

## CROMAX<sup>®</sup> 42CrMo4 (4140)

### RELATED SPECIFICATIONS:

Australia	AS 1444- 4140
Europe	EN 42CrMo4+QT
Germany	DIN 42CrMo4V
Great Britain	BS 708M40
France	AFNOR 42CD4
USA	SAE/ASTM 4140

### DESCRIPTION:

Quenched-and tempered Cromax<sup>®</sup> 42CrMo4 is manufactured from the standard low-alloy chromium-molybdenum steel. The product finds application where there is a requirement for elevated strength in combination with a defined and high level of toughness.

### TYPICAL CHEMICAL ANALYSIS:

C %	Si %	Mn %	S %	Cr %	Mo %
0.42	0.25	0.80	0.02	1.05	0.20

### MECHANICAL PROPERTIES:

Quenched and tempered in accordance with EN 10083-1 + A1. Other heat treatment conditions can be supplied by special arrangement.

Size Ø mm	Yield stress R <sub>p0.2</sub> ,N/nn <sup>2</sup> , min.	Ultimate tensile Stress, R <sub>m</sub> ,N/nn <sup>2</sup>	Elongation A <sub>5</sub> ,%, min.	Hardness HB	Toughness KV, Joule, min.
<40	750	1000-1200	11	295-355	35 at 20°C
40-95	650	900-1100	12	265-325	35 at 20°C
>95	550	800-950	13	235-295	35 at 20°C

### CHROME LAYER:

The thickness of the chrome layer is minimum 20 µm.

### 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, INDUCTION HARDENING:

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

Cromax 42CrMo4 can be supplied in an induction-hardened execution. In such a case, the hardness immediately beneath the chrome layer is 55 HRC min., and the depth of hardening is between 1.0 and 3.0 mm depending on dimension.

However, for applications requiring induction hardening, Cromax 482, induction-hardened hard-chrome bar is recommended.

## STRAIGHTNESS:

The maximum deviation is 0.2mm/1.0m.

## ROUNDNESS:

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

## DIAMETER TOLERANCE:

ISO f7 are standard.

Specific machining recommendations for turning and threading of Cromax 42CrMo4 are tabulated below.

### Tolerance Ranges

Size mm	ISO f7 µm upper	ISO f7 µm lower
> 18-30	-20	-41
> 30-50	-25	-50
> 50-80	-30	-60
> 80-120	-36	-71

## WELDABILITY:

Cromax 42CrMo4 has only limited weldability. Preheating to 200-300°C is strongly recommended; the upper limit should not be exceeded because of risk for deterioration of the chrome layer.

Cromax 42CrMo4 can be friction welded. However, precautions are necessary so as to limit the formation of undesirable microstructures in the welded zone.

## MACHINING:

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 - P30	ISO P10 - P15	ISO P20 - P30
Speed, m/min	130 180	180 - 230	110 - 140

## 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, provided 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	Coper 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 40h in AASS test. The same rating will be achieved in NSS test after about 100h.

## DELIVERY LENGTHS:

Production lengths are between 4.0-7.6m. Standard is 6.1 +0.1/-0m. Bars with length 7.6 +0.1/-0m can only be supplied for diameters between 40-80mm.

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:

Green 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 – 25mm – 110mm

## COLOUR CODE: BOTTLE GREEN

