



2008

# 2008 Fulcrum Linea

[www.fulcrumwheels.com](http://www.fulcrumwheels.com)

English



**The Orbea Racing Team** will not just live the racing season in the light reflected by the feats of their captain, Julien Absalon: the team manager Ixio Barandiarán also expects flattering results from other outstanding team athletes such as Rubén Ruzafa, Jean-Christophe Peraud and Iñaki Lejarreta.

## FULCRUM® TAKES TO THE NEW OFF-ROAD TRACKS

Three intense and demanding years have seen Fulcrum® achieving positive results in market terms and flattering sporting successes in the world's most important road races. But our great passion for cycling means that we never stop testing ourselves and continually tackle new situations. The 2008 season will be remembered as the one in which Fulcrum® took up the off-road challenge without making a secret out of the competitive ambitions we nourish and confident that we will rise to the level already achieved in the road framework. That is why we have signed a partnership with athletes of supreme competitive calibre such as those of the Orbea Racing Team and its captain, Julien Absalon, an athlete the specialist press defines as "the best MTB rider in history".

Julien Absalon\_2006 World Champion

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REDMETALTECH

# FEATURING 2:1 SPOKE RATIO

## 2:1 Two-to-One™ Spoke Ratio

The 2:1 Two-to-One™ system has been used for all the rear wheels and for the first time Fulcrum® has also extended their advantages to all the front wheels fitted with disc brakes. The doubling of the spokes on the critical side makes it possible to reduce the unit load borne by each spoke as the spokes themselves are no longer subject to the mechanical stress resulting from the different disc.

Overcoming this drawback the spokes will be able to transfer the forces exerted at the rear by the pedalling traction and at the front by the torsion torque of braking, and give the front wheel previously unknown stability.

*If traction and torque transfer are entrusted to a single spoke in a traditional wheel, they are distributed to two spokes in a Fulcrum® 2:1 wheel for greater reliability, performance and longer life.*



*With the patented Fulcrum® 2:1 system also extended to front wheels with disc brakes, the torque of the forces exerted by the calliper on the rotor is supported and balanced by a double number of spokes. As a result this configuration makes it possible to obtain great riding stability and precision even when braking.*

# AFS™ AXIAL FIXING SYSTEM



**AFS™** The Axial Fixing System™ is the solution developed by Fulcrum® to fix the disc brake to the hub. The constraint granted by the butt area of the release mechanism, greater than in familiar standard ones, makes it possible to obtain greater structural rigidity and therefore more precise and powerful braking. The availability of the International Standard option ensures full compatibility of Fulcrum® wheels even with the most widespread braking systems that use this assembly plan.

*Simple and effective: Fulcrum®'s Axial Fixing System™ makes it possible to fix the rotor disc to the hub with a simple ring. The AFS™ is perfectly compatible with the Shimano Inc. Center-Lock system.*





# MO MAG

## SUPER STRONG NO HOLE RIM BED

### TOP BRIDGE WITHOUT HOLES FOR GREATER TORSIONAL RIGIDITY

*The use of MoMag™ technology makes it possible to make a rim with a top bridge without any holes, and therefore guarantee appropriate air tightness for the tubeless tyre.*

*The only hole in the rim is the one for the special valve that makes it possible to obtain the tyre's working pressure. The special gaskets fitted guarantee its hermetic tightness.*

**MoMag™** technology is integrated in wheels which do not have drilling of the top bridge of the rim. The nipples in these wheels are guided to their seat by employing a little magnet. Their accessibility from the outside makes it possible to carry out all the spoke tensioning and replacement operations conveniently. The absence of holes on the rim bed permits all the original strength to be maintained as well as the use of tubeless tyres. The hermetically sealed valve ensures that the tubeless tyre is kept under pressure.

*Unlike normal releases, the eccentric axle in Fulcrum® quick-releases is actuated by the torsion of both ends, and locking becomes easier and more secure.*

# QUICK RELEASE

**Quick-releases for Off-Road wheels** The quick-releases make use of the new patented Fulcrum® mechanism: a locking lever centred on the axis of the axle. This lever engages both ends of the axle fitted with a cam that exerts the closing traction on the axis, by means of a fork coupling. The synchrony with which the lever fork exerts the torsion on the ends of the eccentric axle makes the operation for locking and releasing the component more fluid, smooth and secure.

*The assembly of the locking lever, practically aligned with the axis of the locking pin, makes it possible to actuate the release more easily even when there are forks with liners with a particularly large diameter.*



# OVERSIZE AXLE

ERODIUM WHEELS AND HUBS

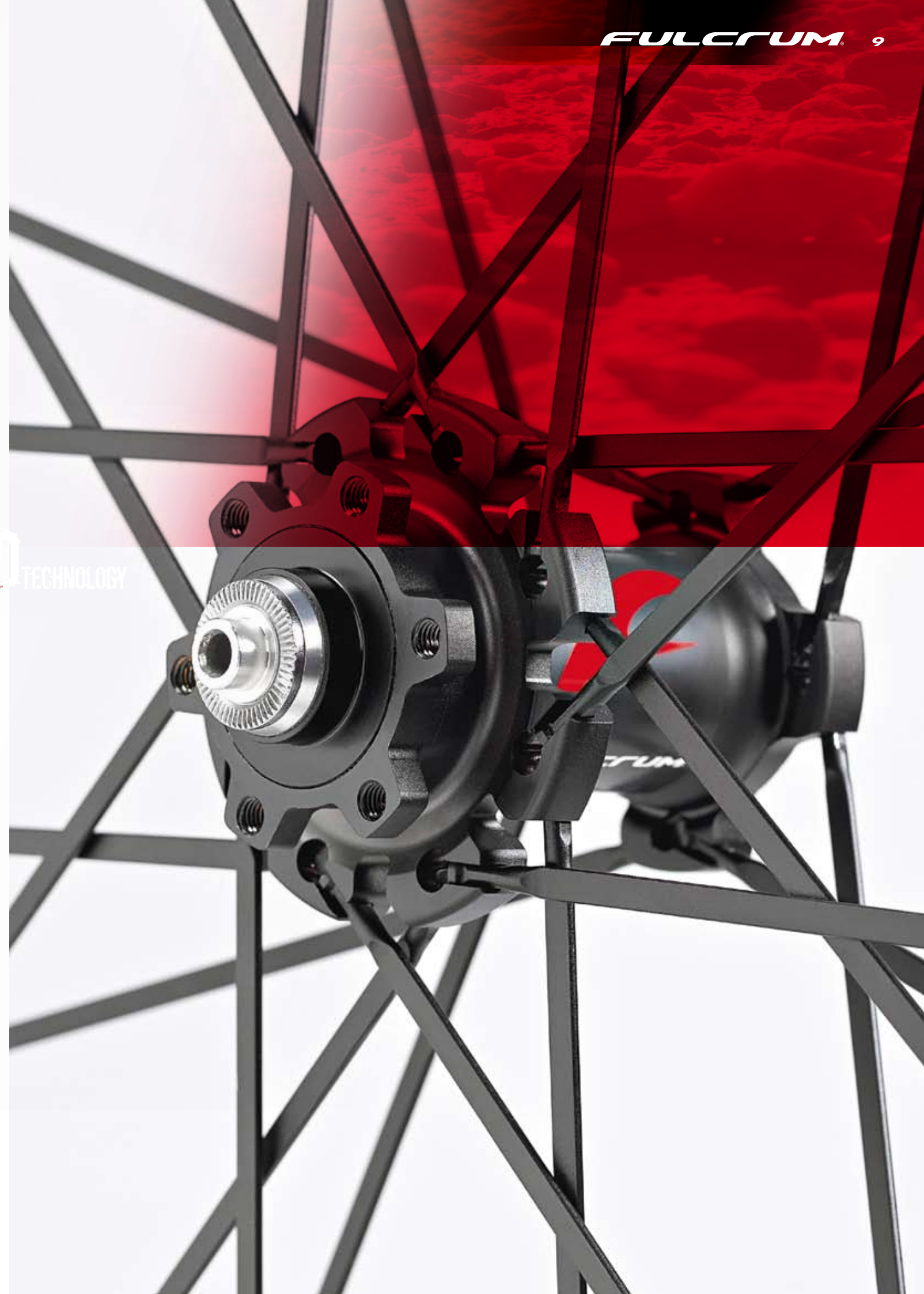
20 MM  
OVERSIZE AXLE

The hubs designed for Fulcrum® wheels employ a generously dimensioned design for both the central body and for the rotation axis. The diameter of the latter, 20 mm for all the models with disc brakes, guarantees high resistance to transverse and torsional stresses. A contribution is also made to this result by the mechanical architecture of the hub which, in the AFS™ version, is provided with bearings with a double ball-bearing race positioned outside the flange, so that it is aligned with the disc on the respective side. The Red Metal™ Zero and Red Metal™ 1 models are fitted with precision bearings with cones and cups which make fine adjustment possible and with a double gasket to provide a barrier against the infiltration of dust and mud.



*A wheel's resistance to transverse loads largely depends on the dimension of the axle. For this reason our hubs feature 20 mm oversize axles combined with greater distancing of the bearings.*

TECHNOLOGY







**Red Metal™ Zero** The top of the off-road Fulcrum® range is dominated by the preferred wheel of champions Red Metal™ Zero, used in competitions by Julien Absalon and his companions in the Orbea Cross Country Team. It has a welded rim with a 23.5 mm side, worked with a triple milling operation, a Fulcrum® patent, and with a specific profile for disk brakes. The assembly configuration uses aluminium spokes with an aerodynamic profile and stainless steel nipples arranged in a 2:1 Two-to-One™ configuration; 16+8 for both wheels, with the 16 spokes located on the disc side of the front wheel and on the sprocket set side of the rear one for greater performance.



### 6 Bolts & AFS™

The hubs have been designed with oversize bodies and flanges to increase the resistance to torsion.



The quick-release employs the special patented double pivot lever, with reduced lateral bulk.

The hubs have an oversize aluminium body that rotates by means of adjustable bearings on a 20 mm axle. This wheel is compatible with UST Tubeless tyres and with the AFS™ Fulcrum® systems or the International Standard as far as the disc brakes are concerned.

The triple milling operation to lighten the rim is carried out to remove the excess material in the sections between one spoke and the next.



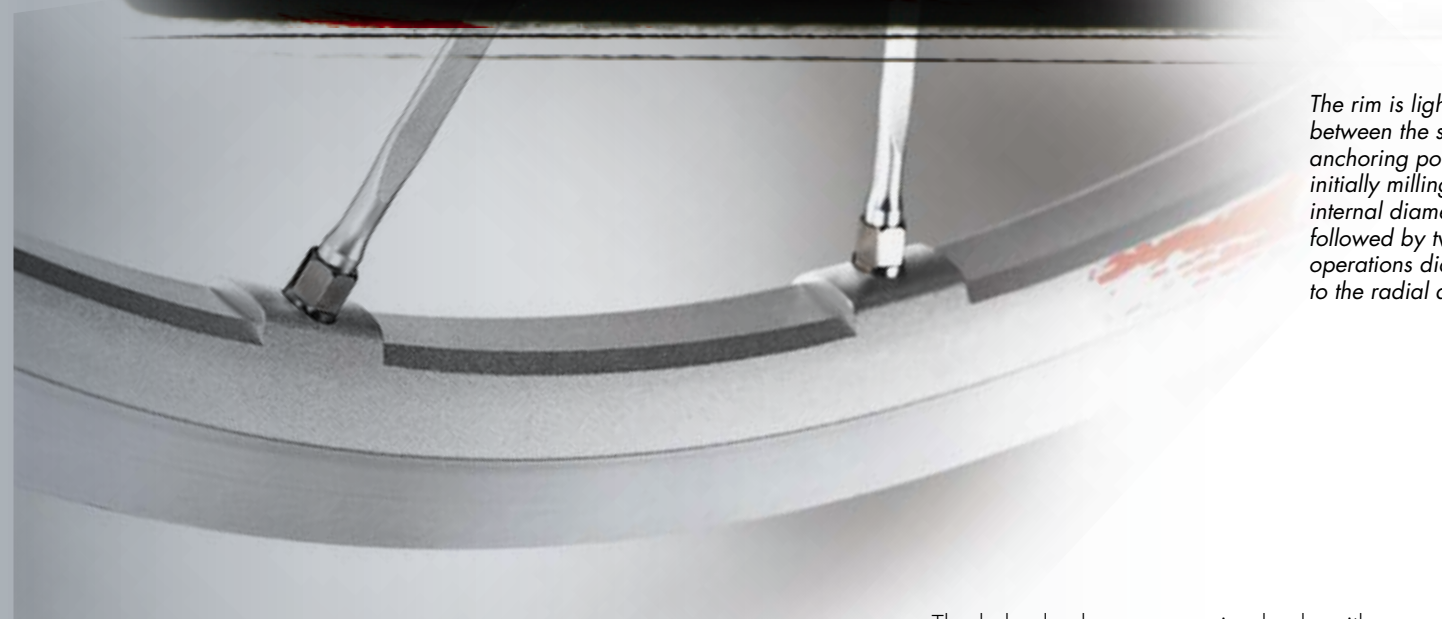


**Red Metal™ Zero** The most prestigious wheel in the Fulcrum® range is also available for cantilever brakes. The limitation of the number of spokes and the disc-free hub make it possible to obtain a decisive weight reduction: 1486 g. 18 radial spokes are fitted on the front wheel while the rear employs the Fulcrum® 2:1 Two-to-One™ system and envisages 14+7 spokes on the drive side. Given the use of the specific braking system it was possible to reduce the front axle diameter to 17 mm, while the diameter of the rear remains at 20 mm.

*The valve on the rim has special pressure-proof gaskets to ensure tightness at the inflation setting values.*

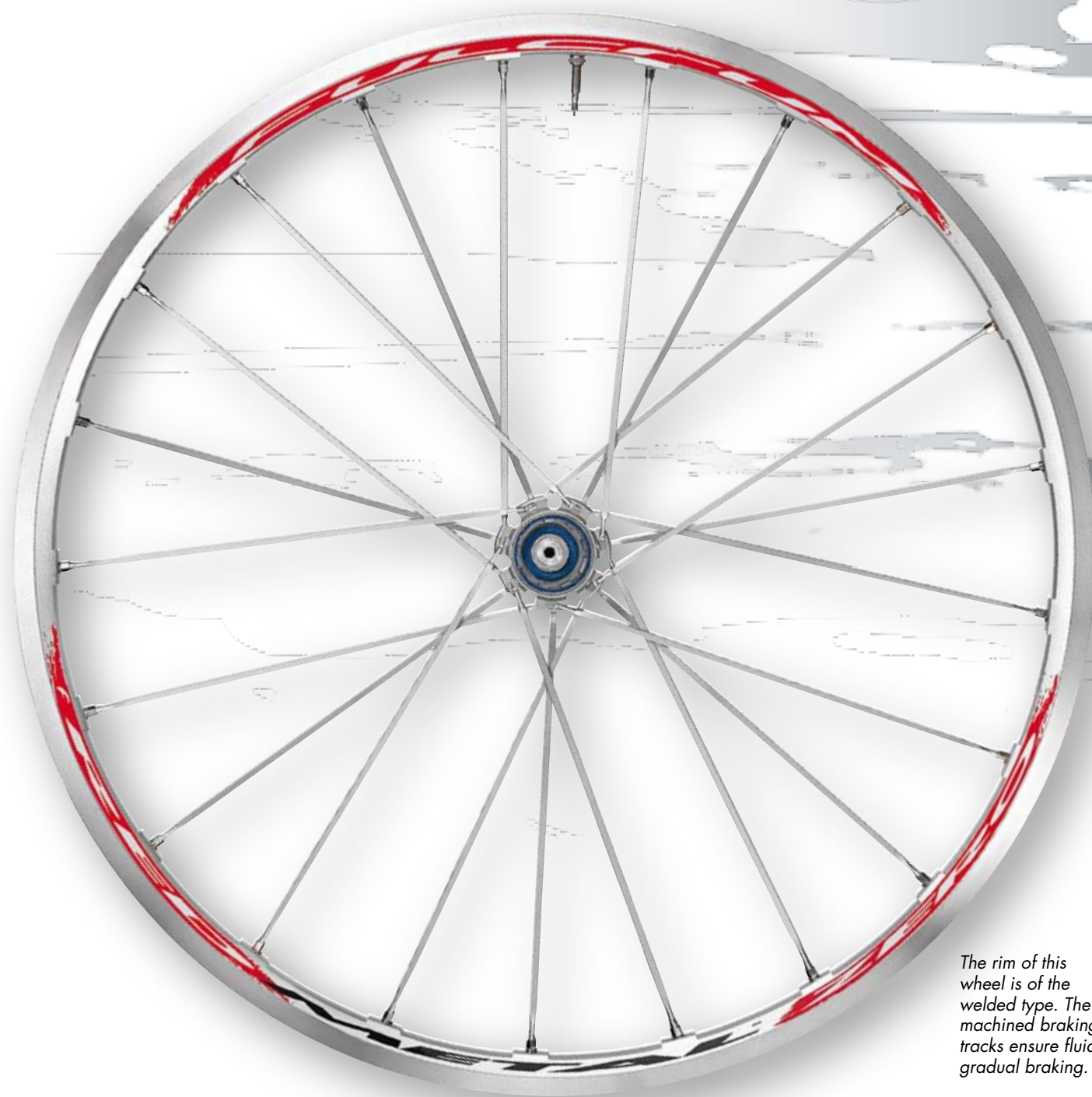


*The rim is lightened between the spoke anchoring points by initially milling the internal diameter, followed by two operations diagonally to the radial axis.*

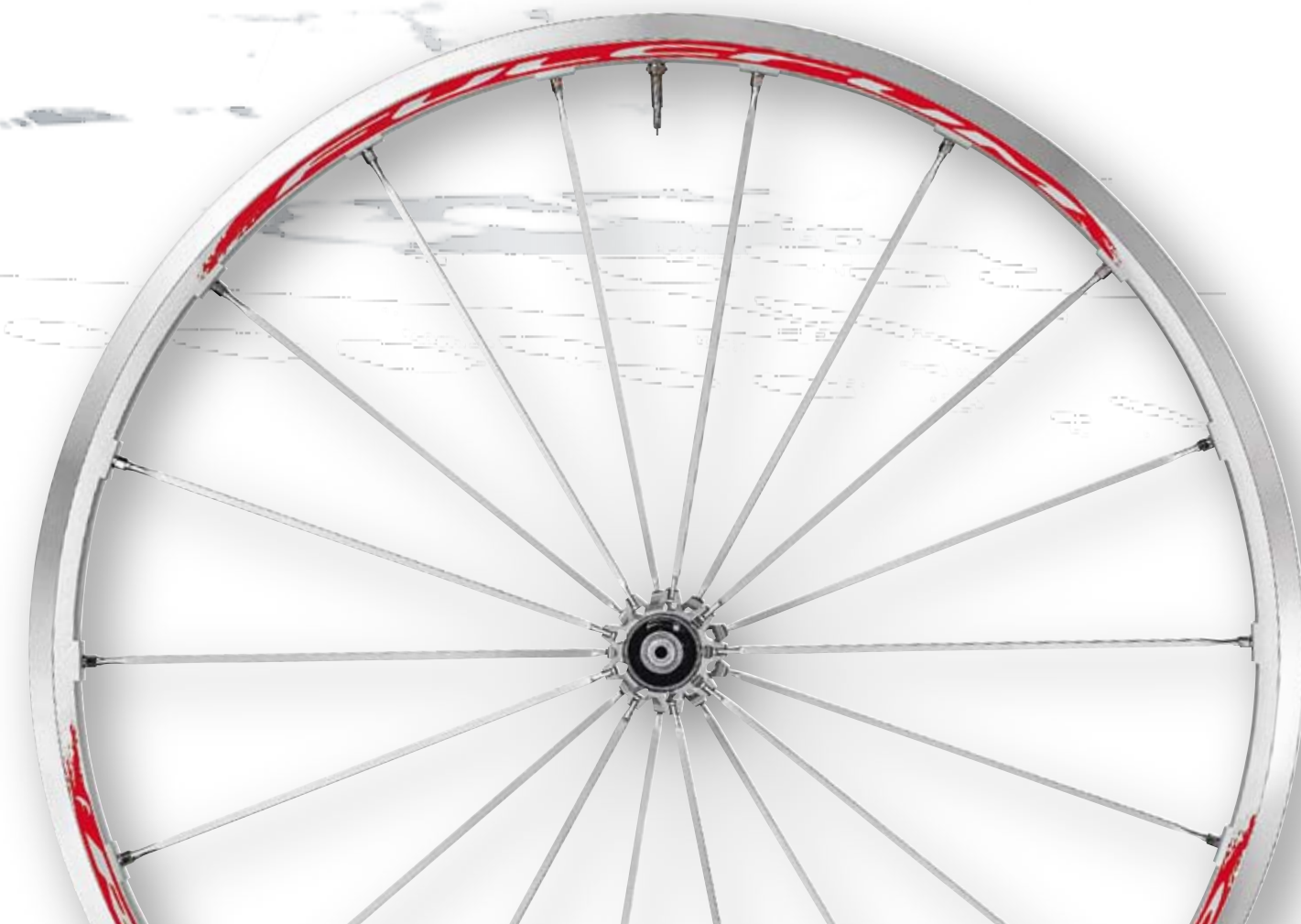


The hub also has an oversize body with adjustable high-precision bearings with cones and cups. The freewheel, with a steel body, also turns on two sealed bearings. The rim is compatible with UST Tubeless tyres.

*As this wheel is dedicated to cantilever brakes the front hub axle diameter is 17 mm while the rear diameter is 20.*



*The rim of this wheel is of the welded type. The machined braking tracks ensure fluid gradual braking.*







**Red Metal™ 1** Red Metal™ 1 wheels represent the top end of the Fulcrum® range. These wheels are only available in the disc brake version and are aimed at professional racers and high-level users with very high quality demands. They use an aluminium rim with a welded joint, lightened in the spaces between the spokes and with a calibrated profile without a braking track. They are fitted with aerodynamic stainless steel spokes, with variable 2-1.8-2 mm thickness, and with a 2:1 Two-to-One™ configuration at both the front and rear in a 16+8 unit combination.

*The hubs run on high-precision bearings that can be adjusted by cones and cups.*



6 Bolts & AFS™

*The wheel is fitted with stainless steel spokes, with double 2.0-1.8-2.0 thickness and aerodynamic profile, tensioned by brass nipples.*

The hub features an oversize body with both axles measuring 20 mm and adjustable precision bearings with cones and cups. The wheel is available in versions for International Standard disc and AFS™.



*The fluidity and operability of the release is guaranteed by the double joint on both ends of the cam pin.*



**Red Metal™ 3** The Red Metal™ 3, the solid and reliable wheels for everyday use, distinguished by an enviable quality-price ratio, are in the middle of the Fulcrum® range. Available in the disc version only, with welded joints and anodized black, they weigh 1853 g overall. They employ stainless steel spokes with a 2 mm thickness in the 2:1 Two-to-One™ assembly configuration on both wheels, with 16 elements on the sprocket set side of the rear wheel and on the disc side of the front, and 8 on the opposite side. The hubs fitted are of the aluminium oversize type fitted with a 20 mm axle front and rear. These wheels are compatible with Tubeless UST tyres whose availability in International Standard and AFS™ versions means that they can be combined with the main disc braking systems on the market.



*The design of the quick-releases aimed for secure locking, obtained by an optimum lever-closure ratio.*

*The rim side height is 25 mm. Specific use with disc brakes makes it possible to reduce the wall thicknesses and provide greater peripheral lightness.*



**6 Bolts & AFS™**



*The freewheel body of the rear hub is made of steel while the entire mechanism runs on two sealed bearings.*







**Red Metal™ 5** Red Metal™ 5 wheels allow all enthusiasts to enter the Fulcrum® Off-Road universe. Their rim has a specific profile for disc brakes with a height of 19 mm, a bonded joint and black anodized finish. This is the same finish that distinguishes the spokes mounted in a 2:1 Two-to-One™ configuration with 16 elements on the sprocket set and disc side and eight elements on the other. The axles, with a 20 mm diameter both front and rear, run on sealed bearings. The freewheel, with a steel body, turns on sealed bearings. The total weight is 1805 g, compatibility is

*The double fulcrum of the quick-release guarantees easy locking and more secure fastening*



### 6 Bolts & AFS™

*Two bearings sealed to prevent the infiltration of dust and dirt, for the rotation of the 20 mm oversize axle; plus another two for the freewheel body.*



*Red Metal™ 5 wheels are provided with a normal rim with the drilling required for spoke insertion. The tyres therefore must have standard rim tapes.*

guaranteed with standard tyres with rim tape, and the disc assembly option is envisaged in the International Standard and with AFS™, and therefore with the most common braking system.







REDMETAL™

	REDMETAL™ ZERO front Rim Brake	REDMETAL™ ZERO rear Rim Brake	REDMETAL™ ZERO front Disk Brake	REDMETAL™ ZERO rear Disk Brake	REDMETAL™ 1 front Disk Brake	REDMETAL™ 1 rear Disk Brake	REDMETAL™ 3 front Disk Brake	REDMETAL™ 3 rear Disk Brake	REDMETAL™ 5 front Disk Brake	REDMETAL™ 5 rear Disk Brake
nominal weight*	633	823	706	862	760	905	815	1000	805	965
finish	silver	silver	black	black	black	black	black	black	black	black
welded rim joint	yes	yes	yes	yes	yes	yes	yes	yes	no	no
RIM TAPE	not needed	not needed	not needed	not needed	not needed	not needed	not needed	not needed	yes	yes
machining	yes	yes	yes	yes	yes	yes	no	no	no	no
nominal width	17	17	19	19	19	19	19	19	19	19
spoke material	aluminium	aluminium	aluminium	aluminium	stainless steel	stainless steel	stainless steel	stainless steel	stainless steel	stainless steel
number of spokes	16 radial	7 left 14 right	16 left 8 right	8 left 16 right	16 left 8 right	8 left 16 right	16 left 8 right	8 left 16 right	16 left 8 right	8 left 16 right
type of spokes	aero with variable section	aero with variable section	aero with variable section	aero with variable section	aero with variable section	aero with variable section	aero	aero	aero	aero
hub material (body/axle/Fwbody)	Alu/ Alu/-	Alu/ Alu/ Steel	Alu/ Alu/-	Alu/ Alu/ Steel	Alu/ Alu/-	Alu/ Alu/ Steel	Alu/ Alu/-	Alu/ Alu/ Steel	Alu/ Alu/-	Alu/ Alu/ Steel
O.L.D.	100mm	135mm	100mm	135mm	100mm	135mm	100mm	135mm	100mm	135mm
braking system compatibility	Linear Pull		ISO INTL 6 Bolts AFS™		ISO INTL 6 Bolts AFS™		ISO INTL 6 Bolts AFS™		ISO INTL 6 Bolts AFS™	

\* The weight of the wheels does not include the quick release, and it refers to the lightest configuration.





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