

High speed steel

E M2

ERASTEEL

CHEMICAL COMPOSITION

C	Cr	Mo	W	Co	V
0.90*	4.2	5.0	6.4	-	1.8

* 0.85 for strips

STANDARDS

- USA: AISI M2
- Europe: HS 6-5-2
- Germany: W.Nr. 1.3343
- France: (AFNOR Z85WDCV6.5.4.2)
- Sweden: SS 2722
- UK : BM2
- Japan: JIS SKH51

DELIVERY HARDNESS

Soft annealed max. 260 HB
 Cold drawn max. 310 HB
 Cold rolled max. 310 HB

DESCRIPTION

E M2 is a medium-alloyed high speed steel which has a good machinability and a good performance and is used in a wide variety of applications.

APPLICATIONS

- Twist drills
- Broaches
- Reamers
- Knives
- Milling cutters
- Saws
- Taps & dies
- Cold work tools

FORM SUPPLIED

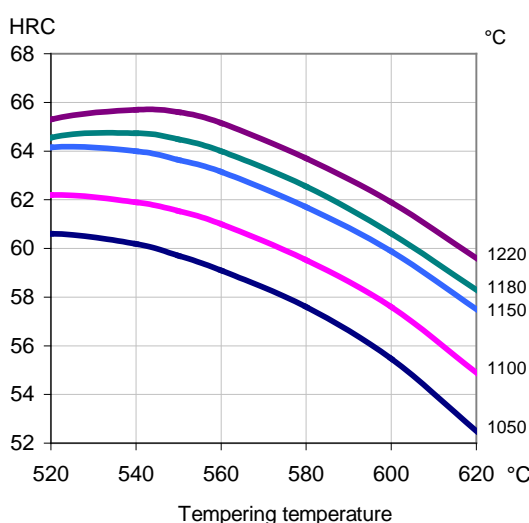
- Drawn wire
- Strips
- Wire rod
- Sheets
- Round bars
- Discs
- Flat bars
- Bi-metal edges
- Square bars

Available surface conditions: drawn, ground, hot rolled, cold rolled, 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
2 x 1 hour

Tool	Hardening	Tempering
Single-edge cutting tools	1220°C	560°C
Multi-edge cutting tools	1180-1220°C	560°C
Cold work tools	1050-1150°C	560°C

The above is for information only and does not create any binding contractual obligations

PROCESSING

E M2 can be worked as follows:

- machining (grinding, turning, milling)
- polishing
- plastic 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 furnish advice on the choice of grinding wheels.

SURFACE TREATMENT

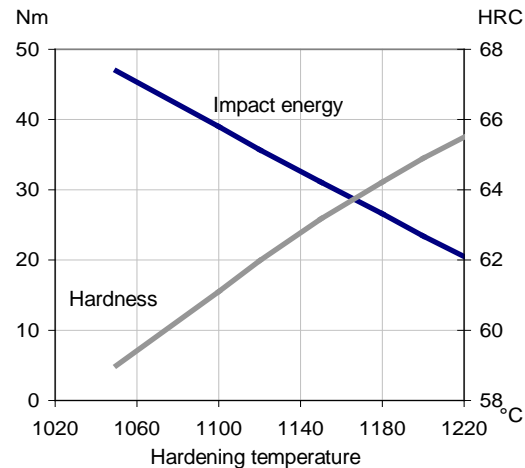
The steel grade is a good substrate material for PVD and CVD coating. If nitriding is requested a small zone of 2-15 µm is recommended. The steel grade can also be steam-tempered if so desired.

PROPERTIES

PHYSICAL PROPERTIES

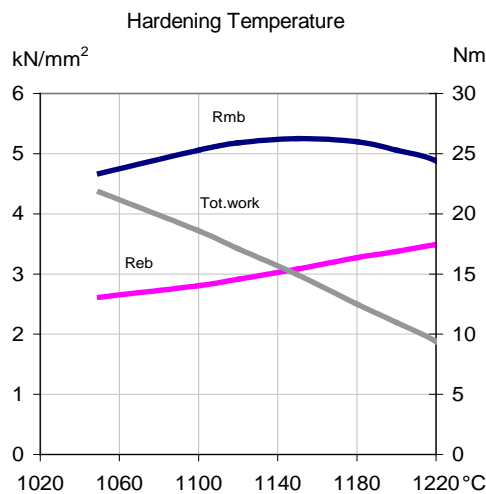
	Temperature		
	20°C	400°C	600°C
Density g/cm ³	8.1	8.1	8.0
Modulus of elasticity kN/mm ²	225	200	180
Thermal expansion ratio per °C	-	12.1x10 ⁻⁶	12.6x10 ⁻⁶
Thermal conductivity W/m°C	24	28	27
Specific heat J/kg °C	420	510	600

IMPACT STRENGTH



Tempering 2 x 1 hour at 560°C
Unnotched test piece 7 x 10 x 55 mm

4-POINT BEND STRENGTH



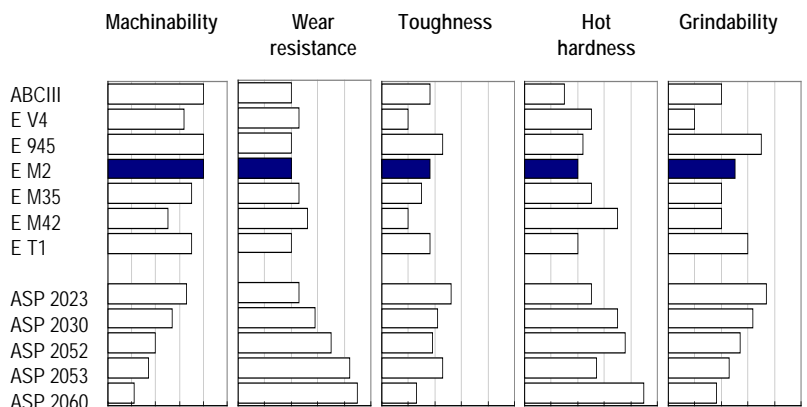
Tempering 2 x 1 hour at 560°C
Dimensions of test piece Ø 4.7 mm

Rmb = Ultimate bend strength in kN/mm²

Reb = Bend yield strength in kN/mm²

Tot. work = Total work in Nm

COMPARATIVE PROPERTIES



MATERIAL SAFETY DATA SHEET

MSDS: A