

# Bearings

## Through Hardened



Bearings can be produced from steel that is suitable for through hardening by quenching and tempering.

The objective is to provide a material that can be quenched and tempered to a hardness of between 60-62 HRC. The main problem is that when we seek to achieve higher and higher hardness figures, to be able to resist surface degradation, we introduce a greater and greater possibility of quench cracking where component shape configurations give differing volume mass. The trade off between steel suitability is dependant on hardenability and quenching speed.

The oldest and most well known UK specification is En 31 now called 534A99. Other alternatives include SAE 52100, 100Cr6, 100C6 or 100CD7.

Where 'clean steel' is a pre-requisite then the most commonly used material is probably S135. Other grades are available where companies have developed specifications to overcome specific problems associated with either physical properties or processing. OvaX 600 is our advanced material to meet this need.

## OvaX 600

Today at Ovako we have designed a modern super clean alloy steel specifically developed for through hardening. OvaX 600 is a perfect steel for conventional furnace hardening & quenching, followed by a tempering process and particularly if the component is given hard shot peening with a 200 % coverage.

The material is capable of achieving the high hardness levels of 60HRC and since the material can be air quenched the quench cracking, normally associated with high hardness in through hardened steels, is virtually eliminated.

The super clean material has been designed to give:

- Exceptional Cleanliness
- Slow Air Cooling Capability
- Very Low Distortion
- Reduced Grinding and Finishing
- Dimensional Stability
- High Operating Temperature

Element	C	Si	Mn	P	S	Cr	Ni	Mo	O	Ti
Min.	0.65	1.45	1.35			1.00		0.23		
Max.	0.70	1.60	1.50	0.025	0.002	1.20	0.25	0.27	9 ppm	30 ppm

## OvaX 600

We normally recommend that the material be delivered after tough tempering to give a hardness of between 240-270 HB. In this condition the other properties are show below.

### Mechanical properties OvaX 600

Tensile strength, $R_m$	750 MPa
Yield strength, $R_{p0.2}$	450 MPa
Elongation, $A_5$	30 %
Area reduction, Z	45 %
Impact strength, KV	20 J
Hardness, HB	240-270 HB

After machining with standard or coated carbide cutting tools the components can be hardened and quenched in still air (or other appropriate quenching medium) to give excellent properties.

### Mechanical properties for OvaX 600 after hardening at low temperature (160° C)

Tensile strength, $R_m$	1550 MPa
Yield strength, $R_{p0.2}$	1450 MPa
Impact strength, KV	6 J
Hardness, HRC	61-63 HRC
Retained austenite, %	10-15 %

OvaX 600 is a superb material for those 'difficult' bearing components and offers a modern alternative to traditional problems where high performance is a basic requirement and enhanced properties are paramount. In addition the control of distortion offers excellent processing properties and the material gives improved high temperature operation.

### Disclaimer

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