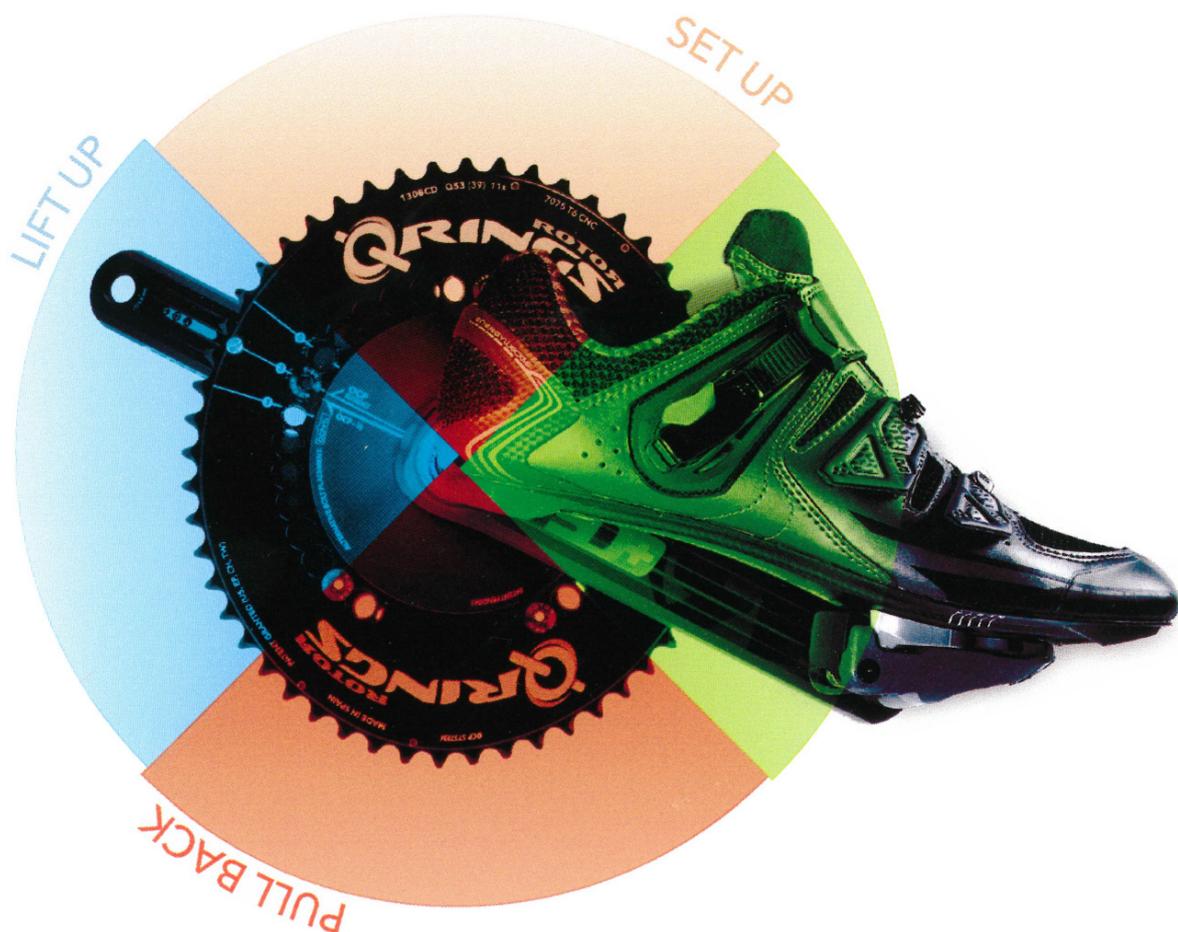


Orient your Chainrings around your riding style....Literally

For more than a century, improving pedalling efficiency has persistently challenged inventors to come up with the most intelligent design to accomplish a single goal; to create a better riding experience. Rotor Q-Rings go one step further by allowing you to fine-tune your improved riding experience by orienting your chainrings around the most productive part of your pedal stroke.

Your Optimum Chaining Position (OCP) takes advantage of the area where you apply the most force during a pedal rotation and compensates for the least productive part.



Why Q-Rings

Biomechanical research indicates that with Q-Rings, the effort is translated into performance and pedalling efficiency. Q-Rings compensate for inefficiencies in the pedal stroke by maximising muscular engagement through the most powerful portion of the pedal stroke and maximising it through the dead spots. In scientific, 1km time trial studies, Q-Rings resulted in a 1.6 second advantage compared to round chainrings.

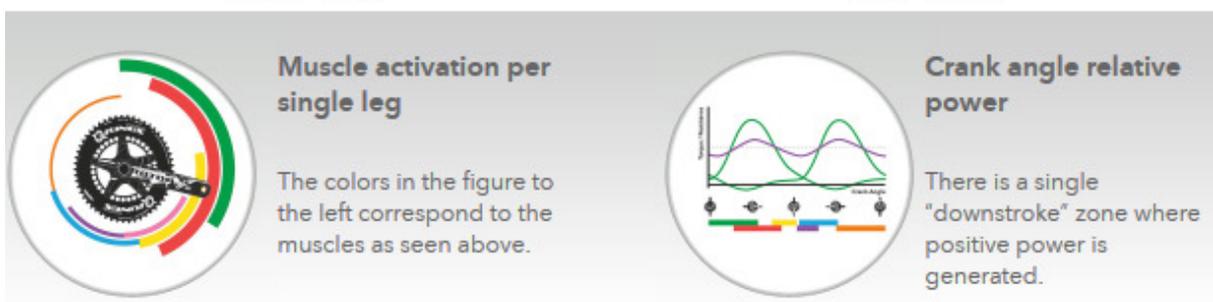
Some of the benefits of Q-Rings include;

- improved overall performance
- a greater ability to accelerate or sprint
- a delay in the sensation of muscular fatigue
- smoother torque
- better grip of the road

Optimise your pedalling – Q-Rings make better use of your strongest muscles

The muscles recruited during pedalling, their relative strength during pedalling and the torque produced as a crankset rotates are shown in the figures below. From these graphs, it is clear that a round chainrings' constant level of resistance interferes with optimal pedalling dynamics.

A Q-Ring gives a silky-smooth “perfect spin” by smoothening out torque variations and making better use of your strongest muscles, visible in the smoother and fuller Graphs to the right: “Round ring vs. Q-Ring spinscan”.



Peer-reviewed scientific research has shown that Q-Rings offer a clear increase in performance compared to round chainrings. Elite level cyclists saw a 1,6 second advantage in a 1km TT study, generating 27 watt (W) more power. For comparison, 60mm aero wheels often claim 1,5-1,8 sec/km and 16W savings.

What does this mean when you're riding? You will discover increased endurance, realise explosive sprints and see a newfound tenacity in climbs. You will find that you can stick with the hardcore group that usually drops you. You will become an improved version of yourself, ready to set new PR's and discover a new depth of performance. Triathletes will notice reduced strain in the bike split and better run split performance.

Q-Ring Zones

The maximum diameter of the Q-Ring occurs where the greatest amount of power is produced in the pedal stroke. The minimum diameter of the Q-Ring occurs where the "dead-spot" are located. Your Optimum Chaining Position (OCP) allows you to vary the angle where your Q-Ring offers its greatest resistance by adjusting it to the precise point where you deliver the maximum power during a single pedal rotation.

Find your Optimum Chaining Position (OCP)

Switching from round rings to Q-Rings is easy and, even though it requires a brief transition period, the rider will start seeing benefits right away. Q-Rings use leg muscles at a different rate than normal round rings, and the muscles need to adapt to the new, more efficient way of pedalling. It is hardly noticeable process that happens naturally – with no sudden changes. Without giving it any thought, he or she is applying power in a more efficient manner while at the same time protecting the knees from possible injury.

OCP allows Rotor to vary the angle where a Q-Ring offers its greatest resistance, adjusting it to the precise point when the rider delivers the maximum power during a single pedal rotation. An OCP ring allows up to 20degrees of angular variation between the first and last adjustment points, all to optimise each individual's downstroke.



Image shows INpower crankset with OCP and MAS drilling

Road Q-Rings and QXL have 5 OCP points. MTB Q-Rings have 3 OCP points. The Micro Adjust Spider, as shown above, (or MAS, standard on Flow cranks and Rotor Power (INpower), and available for 3D+ crank) doubles the number of OCP points. MAS reduces the angle between OCP points by 2.5 degrees.

Customising your Adjustment

Customising adjustment is a process worth the time. The exact position is not determined by height or weight, but rather by individual pedalling style and muscle distribution. Before switching to the next point, it's best to ride at least 10 hours on the previous one.



Starting at the intermediate point, #3, after having passed the adaptation period, the appearance of certain symptoms makes it advisable to switch the OCP. It is advisable to go one-by-one, instead of going up or down more than one point at a time.

Go DOWN one OCP position if;

- it is easy to change pace and sprint, but hard to keep a steady rhythm
- there is a tendency to pedal with a low cadence, or rider stands up or sits on the edge of the saddle more than usual
- there is a need to stretch the ankle too much to apply maximum power
- rider feels pain behind the knee

Go UP one OCP position if;

- rider is comfortable at a constant high speed, but finds it hard to vary the pace
- rider is comfortable at a high cadence
- in order to feel at ease, rider needs to increase cadence uncomfortably or has to slide to the very back of the saddle
- rider feels pain at the front of the knee

Why QXL Rings?

The new ROTOR QXL is a Q-Ring with increased ovalization. They have a similar shape to standard Q-Rings, ensuring exceptional drivetrain stability. QXL rings do not replace standard Q-Rings, rather complement them as each is optimised for different rider profiles and situations.

Rotor believe that standard Q-Rings offer an optimal adaptation; stability and biomechanical balance for most cyclists. However, they are aware of scientific research and feedback from pro riders that shows that greater ovality can be desirable and useful for certain athletes since not all riders have the same muscle build, riding form, or pedaling style.

The feedback was positive from many professional riders previously wary of Q-Rings. These athletes reported an improved cycling experience when pedaling out of the saddle and accelerating. **QXL chainrings** are most noticeable when riding in conditions of high power delivery and consistent maximum (peak) effort, like time trials, sprints, breakaways, etc. Designed for experienced riders who have either been riding Q-Rings and need greater power.

Target Customer Profile

The **QXL rings** are designed more for a type of rider rather than a specific cycling discipline. "Powerful" riders with larger muscle mass that produce a higher peak and average power output typically prefer QXL rings. For example, sprinters tend to have predominantly fast twitch muscle build. This makes an increased degree of optimal ovality because these riders benefit from the decreased negative work offered by the enlarged ovality.

Q-Rings can increase an avid cyclist's performance by as much as 4 seconds per km in a sprint – that's twice the benefit of an aero wheelset! Professionally, athletes who have chosen to ride them have put to rest any doubts about their performance by winning two grand tours, more than 25 Ironman races and over 20 UCI elite Road, MTB and CX world champion titles.