

# CROMAX® TUBE

## HARD CHROME PLATED TUBE

### RELATED SPECIFICATIONS:

Europe	EN 20MnV69
Germany	DIN 20MnV6
Great Britain	BS 55M
France	AFNOR E420
USA	ASTM A572

### DESCRIPTION:

The starting material for Cromax® Tube is either hot finished or cold drawn tube in a microalloyed, low carbon weldable steel of 20MnV6 type. Cromax Tube exhibits a good combination of strength and toughness along with excellent machinability and weldability.

### TYPICAL CHEMICAL ANALYSIS:

C %	Si %	Mn %	S %	V %	C.E. %(*)
0.19	0.35	1.50	0.02	0.11	0.55 max

\*C.E. = % C + % Mn/6 + (%Cu + Ni)/15 + (%Cr + Mo + % V)/5

### MECHANICAL PROPERTIES:

Yield stress Rp0.2,N/nN2, min.	Ultimate tensile Stress, Rm,N/nN2	Elongation A5, %, min.	Hardness HB	Toughness KV, Joule, min.
450	550-800	20	160-240	27 at 20°C

### CHROME LAYER:

The chrome layer thickness is 20µm min.

### SURFACE ROUGHNESS:

The surface roughness (Ra) is always less than 0.2 µm and normally in the range 0.05-0.15 µm. Rt (ISO) is always less than 2.0 µm and normally in the range 0.5-1.5 µm.

### SURFACE HARDNESS:

The chrome layer hardness is 850 HV<sub>0.1</sub> min.

### STRAIGHTNESS:

The maximum deviation is 0.3 mm/1.0 m.

### OD ROUNDNESS:

The out of roundness is maximised at 50% of the diameter tolerance interval.

### OD TOLERANCE:

ISO f8 is standard. Other tolerances can be supplied upon request (narrowest range is ISO level 7).

### OD TOLERANCE RANGES:

Size, mm	ISO f8. $\mu\text{m}$	
	Upper	Lower
>18 - 30	- 20	- 53
>30 - 50	- 25	- 64
>50 - 80	- 30	- 76
>80 - 120	- 36	- 90
>120	- 43	- 106

### ID TOLERANCE:

This is determined by the tolerances for OD and wall thickness.

### WALL TOLERANCES:

No guarantee can be given with respect to excentricity or wall thickness tolerance. Typical levels are  $\pm 5\%$  for wall thickness and  $\pm 10\%$  (of average wall thickness) for excentricity.

### WELDABILITY:

The steel in Cromax Tube has excellent weldability and does not normally require preheating. Suitable consumables are OK 48.00/38.84 for MMA welding and OK 12.64 for MAG welding (shielding gas 80% Ar, 20% CO<sub>2</sub>).

### MACHINING:

Specific machining recommendations for turning and threading of Cromax Tube are tabulated below.

Operation parameters	Rough turning	Fine turning	Threading
Feed, mm/r	0.3 - 0.6	0.05 - 0.3	—
Cut depth, mm	2 - 5	0.2 - 2.0	—
Tool (coated)	ISO P15 - P 30	ISO P10 - P15	ISO P20 - P30
Speed, m/min.	280-350	350-400	200-230

## CORROSION RESISTANCE:

The chromium layer generated in hard chrome plating contains micro cracks and its corrosion resistance is thereby limited. Ovako's Cromax products are characterised by a controlled micro crack distribution with high crack density, which in combination with specially adapted finishing procedures, provides for superior corrosion resistance.

Most corrosion resistance specifications for hard chrome products are based on salt-spray testing following the ISO 9227 standard or its equivalents (see below), combined with evaluation according to ISO 10289.

ISO 9227	ASTM	DIN 50021	SALT SPRAY TYPE
NSS	B 117	SS	Neutral
AASS	B 287	ESS	Acetic acid
CASS	B 368	CASS	Copper accelerated acetic acid

While the correlation between these methods is not always clear, our experience is that a given degree of corrosion is reached 2-3 times as fast in the AASS test as in NSS testing.

Cromax in standard execution is guaranteed to attain rating 9 or better after 40 h in AASS test. The same rating will be achieved in NSS test after about 100h.

## DELIVERY LENGTHS:

Cromax Tube is normally supplied with length 6.1+0.1/-0m. Lengths of up to 7.6 +0.1/-0m can be supplied by special agreement.

The "unchromed length" of each bar, i.e. the distance at each end over which the chrome layer properties and tolerances can not be guaranteed, is at most 0.15m per end, i.e. 0.3m in total per bar.

Fixed, cut lengths can be supplied if required, but at a higher price than production lengths.

## PACKAGING:

Blue plastic sleeve in wooden case. Every Cromax bar is marked with product and batch information so as to facilitate full traceability.

## SIZES AVAILABLE:

Available ex mill – 30x16mm – 140x101mm

## COLOUR CODE: BLUE

