HIGH PERFORMANCE STEEL

Application: Wrist pin

Ductility with Orvar Supreme

Total failure on the race-track can have devastating consequences. Anders "Charley" Karling, European Champion in Drag racing Super Twin Top Fuel Bikes, knows he can avoid this by using only the best.

For the wrist pin to do a good job of holding the piston a combination of ductility and hardness is important---both to avoid breakages and to resist abrasive wear. **Orvar Supreme** can do all of this and minimize the moving mass. By using nitrided **Orvar Supreme** in the wrist pins, Anders "Charley" Karling can win again.

Characteristics

	Orvar Supreme
Delivery hardness & Maximum hardness	Soft annealed to 180 HB, maximum hardness approx. 55 HRC.
Strength	R_m=1820 N/mm^2, $R_{p0,2}$=1520 N/mm^2 at 52 HRC and 21 ℃
Toughness	Charpy V approx. 15 J at 21 °C and 45 HRC
Fatigue	The clean material guarantees good fatigue

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HIGH PERFORMANCE STEEL

Application: Sprocket Shaft

More torque using Orvar Supreme

The Super Twin Top Fuel Drag racing bike that Karling drives is extremely powerful. Especially at the start, all components in the engine and chassis are put under extreme stress.

The torque on the outgoing shaft from the engine is enormous, causing conventional steel grades to twist. By using **Orvar Supreme** the risk for failure is eliminated because it combines high strength with good ductility.

Characteristics

	Orvar Supreme
Delivery hardness & Maximum hardness	Soft annealed to 180 HB, maximum hardness approx. 55 HRC.
Strength	R_m=1820 N/mm^2, $R_{p0,2}$=1520 N/mm^2 at 52 HRC and 21 ℃
Toughness	Charpy V approx. 15 J at 21 °C and 45 HRC
Fatigue	The clean material guarantees good fatigue

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HIGH PERFORMANCE STEEL

Application: Drive shaft

Higher reliability with Orvar Supreme

The performance of a rally-cross car is sometimes extreme. Kenneth Hansen, 11-time European Champion, places high demands on the components in his car to perform the best at any given time. The powerful engine, over 600 bhp, increases the demands on the components. Kenneth Hansen has developed a drive shaft manufactured in tool steel from Uddeholm, **Orvar Supreme.**

The conventional steel grade was SS 2511, case-hardened, 60 HRC at the surface and softer in the middle. When starting, the enormous torque caused the shaft to twist and fracture. A maximum of three starts could be done before the shafts had to be changed.

The solution is a shaft manufactured in **Orvar Supreme** from Uddeholm, through-hardened to 48 HRC. The shaft can be used for 10-20 races before it has to be changed.

Characteristics

	Orvar Supreme
Delivery hardness & Maximum hardness	Soft annealed to 180 HB, maximum hardness approx. 55 HRC.
Strength	R_m=1820 N/mm^2, $R_{p0,2}$=1520 N/mm^2 at 52 HRC and 21 ℃
Toughness	Charpy V approx. 15 J at 21 °C and 45 HRC
Fatigue	The clean material guarantees good fatigue

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HIGH PERFORMANCE STEEL

Application: Connecting Rods

More power with Impax Supreme

Anders "Charley" Karling, European Champion in Drag racing Super Twin Top Fuel Bikes, knows what high speed is. With 800 bhp spread over 345 kilos, the forces are enormous on the components. In order to be a top performer, Karling uses Uddeholm steel in his bike.

The strength of the original connecting rods was too low, so the full power potential in the engine could not be used.

The solution was connecting rods manufactured in **Impax Supreme** with a hardness of 300 HB. Today, the full motor power can be used without deformation of the connecting rods.

Characteristics

	Impax Supreme
Delivery hardness & Maximum hardness	Prehardened to 300 HB, maximum hardness approx. 50 HRC. Good for induction hardening.
Strength	Delivery condition: R_m=1020 N/mm^2, $R_{p0,2}$=900 N/mm^2
Toughness	Charpy V approx. 27 J at 21 ℃
Fatigue	The clean material ensures good fatigue properties

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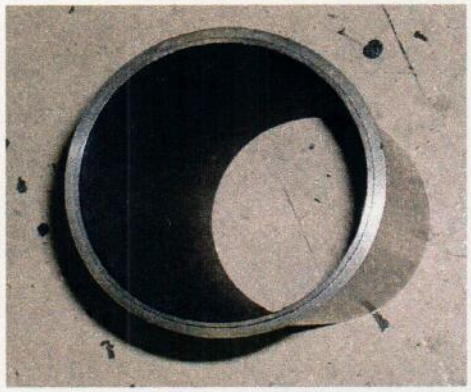
HIGH PERFORMANCE STEEL

Application: Cylinder Liner

Better tuning with Impax Supreme liner



When tuning cars, reliability of the components delivering the power is very important. Together, with a tuning company in Sweden, Uddeholm has made tests with racing cylinder liners manufactured in **Impax Supreme**.

Conventional material cracks because of the high pressure developed in the engine. The original material is not hard enough for those kinds of pressures. **Impax Supreme** is more ductile and has higher resistance to wear, resulting in more reliable motors which can deliver more power.

Characteristics

	Impax Supreme
Delivery hardness & Maximum hardness	Prehardened to 300 HB, maximum hardness approx. 50 HRC. Good response to induction hardening.
Strength	Delivery condition: R_m=1020 N/mm^2, $R_{p0,2}$=900 N/mm^2
Toughness	Charpy V approx. 27 J at 21 ℃
Fatigue	The clean material ensures good fatigue properties.

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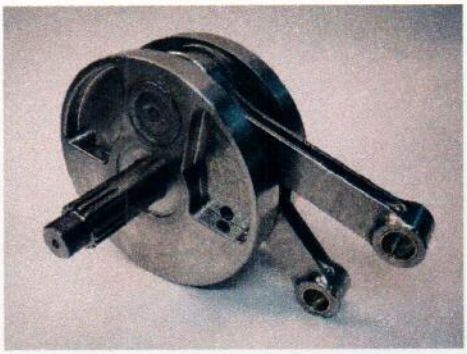
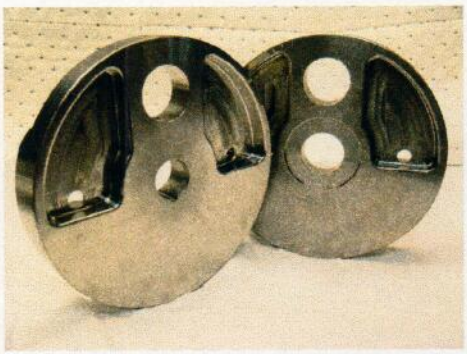
HIGH PERFORMANCE STEEL

Application: Flywheel

To the maximum with Impax Supreme





Revolutions per minute are everything when you want high performance. The flywheel's part in this is crucial for a good balance between rod and piston. Anders "Charley" Karling, European Champion in Drag racing Super Twin Top Fuel Bikes, manufactures his flywheels and other key components in-house.

By using **Impax Supreme** from Uddeholm, "Charley" can reduce the rotating mass of the flywheel and achieve more revolutions per minute. At the same time, flywheels in **Impax Supreme** have enough strength to resist the high forces developed in a Drag racing bike.

Characteristics

	Impax Supreme
Delivery hardness & Maximum hardness	Prehardened to 300 HB, maximum hardness approx. 50 HRC. Good for induction hardening.
Strength	Delivery condition: R_m=1020 N/mm^2, $R_{p0,2}$=900 N/mm^2
Toughness	Charpy V approx. 27 J at 21 ℃
Fatigue	The clean material ensures good fatigue properties

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HIGH PERFORMANCE STEEL

Application: Valve seat

Better combustion with the right valve seats

Lead-free fuel places high demands on motor parts such as valve seats. To maintain a sealed combustion chamber, a wear-resistant valve seat material is vital.

Vanadis 23 provides a good combination of wear resistance and fatigue strength.

In cases where you want to maximize heat transfer, use the copper alloy **Moldmax.**

Characteristics

	Vanadis 23
Delivery hardness & Maximum hardness	Soft annealed to 260 HB on delivery, can be hardened to approx. 65 HRC
Strength	Delivery condition: R_m=1020 N/mm^2, $R_{p0,2}$=900 N/mm^2
Toughness	Unnotched approx. 45 J at 60 HRC
Fatigue	The clean material guarantees good fatigue
Machinability	For exact cutting data, see "cutting data recommendations"
	Moldmax HH
Delivery hardness	40 HRC
Compressive Strength	Delivery condition: R_m=1280 N/mm^2, $R_{c0,2}$=1070 N/mm^2, Elongation, A_5: 5%
Thermal conductivity	110 W/m°C @ 20°C
Specific heat	380 J/kg°C
Machinability	Cutting data recommendations available in product brochure. Perform machining wet.

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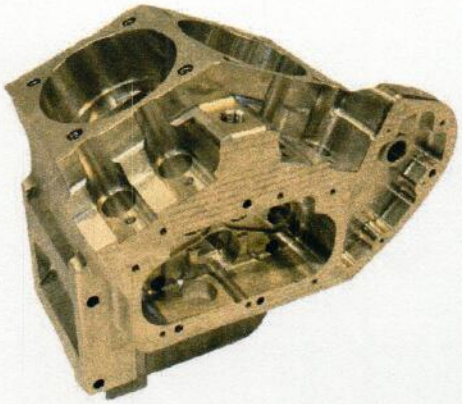
HIGH PERFORMANCE STEEL

Application: Crankcase

No limits with Alumec



On Karling's drag racing bike, everything has to be top of the line.

The original crankcase, made of aluminium, was limiting power output because of fracture risk. More strength was needed without gaining weight. Therefore, steel was not an alternative.

The new crankcase is manufactured in **Alumec**, which is high-strength aluminium with a hardness of 200 HB. The low density (1/3 of steel), with approximately the same level of strength as engineering steel, can decrease the weight of racing engines.

Characteristics

	Alumec
Delivery hardness & Maximum hardness	Prehardened to 180 HB
Strength	R_m=590 N/mm^2, $R_{p0,2}$=550 N/mm^2 at thickness up to 50 mm
Heat conductivity	Very good. The engine can cool off quickly.
Weight	1/3 of the weight compared with steel
Machinability	Very good machinability

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