Conventional High-Speed Steel

Evoloop® M42

ERASTEEL

Evoloop® M42 is a highly cobalt alloyed High-Speed Steel to be used when the demand for hot hardness is of great importance. Evoloop® M42 has a good machinability and a good wear resistance.

STANDARDS

- EN 10027-1: HS 2-9-1-8
- EN 10027-2: 1.3247
- FRANCE: AFNOR Z110DKCWV9.8.4.2.1
- ASTM: AISI M42
- SWEDEN: SS 2723
- JIS: SKH59
- UK: BM42

DELIVERY HARDNESS

- Typical soft annealed hardness is 270 HB
- Cold-drawn and cold-rolled material is typically 10-40 HB harder

CHEMICAL COMPOSITION

Safety datasheet available

C	Cr	Mo	W	Co	V
1.08	3.8	9.4	1.5	8.0	1.2

APPLICATIONS

- Twist drills
- Milling cutters
- End mills
- Broaches
- Reamers
- Bandsaws

FORM SUPPLIED

- Wire rod
- Drawn wire
- Round bars
- Square bars
- Flat bars
- Bi-metal edge

Available surface conditions: drawn, ground, rolled, 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 austenitizing at a temperature suitable for chosen working hardness.
- Tempering at 560˚C three times for at least 1 hour each time.

PROCESSING

Evoloop® M42 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)

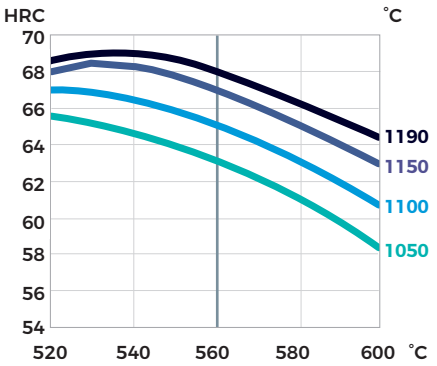
GRINDING

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.

GUIDELINES FOR HARDENING



Tempering temperature in ˚C

Hardness after hardening, quenching and tempering 3 x 1 hour

Tool	Hardening	Tempering
Single-edge cutting tools	1190˚C	560˚C
Multi-edge cutting tools	1150-1180˚C	550-570˚C
Cold work tools	1050-1150˚C	550-570˚C

evoloop® SUSTAINABLE STEEL

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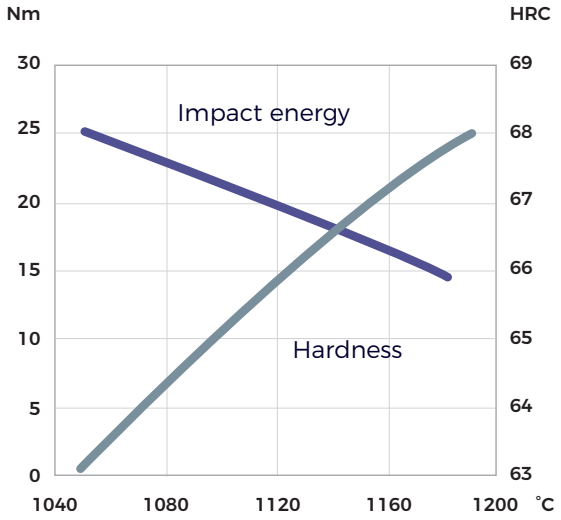
PROPERTIES

PHYSICAL PROPERTIES

Temperature	20˚C	400˚C	600˚C
Density g/cm³	8.0	7.9	7.9
Modulus of elasticity kN/mm²	225	200	180
Thermal expansion ratio per ˚C	-	$11.5x10^{-6}$	$11.8x10^{-6}$
Thermal conductivity W/m˚C	24	28	27
Specific heat J/kg˚C	420	510	600

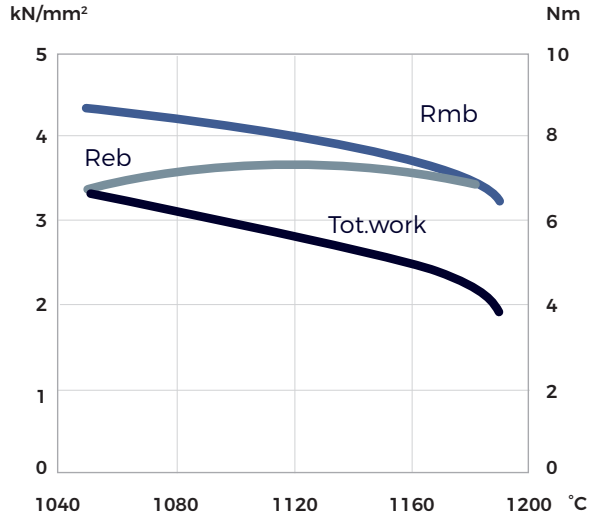
IMPACT TOUGHNESS



Hardening temperature in ˚C

Tempering 3 x 1 hour at 560˚ C
Unnotched test piece 7 x 10 x 55 mm

4-POINT BEND STRENGTH



Hardening temperature in ˚C

Tempering 3 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

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