DT SWISS ENGINEERING PERFORMANCE

EMBARGO
OCTOBER 19, 2023
4 PM CEST

HYBRID MTB
HUBS

240
HYBRID

350
HYBRID

DT SWISS

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EXECUTIVE SUMMARY


RATCHET EXP
240
HYBRID
350
HYBRID
350
HYBRID
RATCHET
350
HYBRID
240

ABSTRACT
HYBRID MTB HUBS

Based on classic MTB hubs, the 240 and 350 Hybrid versions are equipped with special features to make them eMTB-compatible. The power of the motor is of little value if it is not reliably transmitted to the ground. That's exactly where these new hubs come in, with their larger hub flanges specifically adapted for DT Swiss 2.34 mm spokes, offering greater resistance to acceleration and braking.

And that's not all: the freehub system is also adapted to the higher loads produced by eMTBs, so that the hardened steel ratchets can reliably transmit all the generated power over a large contact surface.

Build your next eMTB wheels with the new 240 and 350 Hybrid hubs to extend your rides and ensure they stay stress-free for a long time.

240 HYBRID
FEATURES

RATCHET EXP OS
Featuring bigger bearings than the classic Ratchet EXP System

REDESIGNED HUB SHELL
For enhanced durability

STEEL FREEHUB BODY
To resist against the higher loads

SPECIFIC HUB FLANGES
Suited for specific DT Swiss 2.34 mm spokes

350 HYBRID
FEATURES

RATCHET SYSTEM
Proven Ratchet System

REDESIGNED HUB SHELL
For enhanced durability

STEEL FREEHUB BODY
To resist against the higher loads

SPECIFIC HUB FLANGES
Suited for specific DT Swiss 2.34 mm spokes

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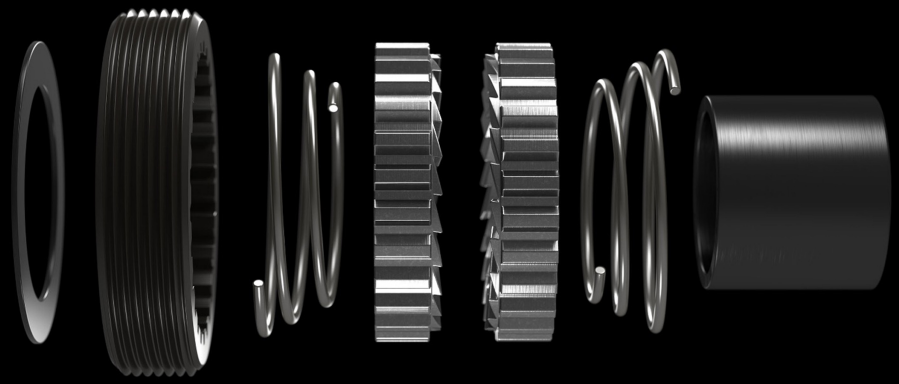
HYBRID HUBS
TECHNOLOGIES

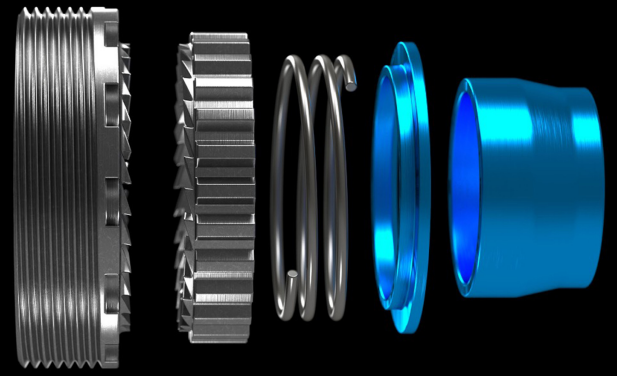

240
240
HYBRID
240
HYBRID
RATCHET EXP

PURPOSE-BUILT
FREEHUB SYSTEMS

The force generated by human muscles and motors is transmitted through the freehub body, then to the freehub system and to the hub shell. On the new generation of Hybrid wheels, the freehub systems have been reengineered to resist even higher loads.



RATCHET



RATCHET EXP OS

PURPOSE-BUILT
RATCHET EXP OS

The advantages of the Ratchet EXP System have been retained. With a ball bearing seated in the threaded ring, the bearing distance is larger than in the conventional Ratchet System. This means that the axle is supported wider, resulting in greater hub stiffness, less movement of the axle and therefore less stress on the bearings, increasing their service life.

The fixed connection of the ratchet and the hub shell, through the integration of the threaded ring and the ratchet, allows the use of a straight spring. This improves the precision of the engagement, since the ratchets are facing in the correct angle. With fewer components, the Ratchet EXP OS System is lighter and easier to maintain.

This precision allows for an increase in the number of teeth from 24 to 30 compared to the conventional system, which in turn reduces the angle of engagement. On an eMTB, where there is a certain amount of free movement of the cranks due to the motor, this provides a small advantage. Specifically optimized for the requirements of eMTB is the size of the threaded ring and the bearing inside it. Not only are the bearings oversized, but also the threaded ring.

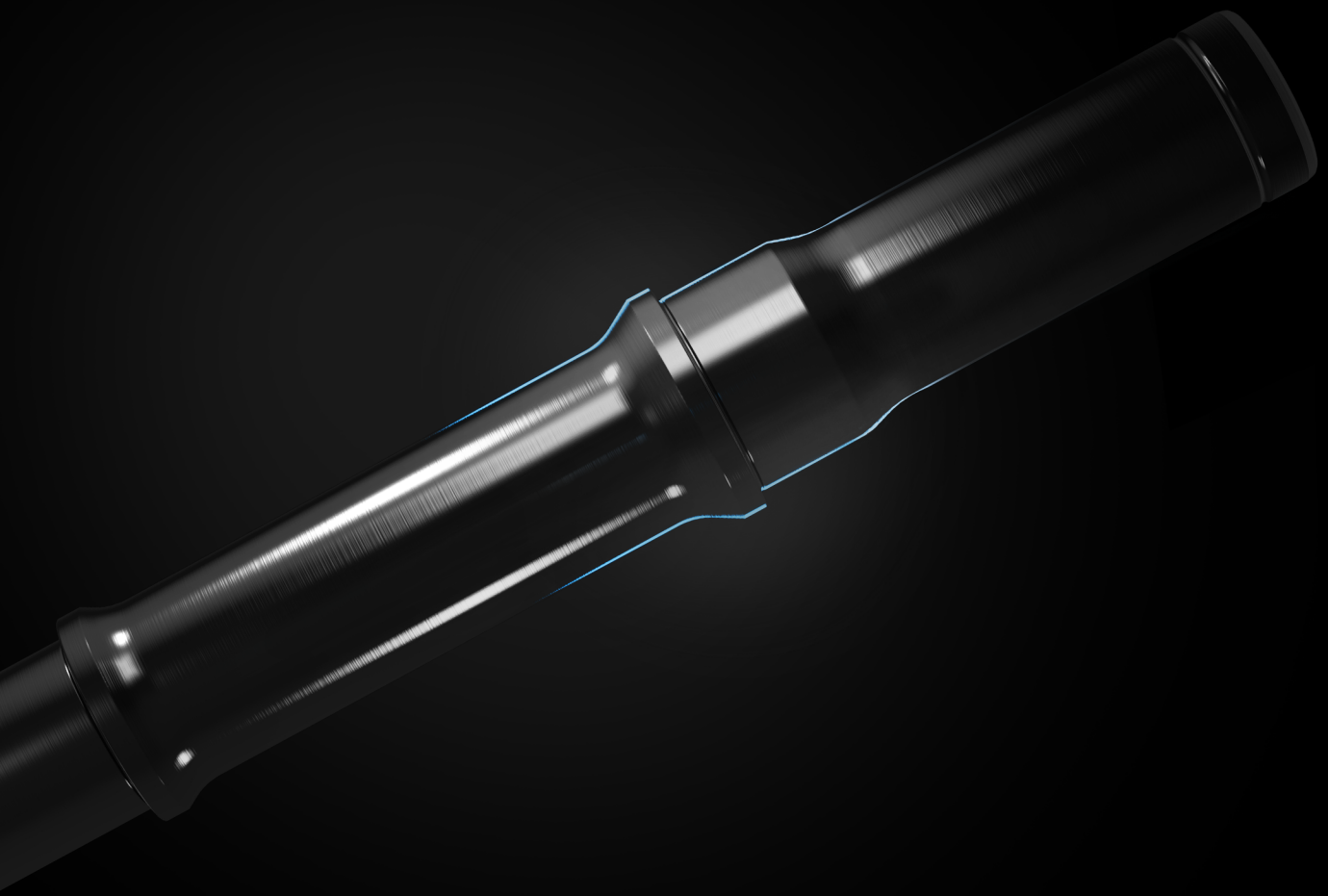
PURPOSE-BUILT **RATCHET EXP OS BEARINGS**

Grooved ball bearings are usually found in high-end bicycle hubs. These bearings have been optimized to spin fast and absorb radial forces while still being able to take up a certain number of axial forces.

Bearing wear occurs when the forces on the balls or on the running surface are too high. The high local loads can lead to indentations in the running surface, which causes the balls to no longer run smoothly. Consequently, the wheel bearings will run roughly on the tread.

Excessive peek loads can also lead to abrasion of the running surface, which can result in play.

To accommodate the higher loads, a 17x28x7 bearing is fitted instead of a 15x26x7 in the Ratchet EXP OS freehub system. These new bearings consist of more bearing balls which are also larger than the previous hybrid hubs generation. These larger bearing balls distribute loads over a larger area of the running surface, whereby less wear occurs.



PURPOSE-BUILT **RATCHET EXP OS REINFORCED AXLE**

For the redesign of the freehub system, the finite element method (FEM) was used to analyze the stress distribution on the axle during eMTB riding. Based on this analysis, the axle wall thickness was increased in the area of the ball bearing in order to cope with the higher bending loads. Following the FEM analysis, laboratory tests confirmed the expected improvements.

FEM makes it possible to optimize components by simulating the overall behavior of the structure under a specific load case. The result of the optimization is more uniform stress distribution and lower tension peaks under loads.

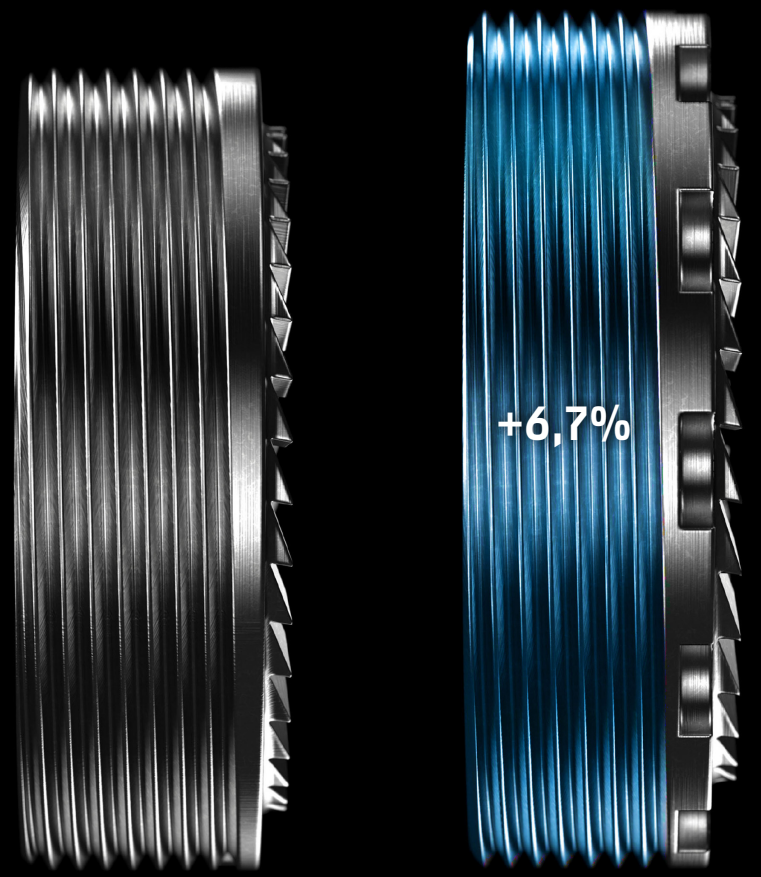
As a result of the adjustments, the axle is 18% stiffer compared to the previous Hybrid MTB axle, allowing for better resistance.

PURPOSE-BUILT **RATCHET EXP OS LARGER THREAD**

While the Ratchet EXP uses a M30 threaded ring, the Ratchet EXP OS features a M32 threaded ring. The threaded ring transmits the force coming from the freehub body to the hub shell. The diameter of the Ratchet EXP OS thread is 6.7% larger than the regular Ratchet EXP system thread, whereby the loads are distributed on a larger surface. This reduces the load peaks, which contributes to the longevity of the system and allows more torque to be transmitted.

Like the Ratchet EXP, the thread of the Ratchet EXP OS is double threaded. This means that the thread has two starts and two threads.

Due to the higher lead angle of the thread, the resistance to loosening is lower than with single-start threads. This simplifies maintenance when compared to single-start threads.



RATCHET EXP
M30

RATCHET EXP OS
M32

PURPOSE-BUILT **RATCHET SYSTEM**

The 350 Hybrid hub uses the Ratchet System established by DT Swiss in 1994. Two conical springs ensure the correct position of the ratchets to each other.

The ratchets are specifically optimized for eMTB use. Made of hardened steel and equipped with 24 teeth, they offer the ideal combination of reliability, weight and engagement angle for this system. More about the engagement angle and the effects on riding behavior can be found on our website.

PURPOSE-BUILT
STEEL FREEHUB BODY

The torque of the motor and crank is transmitted via the chain to the cassette and then to the freehub body. This interface of cassette and freehub body is optimized for the specific loads accrued by eMTBs.

Hybrid freehub bodies are made from specific hardened steel. Compared to the conventional aluminum freehub body, the specific hardened steel offers a higher static strength. In addition, it has a higher fatigue strength. This means that even after a high number of load cycles and high peak loads occurring on accelerations, the steel freehub body offers better resistance to minor marks and wear on its surface.

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PRODUCT SPECIFICATIONS


SL FS 37255240
240
HYBRID

240 HYBRID

WEIGHT	From: 156 g front, 290 g rear
AXLE SYSTEM	Front: 15/110 mm, Rear: 12/148mm
FREEHUB SYSTEM	RATCHET EXP OS 30T
BRAKE INTERFACE	Center Lock / IS (6-bolt)
MATERIAL	Aluminum
HOLES	32
FREEHUB BODY OPTIONS	Shimano MICRO SPLINE Shimano HG
PRICE	From: 177.90 € Front, 335.90 € Rear From: 242.90 $ Front, 459.90 $ Rear From: 186.90 CHF Front, 353.90 CHF Rear From: 299.00 AUD Front, 549.00 AUD Rear

PRODUCT PAGE (available from October 19, 2023)
www.dtswiss.com/en/components/hubs-and-rws/hubs-hybrid-mtb/240


350
HYBRID

350 HYBRID

WEIGHT	From: 174 g front, 302 g rear
AXLE SYSTEM	Front: 15/110 mm, Rear: 12/148mm
FREEHUB SYSTEM	RATCHET 24T
BRAKE INTERFACE	Center Lock / IS (6-bolt)
MATERIAL	Aluminum
HOLES	32, 36
FREEHUB BODY OPTIONS	Shimano MICRO SPLINE Shimano HG
PRICE	From: 92.90 € Front, 229.90 € Rear From: 116.90 $ Front, 297.90 $ Rear From: 97.90 CHF Front, 241.90 CHF Rear From: 189.00 AUD Front, 399.00 AUD Rear

PRODUCT PAGE (available from October 19, 2023)
www.dtswiss.com/en/components/hubs-and-rws/hubs-hybrid-mtb/350

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TECHNOLOGIES

TECHNOLOGIES

RATCHET TECHNOLOGIES
OVERVIEW
More information →

RATCHET EXP OS
TECHNOLOGY
More information →

RATCHET
TECHNOLOGY
More information →

BEARING
TECHNOLOGY
More information →

ENGAGEMENT ANGLE
TECHNOLOGY
More information →


2.0
+HYBRID

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