



CHEMICAL COMPOSITION

C	Cr	Mo	W	Co	V	Nb
1.69	4.0	4.6	6.3	9.0	3.2	2.1

STANDARDS

Not yet standardised

DELIVERY HARDNESS

Soft annealed max. 320 HB
Cold drawn max. 340 HB
Cold rolled max. 340 HB

DESCRIPTION

ASP 2055 is a high alloyed PM-HSS grade with a refined carbide structure for high demanding cutting and cold work applications.

APPLICATIONS

- Hobs
- Shaper cutters
- Broaches
- End mills
- Taps
- Cold work
- Others

DELIVERY FORMS

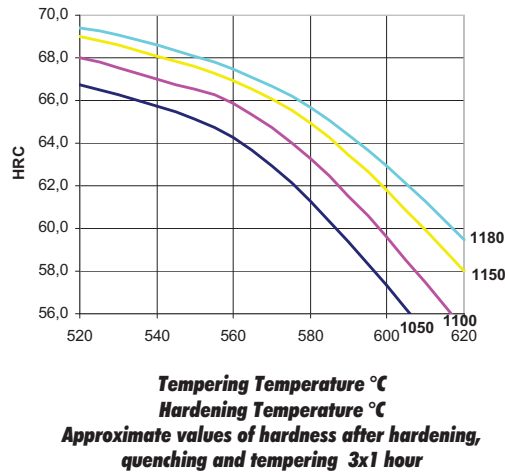
- Peeled bars
- Drawn & Ground bars

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



PROCESSING

ASP 2055 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 manufacturers can furnish advice on the choice of grinding wheels. ASP2055 has a higher grindability than ASP2052 when using alumina based grinding wheels. A more aggressive grinding should be used when using this type of grinding wheel.

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

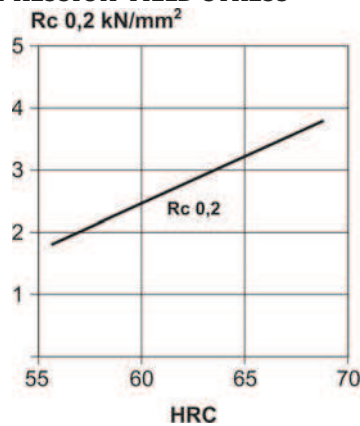
PHYSICAL PROPERTIES

	Temperature		
	20°C	400°C	600°C
Density g/cm ³ (1)	8.0	7.9	7.9
Modulus of elasticity kN/mm ² (2)	240	214	192
Thermal expansion ratio, per °C (2)	-	11,8x10 ⁻⁶	12,3x10 ⁻⁶
Thermal conductivity W/m°C (2)	24	28	27
Specific heat J/kg °C (2)	420	510	600

(1)=Soft annealed

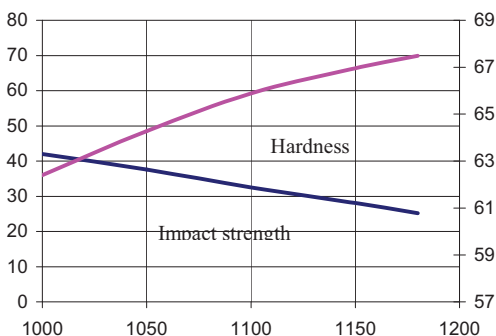
(2)=Hardened 1180°C and tempered 560°C, 3x1 hour

COMPRESSION YIELD STRESS



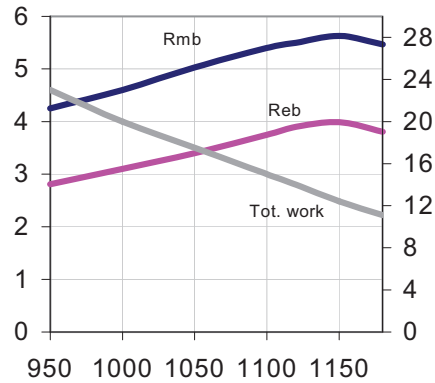
Test piece : hour glass with 10 mm Ø waist

IMPACT STRENGTH



Hardening Temperature °C
Original dimensions 9 x 12 mm
Tempering 3 x 1 hour at 560° C
Unnotched test piece 7 x 10 x 55 mm

4-POINT BEND STRENGTH



Hardening Temperature °C
Original dimensions Ø 7,5 mm
Tempering 3 x 1 hour at 560°C
Dimensions of test piece Ø 4.7 mm

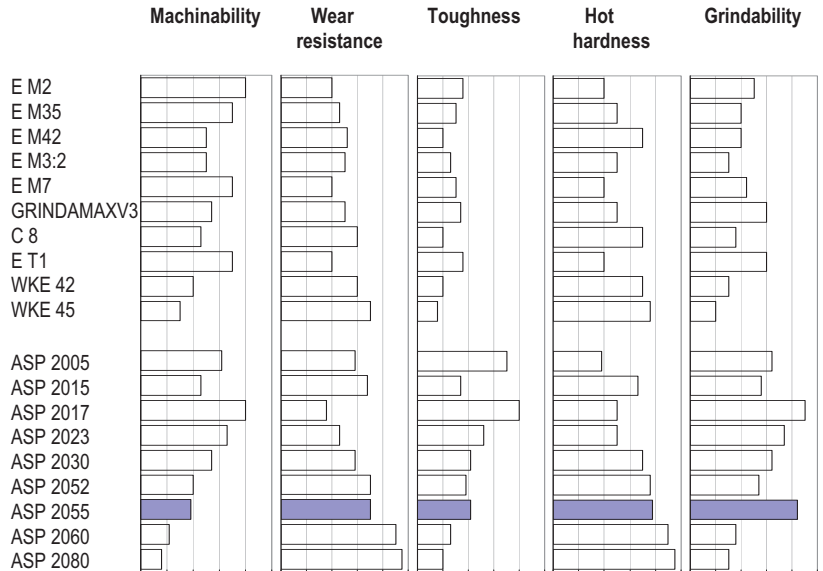
NB: High quality surface

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: B