PowerOval®
Extended Product description (detailed)

*Mechanically superior

-Perfect toothing due to a correct teeth orientation and full-profile teeth.
Each **PowerOval®** tooth is perpendicular oriented to the pitch-curve.
This is a requirement for optimal mechanical efficiency
The **PowerOval®** tooth profiles are not "adjusted". They have been correctly machined over the entire circumference. Full-profile teeth reduce chance of the chain jumping off.
-Sufficient stiffness by using 3 mm aluminum sheet.
-Smooth shifting aided by 6 stainless steel chainlifters,
inner chamfer and shift gates in the teeth on the outer chainring.
- Chain stability on outer ring is 100%: no chain drop off
This was tested by 26 test riders on more than 30 000 km, in competition and in other challenging bike road conditions.

*Bio-mechanically superior

-Aero chainrings
-Sufficiently large ovality (25% for outer and inner rings)
The ovality is the ratio of the major axis (diameter) to the minor axis length of the oval. If the ratio is e.g. 1.25 then the ovality is 25%.
According to research and testing chainring performance increases with increasing ovality. For practical reasons ovality is **restricted** to 25% to avoid mounting problems and to prevent the chain drop off the outer ring when shifting towards the smaller cogs. Chain stability was thoroughly and comprehensively tested. See above.
-Geometry of the shape
The **PowerOval®** consists of 4 shape sectors: a circle arc, a transition to flat, a flat section and a spiral of Archimedes as transition from flat to round. Justification of the **PowerOval®** shape, see "Science"
Rotor Q-Ring is a quasi mathematical ellipse. Ogival has one single shape sector (circular segment). Polchlopek (1970) consists of two shape sectors (circular segment and flat teeth-segment). Doval shows three shape segments (two different elliptical arcs and a flat section). Osymetric is composed of five different sections (circle arc, a flat teeth-segment, three arcs with different curvature as a transition from flat to round).
The shape sectors of the **PowerOval®** which are similar to the shape sectors of other manufactures are substantially different in size (number of teeth or number of degrees).

-Crank arm positioning or crank offset ("clocking").
The crank of the **PowerOval®** chainring is oriented in the optimal position yielding a maximal kinetic crankpower gain combined with a minimal peak-power load in the extensor joint muscles of knee and hip. This "optimal crank orientation angle" is confirmed in studies and by tests. See "Science".
However the optimal crank offset is also a function of the bike geometry and the seating position of the cyclist. **PowerOval®** provides 3 mounting possibilities: a crank orientation angle of 68°, measured clockwise from major axis of the chainring (Road Bike), a crank angle of 76° (Time Trial Bike) and of 84° (provides an additional correction possibility for an extreme forward seating position: larger "virtual" seat tube angle).
Other manufacturers of oval chainrings position the crank arm mostly at 105° to 110°. Having the major diameter vertical and the crank arm at e.g. 110° (clockwise), the **vector** of the pedal force is almost maximal in this position.
But the direction of the pedal force vector is far from being optimal. In this position the tangential pedal force component (which generates the crank power) is small and only generates a "modest" crank moment that contributes relatively little to the crank power output. That crank position with greatest force vector is certainly no guarantee of crank power maximization over a complete crank cycle. Moreover, in that mounting position the above mentioned non-circulars have their largest gears close to the less effective pedaling sectors (dead-point zones). At increasing and higher pedaling rates these ineffective positions become more distinctive (see References, 17, "Science/Performance").

For the **PowerOval®**, because of its optimal crank arm positioning:
-the largest gear(s) take place at the beginning of the "power zone", far from the ineffective pedaling sectors.
-and there, the tangential pedal force component equals the total pedal force vector which generates a large crank moment contributing maximal to the crank power output.

Only the Polchlopek oval positions the crank arm relatively good to get crankpower gain, namely at 78°, measured clockwise from major diameter.
All the other manufacturers of ovals copy the "erroneous" crank arm orientation from each other.

***Aestethic attractive finish**

Black anodized with Italian design logo.
Stylish lettering with technical info on **PowerOval®** outer and inner ring.
Aero
Logo and lettering by print engraving.

***Equivalent maximum and minimum round chainrings**

Depends on ovality.

		Equivalent round chainrings	
PowerOval®	Ovality	Maximum	Minimum
54 teeth	25 %	60.8 teeth	47.3 teeth
52 teeth	25 %	58.5 teeth	46.2 teeth
44 teeth	25 %	49.5 teeth	38.5 teeth
42 teeth	20 %	46.2 teeth	38.2 teeth
38 teeth	25 %	42.8 teeth	33.8 teeth

For example:
A **PowerOval®** 38 teeth chainring with 25% ovality feels like a 42.8 teeth ring during the power stroke and like a 33.8 teeth ring at the dead spots. In between, all other teeth sizes.