

CHEMICAL COMPOSITION

C	Cr	Mo	W	Co	V
1.30	4.2	4.5	5.6	-	4.0

STANDARDS

- USA: AISI M4
- Europe: HS 6-5-4
- Germany: 1.3351
- France: AFNOR X135WMoCrV 6-5-4-4
- Japan: JIS SKH54

DELIVERY HARDNESS

- Typical soft annealed hardness is 250 HB
- Cold drawn and cold rolled material is typically 10-40 HB harder

DESCRIPTION

E M4 is a vanadium based grade used for cold work applications.

APPLICATIONS

- Punches
- Form tools
- Rolls
- Broach inserts
- Dies

FORM SUPPLIED

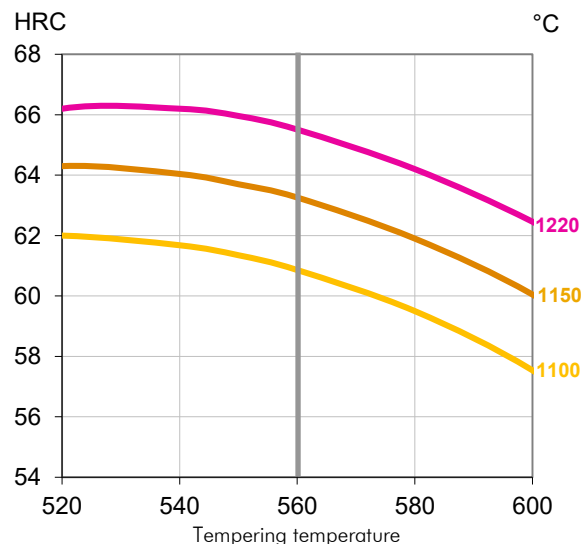
- Drawn wire
- Round bars
- Flat bars
- Square bars

Available surface conditions: hot rolled, drawn, ground, peeled, turned.

HEAT TREATMENT

- Soft annealing in a protective atmosphere at 850-900°C for 3 hours, followed by slow cooling 10°C per hour down to 700°C, then air cooling.
- Stress-relieving at 600°C to 700°C for approximately 2 hours, slow cooling down to 500°C.
- Hardening in a protective atmosphere with pre-heating in 2 steps at 450-500°C and 850-900°C and austenitising at a temperature suitable for chosen working hardness.
- 2 tempers at 560°C are recommended with at least 1 hour holding time each time.

GUIDELINES FOR HARDENING



Hardness after hardening, quenching and tempering 2x1 hour

Tool	Hardening	Tempering
Single-edge cutting tools	1220°C	550-570°C
Multi-edge cutting tools	1100-1220 °C	550-570°C
Cold work tools	1100-1180°C	550-570°C

PROCESSING

E M4 can be worked as follows:

- machining (grinding, turning, milling)
- polishing
- hot forming
- electrical discharge machining
- welding (special procedure including preheating and filler materials of base material composition).

GRINDING

During grinding, local heating of the surface, which can alter the temper, must be avoided. Grinding wheel manufacturers can provide advice on the choice of grinding wheels.

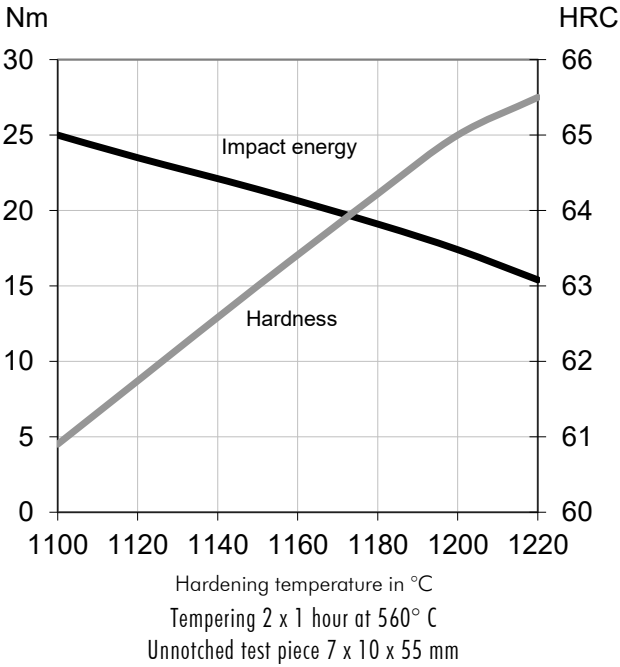
SURFACE TREATMENT

The steel grade is a perfect substrate material for PVD coating. If nitriding is requested, a small diffusion zone is recommended but avoid compound and oxidized layers.

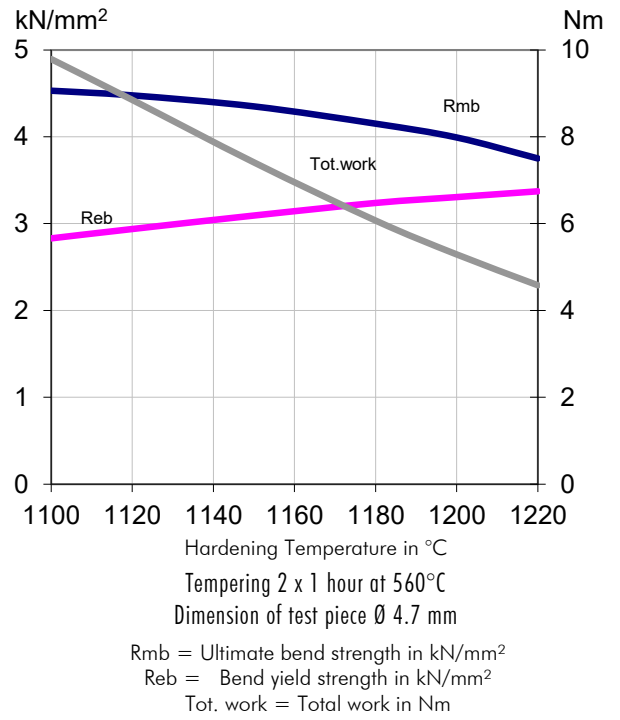
PHYSICAL PROPERTIES

Temperature	20°C
Density g /cm ³	8.0

IMPACT TOUGHNESS



4-POINT BEND STRENGTH



SAFETY DATA SHEET SDS: A

COMPARATIVE PROPERTIES

