

MOBILITY

voestalpine RACING SOLUTIONS CRANKSHAFTS

WHEN PERFORMANCE MATTERS

Racing crankshafts operate in one of the most demanding environments in mechanical engineering. These components are designed to endure immense forces, rapid rotational speeds, and extreme thermal conditions. Despite being manufactured from high-performance steel alloys, failures can still occur—often due to a complex interplay of stress, fatigue, and microscopic imperfections within the material. The two most common causes of material related failure are:

1. Fatigue and Material Limits
2. Overloading and Torque Spikes

The steels used in the manufacture of racing crankshafts are among the most advanced metallurgical materials available, specifically engineered to endure the extreme mechanical and thermal stresses encountered in high-performance motorsport environments. These steels are typically through-hardened high-strength grades, often combined with nitriding treatments to enhance surface hardness and fatigue resistance.

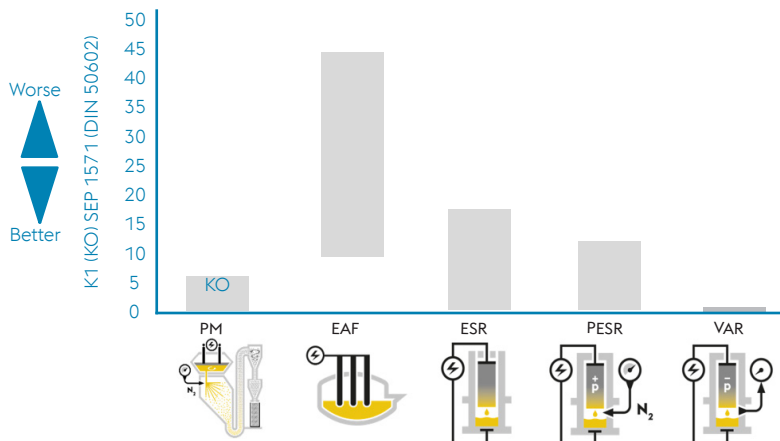
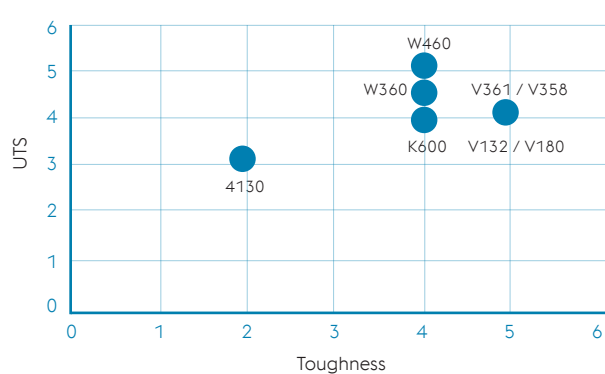
MATERIAL FAILURE & OUR SOLUTION

Material Related Failure	voestalpine Solution	Material Grades
Fatigue and Material Limits	Increased cleanliness	BÖHLER V361/V358, W460 & V180*
Overloading and Torque Spikes	High tensile strength, high yield strength, high fracture toughness	BÖHLER V361/V358, W460 & V180*

* The grades listed above are general recommendations. For detailed guidance tailored to your specific application, please contact us directly.

COMPARISON OF PROPERTIES

CLEANLINESS VS. MELTING PROCESS



COMPARISON OF PROPERTIES

Property	BÖHLER V361 / V358	BÖHLER W360 / W460	BÖHLER K600	BÖHLER V132 / V180 4340 / 4340Si	Standard Grade 4130
Steel Type	3% CrMoV	High C / CMV	~EN30 B type	1.5-2.5 % NiCrMo	1.5% Cr 0.25 Mo + Al if req.
Melting Route	VIM + VAR (V361) Air Melt + VAR (V358)	Air Melt + PESR (W360) Air Melt + VAR X 2 (W460)	Air Melt	Air Melt + VAR	Air Melt
UTS	★★★★★	★★★★★	★★★★★	★★★★★	★★★
Toughness*	★★★★★	★★★★★	★★★★★	★★★★★ (in VAR quality)	★★
Hardness	★★★★★	★★★★★	★★	★★★	★★
Surface Hardening	Nitriding PVD Carb possible	Nitriding PVD Carb possible	Nitriding (core hardness limit 45 HRC) Carb possible	PVD Low temperature coatings < 300 °C	Al alloyed EN 41 type good sur- face Nitriding re- sponse
Maximum Ruling Section HT Stability	Circa 70mm Oil quench Good	Circa 150 mm vac gas quench Good	Suitable for very large sections air hardens circa 200 mm + Very good	Circa 75 mm with OQ Good	Circa 30 mm components. Average

* Toughness is significantly reduced in 4130 when produced without VAR.

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ONE STEP AHEAD.