

OVAKO 280 HOLLOW BAR

RELATED SPECIFICATIONS:

Europe	EN 10294 -1 19MnVS6
Germany	20MnV6
France	20MV6
SS	2142

DESCRIPTION:

Ovako 280 is produced using the same process for their bearing steel and is subject to the same stringent demands regarding the residual element content. The process also includes accurate control of aluminium, nitrogen and titanium content. This results in a steel with the following beneficial characteristics:

- Higher strength, better ductility (area reduction and contraction)
- Better machinability
- Good weldability
- Excellent chrome plating properties
- Even hardenability and dimensional stability

APPLICATIONS:

Machine tools, hydraulic cylinders, injection moulding machines, printing rollers, bushings, transmission elements, couplings, spindles in electric motors and shafts.

CHEMICAL ANALYSIS:

	C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	Cu %	V %	Ca ppm	Ti ppm	O ppm	N ppm
Min.	0.17	0.30	1.45	-	0.020	0.20	-	-	-	0.080	-	-	-	70
Max.	0.20	0.45	1.60	0.030	0.035	0.30	0.30	0.10	0.30	0.120	15	30	15	150

MECHANICAL PROPERTIES (Hot rolled condition):

Wall thickness, mm	Yield strength, R _{eH} min MPa	Tensile strength, R _m min MPa	Elongation, A ₅ min %	Hardness, approx HB	Impact strength, min at +20°C J
≤ 25	500	670	20	225	27
> 25	470	640	20	220	27

CARBON EQUIVALENT:

The average carbon equivalent is 0.51 which means that under normal circumstances the tube can be welded without preheating (see under 'Welding').

The carbon equivalent is calculated according to the following formula:

$$E_c = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$$

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6

5

15

SULPHUR CONTENT:

The Ovako 280 has a controlled sulphur content; min 0.020% and max 0.035%. Machinability is greatly improved, allowing higher cutting speeds and improved chip breaking.

TITANIUM CONTENT:

The titanium content is maximised at 30 ppm in order to reduce the amount of hard titanium nitrides always present in steel. Low titanium content improves machinability and fatigue strength.

NITROGEN CONTENT:

The controlled nitrogen content in Ovako 280 is within the 70-150 ppm interval. This level gives the steel a high and stable strength and secures the grain size of the steel in case hardening and Q/T.

ALUMINIUM CONTENT:

Ovako 280 is fine grain treated with aluminium. The content is adjusted to give a favourable grain size during hardening.

The fine grain treatment also has a positive influence on the weldability.

INCLUSIONS:

Normally, the inclusions are divided in two size groups, macro and micro inclusions. In the Ovako 280 Grade, the content of macro inclusions is max 20 mm/m² (step down test ISO 3763).

The max content of micro inclusions appears from the following table.

<i>Type</i>	<i>Thin</i>	<i>Thick</i>
A	2.5	2.0
B	1.5	0.2
C	0	0
D	1.5	0.5

According to ASTM 295

GRAIN SIZE:

Thanks to the controlled nitrogen content and the fine grain treatment with aluminium, Ovako 280 has a grain size well suited for carburizing and Q/T (within the 5-8 intervals according to McQuad-Ehn).

TOLERANCES:

Outer Diameter, mm	OD Tolerance
<= 80	± 0.4 mm
> 80 - <= 200	± 0.5% of OD
> 200	± 1.0% of OD
Outer Diameter, mm	Wall Tolerance
<= 200 (wall/OD >= 0.1)	± 5% (min ± 0.5 mm)
<= 200 (wall/OD <= 0.1)	± 6.5%
> 200	± 12.5%

OVALITY:

The ovality may amount to maximum 65% of the total OD tolerance.

STRAIGHTNESS:

The maximum deviation from straight is 1 mm/m.

CASE HARDENING:

Ovako 280 can be case hardened by carburising and quenching. The carburising temperature should be adjusted to suit the carburising agent and the required depth of case, and is usually in the range 850-950°C.

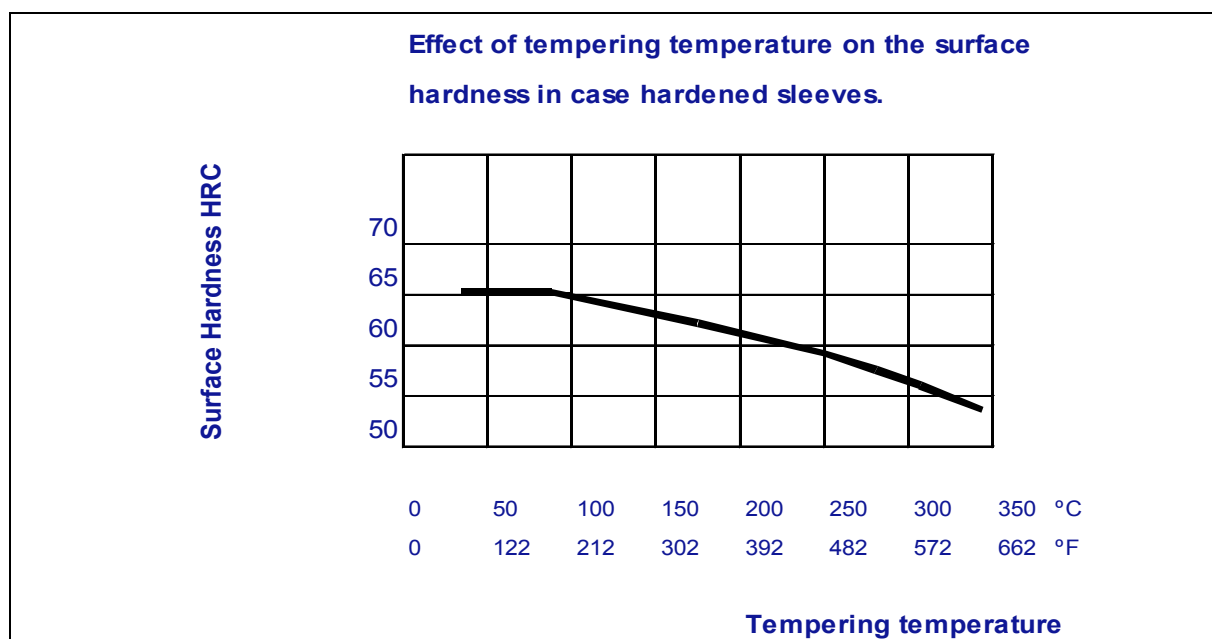
WELDABILITY:

The Ovako 280 tube has good weldability thanks to the low carbon content and average 0.51 carbon equivalent.

This means that the tube can normally be welded without pre-heating at combined wall thicknesses up to 25mm. The low carbon and phosphorus content also minimize the risk for brittle fracture of the weld.

TEMPERING:

Components should be tempered at between 150–200°C to achieve maximum hardness and soaked at temperature for at least an hour per 25mm of cross section. Normal surface hardness should be 58–63 Rockwell 'C'.



NITRIDING:

500-520°C. Surface hardness around 650HV. Also suitable for ion nitriding.

SIZE RANGE:

Refer to complete size range.

COLOUR CODE: YELLOW END

