

ZIPP

Wheel and Hub Specifications



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

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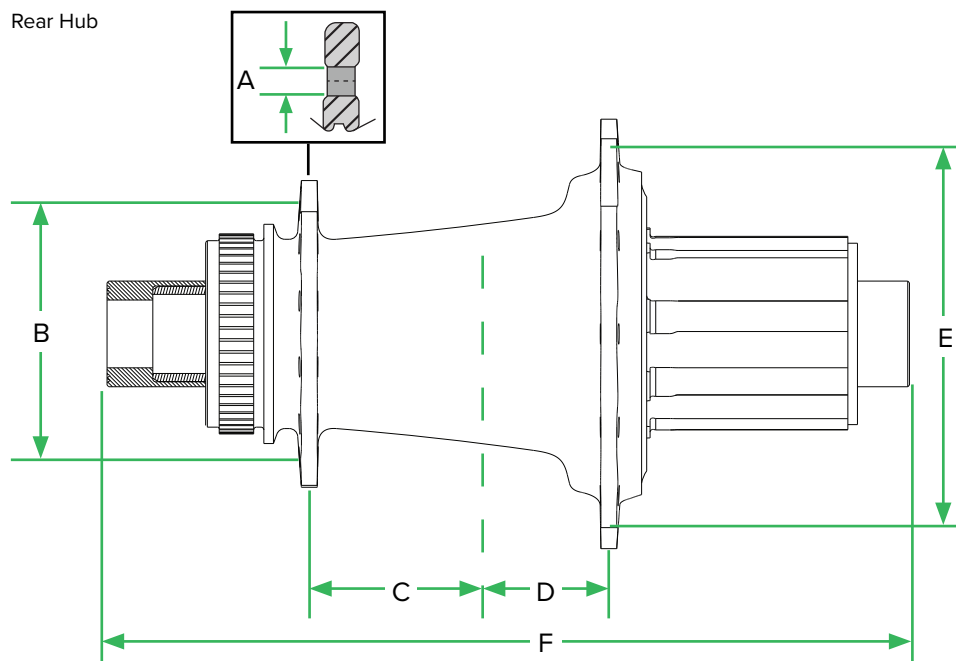
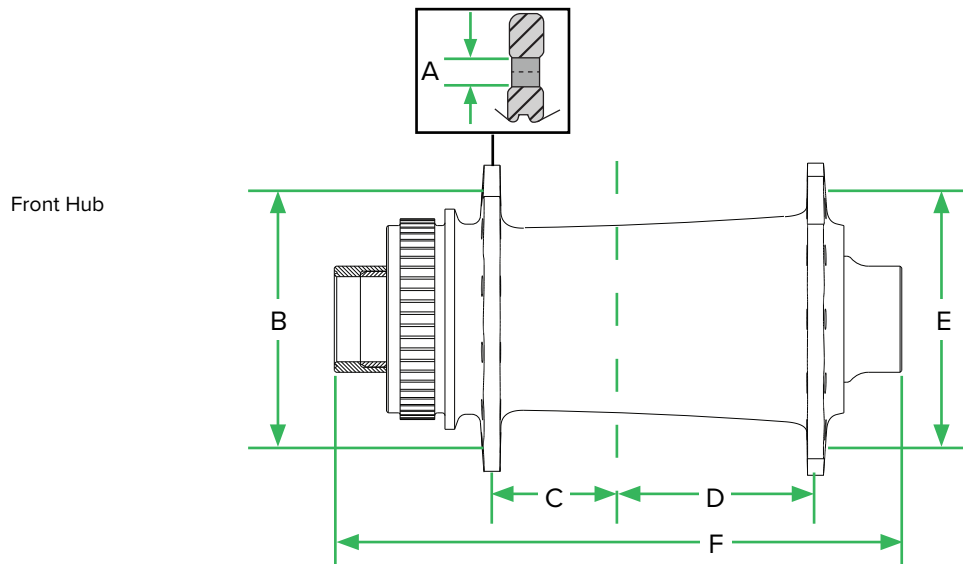
Warranty and Trademark

For SRAM Warranty information, visit: www.sram.com/warranty.

For SRAM Trademark information, visit: www.sram.com/website-terms-of-use

Hub Dimensions - Road Disc Brake Hubs

	Cognition Disc Brake				76 / 176 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, 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.

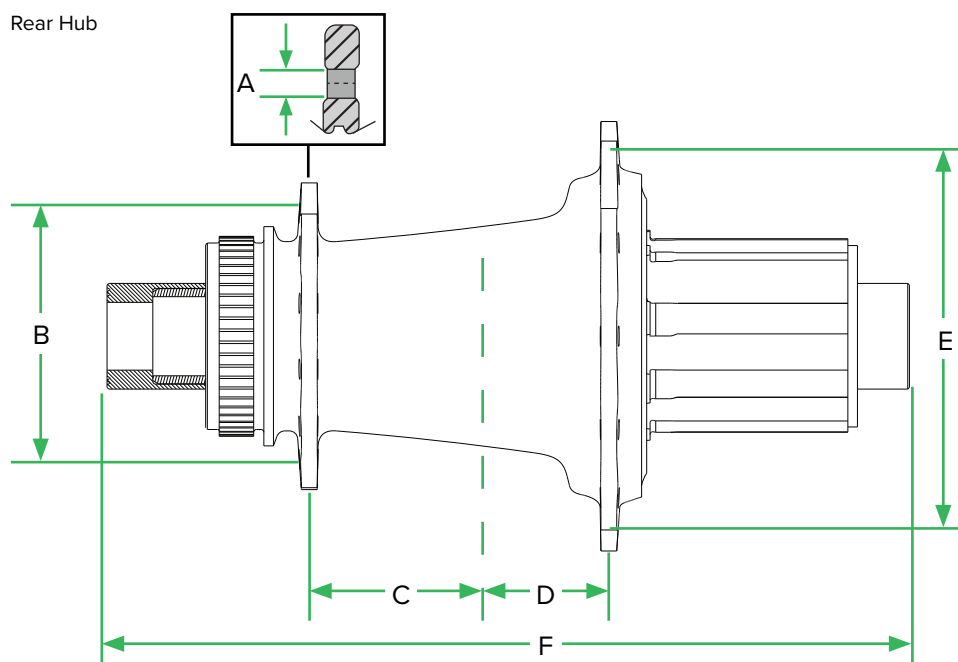
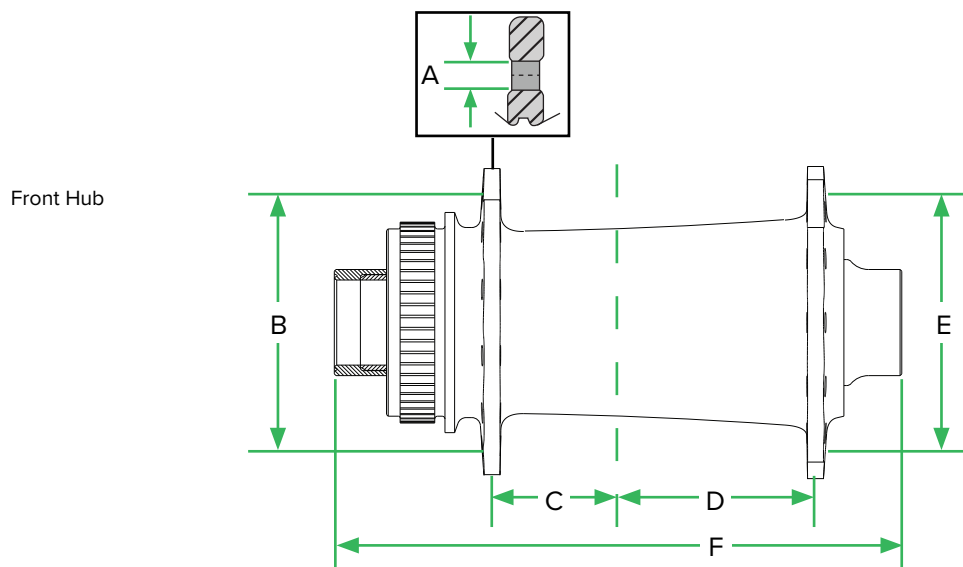
	ZR1 Disc Brake					
	Front	Rear	Front	Rear	Front	Rear
Spoke Count	20	20	24	24	28	28
A - Spoke hole diameter	2.7	2.7	2.7	2.7	2.7	2.7
B - Pitch Circle Diameter - NDS	44.3	50	44.3	50	44.3	50
C - Center to Flange - NDS	21.6	34.4	21.6	34.4	21.6	34.4
D - Center to Flange - DS	34.3	18.1	34.3	18.1	34.3	18.1
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.

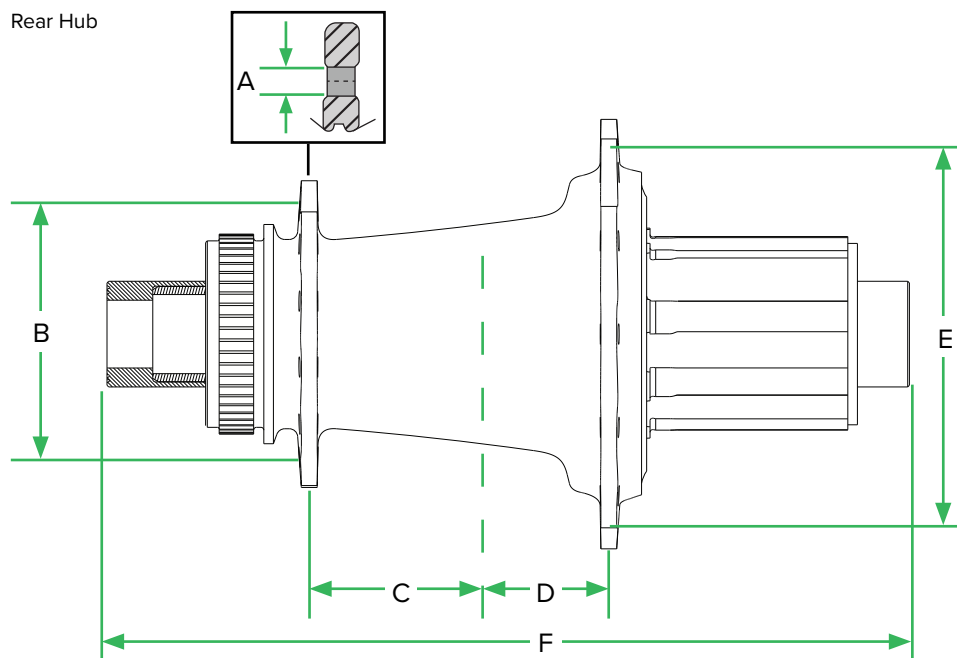
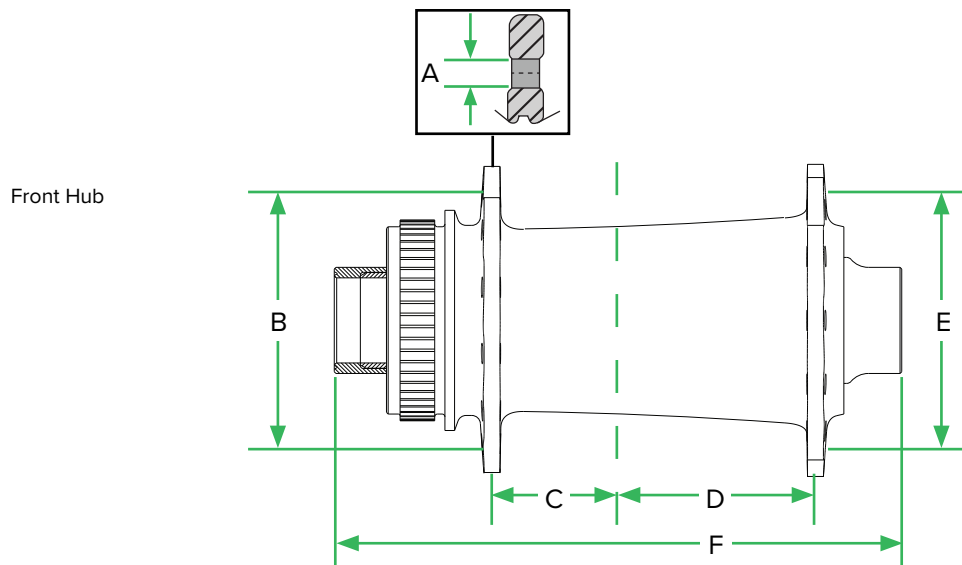
	ZR1 SL Disc Brake					
	Front	Rear	Front	Rear	Front	Rear
Spoke Count	20	20	24	24	28	28
A - Spoke hole diameter	2.6	2.6	2.6	2.6	2.6	2.6
B - Pitch Circle Diameter - NDS	44.3	48.5	44.3	48.5	44.3	48.5
C - Center to Flange - NDS	21.8	33.6	21.8	33.6	21.8	33.6
D - Center to Flange - DS	34.4	18.1	34.4	18.1	34.4	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.

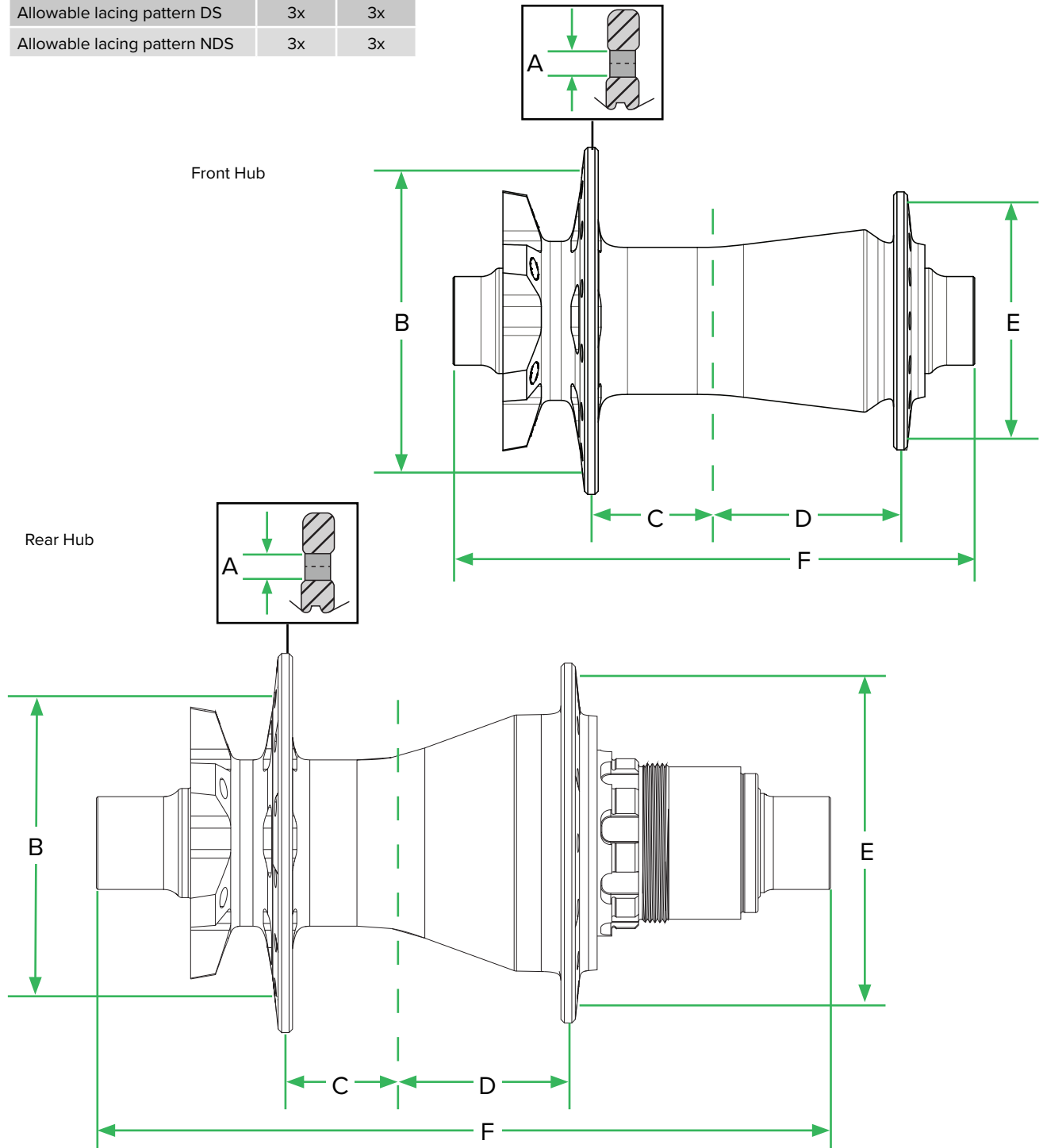
Radial lacing reduces the allowable spoke tension to 110 KGF/ Max



*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

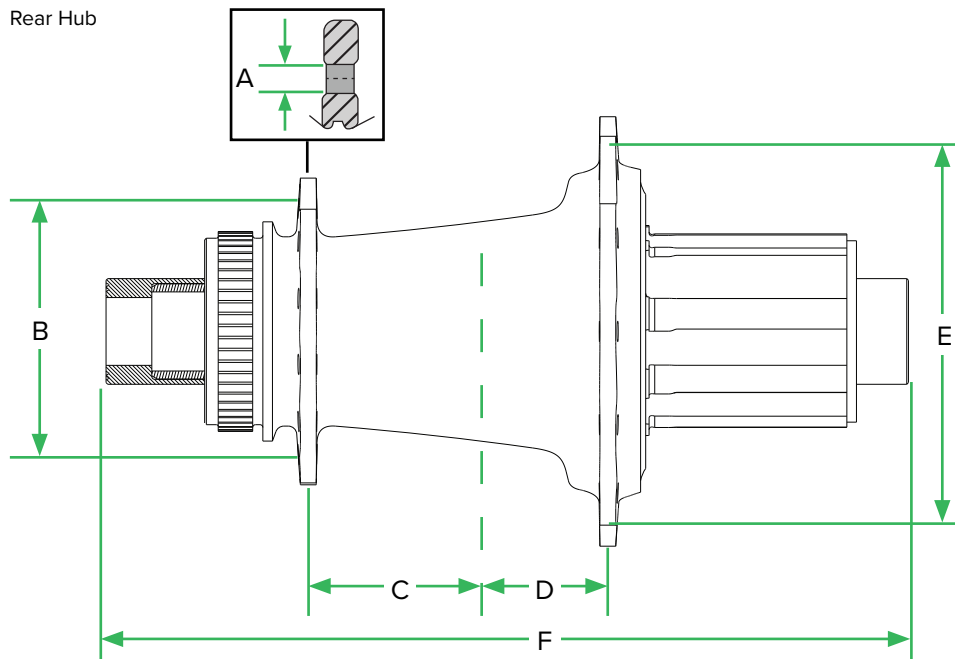
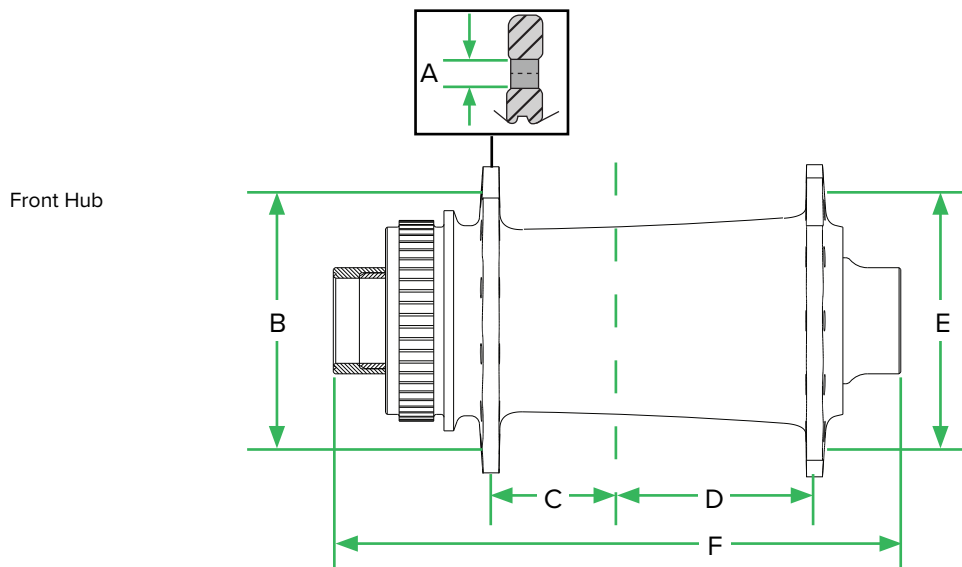
	ZM2 Disc Brake	
	Front	Rear
Spoke Count	32	32
A - Spoke hole diameter	2.7	2.7
B - Pitch Circle Diameter - NDS	61.2	64.4
C - Center to Flange - NDS	26.1	36.2
D - Center to Flange - DS	39.6	21.4
E - Pitch Circle Diameter - DS	42.4	60.5
F - Over Locknut Dimension	110	148
Max Spoke Tension*	125 kgf / 1225N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

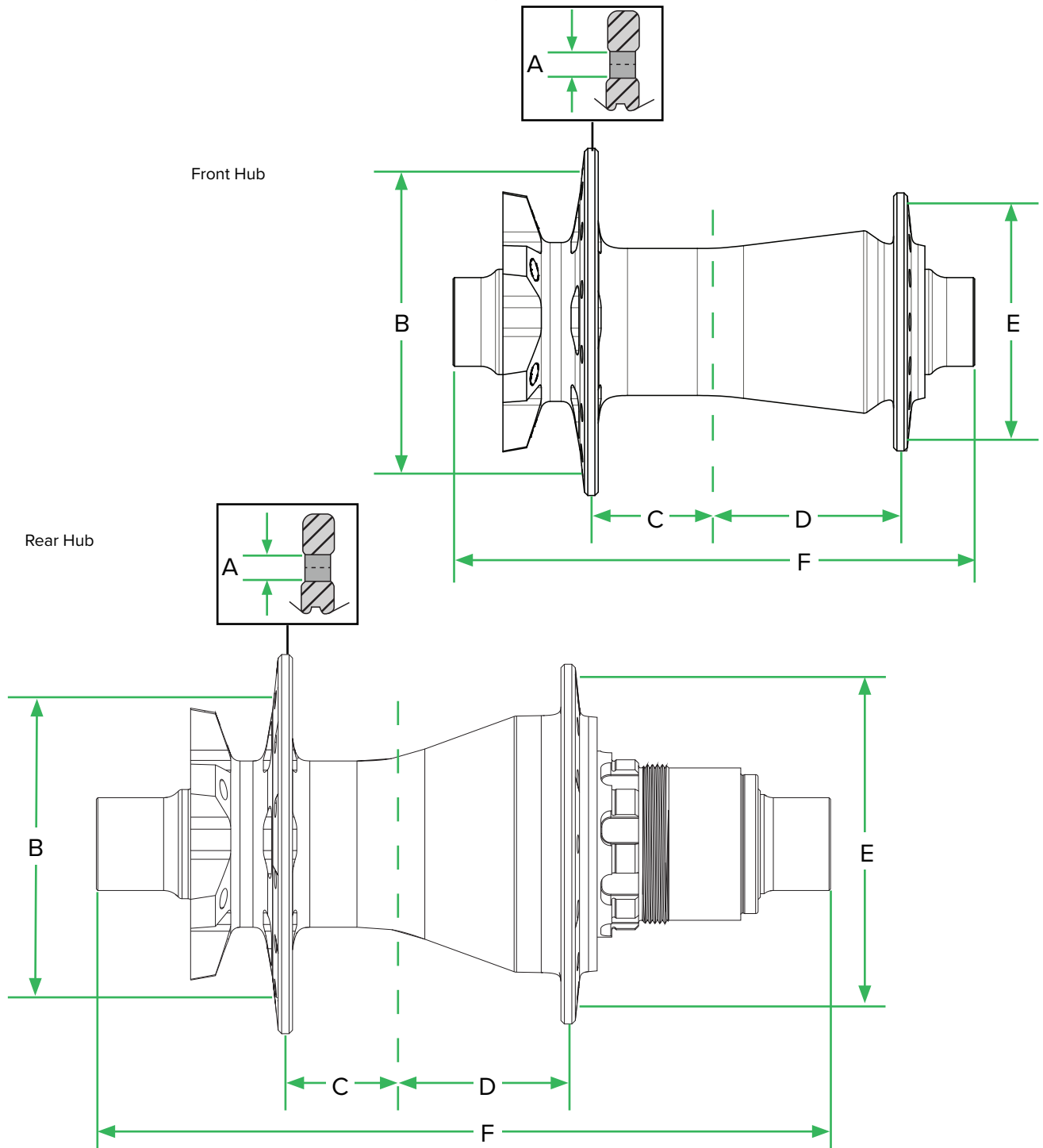
**ZM2 SL
Center Lock**

	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.

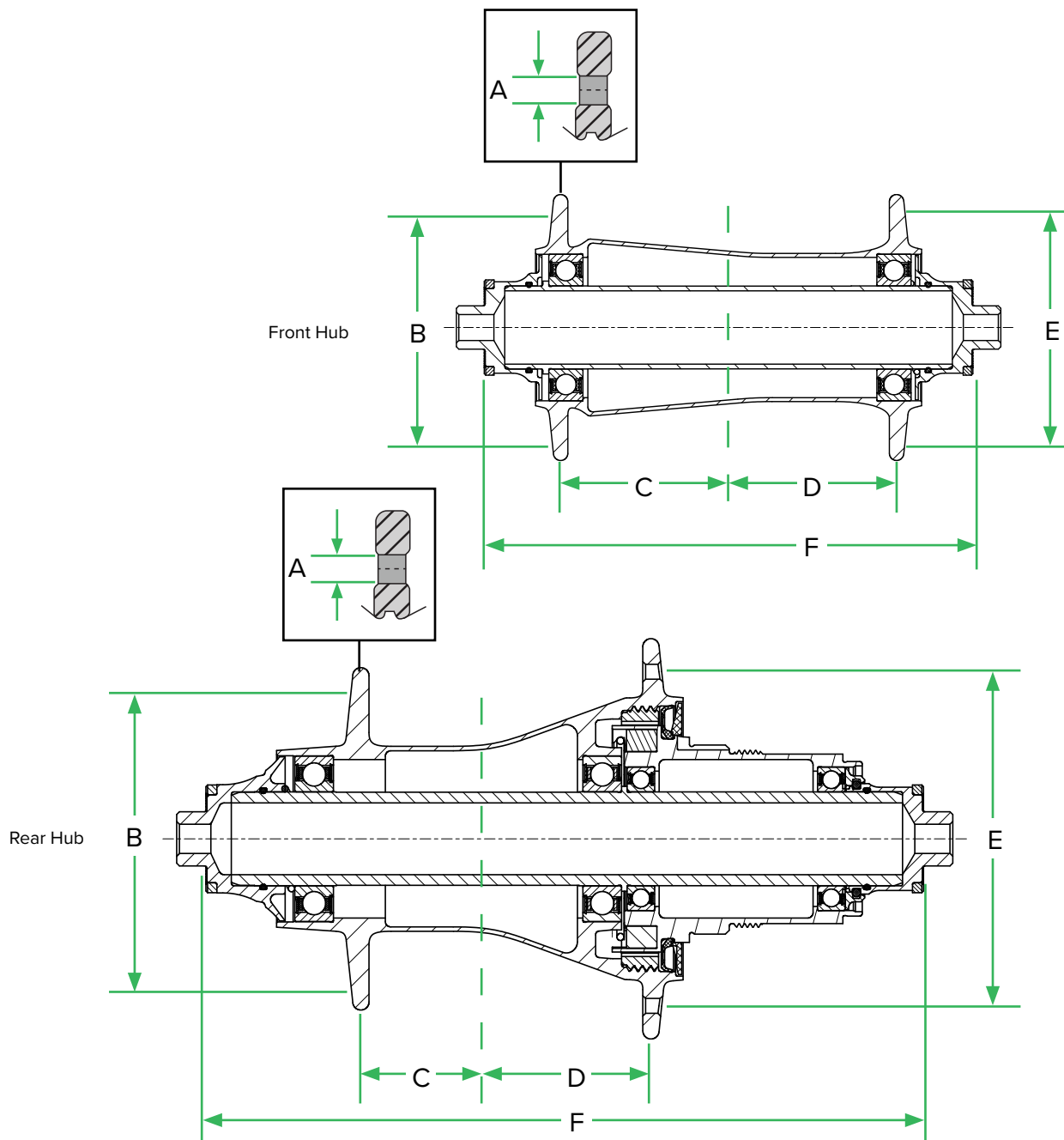
	ZM 900 6-Bolt			
	Front	Rear	Front	Rear
Spoke Count	24	24	28	28
A - Spoke hole diameter	2.7	2.7	2.7	2.7
B - Pitch Circle Diameter - NDS	60	58	60	58
C - Center to Flange - NDS	26	35.3	26	35.3
D - Center to Flange - DS	38.6	20.8	38.6	20.8
E - Pitch Circle Diameter - DS	50	60	50	60
F - Over Locknut Dimension	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 Rim Brake		76 / 176 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 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.

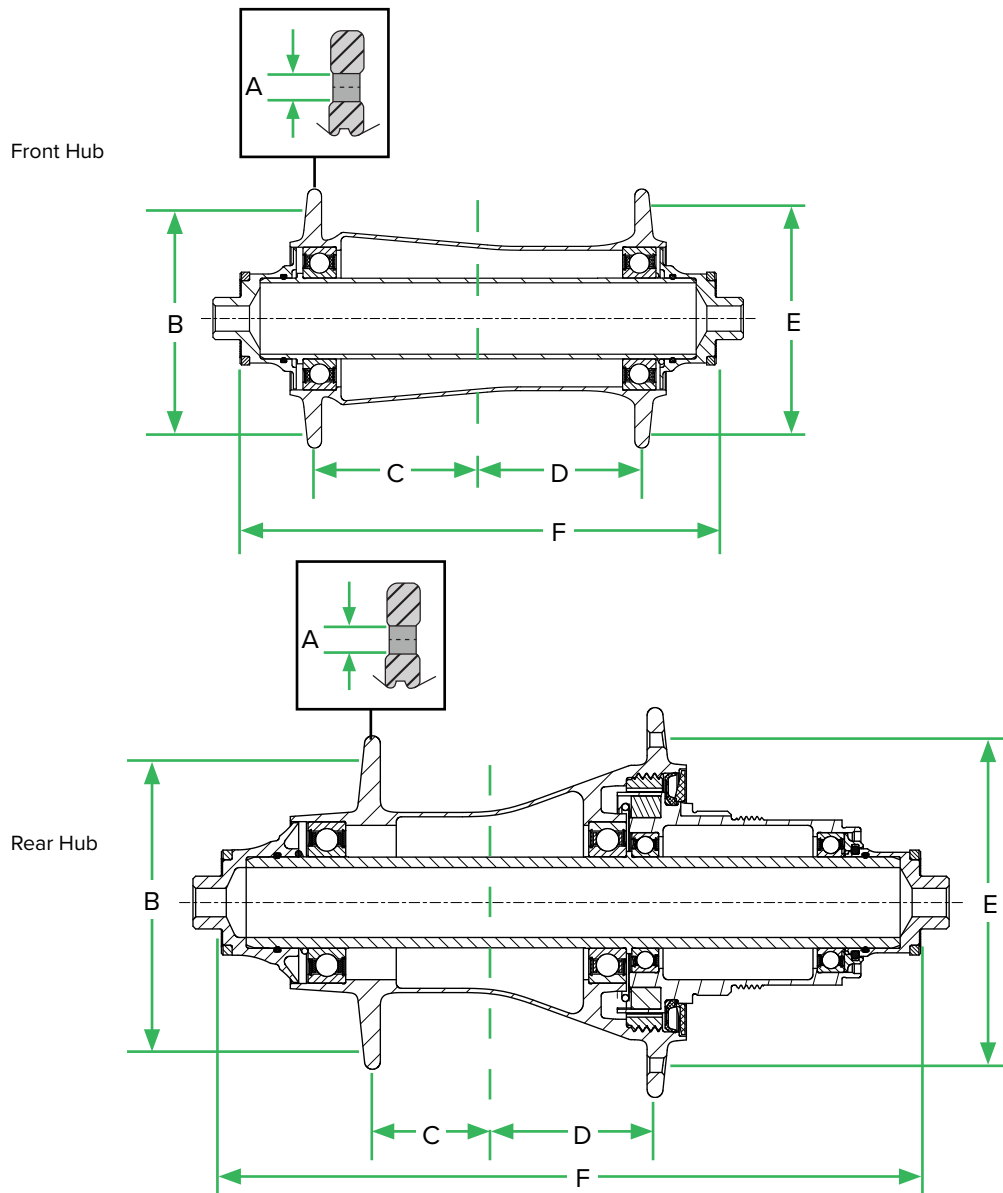
3-cross spoke lacing may only be used with 28 hole hubs.

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

Max Spoke Tension* 125kgf / 1225N

Allowable lacing pattern DS 2x 2x

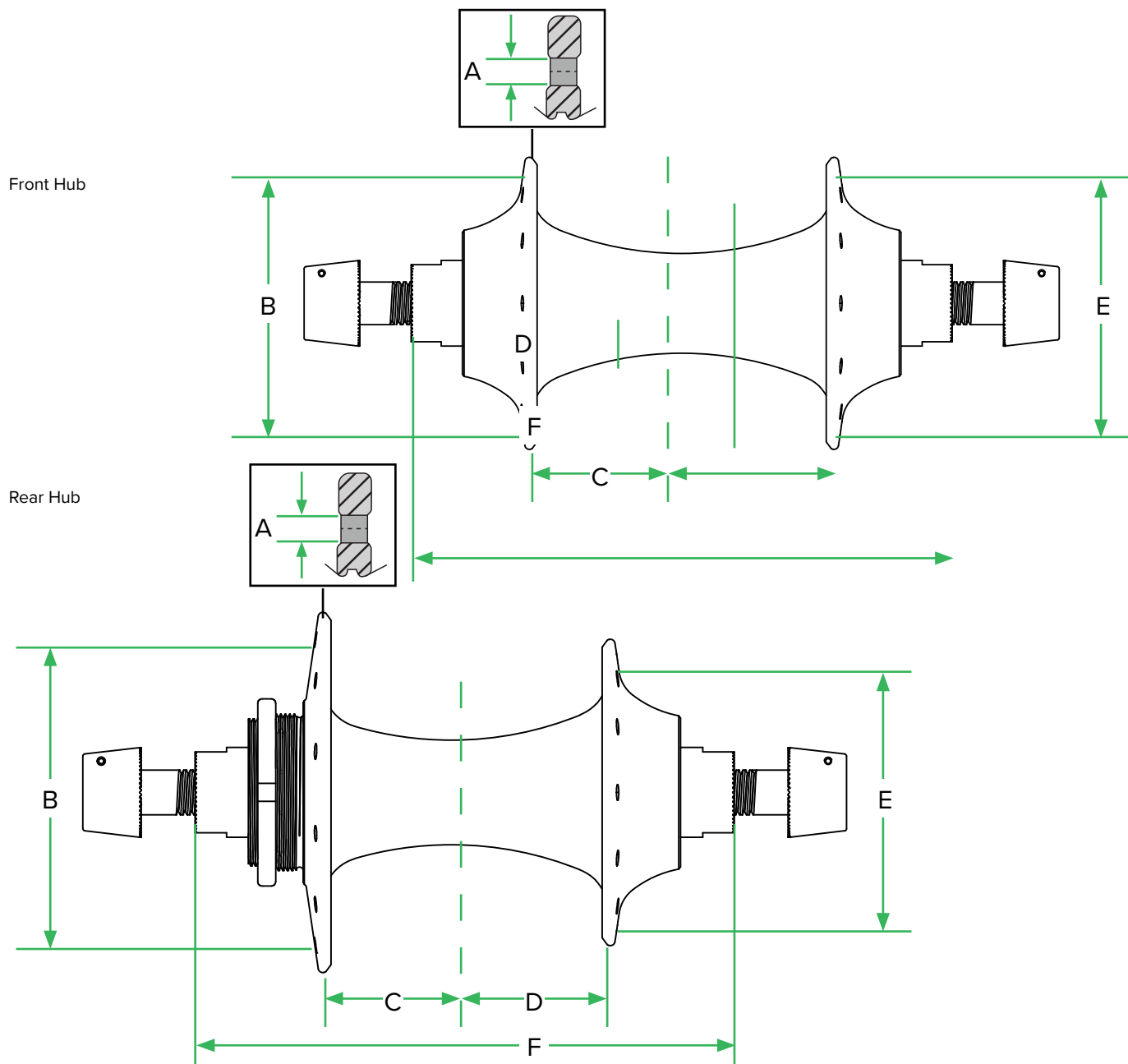
Allowable lacing pattern NDS 2x 2x



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

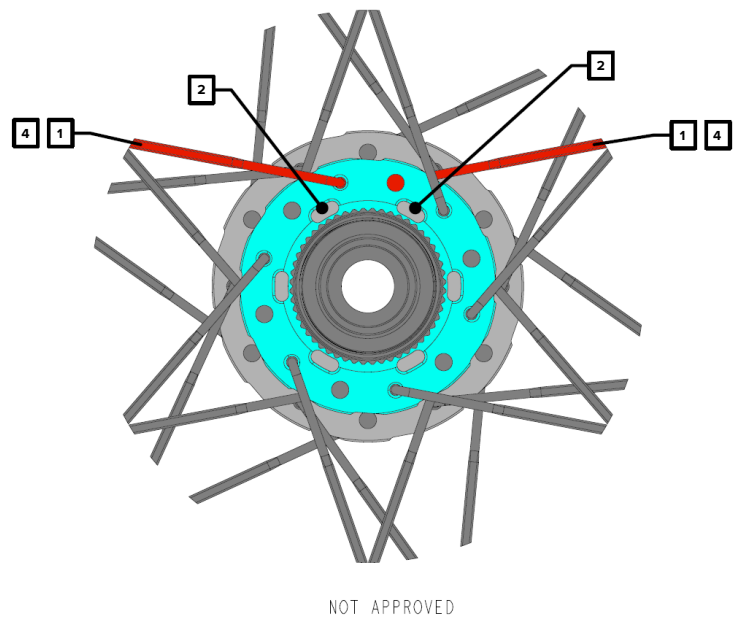
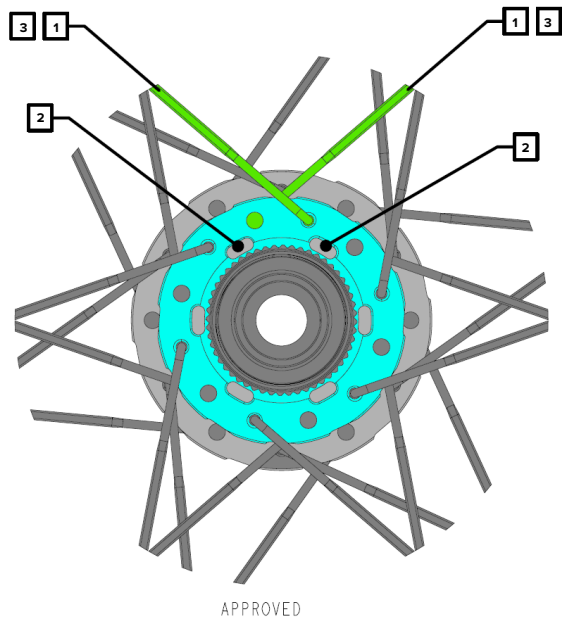
Hub Dimensions - Track Hubs

	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



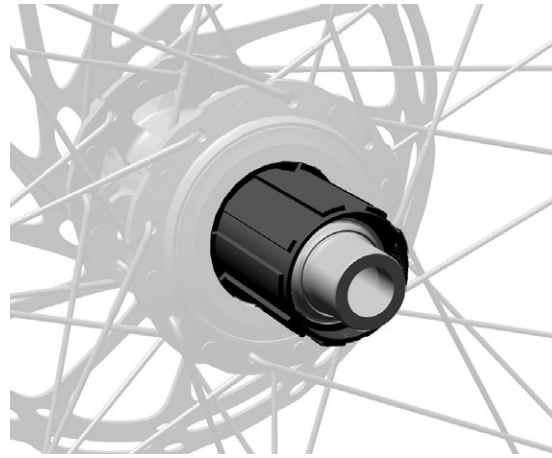
- 1 Spoke
- 2 Hub Cutout
- 3 Spokes shall be assembled on the non-drive side of the hub in a direction facing away from cutouts, as shown in the image.
- 4 Not approved: when spokes are laced on the non-drive side of the hub in a direction facing the cutouts, as shown in the image, the hub flange has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

Driver Body Identification

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

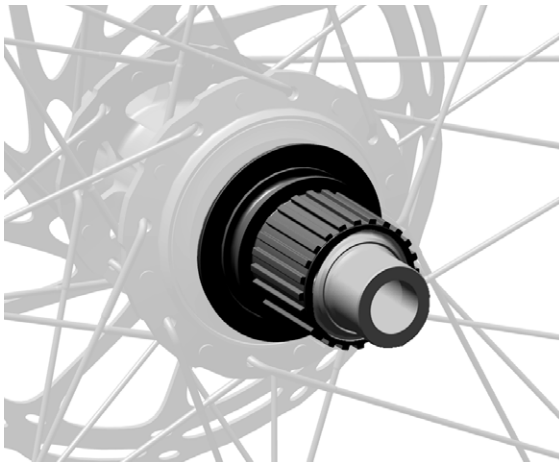


XD/XDR

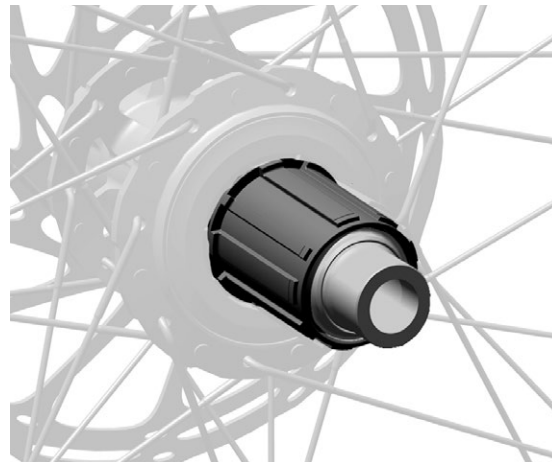


Splined - SRAM/Shimano

-10/9 Speed MTB
-11/10 Speed Road



MicroSpline



Campagnolo

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

		**101 XPLR (WH-101-XPLR-A1)	**3ZERO MOTO (WH-MOTO-30-A1)	**3ZERO MOTO (WH-MOTO-30-B1)	1ZERO HITOP SW (WH-1ZRO-HTSW-A1)	1ZERO HITOP S (WH-1ZRO-HTS-A1)
Rim Description	Rim Specifications	Carbon - Hookless	Carbon - Hookless	Carbon - Hookless	Carbon - Hookless	Carbon - Hookless
ERD		700C : 610 mm with Washers 650B : 572 mm with Washers	29" : 619 with Washers 27.5" : 581 with Washers	29" : 619 with Washers 27.5" : 581 with Washers	29" : 603	29" : 603
Rim Profile		Front: Asymmetrical Rear: Asymmetrical	Front: Asymmetrical Rear: Asymmetrical	Front: Asymmetrical Rear: Asymmetrical	Front: Asymmetrical Rear: Asymmetrical	Front: Asymmetrical Rear: Asymmetrical
Rim Width		External: 34 mm Internal: 27 mm	External: 37.5 mm Internal: 30 mm	External: 37.5 mm Internal: 30 mm	External: 38 mm Internal: 30 mm	External: 38 mm Internal: 30 mm
Rim Orientation / Direction		Front: Short Side toward drive side Rear: Short Side toward non-drive side	Front: Short Side toward drive side Rear: Short Side toward non-drive side	Front: Short Side toward drive side Rear: Short Side toward non-drive side	Front: Short Side toward drive side Rear: Short Side toward non-drive side	Front: Short Side toward drive side Rear: Short Side toward non-drive side
Spoke Count		Front: 28 Rear: 28	Front: 32 Rear: 32	Front: 32 Rear: 32	Front: 24 Rear: 24	Front: 24 Rear: 24
Spoke Pattern	Front: 3X Rear: 3X	Front: 3X Rear: 3X	Front: 3X Rear: 3X	Front: 2X Rear: 2X	Front: 2X Rear: 2X	
Min. Spoke Gauge	Spoke Specifications	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 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

	**303 Firecrest Carbon Tubeless Disc Brake (WH-303-FTLD-A1)	**303 Firecrest 650b Carbon Tubeless Disc Brake (WH-303-F650-A1)	**303 S Carbon Tubeless Disc Brake (WH-303-STLD-A1)	**303 Firecrest Carbon Tubeless Rim Brake (WH-303-FTLR-A1)	**303 Firecrest Carbon Tubular Disc Brake (WH-303-FTUD-A1)	**303 Firecrest Tubular Rim Brake (WH-303-FTUR-A1)
Rim Description	Carbon - Hookless	Carbon - w/Hooks	Carbon - Hookless	Carbon - w/Hooks	Carbon	Carbon
ERD	564 mm with Washers	513 mm with Washers	551 mm with Washers	550 mm with Washers	552 mm with Washers	552 mm with Washers
Rim Profile	Symmetrical	Symmetrical	Symmetrical	Symmetrical	Symmetrical	Symmetrical
Rim Width	External: 29.7 mm Internal: 25 mm	External: 30 mm Internal: 21 mm	External: 28 mm Internal: 23 mm	External: 27 mm Internal: 19	External: 27 mm Internal: n/a	External: 27 mm Internal: n/a
Rim Orientation / Direction	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Spoke Count	Front: 24 Rear: 24	Front: 24 Rear: 24	Front: 24 Rear: 24	Front: 18 Rear: 24	Front: 24 Rear: 24	Front: 24 Rear: 24
Spoke Pattern	Front: 2X Rear: 2X	Front: 2X Rear: 2X	Front: 2X Rear: 2X	Front: Radial Rear: 2X	Front: 2X Rear: 2X	Front: Radial Rear: 2X
Min. Spoke 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 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

		**303 SW Carbon Tubeless Disc Brake (WH-303-SW-A1)	**353 NSW Carbon Tubeless Disc Brake (WH-353-NSW-B1)
Rim Description	Rim Specifications	Carbon - Hookless	Carbon - Hookless
ERD		Not Applicable	Not Applicable
Rim Profile		Symmetrical	Symmetrical
Rim Width		External: 33.5 mm Internal: 25 mm	External: 29.5 mm Internal: 25 mm
Rim Orientation / Direction		Not Applicable	Not Applicable
Spoke Count	Spoke Specifications	Front: 20 Rear: 20	Front: 20 Rear: 20
Spoke Pattern		Front: 2X Rear: 2X	Front: 2X Rear: 2X
Min. Spoke 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 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

		**404 Firecrest Carbon Tubeless Disc Brake (WH-404-FTLD-A1)	**404 Firecrest Tubeless Disc Brake (WH-404-FTLD-B1)	**404 Firecrest Carbon Tubeless Rim Brake (WH-404-FTLR-A1)	404 Firecrest Track Tubular (WH-404-TUTK-A1)
Rim Description	Rim Specifications	Carbon - w/Hooks	Carbon - Hookless	Carbon - w/Hooks	Carbon
ERD		527 mm with Washers	531 mm with Washers	527 mm with Washers	Not Applicable
Rim Profile		Symmetrical	Symmetrical	Symmetrical	Symmetrical
Rim Width		External: 27 mm Internal: 19 mm	External: 28 mm Internal: 23 mm	External: 27 mm Internal: 19	External: 27 mm Internal: n/a
Rim Orientation / Direction		Not Applicable	Not Applicable	Not Applicable	Not Applicable
Spoke Count	Spoke Specifications	Front: 24 Rear: 24	Front: 24 Rear: 24	Front: 18 Rear: 24	Front: 28 Rear: 28
Spoke Pattern		Front: 2X Rear: 2X	Front: 2X Rear: 2X	Front: Radial Rear: 2X	Front: Radial Rear: 2X
Min. Spoke 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 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

	**808 Firecrest Carbon Tubeless Disc Brake (WH-808-FTLD-A1)	808 Firecrest Carbon Tubeless Disc Brake (WH-808-FTLD-B1)	**808 Firecrest Carbon Tubeless Rim Brake (WH-808-FTLR-A1)	808 Firecrest Tubular Track (WH-808-TUTK-A1)
Rim Description	Carbon - w/Hooks	Carbon - Hookless	Carbon - w/Hooks	Carbon
ERD	478 mm with Washers	482 mm	478 mm with Washers	478 mm
Rim Profile	Symmetrical	Symmetrical	Symmetrical	Front: Symmetrical Rear: Asymmetrical
Rim Width	External: 27 mm Internal: 19 mm	External: 27 mm Internal: 23 mm	External: 27 mm Internal: 18 mm	External: 27 mm Internal: n/a
Rim Orientation / Direction	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Spoke Count	Front: 24 Rear: 24	Front: 20 Rear: 20	Front: 18 Rear: 24	Front: 20 Rear: 24
Spoke Pattern	Front: 2X Rear: 2X	Front DS: Radial Front NDS: 2X Rear: 2X	Front: Radial Rear: 2X	Front: Radial Rear: 2X
Min. Spoke 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 Size	2.0 x 14 mm	2.0 x 16 mm square 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.

Wheel Serial Number Locations

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.

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.
- ZZZZZZ = 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		

[†]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 Series Tubular Rim Brake Wheels

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 Series Carbon Clincher Rim Brake Wheels

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		

[†]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.

404 Series Tubular Disc Brake Wheels

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 Series Tubular Track Wheels

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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