

CHEMICAL COMPOSITION

C	Cr	Mo	W	Co	V	Nb
0.80	4.0	3.0	3.0	8.0	1.0	1.0

STANDARDS

- Europe: HS 3-3-1-8

DELIVERY HARDNESS

Soft annealed max. 260 HB
 Cold drawn max. 320 HB
 Cold rolled max. 320 HB

DESCRIPTION

ASP 2017 is a grade with high toughness and excellent grindability.

APPLICATIONS

- Taps
- Bi-metal saws
- Roughing end mills

FORM SUPPLIED

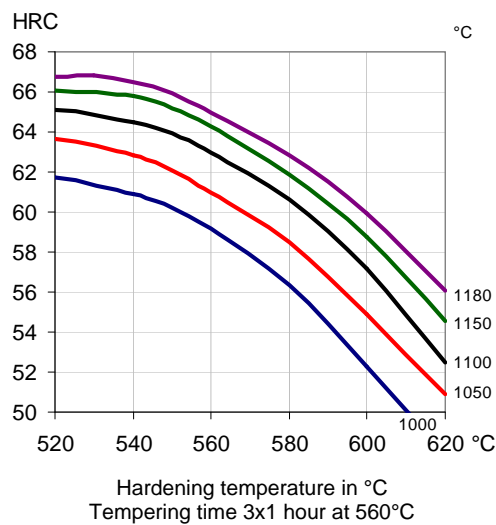
- Coils
- Forged blanks
- Round bars
- Flat & square bars

Available surface conditions : drawn, ground, hot worked, peeled, rough machined, cold rolled, hot rolled.

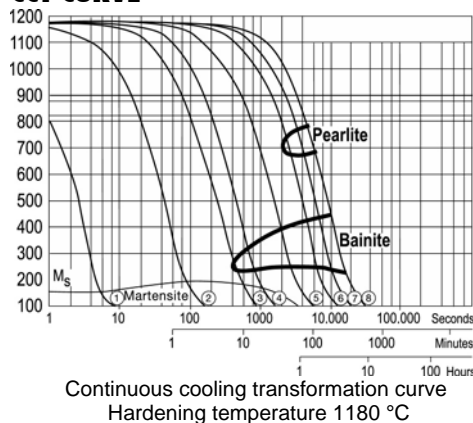
HEAT TREATMENT

- Soft annealing in a protective atmosphere at 850-900°C for 3 hours, followed by slow cooling at 10°C/h down to 700°C, then air cooling.
- Stress-relieving at 600-700°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. Cooling down to 40-50°C.
- Tempering at 560°C three times for at least 1 hour each time. Cooling to room temperature (25°C) between temperings.

GUIDELINES FOR HARDENING



CCT CURVE



PROCESSING

ASP 2017 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 may alter the temper, must be avoided. Grinding wheel makers 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 demanded a small zone of 2-15 µm is recommended. The steel grade can also be steam-tempered if so desired.

PROPERTIES

PHYSICAL PROPERTIES

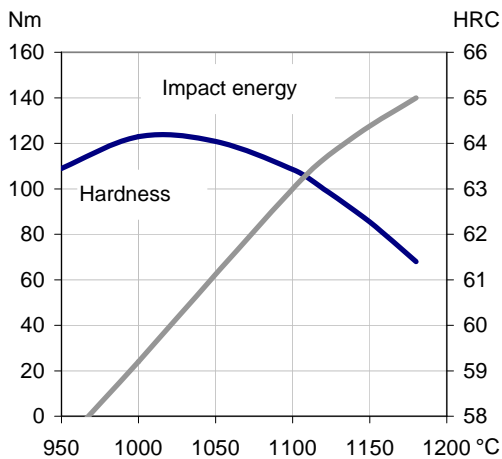
	Temperature		
	20°C	400°C	600°C
Density g/cm ³ (1)	8.0	7.9	7.8
Modulus of elasticity kN/mm ² (2)	235	210	190
Thermal conductivity W/m°C (3)	20	27.5	29
Specific heat J/kg °C (2)	420	510	600

(1)=Soft annealed

(2)=Hardened 1180°C and tempered 560°C, 3x1 hour

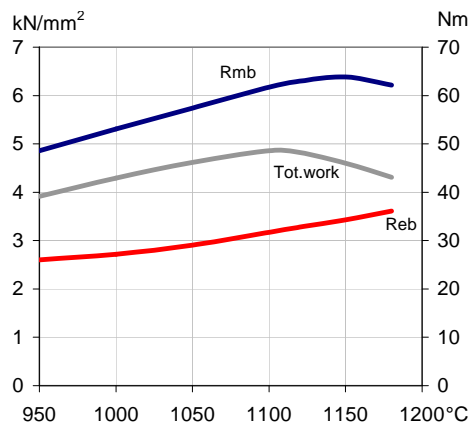
(3)=Hardened 1100°C and tempered 560°C, 3x1 hour

IMPACT STRENGTH



Hardening Temperature in °C
Original dimensions Ø 14 mm
Tempering 3 x 1 hour at 560° C

4-POINT BEND STRENGTH



Hardening temperature in °C
Original dimensions Ø 6 mm
Tempering 3 x 1 hour at 560° C

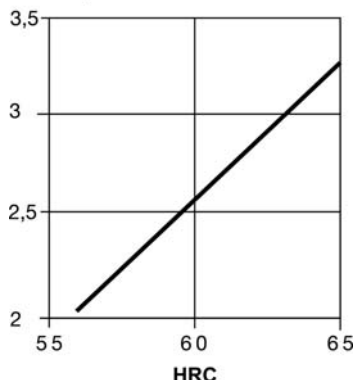
Rmb = Ultimate bend strength in kN/mm²

Reb = Bend yield strength in kN/mm²

Tot. work = Total work in Nm

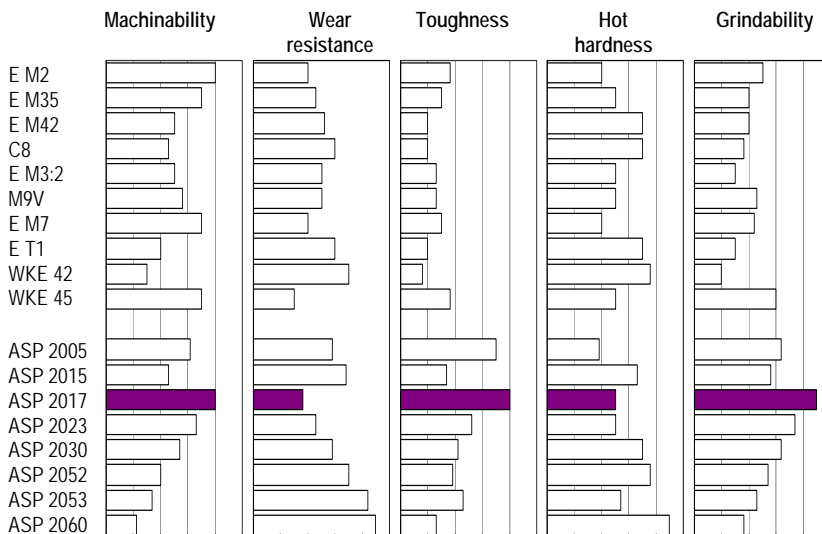
COMPRESSION YIELD STRESS

Rc 0,2 kN/mm²



Test piece : hour glass with 10 mm Ø waist

COMPARATIVE PROPERTIES



MATERIAL SAFETY DATA SHEET

MSDS: B