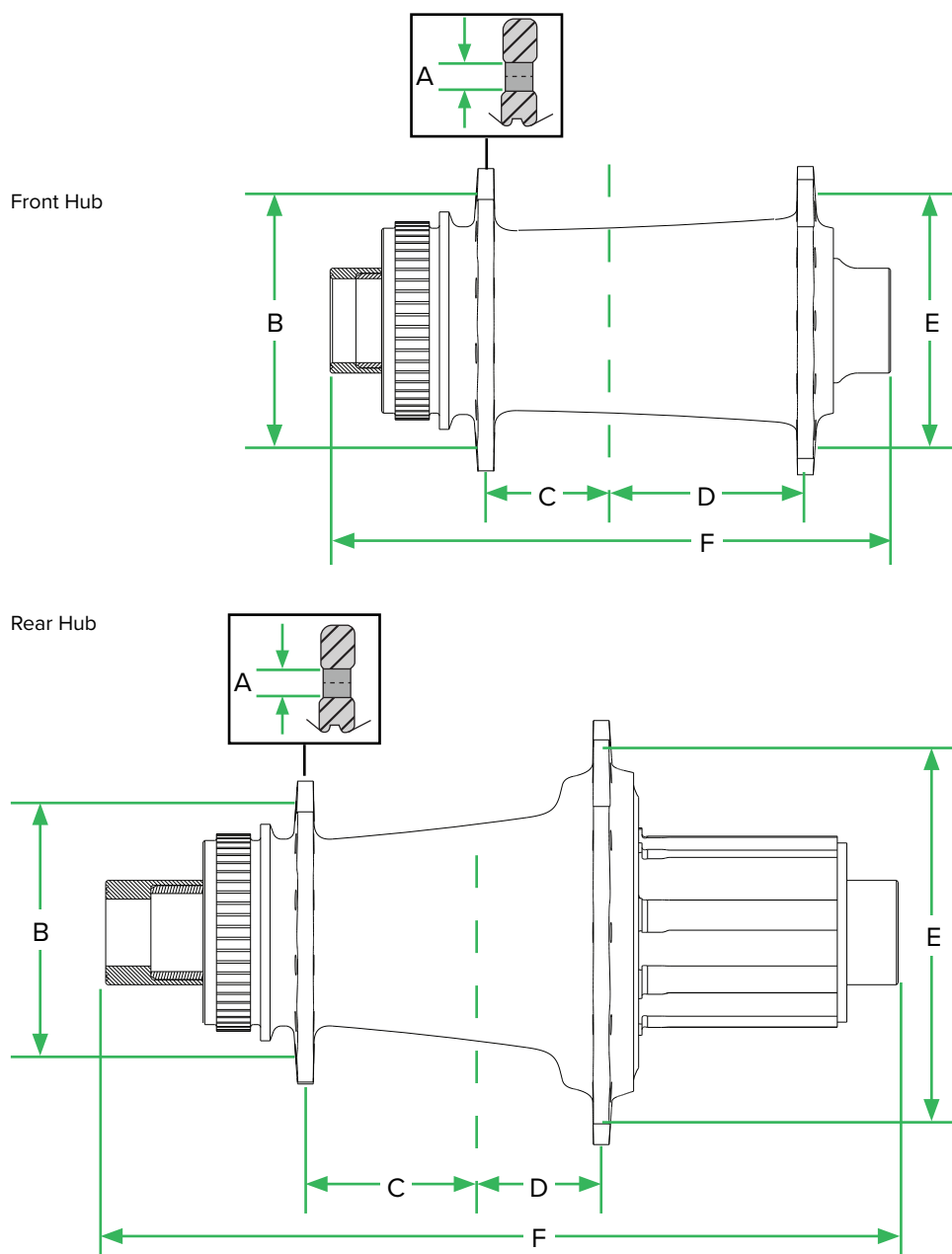
|                                 | ZM2<br>Disc Brake |      |
|---------------------------------|-------------------|------|
|                                 | Front             | Rear |
| Spoke Count                     | 32                | 32   |
| A - Spoke hole diameter         | 2.7               | 2.7  |
| B - Pitch Circle Diameter - NDS | 61.2              | 64.4 |
| C - Center to Flange - NDS      | 26.1              | 36.2 |
| D - Center to Flange - DS       | 39.6              | 21.4 |
| E - Pitch Circle Diameter - DS  | 42.4              | 60.5 |
| F - Over Locknut Dimension      | 110               | 148  |
| Max Spoke Tension*              | 125 kgf / 1225N   |      |
| Allowable lacing pattern DS     | 3x                | 3x   |
| Allowable lacing pattern NDS    | 3x                | 3x   |



\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

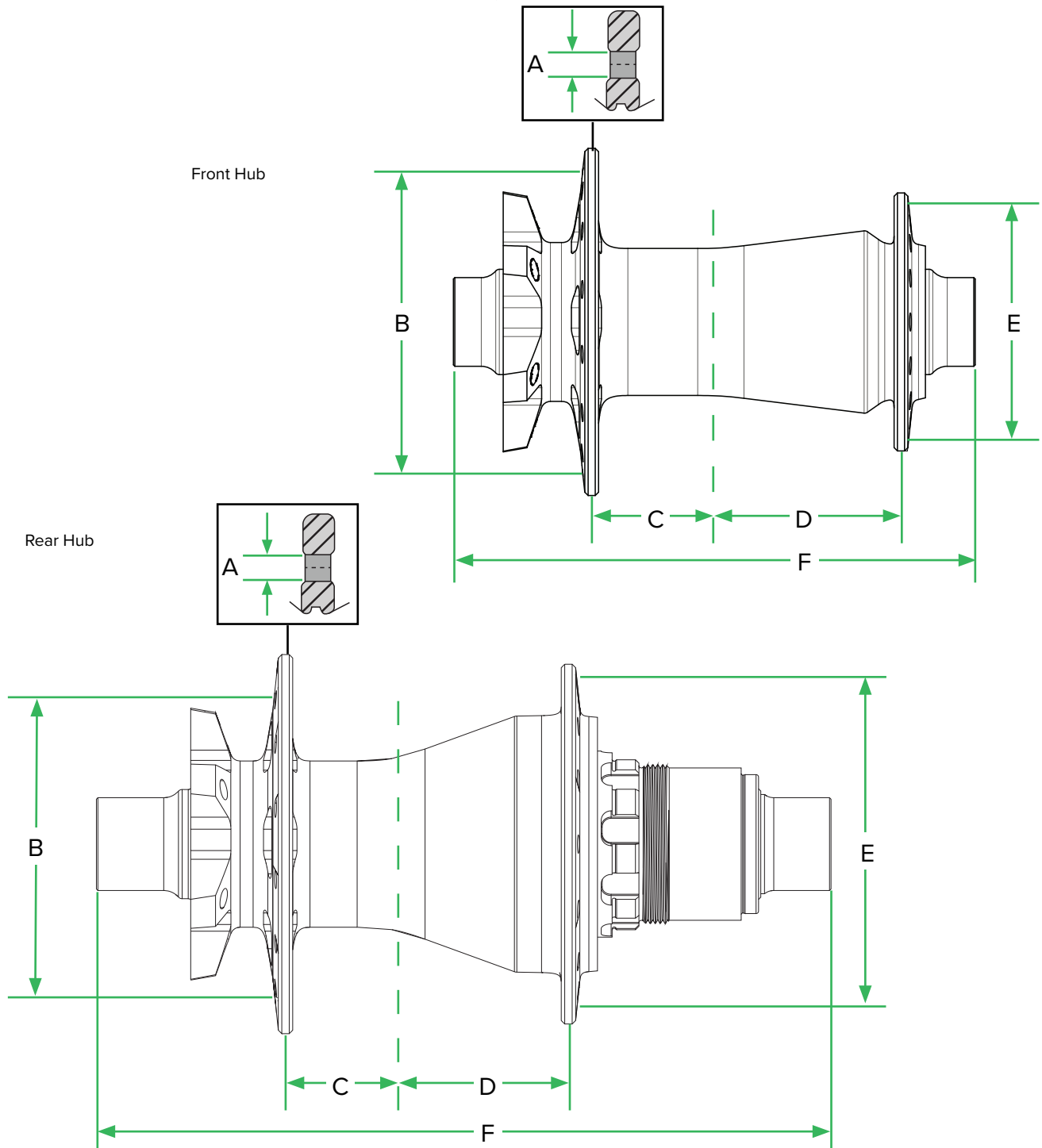


| ZM2 SL<br>Center Lock           |                 |      |
|---------------------------------|-----------------|------|
|                                 | Front           | Rear |
| Spoke Count                     | 24              | 24   |
| A - Spoke hole diameter         | 2.6             | 2.6  |
| B - Pitch Circle Diameter - NDS | 44.3            | 48.5 |
| C - Center to Flange - NDS      | 27.5            | 38.1 |
| D - Center to Flange - DS       | 39.8            | 21   |
| E - Pitch Circle Diameter - DS  | 37.8            | 60.5 |
| F - Over Locknut Dimension      | 110             | 148  |
| Max Spoke Tension*              | 125 kgf / 1225N |      |
| Allowable lacing pattern DS     | 2x              | 2x   |
| Allowable lacing pattern NDS    | 2x              | 2x   |



\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

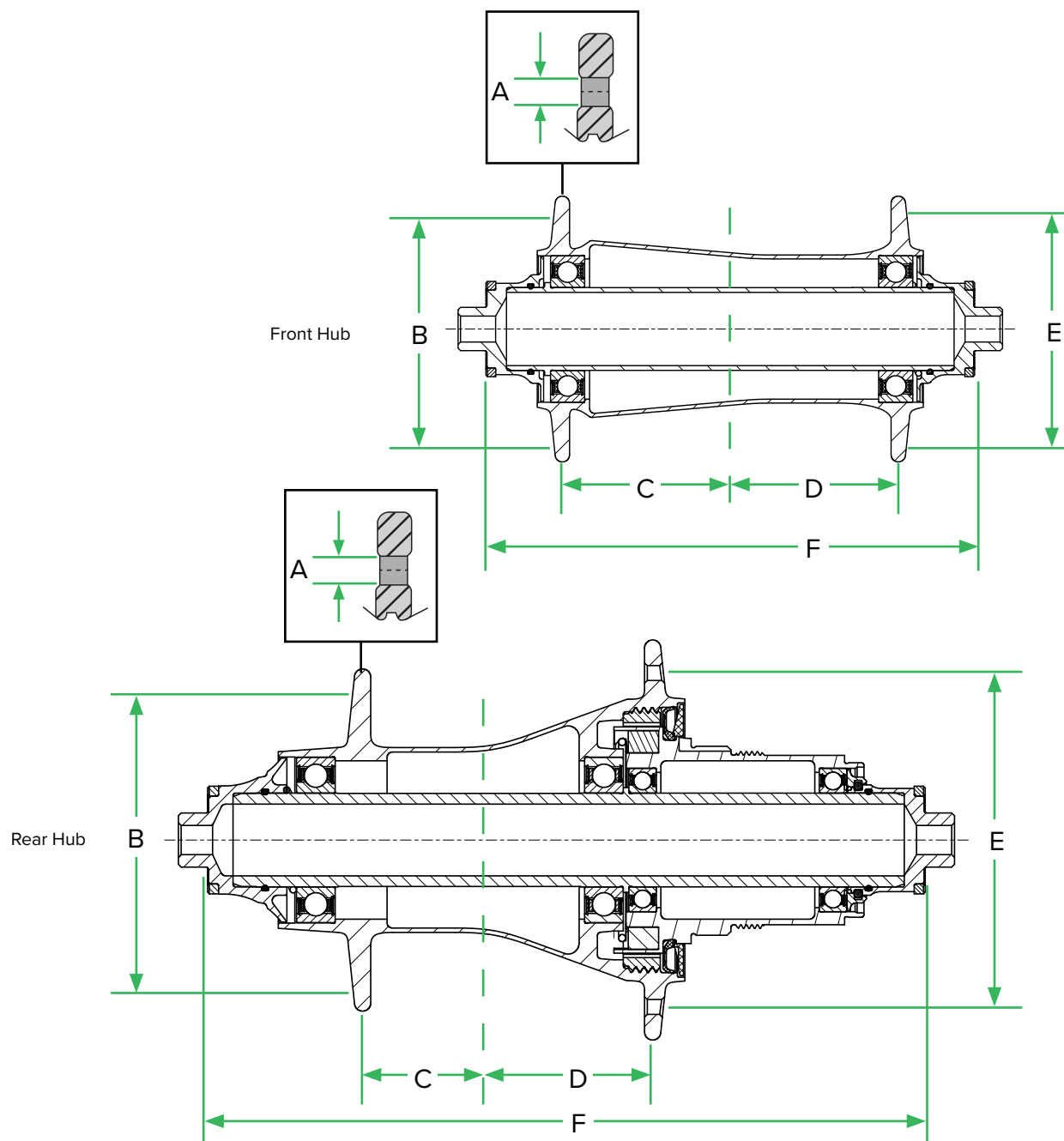
| ZM 900<br>6-Bolt                |                |        |       |      |
|---------------------------------|----------------|--------|-------|------|
|                                 | Front          | Rear   | Front | Rear |
| Spoke Count                     | 24             | 24     | 28    | 28   |
| A - Spoke hole diameter         | 2.7            | 2.7    | 2.7   | 2.7  |
| B - Pitch Circle Diameter - NDS | 60             | 58     | 60    | 58   |
| C - Center to Flange - NDS      | 26             | 35.3   | 26    | 35.3 |
| D - Center to Flange - DS       | 38.6           | 20.8   | 38.6  | 20.8 |
| E - Pitch Circle Diameter - DS  | 50             | 60     | 50    | 60   |
| F - Over Locknut Dimension      | 110            | 148    | 110   | 148  |
| Max Spoke Tension*              | 125kgf / 1225N |        | -     |      |
| Allowable lacing pattern DS     | 2x, 3x         | 2x, 3x | -     |      |
| Allowable lacing pattern NDS    | 2x, 3x         | 2x, 3x |       |      |



\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

## Hub Dimensions - Rim Brake Hubs

|                                       | Cognition<br>Rim Brake |       | 76 / 176<br>Rim Brake |      |
|---------------------------------------|------------------------|-------|-----------------------|------|
|                                       | Front*                 | Rear* | Front                 | Rear |
| Spoke Count                           | 18                     | 24    | 20                    | 24   |
| A - Spoke hole diameter               | 2.5                    | 2.5   | 2.7                   | 2.7  |
| B - Pitch Circle Diameter - NDS       | -                      | -     | 45                    | 53   |
| C - Center to Flange - NDS            | -                      | -     | 38.5                  | 31.5 |
| D - Center to Flange - DS             | -                      | -     | 38.5                  | 15.5 |
| E - Pitch Circle Diameter - DS        | -                      | -     | 45                    | 54   |
| F - Over Locknut Dimension            | 100                    | 130   | 100                   | 130  |
| *No hub flanges; straight pull spokes |                        |       |                       |      |
| Max Spoke Tension*                    | 110kgf / 1080N         |       |                       |      |
| Allowable lacing pattern DS           | -                      | -     | -                     | -    |
| Allowable lacing pattern NDS          | -                      | -     | -                     | -    |



\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

|                                      | ZR1<br>Rim Brake |      |
|--------------------------------------|------------------|------|
|                                      | Front            | Rear |
| Spoke Count                          | 24               | 24   |
| A - Spoke hole diameter              | 2.7              | 2.7  |
| B - Pitch Circle Diameter - NDS      | 42.4             | 50   |
| C - Center to Flange - NDS           | 34.4             | 36   |
| D - Center to Flange - DS            | 34.4             | 15.7 |
| E - Pitch Circle Diameter - DS       | 42.4             | 60.5 |
| F - Over Locknut Dimension           | 100              | 130  |
| No hub flanges; straight pull spokes |                  |      |

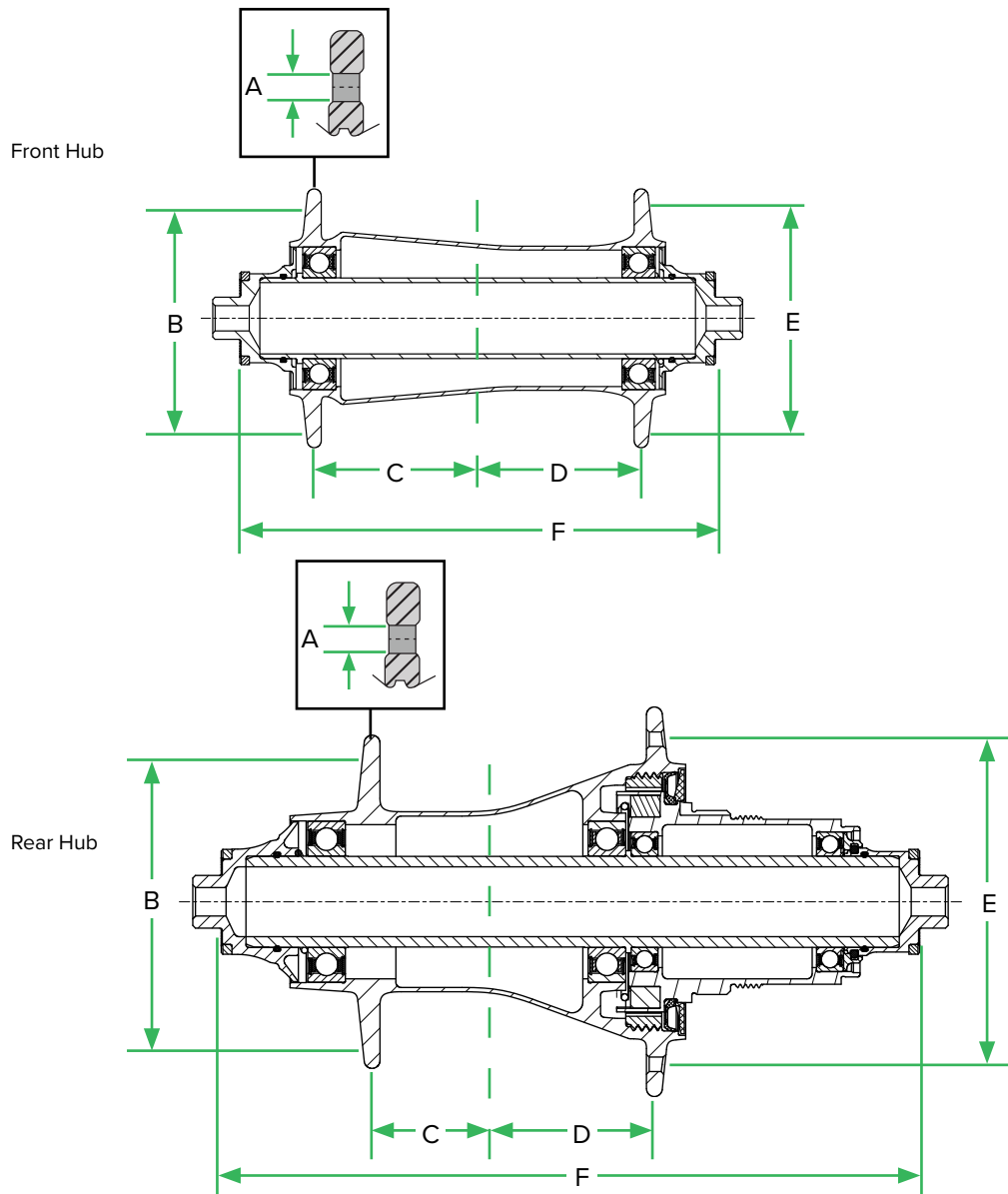
#### ZR1 Rim Brake Hub Wheel Building requirements and restrictions

2-cross spoke lacing may only be used with 24 or 20 hole hubs.

3-cross spoke lacing may only be used with 28 hole hubs.

Radial spoke lacing **may not be used**.

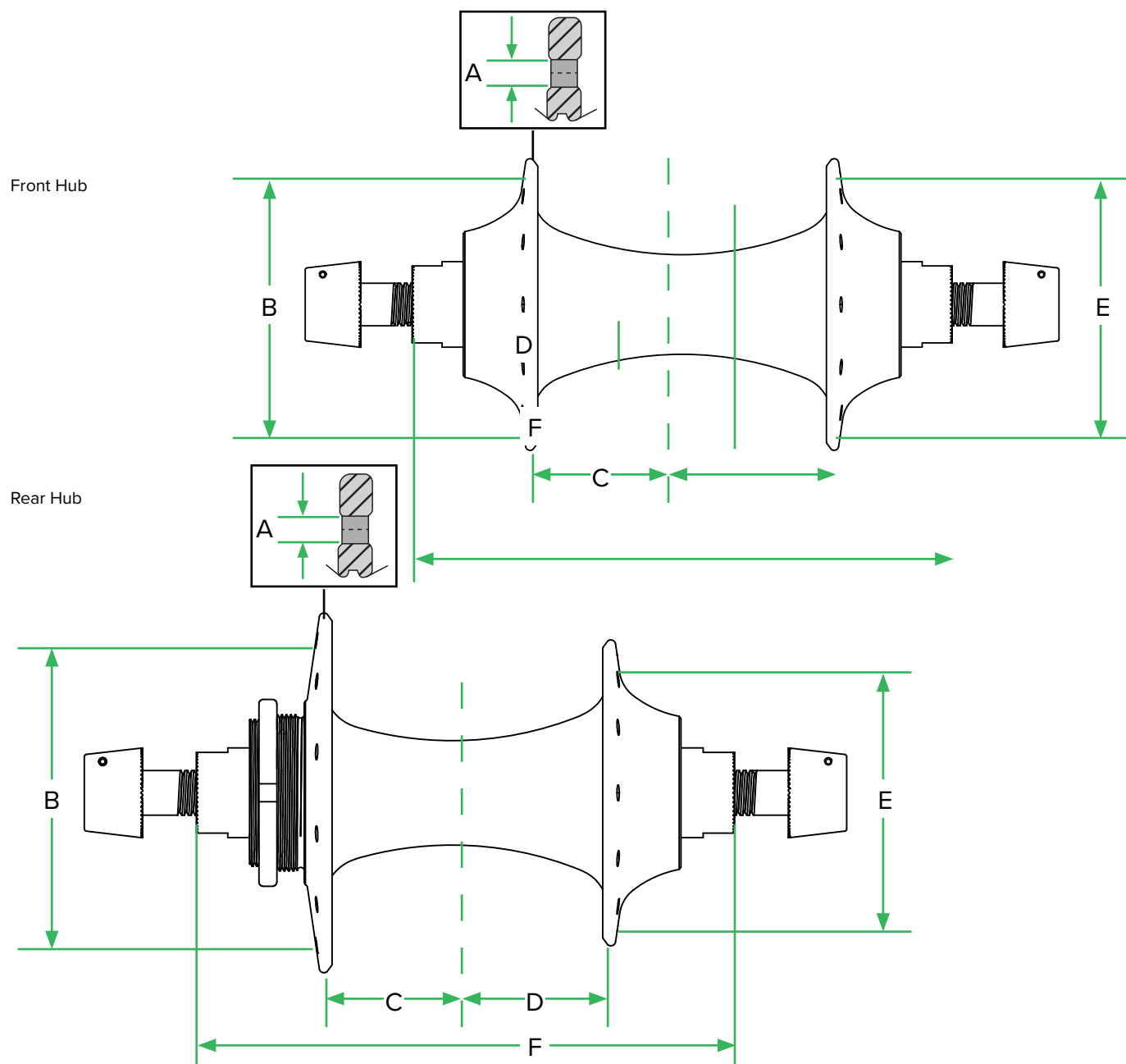
|                              |                |    |
|------------------------------|----------------|----|
| Max Spoke Tension*           | 125kgf / 1225N |    |
| Allowable lacing pattern DS  | 2x             | 2x |
| Allowable lacing pattern NDS | 2x             | 2x |



\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

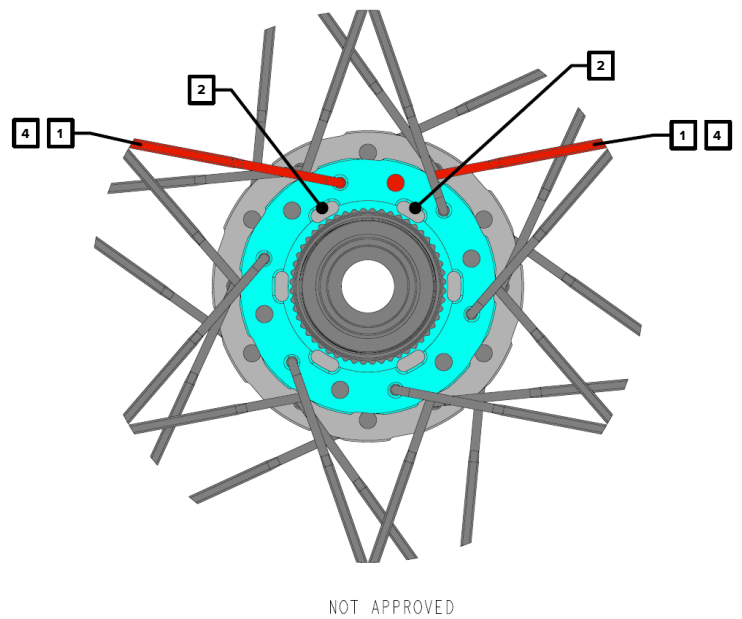
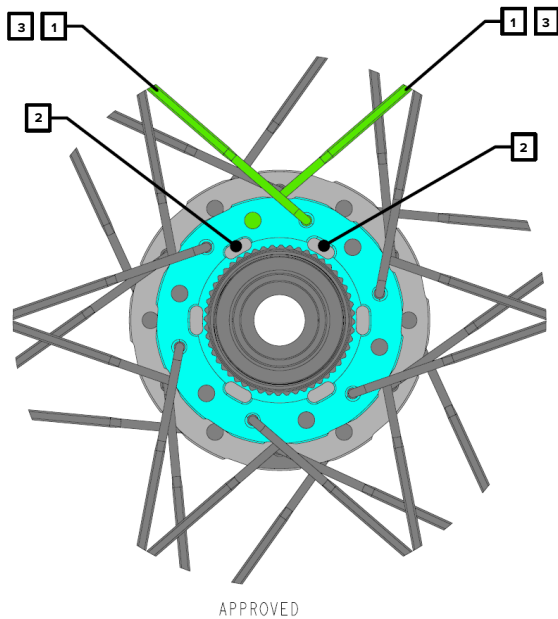
## Hub Dimensions - Track Hubs

|                                 | Track |      |
|---------------------------------|-------|------|
|                                 | Front | Rear |
| Spoke Count                     | 24    | 24   |
| A - Spoke hole diameter         | 2.6   | 2.6  |
| B - Pitch Circle Diameter - NDS | 45    | 45   |
| C - Center to Flange - NDS      | 22.2  | 35.2 |
| D - Center to Flange - DS       | 34.8  | 17.8 |
| E - Pitch Circle Diameter - DS  | 45    | 66   |
| F - Over Locknut Dimension      | 100   | 135  |
| Max Spoke Tension*              | -     |      |
| Allowable lacing pattern DS     | -     | -    |
| Allowable lacing pattern NDS    | -     | -    |



\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

## Wheel Lacing Pattern Restrictions

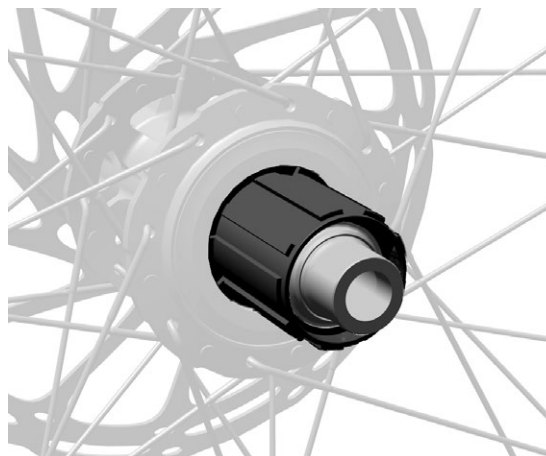


- 1 Spoke
- 2 Hub Cutout
- 3 Spokes shall be assembled on the non-drive side of the hub in a direction facing away from cutouts, as shown in the image.
- 4 Not approved: when spokes are laced on the non-drive side of the hub in a direction facing the cutouts, as shown in the image, the hub flange has lower fatigue strength.
- 5 Image is for reference only and applies to ZM2 SL and ZM900 only, rear and front.

Use images below to identify driver body type. Refer to the [Zipp Spare Parts Catalog](#) for more information or part numbers.



**XD/XDR**



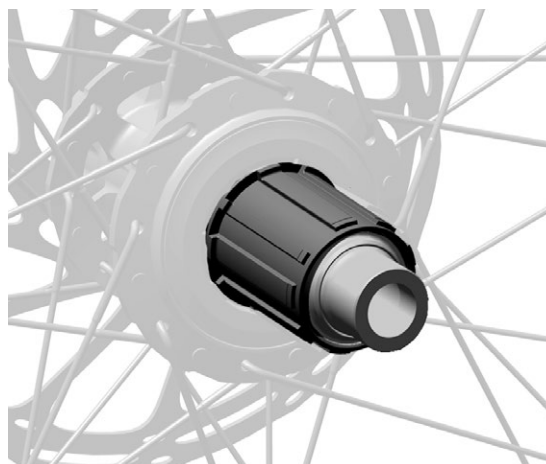
**Splined - SRAM/Shimano**

-10/9 Speed MTB

-11/10 Speed Road



**MicroSpline**



**Campagnolo**

# Rim Specifications - 101, 3ZERO MOTO, and 1ZERO Series Rims

|                                |                      | <b>**101 XPLR<br/>(WH-101-XPLR-A1)</b>                                                     | <b>**3ZERO MOTO<br/>(WH-MOTO-30-A1)</b>                                                    | <b>**3ZERO MOTO<br/>(WH-MOTO-30-B1)</b>                                                    | <b>1ZERO HITOP SW<br/>(WH-1ZRO-HTSW-A1)</b>                                                | <b>1ZERO HITOP S<br/>(WH-1ZRO-HTS-A1)</b>                                                  |
|--------------------------------|----------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Rim Description                | Rim Specifications   | Carbon - Hookless                                                                          | Carbon - Hookless                                                                          | Carbon - Hookless                                                                          | Carbon - Hookless                                                                          | Carbon - Hookless                                                                          |
| ERD                            |                      | 700C : 610 mm<br>with Washers<br>650B : 572 mm<br>with Washers                             | 29" : 619<br>with Washers<br>27.5" : 581<br>with Washers                                   | 29" : 619<br>with Washers<br>27.5" : 581<br>with Washers                                   | 29" : 603                                                                                  | 29" : 603                                                                                  |
| Rim Profile                    |                      | Front: Asymmetrical<br>Rear: Asymmetrical                                                  | Front: Asymmetrical<br>Rear: Asymmetrical                                                  | Front: Asymmetrical<br>Rear: Asymmetrical                                                  | Front: Asymmetrical<br>Rear: Asymmetrical                                                  | Front: Asymmetrical<br>Rear: Asymmetrical                                                  |
| Rim Width                      |                      | External: 34 mm<br>Internal: 27 mm                                                         | External: 37.5 mm<br>Internal: 30 mm                                                       | External: 37.5 mm<br>Internal: 30 mm                                                       | External: 38 mm<br>Internal: 30 mm                                                         | External: 38 mm<br>Internal: 30 mm                                                         |
| Rim Orientation /<br>Direction |                      | Front: Short Side<br>toward drive side<br><br>Rear: Short Side<br>toward non-drive<br>side | Front: Short Side<br>toward drive side<br><br>Rear: Short Side<br>toward non-drive<br>side | Front: Short Side<br>toward drive side<br><br>Rear: Short Side<br>toward non-drive<br>side | Front: Short Side<br>toward drive side<br><br>Rear: Short Side<br>toward non-drive<br>side | Front: Short Side<br>toward drive side<br><br>Rear: Short Side<br>toward non-drive<br>side |
| Spoke Count                    | Spoke Specifications | Front: 28<br>Rear: 28                                                                      | Front: 32<br>Rear: 32                                                                      | Front: 32<br>Rear: 32                                                                      | Front: 24<br>Rear: 24                                                                      | Front: 24<br>Rear: 24                                                                      |
| Spoke Pattern                  |                      | Front: 3X<br>Rear: 3X                                                                      | Front: 3X<br>Rear: 3X                                                                      | Front: 3X<br>Rear: 3X                                                                      | Front: 2X<br>Rear: 2X                                                                      | Front: 2X<br>Rear: 2X                                                                      |
| Min. Spoke<br>Gauge            |                      | 2.0/2.25 - 1.25/2.0                                                                        | 2.0/1.65/2.0                                                                               | 2.0/2.25 - 1.25/2.0                                                                        | 2.0/2.2 - 0.9/2.0                                                                          | 2.0/2.25 - 1.25/2.0                                                                        |
| Spoke Tension*                 |                      | 115 ±10 Kgf                                                                                | 115 ±10 Kgf                                                                                | 115 ±10 Kgf                                                                                | 115 ±10 Kgf                                                                                | 115 ±10 Kgf                                                                                |
| Spoke Nipple<br>Size           |                      | 2.0 x 14 mm                                                                                | 2.0 x 14 mm                                                                                | 2.0 x 14 mm                                                                                | 2.0 x 16 mm                                                                                | 2.0 x 16 mm                                                                                |
| Washers                        |                      | Sapim NRHM                                                                                 | Sapim NRHM                                                                                 | Sapim NRHM                                                                                 | Not Applicable                                                                             | Not Applicable                                                                             |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.



# Rim Specifications - 303 Series Rims

|                                |                      | <b>**303 Firecrest<br/>Carbon Tubeless<br/>Disc Brake<br/>(WH-303-FTLD-A1)</b> | <b>**303 Firecrest<br/>650b Carbon<br/>Tubeless Disc<br/>Brake<br/>(WH-303-F650-A1)</b> | <b>**303 S Carbon<br/>Tubeless Disc<br/>Brake<br/>(WH-303-STLD-A1)</b> | <b>**303 Firecrest<br/>Carbon Tubeless<br/>Rim Brake<br/>(WH-303-FTLR-A1)</b> | <b>**303 Firecrest<br/>Carbon Tubular<br/>Disc Brake<br/>(WH-303-FTUD-A1)</b> | <b>**303 Firecrest<br/>Tubular Rim Brake<br/>(WH-303-FTUR-A1)</b> |
|--------------------------------|----------------------|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Rim Description                | Rim Specifications   | Carbon - Hookless                                                              | Carbon - w/Hooks                                                                        | Carbon - Hookless                                                      | Carbon - w/Hooks                                                              | Carbon                                                                        | Carbon                                                            |
| ERD                            |                      | 564 mm<br>with Washers                                                         | 513 mm<br>with Washers                                                                  | 551 mm<br>with Washers                                                 | 550 mm<br>with Washers                                                        | 552 mm<br>with Washers                                                        | 552 mm<br>with Washers                                            |
| Rim Profile                    |                      | Symmetrical                                                                    | Symmetrical                                                                             | Symmetrical                                                            | Symmetrical                                                                   | Symmetrical                                                                   | Symmetrical                                                       |
| Rim Width                      |                      | External: 29.7 mm<br>Internal: 25 mm                                           | External: 30 mm<br>Internal: 21 mm                                                      | External: 28 mm<br>Internal: 23 mm                                     | External: 27 mm<br>Internal: 19                                               | External: 27 mm<br>Internal: n/a                                              | External: 27 mm<br>Internal: n/a                                  |
| Rim Orientation /<br>Direction |                      | Not Applicable                                                                 | Not Applicable                                                                          | Not Applicable                                                         | Not Applicable                                                                | Not Applicable                                                                | Not Applicable                                                    |
| Spoke Count                    | Spoke Specifications | Front: 24<br>Rear: 24                                                          | Front: 24<br>Rear: 24                                                                   | Front: 24<br>Rear: 24                                                  | Front: 18<br>Rear: 24                                                         | Front: 24<br>Rear: 24                                                         | Front: 24<br>Rear: 24                                             |
| Spoke Pattern                  |                      | Front: 2X<br>Rear: 2X                                                          | Front: 2X<br>Rear: 2X                                                                   | Front: 2X<br>Rear: 2X                                                  | Front: Radial<br>Rear: 2X                                                     | Front: 2X<br>Rear: 2X                                                         | Front: Radial<br>Rear: 2X                                         |
| Min. Spoke<br>Gauge            |                      | 2.0/2.25 - 1.25/2.0                                                            | 2.0/2.2 - 0.9/2.0                                                                       | 2.0/2.25 - 1.25/2.0                                                    | 2.0/2.25 - 1.25/2.0                                                           | 2.0/2.2 - 0.9/2.0                                                             | 2.0/2.25 - 1.25/2.0                                               |
| Spoke Tension*                 |                      | 100 +10/-5 Kgf                                                                 | 100 +10/-5 Kgf                                                                          | 100 +10/-5 Kgf                                                         | 100 +10/-5 Kgf                                                                | 100 +10/-5 Kgf                                                                | 100 +10/-5 Kgf                                                    |
| Spoke Nipple<br>Size           |                      | 2.0 x 14 mm                                                                    | 2.0 x 14 mm                                                                             | 2.0 x 14 mm                                                            | 2.0 x 14 mm                                                                   | 2.0 x 14 mm                                                                   | 2.0 x 14 mm                                                       |
| Washers                        |                      | Oval                                                                           | Oval                                                                                    | Oval                                                                   | Oval                                                                          | Oval                                                                          | Oval                                                              |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

## Rim Specifications - 303 Series Rims

|                                |                      | <b>**303 SW Carbon<br/>Tubeless Disc<br/>Brake<br/>(WH-303-SW-A1)</b> | <b>**353 NSW<br/>Carbon Tubeless<br/>Disc Brake<br/>(WH-353-NSW-B1)</b> |
|--------------------------------|----------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|
| Rim Description                | Rim Specifications   | Carbon - Hookless                                                     | Carbon - Hookless                                                       |
| ERD                            |                      | Not Applicable                                                        | Not Applicable                                                          |
| Rim Profile                    |                      | Symmetrical                                                           | Symmetrical                                                             |
| Rim Width                      |                      | External: 33.5 mm<br>Internal: 25 mm                                  | External: 29.5 mm<br>Internal: 25 mm                                    |
| Rim Orientation /<br>Direction |                      | Not Applicable                                                        | Not Applicable                                                          |
| Spoke Count                    | Spoke Specifications | Front: 20<br>Rear: 20                                                 | Front: 20<br>Rear: 20                                                   |
| Spoke Pattern                  |                      | Front: 2X<br>Rear: 2X                                                 | Front: 2X<br>Rear: 2X                                                   |
| Min. Spoke<br>Gauge            |                      | 2.0/2.25 - 1.25/2.0                                                   | 2.0/2.2 - 0.9/2.0                                                       |
| Spoke Tension*                 |                      | 115 +10/-5 Kgf                                                        | 100 +10/-5 Kgf                                                          |
| Spoke Nipple<br>Size           |                      | 2.0 x 16 mm                                                           | 2.0 x 16 mm                                                             |
| Washers                        |                      | No Washers                                                            | No Washers                                                              |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

## Rim Specifications - 404 Series Rims

|                                |                      | <b>**404 Firecrest<br/>Carbon Tubeless<br/>Disc Brake<br/>(WH-404-FTLD-A1)</b> | <b>**404 Firecrest<br/>Tubeless Disc<br/>Brake<br/>(WH-404-FTLD-B1)</b> | <b>**404 Firecrest<br/>Carbon Tubeless<br/>Rim Brake<br/>(WH-404-FTLR-A1)</b> | <b>404 Firecrest<br/>Track Tubular<br/>(WH-404-TUTK-A1)</b> |
|--------------------------------|----------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------|
| Rim Description                | Rim Specifications   | Carbon - w/Hooks                                                               | Carbon - Hookless                                                       | Carbon - w/Hooks                                                              | Carbon                                                      |
| ERD                            |                      | 527 mm<br>with Washers                                                         | 531 mm<br>with Washers                                                  | 527 mm<br>with Washers                                                        | Not Applicable                                              |
| Rim Profile                    |                      | Symmetrical                                                                    | Symmetrical                                                             | Symmetrical                                                                   | Symmetrical                                                 |
| Rim Width                      |                      | External: 27 mm<br>Internal: 19 mm                                             | External: 28 mm<br>Internal: 23 mm                                      | External: 27 mm<br>Internal: 19                                               | External: 27 mm<br>Internal: n/a                            |
| Rim Orientation /<br>Direction |                      | Not Applicable                                                                 | Not Applicable                                                          | Not Applicable                                                                | Not Applicable                                              |
| Spoke Count                    | Spoke Specifications | Front: 24<br>Rear: 24                                                          | Front: 24<br>Rear: 24                                                   | Front: 18<br>Rear: 24                                                         | Front: 28<br>Rear: 28                                       |
| Spoke Pattern                  |                      | Front: 2X<br>Rear: 2X                                                          | Front: 2X<br>Rear: 2X                                                   | Front: Radial<br>Rear: 2X                                                     | Front: Radial<br>Rear: 2X                                   |
| Min. Spoke<br>Gauge            |                      | 2.0/2.2 - 0.9/2.0                                                              | 2.0/2.25 - 1.25/2.0                                                     | 2.0/2.25 - 1.25/2.0                                                           | 2.0/2.2 - 0.9/2.0                                           |
| Spoke Tension*                 |                      | 100 +10/-5 Kgf                                                                 | 100 +10/-5 Kgf                                                          | 100 +10/-5 Kgf                                                                | 100 +10/-5 Kgf                                              |
| Spoke Nipple<br>Size           |                      | 2.0 x 14 mm                                                                    | 2.0 x 14 mm                                                             | 2.0 x 14 mm                                                                   | 2.0 x 14 mm                                                 |
| Washers                        |                      | Oval                                                                           | Oval                                                                    | Oval                                                                          | Oval                                                        |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

## Rim Specifications - 808 Series Rims

|                                |                      | <b>**808 Firecrest<br/>Carbon Tubeless<br/>Disc Brake<br/>(WH-808-FTLD-A1)</b> | <b>808 Firecrest<br/>Carbon Tubeless<br/>Disc Brake<br/>(WH-808-FTLD-B1)</b> | <b>**808 Firecrest<br/>Carbon Tubeless<br/>Rim Brake<br/>(WH-808-FTLR-A1)</b> | <b>808 Firecrest<br/>Tubular Track<br/>(WH-808-TUTK-A1)</b> |
|--------------------------------|----------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------|
| Rim Description                | Rim Specifications   | Carbon - w/Hooks                                                               | Carbon - Hookless                                                            | Carbon - w/Hooks                                                              | Carbon                                                      |
| ERD                            |                      | 478 mm<br>with Washers                                                         | 482 mm                                                                       | 478 mm<br>with Washers                                                        | 478 mm                                                      |
| Rim Profile                    |                      | Symmetrical                                                                    | Symmetrical                                                                  | Symmetrical                                                                   | Front: Symmetrical<br>Rear: Asymmetrical                    |
| Rim Width                      |                      | External: 27 mm<br>Internal: 19 mm                                             | External: 27 mm<br>Internal: 23 mm                                           | External: 27 mm<br>Internal: 18 mm                                            | External: 27 mm<br>Internal: n/a                            |
| Rim Orientation /<br>Direction |                      | Not Applicable                                                                 | Not Applicable                                                               | Not Applicable                                                                | Not Applicable                                              |
| Spoke Count                    | Spoke Specifications | Front: 24<br>Rear: 24                                                          | Front: 20<br>Rear: 20                                                        | Front: 18<br>Rear: 24                                                         | Front: 20<br>Rear: 24                                       |
| Spoke Pattern                  |                      | Front: 2X<br>Rear: 2X                                                          | Front DS: Radial<br>Front NDS: 2X<br>Rear: 2X                                | Front: Radial<br>Rear: 2X                                                     | Front: Radial<br>Rear: 2X                                   |
| Min. Spoke<br>Gauge            |                      | 2.0/2.25 - 1.25/2.0                                                            | 2.0/2.25 - 1.25/2.0                                                          | 2.0/2.25 - 1.25/2.0                                                           | 2.0/2.2 - 0.9/2.0                                           |
| Spoke Tension*                 |                      | 100 +10/-5 Kgf                                                                 | 125 +10/-5 Kgf                                                               | 100 +10/-5 Kgf                                                                | 100 +10/-5 Kgf                                              |
| Spoke Nipple<br>Size           |                      | 2.0 x 14 mm                                                                    | 2.0 x 16 mm square<br>head                                                   | 2.0 x 14 mm                                                                   | 2.0 x 14 mm                                                 |
| Washers                        |                      | Oval                                                                           | No Washers                                                                   | Oval                                                                          | Oval                                                        |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

### General Notes

The serial number on your Zipp wheels can be used to find the model code (ex. WH-MOTO-30-A1) by searching on the SRAM Service Page at [www.sram.com/en/service](http://www.sram.com/en/service).

Model Code example: **WH-1ZRO-HTSW-A1**

**WH** = Product Type - **Wheel**

**1ZRO** = Platform/Series - **1 Zero**

**HTSW** = Model - **HiTOP SW**

**A1** = Version - (**A** - first generation, **1** - first iteration)

Information in this document is subject to change without prior notice.

Some products do not have a serial number as formatted in this document.

If you have any questions please contact your SRAM representative.

### Possible serial number locations

- Depending on the wheel model, the serial number is located on the spoke bed, tire bed, or on the inside edge of the rim next to or across from the valve hole.
- ZZZZZZZ = Sequential number (0000001-9999999)



# Wheel Model Code Matrix

|          |             | Disc Brake      |                                               | Rim Brake       |                                         |
|----------|-------------|-----------------|-----------------------------------------------|-----------------|-----------------------------------------|
| Tubeless | 1ZERO HiTop | WH-1ZRO-HTSW-A1 | 1ZERO HiTOP SW                                |                 |                                         |
|          |             | WH-1ZRO-HTS-A1  | 1ZERO HiTOP S                                 |                 |                                         |
|          | 3ZERO       | WH-MOTO-30-A1   | 3ZERO MOTO                                    |                 |                                         |
|          |             | WH-MOTO-30-B1   | 3ZERO MOTO                                    |                 |                                         |
|          | 101         | WH-101-XPLR-A1  | 101 XPLR                                      |                 |                                         |
|          | 202         | WH-202-FTLD-A1  | 202 Firecrest Carbon Tubeless Disc Brake      |                 |                                         |
|          |             | WH-202-NTLD-A2  | 202 NSW Carbon Tubeless Disc Brake            |                 |                                         |
|          | 303         | WH-353-NTLD-A1  | 353 NSW Tubeless Disc Brake                   | WH-303-FTLR-A1  | 303 Firecrest Carbon Tubeless Rim Brake |
|          |             | WH-353-NSW-B1   | 353 NSW Tubeless Disc Brake                   | WH-303-NTLR-A2  | 303 NSW Carbon Tubeless Rim Brake       |
|          |             | WH-303-FTLD-A1  | 303 Firecrest Carbon Tubeless Disc Brake      | WH-302-TL-RB-A1 | 302 Carbon Tubeless Rim Brake           |
|          |             | WH-303-F650-A1  | 303 Firecrest 650b Carbon Tubeless Disc Brake |                 |                                         |
|          |             | WH-303-STLD-A1  | 303 S Carbon Tubeless Disc Brake              |                 |                                         |
|          |             | WH-303-XPSW-A1  | 303 XPLR SW Carbon Tubeless Disc Brake        |                 |                                         |
|          |             | WH-303-XPS-A1   | 303 XPLR S Carbon Tubeless Disc Brake         |                 |                                         |
|          |             | WH-303-SW-A1    | 303 SW Tubeless Disc Brake                    |                 |                                         |
|          | 404         | WH-454-NTLD-A1  | 454 NSW Carbon Tubeless Disc Brake            | WH-454-NTLR-A1  | 454 NSW Carbon Tubeless Rim Brake       |
|          |             | WH-454_NTLD-C1  | 454 NSW Tubeless Disc Brake                   | WH-454-NTLR-B1  | 454 NSW Carbon Tubeless Rim Brake       |
|          |             | WH-454-NTLD-B1  | 454 NSW Tubeless Disc Brake                   | WH-404-NTLR-A2  | 404 NSW Carbon Tubeless Rim Brake       |
|          |             | WH-404-NTLD-A2  | 404 NSW Carbon Tubeless Disc Brake            | WH-404-FTLR-A1  | 404 Firecrest Carbon Tubeless Rim Brake |
|          |             | WH-404-FTLD-A1  | 404 Firecrest Tubeless Disc Brake             |                 |                                         |
|          |             | WH-404-FTLD-B1  | 404 Firecrest Tubeless Disc Brake             |                 |                                         |
|          | 808         | WH-858-NTLD-A1  | 858 NSW Tubeless Disc Brake                   | WH-858-NTLR-A1  | 858 NSW Carbon Tubeless Rim Brake       |
|          |             | WH-858-NTLD-B1  | 858 NSW Tubeless Disc Brake                   | WH-858-NTLR-B1  | 858 NSW Tubeless Rim Brake              |
|          |             | WH-858-NTLD-C1  | 858 NSW Tubeless Disc Brake                   | WH-808-NTLR-A2  | 808 NSW Carbon Tubeless Rim Brake       |
|          |             | WH-858-NTLD-D1  | 858 NSW Tubeless Disc Brake                   | WH-808-FTLR-A1  | 808 Firecrest Carbon Tubeless Rim Brake |
|          |             | WH-808-FTLD-A1  | 808 Firecrest Carbon Tubeless Disc Brake      |                 |                                         |
|          |             | WH-808-FTLD-B1  | 808 Firecrest Carbon Tubeless Disc Brake      |                 |                                         |
|          |             | WH-808-NTLD-A2  | 808 NSW Carbon Tubeless Disc Brake            |                 |                                         |
|          | Super-9     | WH-SP9-TLD-A1   | Super-9 Carbon Tubeless Disc Brake Disc       | WH-SP9-TLR-A1   | Super-9 Carbon Tubeless Rim Brake Disc  |
| Tubular  | 303         | WH-303-FTUD-A1  | 303 Firecrest Carbon Tubular Disc Brake       | WH-303-FTUR-A1  | 303 Firecrest Carbon Tubular Rim Brake  |
|          | 404         | WH-454-NTUD-A2  | 454 NSW Carbon Tubular Disc Brake             | WH-454-NTUR-A2  | 454 NSW Carbon Tubular Rim Brake        |
|          |             | WH-454-NTUD-B1  | 454 NSW Tubular Disc Brake                    | WH-454-NTUR-B1  | 454 NSW Tubular Rim Brake               |
|          | Super-9     | WH-SP9-TUD-A2   | Super-9 Carbon Tubular Disc Brake Disc        | WH-SP9-TUR-A2   | Super-9 Carbon Tubular Rim Brake Disc   |
| Track    | 404         | WH-404-TUTK-A1  | 404 Firecrest Track Tubular                   |                 |                                         |
|          | 808         | WH-808-TUTK-A1  | 808 Firecrest Track Tubular                   |                 |                                         |
|          | Super-9     | WH-SP9-TLTK-B1  | Super-9 Clincher Track Disc                   |                 |                                         |

## 101 XPLR Series Tubeless Disc Brake Wheels

| 101 XPLR (WH-101-XPLR-A1)                                                    |                                            |                                  |                                        |                  |
|------------------------------------------------------------------------------|--------------------------------------------|----------------------------------|----------------------------------------|------------------|
| Max Recommended System Weight (Bike, Rider, and Equipment): 286 lbs / 130 kg |                                            |                                  |                                        |                  |
| Air Pressure                                                                 | 65 psi / 4.48 bar                          |                                  |                                        |                  |
| Tire Compatibility                                                           | Tubeless tires only                        | Minimum: 35 mm                   |                                        |                  |
| Hub Model                                                                    | ZR1                                        |                                  |                                        |                  |
| Brake Compatibility                                                          | Disc (Center Lock)                         |                                  |                                        |                  |
| Compatible Drivers                                                           | XDR, Splined Road, MicroSpline, Campagnolo |                                  |                                        |                  |
| Rim Specifications                                                           |                                            |                                  |                                        |                  |
| Rim Description                                                              | Carbon - Hookless                          |                                  |                                        |                  |
| ERD**                                                                        | 700C : 610 mm w/washers                    |                                  | 650B : 572 mm w/washers                |                  |
| Rim Profile                                                                  | Front: Asymmetrical                        |                                  | Rear: Asymmetrical                     |                  |
| Rim Width                                                                    | External: 34 mm                            |                                  | Internal: 27 mm                        |                  |
| Rim Orientation / Direction                                                  | Front: Short Side toward drive side        |                                  | Rear: Short Side toward non-drive side |                  |
| Spoke Specifications                                                         |                                            |                                  |                                        |                  |
| Spoke Type                                                                   | CX-Sprint                                  |                                  |                                        |                  |
| Spoke Count                                                                  | Front: 28                                  |                                  | Rear: 28                               |                  |
| Spoke Pattern                                                                | Front: 3X                                  |                                  | Rear: 3X                               |                  |
| Spoke Length - 700C                                                          | Front DS: 304 mm                           | Front NDS: 302 mm                | Rear DS: 302 mm                        | Rear NDS: 304 mm |
| Spoke Length - 650B                                                          | Front DS: 286 mm                           | Front NDS: 284 mm                | Rear DS: 282 mm                        | Rear NDS: 284 mm |
| Min. Spoke Gauge                                                             | 2.0 mm / 2.25 mm - 1.25 mm / 2.0 mm        |                                  |                                        |                  |
| Spoke Tension*                                                               | 115 ±10 Kgf                                |                                  |                                        |                  |
| Nipple Type                                                                  | Material: Aluminum                         | Anti-Rotation: Sapim Secure Lock |                                        |                  |
| Spoke Nipple Size                                                            | 2.0 x 14 mm                                |                                  |                                        |                  |
| Washers                                                                      | Sapim NRHM                                 |                                  |                                        |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**202 NSW Carbon Tubeless Disc Brake (WH-202-NTLD-A2)**

|                                                                              |                               |                |
|------------------------------------------------------------------------------|-------------------------------|----------------|
| Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg |                               |                |
| Air Pressure                                                                 | 125 psi / 8.6 bar             |                |
| Tire Compatibility                                                           | Tube-type or Tubeless         | Minimum: 25 mm |
| Hub Model                                                                    | Cognition v2                  |                |
| Brake Compatibility                                                          | Disc (Center Lock)            |                |
| Compatible Drivers                                                           | XDR, Splined Road, Campagnolo |                |

**Rim Specifications**

|                             |                  |                 |  |
|-----------------------------|------------------|-----------------|--|
| Rim Description             | Carbon - w/Hooks |                 |  |
| ERD**                       | 578 mm w/washers |                 |  |
| Rim Profile                 | Symmetrical      |                 |  |
| Rim Width                   | External: 29 mm  | Internal: 21 mm |  |
| Rim Orientation / Direction | Not Applicable   |                 |  |

**Spoke Specifications**

|                   |                    |                                  |                 |                  |
|-------------------|--------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black     |                                  |                 |                  |
| Spoke Count       | Front: 24          |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X          |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 280 mm   | Front NDS: 278 mm                | Rear DS: 274 mm | Rear NDS: 280 mm |
| Min. Spoke Gauge  | 2.0/2.2 - 0.9/2.0  |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf     |                                  |                 |                  |
| Nipple Type       | Material: Aluminum | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm        |                                  |                 |                  |
| Washers           | Material: Steel    | Shape: Oval                      |                 |                  |

**202 Firecrest Carbon Tubeless Disc Brake (WH-202-FTLD-A1)**

|                                                                              |                                            |                |
|------------------------------------------------------------------------------|--------------------------------------------|----------------|
| Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg |                                            |                |
| Air Pressure                                                                 | 100 psi / 6.9 bar                          |                |
| Tire Compatibility                                                           | Tube-type or Tubeless                      | Minimum: 25 mm |
| Hub Model                                                                    | ZR1                                        |                |
| Brake Compatibility                                                          | Disc (Center Lock)                         |                |
| Compatible Drivers                                                           | XDR, Splined Road, MicroSpline, Campagnolo |                |

**Rim Specifications**

|                             |                  |                 |  |
|-----------------------------|------------------|-----------------|--|
| Rim Description             | Carbon - w/Hooks |                 |  |
| ERD**                       | 578 mm w/washers |                 |  |
| Rim Profile                 | Symmetrical      |                 |  |
| Rim Width                   | External: 29 mm  | Internal: 21 mm |  |
| Rim Orientation / Direction | Not Applicable   |                 |  |

**Spoke Specifications**

|                   |                         |                                  |                 |                  |
|-------------------|-------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Sprint - Black       |                                  |                 |                  |
| Spoke Count       | Front: 24               |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X               |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 280 mm        | Front NDS: 278 mm                | Rear DS: 274 mm | Rear NDS: 280 mm |
| Min. Spoke Gauge  | 2.0 / 2.25 - 1.25 / 2.0 |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf          |                                  |                 |                  |
| Nipple Type       | Material: Aluminum      | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm             |                                  |                 |                  |
| Washers           | Material: Steel         | Shape: Oval                      |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.



**353 NSW Tubeless Disc Brake (WH-353-NTLD-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                                  |                                                         |
|---------------------|--------------------------------------------------|---------------------------------------------------------|
| Air Pressure        | 28 mm = 72 psi / 5 bar, 30 mm = 65 psi / 4.5 bar |                                                         |
| Tire Compatibility  | Tubeless tires only                              | Minimum: 30 mm, only certain 28 mm tires are compatible |
| Hub Model           | Cognition v2                                     |                                                         |
| Brake Compatibility | Disc (Center Lock)                               |                                                         |
| Compatible Drivers  | XDR, Splined Road, Campagnolo                    |                                                         |

**Rim Specifications**

|                             |                   |                 |  |
|-----------------------------|-------------------|-----------------|--|
| Rim Description             | Carbon - Hookless |                 |  |
| ERD                         | 552 mm            |                 |  |
| Rim Profile                 | Symmetrical       |                 |  |
| Rim Width                   | External: 30 mm   | Internal: 25 mm |  |
| Rim Orientation / Direction | Not Applicable    |                 |  |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black                    |                                  |                 |                  |
| Spoke Count       | Front: 24                         |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X                         |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 266 mm                  | Front NDS: 264 mm                | Rear DS: 260 mm | Rear NDS: 266 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 125 +10/-5 Kgf                    |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 16 mm square head           |                                  |                 |                  |
| Washers           | No washers                        |                                  |                 |                  |

**353 NSW Tubeless Disc Brake (WH-353-NSW-B1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 114 kg

|                     |                                                                                |                                                         |  |
|---------------------|--------------------------------------------------------------------------------|---------------------------------------------------------|--|
| Air Pressure        | 28 mm = 72 psi / 5 bar, 30-34 mm = 65 psi / 4.5 bar, 35-39 mm = 58 psi / 4 bar |                                                         |  |
| Tire Compatibility  | Tubeless tires only                                                            | Minimum: 30 mm, only certain 28 mm tires are compatible |  |
| Hub Model           | ZR1 SL                                                                         |                                                         |  |
| Brake Compatibility | Disc (Center Lock)                                                             |                                                         |  |
| Compatible Drivers  | SRAM XDR, SRAM/Shimano Road, Campagnolo                                        |                                                         |  |

**Rim Specifications**

|                             |                   |                 |  |
|-----------------------------|-------------------|-----------------|--|
| Rim Description             | Carbon - Hookless |                 |  |
| ERD                         | 564 mm            |                 |  |
| Rim Profile                 | Symmetrical       |                 |  |
| Rim Width                   | External: 30 mm   | Internal: 25 mm |  |
| Rim Orientation / Direction | Not Applicable    |                 |  |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black                    |                                  |                 |                  |
| Spoke Count       | Front: 20                         |                                  | Rear: 20        |                  |
| Spoke Pattern     | Front: 2X                         |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 276 mm                  | Front NDS: 278 mm                | Rear DS: 274 mm | Rear NDS: 276 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf                    |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 16 mm square head           |                                  |                 |                  |
| Washers           | No washers                        |                                  |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

**303 Firecrest Carbon Tubeless Disc Brake (WH-303-FTLD-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                                                                                            |                                                         |
|---------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Air Pressure        | 28 mm = 72 psi / 5 bar, 30-34mm = 65 psi / 4.5 bar, 35-39 mm = 4 bar / 58 psi, 40-44 mm = 51 psi / 3.5 bar |                                                         |
| Tire Compatibility  | Tubeless tires only                                                                                        | Minimum: 30 mm, only certain 28 mm tires are compatible |
| Hub Model           | ZR1                                                                                                        |                                                         |
| Brake Compatibility | Disc (Center Lock)                                                                                         |                                                         |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo                                                                 |                                                         |

**Rim Specifications**

|                             |                   |                 |  |
|-----------------------------|-------------------|-----------------|--|
| Rim Description             | Carbon - Hookless |                 |  |
| ERD**                       | 565 mm w/washers  |                 |  |
| Rim Profile                 | Symmetrical       |                 |  |
| Rim Width                   | External: 29.7 mm | Internal: 25 mm |  |
| Rim Orientation / Direction | Not Applicable    |                 |  |

**Spoke Specifications**

|                   |                     |                                  |                 |                  |
|-------------------|---------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Sprint†          |                                  |                 |                  |
| Spoke Count       | Front: 24           |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X           |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 272 mm    | Front NDS: 270 mm                | Rear DS: 266 mm | Rear NDS: 270 mm |
| Min. Spoke Gauge  | 2.0/2.25 - 1.25/2.0 |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf      |                                  |                 |                  |
| Nipple Type       | Material: Aluminum  | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm         |                                  |                 |                  |
| Washers           | Material: Steel     | Shape: Oval                      |                 |                  |

<sup>†</sup>During calendar year 2022 Zipp changed from CX-Ray to CX-Sprint spokes on 303 and 404 Firecrest series wheels to guarantee production quantities. When replacing spokes, please take care to confirm and match spoke type in the wheel, or rebuild the entire wheel. 303 and 404 Firecrest wheels will continue with the CX-Sprint spoke specification moving forward.

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**303 Firecrest 650b Carbon Tubeless Disc Brake (WH-303-F650-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                            |                |  |
|---------------------|--------------------------------------------|----------------|--|
| Air Pressure        | 00 psi / 8.5 bar                           |                |  |
| Tire Compatibility  | Tubeless tires only                        | Minimum: 25 mm |  |
| Hub Model           | ZR1                                        |                |  |
| Brake Compatibility | Disc (Center Lock)                         |                |  |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo |                |  |

**Rim Specifications**

|                             |                     |                 |  |
|-----------------------------|---------------------|-----------------|--|
| Rim Description             | Carbon - with Hooks |                 |  |
| ERD**                       | 513 mm w/washers    |                 |  |
| Rim Profile                 | Symmetrical         |                 |  |
| Rim Width                   | External: 30 mm     | Internal: 21 mm |  |
| Rim Orientation / Direction | Not Applicable      |                 |  |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Sprint                         |                                  |                 |                  |
| Spoke Count       | Front: 24                         |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X                         |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 248 mm                  | Front NDS: 246 mm                | Rear DS: 242 mm | Rear NDS: 246 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf                    |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm                       |                                  |                 |                  |
| Washers           | Material: Steel                   | Shape: Oval                      |                 |                  |

**303 S Carbon Tubeless Disc Brake (WH-303-STLD-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                                                                   |                |            |
|---------------------|-----------------------------------------------------------------------------------|----------------|------------|
| Air Pressure        | 25-29 mm = 72 psi / 5 bar, 30-34 mm = 65 psi / 4.5 bar, 35-39 mm = 58 psi / 4 bar |                |            |
| Tire Compatibility  | Tubeless tires only                                                               | Minimum: 25 mm |            |
| Hub Model           | Front: 76D                                                                        |                | Rear: 176D |
| Brake Compatibility | Disc (Center Lock)                                                                |                |            |
| Compatible Drivers  | XDR, Splined Road                                                                 |                |            |

**Rim Specifications**

|                             |                   |                 |  |
|-----------------------------|-------------------|-----------------|--|
| Rim Description             | Carbon - Hookless |                 |  |
| ERD**                       | 551 mm w/washers  |                 |  |
| Rim Profile                 | Symmetrical       |                 |  |
| Rim Width                   | External: 28 mm   | Internal: 23 mm |  |
| Rim Orientation / Direction | Not Applicable    |                 |  |

**Spoke Specifications**

|                   |                                     |                                  |                 |                  |
|-------------------|-------------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Sprint                           |                                  |                 |                  |
| Spoke Count       | Front: 24                           |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X                           |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 266 mm                    | Front NDS: 268 mm                | Rear DS: 264 mm | Rear NDS: 266 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.25 mm - 1.25 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf                      |                                  |                 |                  |
| Nipple Type       | Material: Brass                     | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm                         |                                  |                 |                  |
| Washers           | Material: Steel                     | Shape: Oval                      |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**303 XPLR SW Carbon Tubeless Disc Brake (WH-303-XPSW-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 286 lbs / 130 kg

|                     |                                                                                       |                |
|---------------------|---------------------------------------------------------------------------------------|----------------|
| Air Pressure        | 40-44 mm = 51 psi / 3.5 bar, 45-54 mm = 44 psi / 3.0 bar, 55-60 mm = 36 psi / 2.5 bar |                |
| Tire Compatibility  | Tubeless                                                                              | Minimum: 40 mm |
| Hub Model           | ZR1                                                                                   |                |
| Brake Compatibility | Disc (Center Lock)                                                                    |                |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo                                            |                |

**Rim Specifications**

|                             |                    |                 |  |
|-----------------------------|--------------------|-----------------|--|
| Rim Description             | Carbon - Hookless  |                 |  |
| ERD                         | 537 mm, No washers |                 |  |
| Rim Profile                 | Symmetrical        |                 |  |
| Rim Width                   | External: 40 mm    | Internal: 32 mm |  |
| Rim Orientation / Direction | Not Applicable     |                 |  |

**Spoke Specifications**

|                   |                    |                                  |              |               |
|-------------------|--------------------|----------------------------------|--------------|---------------|
| Spoke Type        | CX-Ray             |                                  |              |               |
| Spoke Count       | Front: 24          |                                  | Rear: 24     |               |
| Spoke Pattern     | Front: 2X          |                                  | Rear: 2X     |               |
| Spoke Length      | Front DS: 258      | Front NDS: 260                   | Rear DS: 256 | Rear NDS: 258 |
| Min. Spoke Gauge  | 2.0/2.2 - 0.9/2.0  |                                  |              |               |
| Spoke Tension*    | 115 + ± 10 Kgf     |                                  |              |               |
| Nipple Type       | Material: Aluminum | Anti-Rotation: Sapim Secure Lock |              |               |
| Spoke Nipple Size | 2.0 x 16 mm        |                                  |              |               |
| Washers           | Material: N/A      | Shape: N/A                       |              |               |

**303 XPLR S Carbon Tubeless Disc Brake (WH-303-XPS-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 286 lbs / 130 kg

|                     |                                                                                     |                |
|---------------------|-------------------------------------------------------------------------------------|----------------|
| Air Pressure        | 40-44 mm = 51 psi / 3.5 bar, 45-54 mm = 44 psi / 3 bar, 55-60 mm = 36 psi / 2.5 bar |                |
| Tire Compatibility  | Tubeless                                                                            | Minimum: 40 mm |
| Hub Model           | 176/76                                                                              |                |
| Brake Compatibility | Disc (Center Lock)                                                                  |                |
| Compatible Drivers  | XDR, Splined Road                                                                   |                |

**Rim Specifications**

|                             |                    |                 |  |
|-----------------------------|--------------------|-----------------|--|
| Rim Description             | Carbon - Hookless  |                 |  |
| ERD                         | 537 mm, No washers |                 |  |
| Rim Profile                 | Symmetrical        |                 |  |
| Rim Width                   | External: 40 mm    | Internal: 32 mm |  |
| Rim Orientation / Direction | Not Applicable     |                 |  |

**Spoke Specifications**

|                   |                   |                                  |  |              |               |
|-------------------|-------------------|----------------------------------|--|--------------|---------------|
| Spoke Type        | CX-Sprint         |                                  |  |              |               |
| Spoke Count       | Front: 24         |                                  |  | Rear: 24     |               |
| Spoke Pattern     | Front: 2X         |                                  |  | Rear: 2X     |               |
| Spoke Length      | Front DS: 258     | Front NDS: 260                   |  | Rear DS: 256 | Rear NDS: 258 |
| Min. Spoke Gauge  | 2.0/2.2 - 0.9/2.0 |                                  |  |              |               |
| Spoke Tension*    | 115 + ± 10 Kgf    |                                  |  |              |               |
| Nipple Type       | Material: Brass   | Anti-Rotation: Sapim Secure Lock |  |              |               |
| Spoke Nipple Size | 2.0 x 16 mm       |                                  |  |              |               |
| Washers           | Material: N/A     | Shape: N/A                       |  |              |               |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**303 SW Tubeless Disc Brake (WH-303-SW-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 265 lbs / 120 kg

|                     |                                                                                                             |                                                         |
|---------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Air Pressure        | 28 mm = 72 psi / 5 bar, 30-34 mm = 65 psi / 4.5 bar, 35-39 mm = 58 psi / 4 bar, 40-44 mm = 51 psi / 3.5 bar |                                                         |
| Tire Compatibility  | Tubeless tires only                                                                                         | Minimum: 30 mm, only certain 28 mm tires are compatible |
| Hub Model           | ZR1                                                                                                         |                                                         |
| Brake Compatibility | Disc (Center Lock)                                                                                          |                                                         |
| Compatible Drivers  | SRAM XDR, SRAM/Shimano Road                                                                                 |                                                         |

**Rim Specifications**

|                             |                   |                 |
|-----------------------------|-------------------|-----------------|
| Rim Description             | Carbon - Hookless |                 |
| ERD**                       | 564 mm            |                 |
| Rim Profile                 | Symmetrical       |                 |
| Rim Width                   | External: 33 mm   | Internal: 25 mm |
| Rim Orientation / Direction | Not Applicable    |                 |

**Spoke Specifications**

|                   |                    |                                  |                 |                  |
|-------------------|--------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Sprint          |                                  |                 |                  |
| Spoke Count       | Front: 20          |                                  | Rear: 20        |                  |
| Spoke Pattern     | Front: 2X          |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 274 mm   | Front NDS: 276 mm                | Rear DS: 272 mm | Rear NDS: 276 mm |
| Min. Spoke Gauge  | 2.0/2.2 - 0.9/2.0  |                                  |                 |                  |
| Spoke Tension*    | 115 +10/-5 Kgf     |                                  |                 |                  |
| Nipple Type       | Material: Aluminum | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 16 mm        |                                  |                 |                  |
| Washers           | Material: N/A      | Shape: N/A                       |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

## 303 Series Tubeless Rim Brake Wheels

### 303 NSW Carbon Tubeless Rim Brake (WH-303-NTLR-A2)

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                               |                |
|---------------------|-------------------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar             |                |
| Tire Compatibility  | Tube-type or Tubeless         | Minimum: 23 mm |
| Hub Model           | Cognition v2                  |                |
| Brake Compatibility | Disc (Center Lock)            |                |
| Compatible Drivers  | XDR, Splined Road, Campagnolo |                |

#### Rim Specifications

|                             |                    |                   |
|-----------------------------|--------------------|-------------------|
| Rim Description             | Carbon - w/Hooks   |                   |
| ERD**                       | 550 mm w/washers   |                   |
| Rim Profile                 | Front: Symmetrical | Rear: Symmetrical |
| Rim Width                   | External: 27 mm    | Internal: 19 mm   |
| Rim Orientation / Direction | Not Applicable     |                   |

#### Spoke Specifications

|                   |                        |                                  |                 |                  |
|-------------------|------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black         |                                  |                 |                  |
| Spoke Count       | Front: 18              |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: Radial          |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 260 mm       | Front NDS: 260 mm                | Rear DS: 270 mm | Rear NDS: 272 mm |
| Min. Spoke Gauge  | 2.0 / 2.2 - 1.25 / 2.0 |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf         |                                  |                 |                  |
| Nipple Type       | Material: Aluminum     | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm            |                                  |                 |                  |
| Washers           | Material: Carbon       | Shape: Oval                      |                 |                  |

### 303 Firecrest Carbon Tubeless Rim Brake (WH-303-FTLR-A1)

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                            |                |
|---------------------|--------------------------------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar                          |                |
| Tire Compatibility  | Tube-type or Tubeless                      | Minimum: 23 mm |
| Hub Model           | ZR1                                        |                |
| Brake Compatibility | Rim Brake                                  |                |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo |                |

#### Rim Specifications

|                             |                     |                 |
|-----------------------------|---------------------|-----------------|
| Rim Description             | Carbon - with Hooks |                 |
| ERD**                       | 550 mm w/washers    |                 |
| Rim Profile                 | Symmetrical         |                 |
| Rim Width                   | External: 27 mm     | Internal: 19 mm |
| Rim Orientation / Direction | Not Applicable      |                 |

#### Spoke Specifications

|                   |                        |                                  |                 |                  |
|-------------------|------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Sprint              |                                  |                 |                  |
| Spoke Count       | Front: 18              |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: Radial          |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 254 mm       | Front NDS: 254 mm                | Rear DS: 260 mm | Rear NDS: 264 mm |
| Min. Spoke Gauge  | 2.0 / 2.2 - 1.25 / 2.0 |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf         |                                  |                 |                  |
| Nipple Type       | Material: Aluminum     | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm            |                                  |                 |                  |
| Washers           | Material: Steel        | Shape: Oval                      |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**303 Firecrest Carbon Tubular Disc Brake (WH-303-FTUD-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                            |                         |
|---------------------|--------------------------------------------|-------------------------|
| Air Pressure        | 125 psi / 8.6 bar                          |                         |
| Tire Compatibility  | Tubular                                    | Minimum: Not Applicable |
| Hub Model           | ZR1                                        |                         |
| Brake Compatibility | Disc (Center Lock)                         |                         |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo |                         |

**Rim Specifications**

|                             |                  |                          |
|-----------------------------|------------------|--------------------------|
| Rim Description             | Carbon           |                          |
| ERD**                       | 552 mm w/washers |                          |
| Rim Profile                 | Symmetrical      |                          |
| Rim Width                   | External: 27 mm  | Internal: Not Applicable |
| Rim Orientation / Direction | Not Applicable   |                          |

**Spoke Specifications**

|                   |                    |                   |                                  |                 |                  |
|-------------------|--------------------|-------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Sprint          |                   |                                  |                 |                  |
| Spoke Count       | Front: 24          |                   |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X          |                   |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 268 mm   | Front NDS: 266 mm |                                  | Rear DS: 260 mm | Rear NDS: 266 mm |
| Min. Spoke Gauge  | 2.0/2.2 - 0.9/2.0  |                   |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf     |                   |                                  |                 |                  |
| Nipple Type       | Material: Aluminum |                   | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm        |                   |                                  |                 |                  |
| Washers           | Material: Steel    |                   | Shape: Oval                      |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

| 303 Firecrest Tubular Rim Brake (WH-303-FTUR-A1)                             |                                            |                                  |                          |                  |
|------------------------------------------------------------------------------|--------------------------------------------|----------------------------------|--------------------------|------------------|
| Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg |                                            |                                  |                          |                  |
| Air Pressure                                                                 | 125 psi / 8.6 bar                          |                                  |                          |                  |
| Tire Compatibility                                                           | Tubular                                    | Minimum: Not Applicable          |                          |                  |
| Hub Model                                                                    | ZR1                                        |                                  |                          |                  |
| Brake Compatibility                                                          | Rim Brake                                  |                                  |                          |                  |
| Compatible Drivers                                                           | XDR, Splined Road, MicroSpline, Campagnolo |                                  |                          |                  |
| Rim Specifications                                                           |                                            |                                  |                          |                  |
| Rim Description                                                              | Carbon                                     |                                  |                          |                  |
| ERD**                                                                        | 552 mm w/washers                           |                                  |                          |                  |
| Rim Profile                                                                  | Front: Symmetrical                         |                                  | Rear: Symmetrical        |                  |
| Rim Width                                                                    | External: 27 mm                            |                                  | Internal: Not Applicable |                  |
| Rim Orientation / Direction                                                  | Not Applicable                             |                                  |                          |                  |
| Spoke Specifications                                                         |                                            |                                  |                          |                  |
| Spoke Type                                                                   | CX-Sprint                                  |                                  |                          |                  |
| Spoke Count                                                                  | Front: 18                                  |                                  | Rear: 24                 |                  |
| Spoke Pattern                                                                | Front: Radial                              |                                  | Rear: 2X                 |                  |
| Spoke Length                                                                 | Front DS: 256 mm                           | Front NDS: 256 mm                | Rear DS: 260 mm          | Rear NDS: 266 mm |
| Min. Spoke Gauge                                                             | 2.0 / 2.25 - 1.25 / 2.0                    |                                  |                          |                  |
| Spoke Tension*                                                               | 100 +10/-5 Kgf                             |                                  |                          |                  |
| Nipple Type                                                                  | Material: Aluminum                         | Anti-Rotation: Sapim Secure Lock |                          |                  |
| Spoke Nipple Size                                                            | 2.0 x 14 mm                                |                                  |                          |                  |
| Washers                                                                      | Material: Steel                            | Shape: Oval                      |                          |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.



## 302 Carbon Tubeless Rim Brake (WH-302-TL-A1)

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                       |                |           |
|---------------------|-----------------------|----------------|-----------|
| Air Pressure        | 125 psi / 8.6 bar     |                |           |
| Tire Compatibility  | Tube-type or Tubeless | Minimum: 20 mm |           |
| Hub Model           | Front: 76             |                | Rear: 176 |
| Brake Compatibility | Rim Brake             |                |           |
| Compatible Drivers  | XDR, Splined Road     |                |           |

### Rim Specifications

|                             |                  |                 |
|-----------------------------|------------------|-----------------|
| Rim Description             | Carbon - w/Hooks |                 |
| ERD**                       | 551 mm w/washers |                 |
| Rim Profile                 | Symmetrical      |                 |
| Rim Width                   | External: 26 mm  | Internal: 17 mm |
| Rim Orientation / Direction | Not Applicable   |                 |

### Spoke Specifications

|                   |                         |                               |                 |                  |
|-------------------|-------------------------|-------------------------------|-----------------|------------------|
| Spoke Type        | CX-Sprint - Black       |                               |                 |                  |
| Spoke Count       | Front: 20               |                               | Rear: 24        |                  |
| Spoke Pattern     | Front: Radial           |                               | Rear: 2X        |                  |
| Spoke Length      | Front DS: 256 mm        | Front NDS: 256 mm             | Rear DS: 262 mm | Rear NDS: 264 mm |
| Min. Spoke Gauge  | 2.0 / 2.25 - 1.25 / 2.0 |                               |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf          |                               |                 |                  |
| Nipple Type       | Material: Brass         | Anti-Rotation: Not Applicable |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm             |                               |                 |                  |
| Washers           | Material: Steel         | Shape: Oval                   |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**454 NSW Tubeless Disc Brake (WH-454-NTLD-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                            |                |
|---------------------|--------------------------------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar                          |                |
| Tire Compatibility  | Tube-type or Tubeless                      | Minimum: 23 mm |
| Hub Model           | Cognition v2                               |                |
| Brake Compatibility | Disc (Center Lock)                         |                |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo |                |

**Rim Specifications**

|                             |                     |                 |
|-----------------------------|---------------------|-----------------|
| Rim Description             | Carbon - with Hooks |                 |
| ERD**                       | 527 mm w/washers    |                 |
| Rim Profile                 | Symmetrical         |                 |
| Rim Width                   | External: 28 mm     | Internal: 19 mm |
| Rim Orientation / Direction | Not Applicable      |                 |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black                    |                                  |                 |                  |
| Spoke Count       | Front: 24                         |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X                         |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 254 mm                  | Front NDS: 252 mm                | Rear DS: 248 mm | Rear NDS: 254 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 115 +10/-5 Kgf                    |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm                       |                                  |                 |                  |
| Washers           | Material: Titanium                | Shape: Round                     |                 |                  |

**454 NSW Tubeless Disc Brake (WH-454-NTLD-B1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                                                             |                |
|---------------------|-----------------------------------------------------------------------------|----------------|
| Air Pressure        | 28 mm = 72 psi / 5 bar, 30-34 mm = 65 psi / 4.5 bar, 35 mm = 58 psi / 4 bar |                |
| Tire Compatibility  | Tubeless tires only                                                         | Minimum: 28 mm |
| Hub Model           | Cognition v2                                                                |                |
| Brake Compatibility | Disc (Center Lock)                                                          |                |
| Compatible Drivers  | XDR, Splined Road                                                           |                |

**Rim Specifications**

|                             |                   |                 |
|-----------------------------|-------------------|-----------------|
| Rim Description             | Carbon - Hookless |                 |
| ERD                         | 530 mm            |                 |
| Rim Profile                 | Symmetrical       |                 |
| Rim Width                   | External: 28 mm   | Internal: 23 mm |
| Rim Orientation / Direction | Not Applicable    |                 |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |  |  |  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|--|--|--|
| Spoke Type        | CX-Ray - Black                    |                                  |                 |                  |  |  |  |
| Spoke Count       | Front: 24                         |                                  | Rear: 24        |                  |  |  |  |
| Spoke Pattern     | Front: 2X                         |                                  | Rear: 2X        |                  |  |  |  |
| Spoke Length      | Front DS: 256 mm                  | Front NDS: 254 mm                | Rear DS: 250 mm | Rear NDS: 256 mm |  |  |  |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |  |  |  |
| Spoke Tension*    | 125 +10/-5 Kgf                    |                                  |                 |                  |  |  |  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |  |  |  |
| Spoke Nipple Size | 2.0 x 16 mm Square Head           |                                  |                 |                  |  |  |  |
| Washers           | Not Applicable                    |                                  |                 |                  |  |  |  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**454 NSW Tubeless Disc Brake (WH-454-NTLD-C1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 114 kg

|                     |                                                                             |                |
|---------------------|-----------------------------------------------------------------------------|----------------|
| Air Pressure        | 28 mm = 72 psi / 5 bar, 30-34 mm = 65 psi / 4.5 bar, 35 mm = 58 psi / 4 bar |                |
| Tire Compatibility  | Tubeless                                                                    | Minimum: 28 mm |
| Hub Model           | ZR1 SL                                                                      |                |
| Brake Compatibility | Disc (Center Lock)                                                          |                |
| Compatible Drivers  | XDR, Splined Road                                                           |                |

**Rim Specifications**

|                             |                   |                 |  |
|-----------------------------|-------------------|-----------------|--|
| Rim Description             | Carbon - Hookless |                 |  |
| ERD**                       | 530 mm            |                 |  |
| Rim Profile                 | Symmetrical       |                 |  |
| Rim Width                   | External: 28 mm   | Internal: 23 mm |  |
| Rim Orientation / Direction | Not Applicable    |                 |  |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black                    |                                  |                 |                  |
| Spoke Count       | Front: 24                         |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X                         |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 254 mm                  | Front NDS: 256 mm                | Rear DS: 252 mm | Rear NDS: 256 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 115 ±10 Kgf                       |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 16 mm                       |                                  |                 |                  |
| Washers           | Material: Titanium                | Shape: Round                     |                 |                  |

**404 NSW Tubeless Disc Brake (WH-404-NTLD-A2)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                            |                |  |
|---------------------|--------------------------------------------|----------------|--|
| Air Pressure        | 125 psi / 8.6 bar                          |                |  |
| Tire Compatibility  | Tube-type or Tubeless                      | Minimum: 23 mm |  |
| Hub Model           | Cognition v2                               |                |  |
| Brake Compatibility | Disc (Center Lock)                         |                |  |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo |                |  |

**Rim Specifications**

|                             |                     |                 |  |
|-----------------------------|---------------------|-----------------|--|
| Rim Description             | Carbon - with Hooks |                 |  |
| ERD**                       | 527 mm w/washers    |                 |  |
| Rim Profile                 | Symmetrical         |                 |  |
| Rim Width                   | External: 27 mm     | Internal: 19 mm |  |
| Rim Orientation / Direction | Not Applicable      |                 |  |

**Spoke Specifications**

|                   |                         |                                  |                 |                  |
|-------------------|-------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black          |                                  |                 |                  |
| Spoke Count       | Front: 24               |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X               |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 254 mm        | Front NDS: 252 mm                | Rear DS: 248 mm | Rear NDS: 254 mm |
| Min. Spoke Gauge  | 2.0 / 2.25 - 1.25 / 2.0 |                                  |                 |                  |
| Spoke Tension*    | 100 10/-5 Kgf           |                                  |                 |                  |
| Nipple Type       | Material: Aluminum      | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm             |                                  |                 |                  |
| Washers           | Material: Steel         | Shape: Oval                      |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**404 Firecrest Carbon Tubeless Disc Brake (WH-404-FTLD-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                                 |                |
|---------------------|-------------------------------------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar                               |                |
| Tire Compatibility  | Tube-type or Tubeless                           | Minimum: 23 mm |
| Hub Model           | ZR1                                             |                |
| Brake Compatibility | Disc (Center Lock)                              |                |
| Compatible Drivers  | SRAM XDR, Splined Road, MicroSpline, Campagnolo |                |

**Rim Specifications**

|                             |                  |                 |
|-----------------------------|------------------|-----------------|
| Rim Description             | Carbon - w/Hooks |                 |
| ERD**                       | 527 mm w/washers |                 |
| Rim Profile                 | Symmetrical      |                 |
| Rim Width                   | External: 27 mm  | Internal: 19 mm |
| Rim Orientation / Direction | Not Applicable   |                 |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Sprint                         |                                  |                 |                  |
| Spoke Count       | Front: 24                         |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X                         |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 254 mm                  | Front NDS: 252 mm                | Rear DS: 248 mm | Rear NDS: 252 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 100 10/-5 Kgf                     |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm                       |                                  |                 |                  |
| Washers           | Material: Steel                   | Shape: Oval                      |                 |                  |

**404 Firecrest Tubeless Disc Brake (WH-404-FTLD-B1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                                                            |                |
|---------------------|----------------------------------------------------------------------------|----------------|
| Air Pressure        | 28 mm =72 psi / 5 bar, 30-34 mm = 65 psi / 4.5 bar, 35 mm = 58 psi / 4 bar |                |
| Tire Compatibility  | Tubeless Tires Only                                                        | Minimum: 28 mm |
| Hub Model           | ZR1                                                                        |                |
| Brake Compatibility | Disc (Center Lock)                                                         |                |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo                                 |                |

**Rim Specifications**

|                             |                   |                 |
|-----------------------------|-------------------|-----------------|
| Rim Description             | Carbon - Hookless |                 |
| ERD**                       | 529 mm w/washers  |                 |
| Rim Profile                 | Symmetrical       |                 |
| Rim Width                   | External: 28 mm   | Internal: 23 mm |
| Rim Orientation / Direction | Not Applicable    |                 |

**Spoke Specifications**

|                   |                         |                                  |                 |                  |
|-------------------|-------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Sprint†              |                                  |                 |                  |
| Spoke Count       | Front: 24               |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X               |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 256 mm        | Front NDS: 254 mm                | Rear DS: 250 mm | Rear NDS: 254 mm |
| Min. Spoke Gauge  | 2.0 / 2.25 - 1.25 / 2.0 |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf          |                                  |                 |                  |
| Nipple Type       | Material: Aluminum      | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm             |                                  |                 |                  |
| Washers           | Material: Steel         | Shape: Oval                      |                 |                  |

<sup>†</sup>During calendar year 2022 Zipp changed from CX-Ray to CX-Sprint spokes on 303 and 404 Firecrest series wheels to guarantee production quantities. When replacing spokes, please take care to confirm and match spoke type in the wheel, or rebuild the entire wheel. 303 and 404 Firecrest wheels will continue with the CX-Sprint spoke specification moving forward.

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**454 NSW Carbon Tubeless Rim Brake (WH-454-NTLR-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                            |                |  |
|---------------------|--------------------------------------------|----------------|--|
| Air Pressure        | 125 psi / 8.6 bar                          |                |  |
| Tire Compatibility  | Tube-type or Tubeless                      | Minimum: 23 mm |  |
| Hub Model           | Cognition v2                               |                |  |
| Brake Compatibility | Rim Brake                                  |                |  |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo |                |  |

**Rim Specifications**

|                             |                   |                 |  |
|-----------------------------|-------------------|-----------------|--|
| Rim Description             | Carbon - w/ Hooks |                 |  |
| ERD**                       | 527 mm w/washers  |                 |  |
| Rim Profile                 | Symmetrical       |                 |  |
| Rim Width                   | External: 27 mm   | Internal: 19 mm |  |
| Rim Orientation / Direction | Not Applicable    |                 |  |

**Spoke Specifications**

|                   |                         |                                  |                 |                  |
|-------------------|-------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black          |                                  |                 |                  |
| Spoke Count       | Front: 18               |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: Radial           |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 248 mm        | Front NDS: 248 mm                | Rear DS: 258 mm | Rear NDS: 260 mm |
| Min. Spoke Gauge  | 2.0 / 2.25 - 1.25 / 2.0 |                                  |                 |                  |
| Spoke Tension*    | 115 +10/-5 Kgf          |                                  |                 |                  |
| Nipple Type       | Material: Aluminum      | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm             |                                  |                 |                  |
| Washers           | Material: Titanium      | Shape: Round                     |                 |                  |

**454 NSW Carbon Tubeless Rim Brake (WH-454-NTLR-B1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                            |                |
|---------------------|--------------------------------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar                          |                |
| Tire Compatibility  | Tube-type or Tubeless                      | Minimum: 23 mm |
| Hub Model           | Cognition v2                               |                |
| Brake Compatibility | Rim Brake                                  |                |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo |                |

**Rim Specifications**

|                             |                   |                 |  |
|-----------------------------|-------------------|-----------------|--|
| Rim Description             | Carbon - w/ Hooks |                 |  |
| ERD**                       | 527 mm w/washers  |                 |  |
| Rim Profile                 | Symmetrical       |                 |  |
| Rim Width                   | External: 27 mm   | Internal: 19 mm |  |
| Rim Orientation / Direction | Not Applicable    |                 |  |

**Spoke Specifications**

|                   |                         |                                  |                 |                  |
|-------------------|-------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black          |                                  |                 |                  |
| Spoke Count       | Front: 18               |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: Radial           |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 248 mm        | Front NDS: 248 mm                | Rear DS: 258 mm | Rear NDS: 260 mm |
| Min. Spoke Gauge  | 2.0 / 2.25 - 1.25 / 2.0 |                                  |                 |                  |
| Spoke Tension*    | 115 +10/-5 Kgf          |                                  |                 |                  |
| Nipple Type       | Material: Aluminum      | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm             |                                  |                 |                  |
| Washers           | Material: Titanium      | Shape: Round                     |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

## 404 Series Carbon Clincher Tubeless Rim Brake Wheels

### 404 NSW Carbon Tubeless Rim Brake (WH-404-NTLR-A2)

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                               |                |
|---------------------|-------------------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar             |                |
| Tire Compatibility  | Tube-type or Tubeless         | Minimum: 23 mm |
| Hub Model           | Cognition v2                  |                |
| Brake Compatibility | Rim Brake                     |                |
| Compatible Drivers  | XDR, Splined Road, Campagnolo |                |

#### Rim Specifications

|                             |                  |                 |
|-----------------------------|------------------|-----------------|
| Rim Description             | Carbon - w/Hooks |                 |
| ERD**                       | 527 mm w/washers |                 |
| Rim Profile                 | Symmetrical      |                 |
| Rim Width                   | External: 27 mm  | Internal: 19 mm |
| Rim Orientation / Direction | Not Applicable   |                 |

#### Spoke Specifications

|                   |                    |                                  |                 |                  |
|-------------------|--------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black     |                                  |                 |                  |
| Spoke Count       | Front: 18          |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: Radial      |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 246 mm   | Front NDS: 246 mm                | Rear DS: 256 mm | Rear NDS: 258 mm |
| Min. Spoke Gauge  | 2.0/2.2 - 0.9/2.0  |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf     |                                  |                 |                  |
| Nipple Type       | Material: Aluminum | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm        |                                  |                 |                  |
| Washers           | Material: Steel    | Shape: Oval                      |                 |                  |

### 404 Firecrest Carbon Tubeless Rim Brake (WH-404-FTLR-A1)

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                            |                |
|---------------------|--------------------------------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar                          |                |
| Tire Compatibility  | Tube-type or Tubeless                      | Minimum: 23 mm |
| Hub Model           | ZR1                                        |                |
| Brake Compatibility | Rim Brake                                  |                |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo |                |

#### Rim Specifications

|                             |                  |                 |
|-----------------------------|------------------|-----------------|
| Rim Description             | Carbon - w/Hooks |                 |
| ERD**                       | 527 mm w/washers |                 |
| Rim Profile                 | Symmetrical      |                 |
| Rim Width                   | External: 27 mm  | Internal: 19 mm |
| Rim Orientation / Direction | Not Applicable   |                 |

#### Spoke Specifications

|                   |                     |                                  |                 |                  |
|-------------------|---------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Sprint†          |                                  |                 |                  |
| Spoke Count       | Front: 18           |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: Radial       |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 242 mm    | Front NDS: 242 mm                | Rear DS: 248 mm | Rear NDS: 252 mm |
| Min. Spoke Gauge  | 2.0/2.25 - 1.25/2.0 |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf      |                                  |                 |                  |
| Nipple Type       | Material: Aluminum  | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm         |                                  |                 |                  |
| Washers           | Material: Steel     | Shape: Oval                      |                 |                  |

†During calendar year 2022 Zipp changed from CX-Ray to CX-Sprint spokes on 303 and 404 Firecrest series wheels to guarantee production quantities. When replacing spokes, please take care to confirm and match spoke type in the wheel, or rebuild the entire wheel. 303 and 404 Firecrest wheels will continue with the CX-Sprint spoke specification moving forward.

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**454 NSW Tubular Disc Brake (WH-454-NTUD-A2)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                               |                |
|---------------------|-------------------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar             |                |
| Tire Compatibility  | Tubular                       | Minimum: 22 mm |
| Hub Model           | Cognition v2                  |                |
| Brake Compatibility | Disc (Center Lock)            |                |
| Compatible Drivers  | XDR, Splined Road, Campagnolo |                |

**Rim Specifications**

|                             |                  |                          |
|-----------------------------|------------------|--------------------------|
| Rim Description             | Carbon           |                          |
| ERD**                       | 525 mm w/washers |                          |
| Rim Profile                 | Symmetrical      |                          |
| Rim Width                   | External: 27 mm  | Internal: Not Applicable |
| Rim Orientation / Direction | Not Applicable   |                          |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black                    |                                  |                 |                  |
| Spoke Count       | Front: 24                         |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X                         |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 254 mm                  | Front NDS: 252 mm                | Rear DS: 248 mm | Rear NDS: 254 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 115 +10/-5 Kgf                    |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm                       |                                  |                 |                  |
| Washers           | Material: Titanium                | Shape: Round                     |                 |                  |

**454 NSW Tubular Disc Brake (WH-454-NTUD-B1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                               |                |  |
|---------------------|-------------------------------|----------------|--|
| Air Pressure        | 125 psi / 8.6 bar             |                |  |
| Tire Compatibility  | Tubular                       | Minimum: 22 mm |  |
| Hub Model           | Cognition v2                  |                |  |
| Brake Compatibility | Disc (Center Lock)            |                |  |
| Compatible Drivers  | XDR, Splined Road, Campagnolo |                |  |

**Rim Specifications**

|                             |                  |                          |
|-----------------------------|------------------|--------------------------|
| Rim Description             | Carbon           |                          |
| ERD**                       | 525 mm w/washers |                          |
| Rim Profile                 | Symmetrical      |                          |
| Rim Width                   | External: 27 mm  | Internal: Not Applicable |
| Rim Orientation / Direction | Not Applicable   |                          |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black                    |                                  |                 |                  |
| Spoke Count       | Front: 24                         |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X                         |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 254 mm                  | Front NDS: 252 mm                | Rear DS: 248 mm | Rear NDS: 254 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 115 +10/-5 Kgf                    |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm                       |                                  |                 |                  |
| Washers           | Material: Titanium                | Shape: Round                     |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**454 NSW Tubular Rim Brake (WH-454-NTUR-A2)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                            |                |
|---------------------|--------------------------------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar                          |                |
| Tire Compatibility  | Tubular                                    | Minimum: 22 mm |
| Hub Model           | Cognition v2                               |                |
| Brake Compatibility | Rim Brake                                  |                |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo |                |

**Rim Specifications**

|                             |                  |                          |
|-----------------------------|------------------|--------------------------|
| Rim Description             | Carbon           |                          |
| ERD**                       | 525 mm w/washers |                          |
| Rim Profile                 | Symmetrical      |                          |
| Rim Width                   | External: 27 mm  | Internal: Not Applicable |
| Rim Orientation / Direction | Not Applicable   |                          |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black                    |                                  |                 |                  |
| Spoke Count       | Front: 18                         |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: Radial                     |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 248 mm                  | Front NDS: 248 mm                | Rear DS: 258 mm | Rear NDS: 260 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 115 +10/-5 Kgf                    |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm                       |                                  |                 |                  |
| Washers           | Material: Titanium                | Shape: Round                     |                 |                  |

**454 NSW Tubular Rim Brake (WH-454-NTUR-B1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                            |                |  |
|---------------------|--------------------------------------------|----------------|--|
| Air Pressure        | 125 psi / 8.6 bar                          |                |  |
| Tire Compatibility  | Tubular                                    | Minimum: 22 mm |  |
| Hub Model           | Cognition v2                               |                |  |
| Brake Compatibility | Rim Brake                                  |                |  |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo |                |  |

**Rim Specifications**

|                             |                  |                          |
|-----------------------------|------------------|--------------------------|
| Rim Description             | Carbon           |                          |
| ERD**                       | 525 mm w/washers |                          |
| Rim Profile                 | Symmetrical      |                          |
| Rim Width                   | External: 27 mm  | Internal: Not Applicable |
| Rim Orientation / Direction | Not Applicable   |                          |

**Spoke Specifications**

|                   |                                   |                                  |  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|--|-----------------|------------------|
| Spoke Type        | CX-Ray - Black                    |                                  |  |                 |                  |
| Spoke Count       | Front: 18                         |                                  |  | Rear: 24        |                  |
| Spoke Pattern     | Front: Radial                     |                                  |  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 248 mm                  | Front NDS: 248 mm                |  | Rear DS: 258 mm | Rear NDS: 260 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |  |                 |                  |
| Spoke Tension*    | 115 +10/-5 Kgf                    |                                  |  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |  |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm                       |                                  |  |                 |                  |
| Washers           | Material: Titanium                | Shape: Round                     |  |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.



**404 Tubular Track (WH-404-TUTK-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

Air Pressure 125 psi / 8.6 bar

Tire Compatibility Tubular Minimum: 22 mm

Hub Model Front: Track Rear: Track

Brake Compatibility Not Applicable

Compatible Drivers Not Applicable

**Rim Specifications**

Rim Description Carbon

ERD\*\* Not Applicable

Rim Profile Front: Symmetrical Rear: Symmetrical

Rim Width External: 27 mm Internal: Not Applicable

Rim Orientation / Direction Not Applicable

**Spoke Specifications**

Spoke Type CX-Ray - Black

Spoke Count Front: 28 Rear: 28

Spoke Pattern Front: Radial Rear: 2X

Spoke Length Front DS: 238 mm Front NDS: 238 mm Rear DS: 242 mm Rear NDS: 246 mm

Min. Spoke Gauge 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm

Spoke Tension\* 100 10/-5 Kgf

Nipple Type Material: Aluminum Anti-Rotation: Sapim Secure Lock

Spoke Nipple Size 2.0 x 14 mm

Washers Material: Steel Shape: Oval

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**858 NSW Tubeless Disc Brake (WH-858-NTLD-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                               |                |
|---------------------|-------------------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar             |                |
| Tire Compatibility  | Tube-type or Tubeless         | Minimum: 23 mm |
| Hub Model           | Cognition v2                  |                |
| Brake Compatibility | Disc (Center Lock)            |                |
| Compatible Drivers  | XDR, Splined Road, Campagnolo |                |

**Rim Specifications**

|                             |                     |                 |
|-----------------------------|---------------------|-----------------|
| Rim Description             | Carbon - with Hooks |                 |
| ERD                         | 478 mm              |                 |
| Rim Profile                 | Symmetrical         |                 |
| Rim Width                   | External: 24 mm     | Internal: 18 mm |
| Rim Orientation / Direction | Not Applicable      |                 |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black                    |                                  |                 |                  |
| Spoke Count       | Front: 24                         |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X                         |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 232 mm                  | Front NDS: 230 mm                | Rear DS: 226 mm | Rear NDS: 232 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 115 +10/-5 Kgf                    |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 16 mm square head           |                                  |                 |                  |
| Washers           | Not Applicable                    |                                  |                 |                  |

**858 NSW Tubeless Disc Brake (WH-858-NTLD-B1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                               |                |
|---------------------|-------------------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar             |                |
| Tire Compatibility  | Tube-type or Tubeless         | Minimum: 23 mm |
| Hub Model           | Cognition v2                  |                |
| Brake Compatibility | Disc (Center Lock)            |                |
| Compatible Drivers  | XDR, Splined Road, Campagnolo |                |

**Rim Specifications**

|                             |                     |                 |
|-----------------------------|---------------------|-----------------|
| Rim Description             | Carbon - with Hooks |                 |
| ERD                         | 478 mm              |                 |
| Rim Profile                 | Symmetrical         |                 |
| Rim Width                   | External: 24 mm     | Internal: 18 mm |
| Rim Orientation / Direction | Not Applicable      |                 |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black                    |                                  |                 |                  |
| Spoke Count       | Front: 24                         |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X                         |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 232 mm                  | Front NDS: 230 mm                | Rear DS: 226 mm | Rear NDS: 232 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 115 +10/-5 Kgf                    |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 16 mm square head           |                                  |                 |                  |
| Washers           | Not Applicable                    |                                  |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

**858 NSW Tubeless Disc Brake (WH-858-NTLD-C1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

Air Pressure 28 mm = 72 psi / 5 bar, 30-32 mm = 65 psi / 4.5 bar

Tire Compatibility Tubeless tires only Minimum: 28 mm

Hub Model Cognition v2

Brake Compatibility Disc (Center Lock)

Compatible Drivers XDR, Splined Road

**Rim Specifications**

Rim Description Carbon - Hookless

ERD 478 mm

Rim Profile Symmetrical

Rim Width External: 27 mm Internal: 23 mm

Rim Orientation / Direction Not Applicable

**Spoke Specifications**

Spoke Type CX-Ray - Black

Spoke Count Front: 20 Rear: 20

Spoke Pattern Front: DS: Radial Front NDS: 2X Rear: 2X

Spoke Length Front DS: 218 mm Front NDS: 232 mm Rear DS: 230 mm Rear NDS: 232 mm

Min. Spoke Gauge 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm

Spoke Tension\* 125 +10/-5 Kgf

Nipple Type Material: Aluminum Anti-Rotation: Sapim Secure Lock

Spoke Nipple Size 2.0 x 16 mm square head

Washers Not Applicable

**858 NSW Tubeless Disc Brake (WH-858-NTLD-D1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 114 kg

Air Pressure 28 mm = 72 psi / 5 bar, 30-32 mm = 65 psi / 4.5 bar

Tire Compatibility Tubeless tires only Minimum: 28 mm

Hub Model ZR1 SL

Brake Compatibility Disc (Center Lock)

Compatible Drivers XDR, Splined Road

**Rim Specifications**

Rim Description Carbon - Hookless

ERD 234 mm

Rim Profile Symmetrical

Rim Width External: 27 mm Internal: 23 mm

Rim Orientation / Direction Not Applicable

**Spoke Specifications**

Spoke Type CX-Ray - Black

Spoke Count Front: 20 Rear: 20

Spoke Pattern Front: 2x Rear: 2X

Spoke Length Front DS: 220 mm Front NDS: 232 mm Rear DS: 230 mm Rear NDS: 232 mm

Min. Spoke Gauge 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm

Spoke Tension\* 100 +10/-5 Kgf

Nipple Type Material: Aluminum Anti-Rotation: Sapim Secure Lock

Spoke Nipple Size 2.0 x 16 mm square head

Washers Not Applicable

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

**808 NSW Carbon Tubeless Disc Brake (WH-808-NTLD-A2)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                               |                |  |
|---------------------|-------------------------------|----------------|--|
| Air Pressure        | 125 psi / 8.6 bar             |                |  |
| Tire Compatibility  | Tube-type or Tubeless         | Minimum: 23 mm |  |
| Hub Model           | Cognition v2                  |                |  |
| Brake Compatibility | Disc (Center Lock)            |                |  |
| Compatible Drivers  | XDR, Splined Road, Campagnolo |                |  |

**Rim Specifications**

|                             |                     |                 |  |
|-----------------------------|---------------------|-----------------|--|
| Rim Description             | Carbon - with Hooks |                 |  |
| ERD**                       | 478 mm w/washers    |                 |  |
| Rim Profile                 | Symmetrical         |                 |  |
| Rim Width                   | External: 27 mm     | Internal: 19 mm |  |
| Rim Orientation / Direction | Not Applicable      |                 |  |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black                    |                                  |                 |                  |
| Spoke Count       | Front: 24                         |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X                         |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 232 mm                  | Front NDS: 230 mm                | Rear DS: 226 mm | Rear NDS: 232 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf                    |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm                       |                                  |                 |                  |
| Washers           | Material: Steel                   | Shape: Oval                      |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**808 Firecrest Carbon Tubeless Disc Brake (WH-808-FTLD-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                            |                |
|---------------------|--------------------------------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar                          |                |
| Tire Compatibility  | Tube-type or Tubeless                      | Minimum: 23 mm |
| Hub Model           | ZR1                                        |                |
| Brake Compatibility | Disc (Center Lock)                         |                |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo |                |

**Rim Specifications**

|                             |                     |                 |
|-----------------------------|---------------------|-----------------|
| Rim Description             | Carbon - with Hooks |                 |
| ERD**                       | 478 mm w/washers    |                 |
| Rim Profile                 | Symmetrical         |                 |
| Rim Width                   | External: 27 mm     | Internal: 19 mm |
| Rim Orientation / Direction | Not Applicable      |                 |

**Spoke Specifications**

|                   |                                     |                                  |                 |                  |
|-------------------|-------------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Sprint                           |                                  |                 |                  |
| Spoke Count       | Front: 24                           |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: 2X                           |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 232 mm                    | Front NDS: 230 mm                | Rear DS: 226 mm | Rear NDS: 230 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.25 mm - 1.25 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf                      |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                  | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm                         |                                  |                 |                  |
| Washers           | Material: Steel                     | Shape: Oval                      |                 |                  |

**808 Firecrest Carbon Tubeless Disc Brake (WH-808-FTLD-B1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                                     |                |
|---------------------|-----------------------------------------------------|----------------|
| Air Pressure        | 28 mm = 72 psi / 5 bar, 30-32 mm = 65 psi / 4.5 bar |                |
| Tire Compatibility  | Tubless tires only                                  | Minimum: 28 mm |
| Hub Model           | ZR1                                                 |                |
| Brake Compatibility | Disc (Center Lock)                                  |                |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo          |                |

**Rim Specifications**

|                             |                   |                 |
|-----------------------------|-------------------|-----------------|
| Rim Description             | Carbon - Hookless |                 |
| ERD**                       | 482 mm            |                 |
| Rim Profile                 | Symmetrical       |                 |
| Rim Width                   | External: 27 mm   | Internal: 23 mm |
| Rim Orientation / Direction | Not Applicable    |                 |

**Spoke Specifications**

|                   |                                     |                                  |  |                 |                  |
|-------------------|-------------------------------------|----------------------------------|--|-----------------|------------------|
| Spoke Type        | CX-Sprint                           |                                  |  |                 |                  |
| Spoke Count       | Front: 20                           |                                  |  | Rear: 20        |                  |
| Spoke Pattern     | Front DS: Radial                    | Front NDS: 2X                    |  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 224 mm                    | Front NDS: 238 mm                |  | Rear DS: 236 mm | Rear NDS: 240 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.25 mm - 1.25 mm / 2.0 mm |                                  |  |                 |                  |
| Spoke Tension*    | 125 +10/-5 Kgf                      |                                  |  |                 |                  |
| Nipple Type       | Material: Aluminum                  | Anti-Rotation: Sapim Secure Lock |  |                 |                  |
| Spoke Nipple Size | 2.0 x 16 mm square head             |                                  |  |                 |                  |
| Washers           | Not Applicable                      |                                  |  |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**858 NSW Tubeless Rim Brake (WH-858-NTLR-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                               |                |
|---------------------|-------------------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar             |                |
| Tire Compatibility  | Tube-type or Tubeless         | Minimum: 23 mm |
| Hub Model           | Cognition v2                  |                |
| Brake Compatibility | Rim                           |                |
| Compatible Drivers  | XDR, Splined Road, Campagnolo |                |

**Rim Specifications**

|                             |                     |                 |
|-----------------------------|---------------------|-----------------|
| Rim Description             | Carbon - with Hooks |                 |
| ERD                         | 478 mm              |                 |
| Rim Profile                 | Symmetrical         |                 |
| Rim Width                   | External: 24 mm     | Internal: 18 mm |
| Rim Orientation / Direction | Not Applicable      |                 |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black                    |                                  |                 |                  |
| Spoke Count       | Front: 18                         |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: Radial                     |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 224 mm                  | Front NDS: 224 mm                | Rear DS: 234 mm | Rear NDS: 236 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 115 +10/-5 Kgf                    |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 16 mm Square Head           |                                  |                 |                  |
| Washers           | Not Applicable                    |                                  |                 |                  |

**858 NSW Tubeless Rim Brake (WH-858-NTLR-B1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                               |                |
|---------------------|-------------------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar             |                |
| Tire Compatibility  | Tube-type or Tubeless         | Minimum: 23 mm |
| Hub Model           | Cognition v2                  |                |
| Brake Compatibility | Rim                           |                |
| Compatible Drivers  | XDR, Splined Road, Campagnolo |                |

**Rim Specifications**

|                             |                     |                 |
|-----------------------------|---------------------|-----------------|
| Rim Description             | Carbon - with Hooks |                 |
| ERD                         | 478 mm              |                 |
| Rim Profile                 | Symmetrical         |                 |
| Rim Width                   | External: 24 mm     | Internal: 18 mm |
| Rim Orientation / Direction | Not Applicable      |                 |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black                    |                                  |                 |                  |
| Spoke Count       | Front: 18                         |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: Radial                     |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 224 mm                  | Front NDS: 224 mm                | Rear DS: 234 mm | Rear NDS: 236 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 115 +10/-5 Kgf                    |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 16 mm Square Head           |                                  |                 |                  |
| Washers           | Not Applicable                    |                                  |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

**808 NSW Tubeless Rim Brake (WH-858-NTLR-A2)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                               |                |  |
|---------------------|-------------------------------|----------------|--|
| Air Pressure        | 125 psi / 8.6 bar             |                |  |
| Tire Compatibility  | Tube-type or Tubeless         | Minimum: 23 mm |  |
| Hub Model           | Cognition v2                  |                |  |
| Brake Compatibility | Rim                           |                |  |
| Compatible Drivers  | XDR, Splined Road, Campagnolo |                |  |

**Rim Specifications**

|                             |                     |                 |  |
|-----------------------------|---------------------|-----------------|--|
| Rim Description             | Carbon - with Hooks |                 |  |
| ERD**                       | 478 mm w/washers    |                 |  |
| Rim Profile                 | Symmetrical         |                 |  |
| Rim Width                   | External: 27 mm     | Internal: 18 mm |  |
| Rim Orientation / Direction | Not Applicable      |                 |  |

**Spoke Specifications**

|                   |                                   |                                  |                 |                  |
|-------------------|-----------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Ray - Black                    |                                  |                 |                  |
| Spoke Count       | Front: 18                         |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: Radial                     |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 224 mm                  | Front NDS: 224 mm                | Rear DS: 234 mm | Rear NDS: 236 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf                    |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm                       |                                  |                 |                  |
| Washers           | Material: Steel                   | Shape: Oval                      |                 |                  |

**808 Firecrest Carbon Tubeless Rim Brake (WH-808-FTLR-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                                            |                |  |  |
|---------------------|--------------------------------------------|----------------|--|--|
| Air Pressure        | 125 psi / 8.6 bar                          |                |  |  |
| Tire Compatibility  | Tube-type or Tubeless                      | Minimum: 23 mm |  |  |
| Hub Model           | ZR1                                        |                |  |  |
| Brake Compatibility | Rim                                        |                |  |  |
| Compatible Drivers  | XDR, Splined Road, MicroSpline, Campagnolo |                |  |  |

**Rim Specifications**

|                             |                     |                 |
|-----------------------------|---------------------|-----------------|
| Rim Description             | Carbon - with Hooks |                 |
| ERD**                       | 478 mm w/washers    |                 |
| Rim Profile                 | Symmetrical         |                 |
| Rim Width                   | External: 27 mm     | Internal: 18 mm |
| Rim Orientation / Direction | Not Applicable      |                 |

**Spoke Specifications**

|                   |                                     |                                  |                 |                  |
|-------------------|-------------------------------------|----------------------------------|-----------------|------------------|
| Spoke Type        | CX-Sprint - Black                   |                                  |                 |                  |
| Spoke Count       | Front: 18                           |                                  | Rear: 24        |                  |
| Spoke Pattern     | Front: Radial                       |                                  | Rear: 2X        |                  |
| Spoke Length      | Front DS: 220 mm                    | Front NDS: 220 mm                | Rear DS: 226 mm | Rear NDS: 230 mm |
| Min. Spoke Gauge  | 2.0 mm / 2.25 mm - 1.25 mm / 2.0 mm |                                  |                 |                  |
| Spoke Tension*    | 100 +10/-5 Kgf                      |                                  |                 |                  |
| Nipple Type       | Material: Aluminum                  | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size | 2.0 x 14 mm                         |                                  |                 |                  |
| Washers           | Material: Steel                     | Shape: Oval                      |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**808 Firecrest Tubular Track (WH-808-TUTK-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

Air Pressure 125 psi / 8.6 bar

Tire Compatibility Tubular Minimum: Not Applicable

Hub Model Zipp 333

Brake Compatibility Not Applicable

Compatible Drivers Not Applicable

**Rim Specifications**

Rim Description Carbon

ERD\*\* 478 mm

Rim Profile Front: Symmetrical Rear: Asymmetrical

Rim Width External: 27 mm Internal: Not Applicable

Rim Orientation / Direction Not Applicable

**Spoke Specifications**

Spoke Type CX-Ray - Black

Spoke Count Front: 20 Rear: 24

Spoke Pattern Front: Radial Rear: 2X

Spoke Length Front DS: 214 mm Front NDS: 214 mm Rear DS: 226 mm Rear NDS: 228 mm

Min. Spoke Gauge 2.0 mm / 2.2 mm - 0.9 mm / 2.0 mm

Spoke Tension\* 100 +10/-5 Kgf

Nipple Type Material: Aluminum Anti-Rotation: Sapim Secure Lock

Spoke Nipple Size 2.0 x 14 mm

Washers Oval

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.



**Super-9 Carbon Tubeless Disc Brake Disc (WH-SP9-TLD-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                    |                |
|---------------------|--------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar  |                |
| Tire Compatibility  | Tubeless           | Minimum: 23 mm |
| Hub Model           | 177 Disc Brake     |                |
| Brake Compatibility | Disc (Center Lock) |                |
| Compatible Drivers  | XDR, Splined Road  |                |

**Rim Specifications**

|                             |                     |                 |
|-----------------------------|---------------------|-----------------|
| Rim Description             | Carbon - with Hooks |                 |
| ERD                         | Not Applicable      |                 |
| Rim Profile                 | Symmetrical         |                 |
| Rim Width                   | External: 28 mm     | Internal: 19 mm |
| Rim Orientation / Direction | Not Applicable      |                 |

**Super-9 Clincher Track Disc (WH-SP9-TLTK-B1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                       |                |
|---------------------|-----------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar     |                |
| Tire Compatibility  | Tube-type or Tubeless | Minimum: 23 mm |
| Hub Model           | WH-SP9-TLTK-B1        |                |
| Brake Compatibility | Not Applicable        |                |
| Compatible Drivers  | Not Applicable        |                |

**Rim Specifications**

|                             |                     |                 |
|-----------------------------|---------------------|-----------------|
| Rim Description             | Carbon - with Hooks |                 |
| ERD                         | Not Applicable      |                 |
| Rim Profile                 | Symmetrical         |                 |
| Rim Width                   | External: 27.5 mm   | Internal: 21 mm |
| Rim Orientation / Direction | Not Applicable      |                 |

**Super-9 Carbon Tubeless Rim Brake Disc (WH-SP9-TLR-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                       |                |
|---------------------|-----------------------|----------------|
| Air Pressure        | 125 psi / 8.6 bar     |                |
| Tire Compatibility  | Tube-type or Tubeless | Minimum: 23 mm |
| Hub Model           | 188 / Super-9 RB      |                |
| Brake Compatibility | Rim                   |                |
| Compatible Drivers  | XDR, Splined Road     |                |

**Rim Specifications**

|                             |                     |                 |
|-----------------------------|---------------------|-----------------|
| Rim Description             | Carbon - with Hooks |                 |
| ERD                         | Not Applicable      |                 |
| Rim Profile                 | Symmetrical         |                 |
| Rim Width                   | External: 28 mm     | Internal: 18 mm |
| Rim Orientation / Direction | Not Applicable      |                 |

**Super-9 Carbon Tubeless Disc Brake Disc (WH-SP9-TLD-B1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 114 kg

|                     |                                                     |                |
|---------------------|-----------------------------------------------------|----------------|
| Air Pressure        | 28 mm = 72 psi / 5 bar, 30-32 mm = 65 psi / 4.5 bar |                |
| Tire Compatibility  | Tubeless                                            | Minimum: 28 mm |
| Hub Model           | ZR1 SL                                              |                |
| Brake Compatibility | Disc (Center Lock)                                  |                |
| Compatible Drivers  | XDR, Splined Road                                   |                |

**Rim Specifications**

|                             |                   |                 |
|-----------------------------|-------------------|-----------------|
| Rim Description             | Carbon - Hookless |                 |
| ERD                         | Not Applicable    |                 |
| Rim Profile                 | Symmetrical       |                 |
| Rim Width                   | External: 30.4 mm | Internal: 23 mm |
| Rim Orientation / Direction | Not Applicable    |                 |

**Super-9 Carbon Tubular Disc Brake Disc (WH-SP9-TUD-A2)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                    |                         |
|---------------------|--------------------|-------------------------|
| Air Pressure        | 125 psi / 8.6 bar  |                         |
| Tire Compatibility  | Tubular            | Minimum: Not Applicable |
| Hub Model           | 177 Disc Brake     |                         |
| Brake Compatibility | Disc (Center Lock) |                         |
| Compatible Drivers  | XDR, Splined Road  |                         |

**Rim Specifications**

|                             |                     |                          |
|-----------------------------|---------------------|--------------------------|
| Rim Description             | Carbon - with Hooks |                          |
| ERD                         | Not Applicable      |                          |
| Rim Profile                 | Symmetrical         |                          |
| Rim Width                   | External: 27.5 mm   | Internal: Not Applicable |
| Rim Orientation / Direction | Not Applicable      |                          |

**Super-9 Carbon Tubular Rim Brake Disc (WH-SP9-TUR-A2)**

Max Recommended System Weight (Bike, Rider, and Equipment): 250 lbs / 115 kg

|                     |                   |                         |
|---------------------|-------------------|-------------------------|
| Air Pressure        | 125 psi / 8.6 bar |                         |
| Tire Compatibility  | Tubular           | Minimum: Not Applicable |
| Hub Model           | 177 Rim Brake     |                         |
| Brake Compatibility | Rim               |                         |
| Compatible Drivers  | XDR, Splined Road |                         |

**Rim Specifications**

|                             |                     |                          |
|-----------------------------|---------------------|--------------------------|
| Rim Description             | Carbon - with Hooks |                          |
| ERD                         | Not Applicable      |                          |
| Rim Profile                 | Symmetrical         |                          |
| Rim Width                   | External: 27.5 mm   | Internal: Not Applicable |
| Rim Orientation / Direction | Not Applicable      |                          |

**3ZERO MOTO (WH-MOTO-30-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 286 lbs / 130 kg

|                     |                     |                |
|---------------------|---------------------|----------------|
| Air Pressure        | 65 psi / 4.48 bar   |                |
| Tire Compatibility  | Tubeless tires only | Minimum: 47 mm |
| Hub Model           | ZM1                 |                |
| Brake Compatibility | Disc (6-bolt)       |                |
| Compatible Drivers  | XD, Splined MTB     |                |

**Rim Specifications**

|                             |                                     |                                        |  |
|-----------------------------|-------------------------------------|----------------------------------------|--|
| Rim Description             | Carbon                              |                                        |  |
| ERD**                       | 29" : 619 mm w/washers              | 27.5" : 581 mm w/washers               |  |
| Rim Profile                 | Front: Asymmetrical                 | Rear: Asymmetrical                     |  |
| Rim Width                   | External: 37.5 mm                   | Internal: 30 mm                        |  |
| Rim Orientation / Direction | Front: Short Side toward drive side | Rear: Short Side toward non-drive side |  |

**Spoke Specifications**

|                      |                    |                                  |                 |                  |
|----------------------|--------------------|----------------------------------|-----------------|------------------|
| Spoke Type           | Sapim D-Light      |                                  |                 |                  |
| Spoke Count          | Front: 32          |                                  | Rear: 32        |                  |
| Spoke Pattern        | Front: 3X          |                                  | Rear: 3X        |                  |
| Spoke Length - 29"   | Front DS: 302 mm   | Front NDS: 300 mm                | Rear DS: 300 mm | Rear NDS: 302 mm |
| Spoke Length - 27.5" | Front DS: 284 mm   | Front NDS: 282 mm                | Rear DS: 280 mm | Rear NDS: 282 mm |
| Min. Spoke Gauge     | 2.0 / 1.65 / 2.0   |                                  |                 |                  |
| Spoke Tension*       | 115 ±10 Kgf        |                                  |                 |                  |
| Nipple Type          | Material: Aluminum | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size    | 2.0 x 14 mm        |                                  |                 |                  |
| Washers              | Sapim NRHM         |                                  |                 |                  |

**3ZERO MOTO (WH-MOTO-30-B1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 286 lbs / 130 kg

|                     |                              |                |
|---------------------|------------------------------|----------------|
| Air Pressure        | 65 psi / 4.48 bar            |                |
| Tire Compatibility  | Tubeless tires only          | Minimum: 47 mm |
| Hub Model           | ZM2                          |                |
| Brake Compatibility | Disc (6-bolt)                |                |
| Compatible Drivers  | XD, Splined MTB, MicroSpline |                |

**Rim Specifications**

|                             |                                     |                                        |  |
|-----------------------------|-------------------------------------|----------------------------------------|--|
| Rim Description             | Carbon - Hookless                   |                                        |  |
| ERD**                       | 29" : 619 mm w/washers              | 27.5" : 581 mm w/washers               |  |
| Rim Profile                 | Front: Asymmetrical                 | Rear: Asymmetrical                     |  |
| Rim Width                   | External: 37.5 mm                   | Internal: 30 mm                        |  |
| Rim Orientation / Direction | Front: Short Side toward drive side | Rear: Short Side toward non-drive side |  |

**Spoke Specifications**

|                      |                         |                                  |                 |                  |
|----------------------|-------------------------|----------------------------------|-----------------|------------------|
| Spoke Type           | CX-Sprint               |                                  |                 |                  |
| Spoke Count          | Front: 32               |                                  | Rear: 32        |                  |
| Spoke Pattern        | Front: 3X               |                                  | Rear: 3X        |                  |
| Spoke Length - 29"   | Front DS: 302 mm        | Front NDS: 298 mm                | Rear DS: 298 mm | Rear NDS: 300 mm |
| Spoke Length - 27.5" | Front DS: 284 mm        | Front NDS: 280 mm                | Rear DS: 280 mm | Rear NDS: 280 mm |
| Min. Spoke Gauge     | 2.0 / 2.25 - 1.25 / 2.0 |                                  |                 |                  |
| Spoke Tension*       | 115 ±10 Kgf             |                                  |                 |                  |
| Nipple Type          | Material: Aluminum      | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size    | 2.0 x 14 mm             |                                  |                 |                  |
| Washers              | Sapim NRHM              |                                  |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

\*\*Washers are required for wheel builds with this rim.

**1ZERO HITOP SW (WH-1ZRO-HTSW-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 286 lbs / 130 kg

|                     |                       |                |                |
|---------------------|-----------------------|----------------|----------------|
| Air Pressure        | 50 psi / 3.4 bar      |                |                |
| Tire Compatibility  | Tube-type or Tubeless | Minimum: 47 mm | Maximum: 71 mm |
| Hub Model           | ZM2 SL                |                |                |
| Brake Compatibility | Disc (Center Lock)    |                |                |
| Compatible Drivers  | XD, Microspline       |                |                |

**Rim Specifications**

|                             |                                     |                                        |  |
|-----------------------------|-------------------------------------|----------------------------------------|--|
| Rim Description             | Carbon - Hookless                   |                                        |  |
| ERD                         | 603 mm                              |                                        |  |
| Rim Profile                 | Front: Asymmetrical                 | Rear: Asymmetrical                     |  |
| Rim Width                   | External: 38 mm                     | Internal: 30 mm                        |  |
| Rim Orientation / Direction | Front: Short Side toward drive side | Rear: Short Side toward non-drive side |  |

**Spoke Specifications**

|                    |                       |                                  |                 |                  |
|--------------------|-----------------------|----------------------------------|-----------------|------------------|
| Spoke Type         | CX-Ray, J-Bend Black  |                                  |                 |                  |
| Spoke Count        | Front: 24             |                                  | Rear: 24        |                  |
| Spoke Pattern      | Front: 2X / 2X        |                                  | Rear: 2X / 2X   |                  |
| Spoke Length - 29" | Front DS: 294 mm      | Front NDS: 290 mm                | Rear DS: 286 mm | Rear NDS: 290 mm |
| Min. Spoke Gauge   | 2.0 / 2.2 - 0.9 / 2.0 |                                  |                 |                  |
| Spoke Tension*     | 115 ±10 Kgf           |                                  |                 |                  |
| Nipple Type        | Material: Aluminum    | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size  | 2.0 x 16 mm           |                                  |                 |                  |
| Washers            | Not Applicable        |                                  |                 |                  |

**1ZERO HITOP S (WH-1ZRO-HTS-A1)**

Max Recommended System Weight (Bike, Rider, and Equipment): 286 lbs / 130 kg

|                     |                       |                |                |
|---------------------|-----------------------|----------------|----------------|
| Air Pressure        | 50 psi / 3.4 bar      |                |                |
| Tire Compatibility  | Tube-type or Tubeless | Minimum: 47 mm | Maximum: 71 mm |
| Hub Model           | ZM 900                |                |                |
| Brake Compatibility | Disc (6-bolt)         |                |                |
| Compatible Drivers  | XD, Microspline       |                |                |

**Rim Specifications**

|                             |                                     |                                        |  |
|-----------------------------|-------------------------------------|----------------------------------------|--|
| Rim Description             | Carbon - Hookless                   |                                        |  |
| ERD                         | 603 mm                              |                                        |  |
| Rim Profile                 | Front: Asymmetrical                 | Rear: Asymmetrical                     |  |
| Rim Width                   | External: 38 mm                     | Internal: 30 mm                        |  |
| Rim Orientation / Direction | Front: Short Side toward drive side | Rear: Short Side toward non-drive side |  |

**Spoke Specifications**

|                    |                         |                                  |                 |                  |
|--------------------|-------------------------|----------------------------------|-----------------|------------------|
| Spoke Type         | CX-Sprint, J-Bend Black |                                  |                 |                  |
| Spoke Count        | Front: 24               |                                  | Rear: 24        |                  |
| Spoke Pattern      | Front: 2X / 2X          |                                  | Rear: 2X / 2X   |                  |
| Spoke Length - 29" | Front DS: 292 mm        | Front NDS: 288 mm                | Rear DS: 288 mm | Rear NDS: 290 mm |
| Min. Spoke Gauge   | 2.0 / 2.25 - 1.25 / 2.0 |                                  |                 |                  |
| Spoke Tension*     | 115 ±10 Kgf             |                                  |                 |                  |
| Nipple Type        | Material: Aluminum      | Anti-Rotation: Sapim Secure Lock |                 |                  |
| Spoke Nipple Size  | 2.0 x 16 mm             |                                  |                 |                  |
| Washers            | Not Applicable          |                                  |                 |                  |

\*Spoke tension must be measured without a tire installed, and wheel tensioning must be completed without a tire installed.

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