Conventional High-Speed Steel

Evoloop® M1

ERASTEEL

Evoloop® M1 is molybdenum-based grade which has a good machinability, a good performance and is used for many applications.

STANDARDS

- > EN 10027-1: HS 2-9-1
- > EN 10027-2: 1.3346
- > FRANCE: AFNOR Z85DCWV.8.4.2.1
- > ASTM: AISI M1
- > UK: BM1

DELIVERY HARDNESS

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

CHEMICAL COMPOSITION

Safety datasheet available

C	Cr	Mo	W	Co	V
0.83	3.8	8.5	1.8	-	1.2

APPLICATIONS

- > Twist drills
- > Taps
- > Reamers
- > Rolls
- > Dies

FORM SUPPLIED

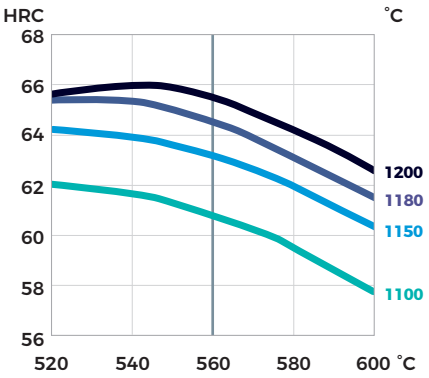
- > Drawn wire
- > Round bars
- > Square bars
- > Sheets
- > Flat bars

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.
- > Tempering at 560˚C twice for at least 1 hour each time.

GUIDELINES FOR HARDENING



Tempering temperature in ˚C

Hardness after hardening, quenching and tempering 2 x 1 hour

Tool	Hardening	Tempering
Single-edge cutting tools	1200˚C	560˚C
Multi-edge cutting tools	1180-1200˚C	550-570˚C
Cold work tools	1100-1150˚C	550-570˚C

PROCESSING

Evoloop® M1 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 may 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.

evoloop® SUSTAINABLE STEEL

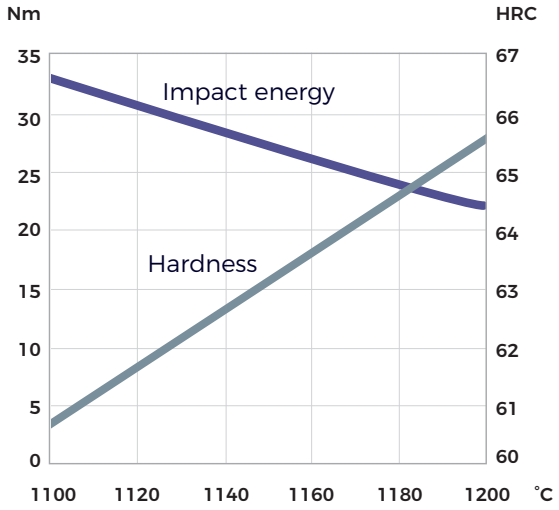
ERASTEEL

PROPERTIES

PHYSICAL PROPERTIES

Temperature	20°C
Density g/cm³	8.0

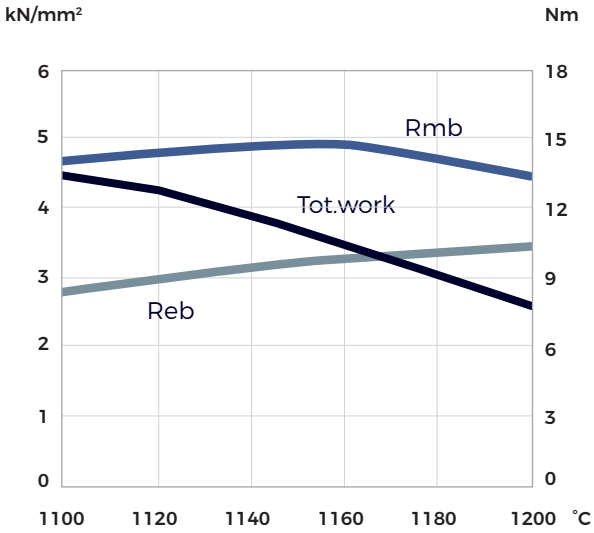
IMPACT TOUGHNESS



Hardening temperature in °C

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

4-POINT BEND STRENGTH



Hardening temperature in °C

Tempering 2 x 1 hour at 560°C
Dimension 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