

## CHEMICAL COMPOSITION

C	Cr	Mo	W	Co	V	S
2.30	4.2	7.0	6.5	10.5	6.5	0.23

SAFETY DATA SHEET SDS: B

## STANDARDS

- Europe: HS 6-7-6-10
- Germany: 1.3241

## DELIVERY HARDNESS

- Typical soft annealed hardness is 345 HB

## DESCRIPTION

ASP® 2078 is a highly alloyed grade for applications needing high hardness, high hot hardness and wear resistance. Sulphur addition gives it an improved machinability.

## APPLICATIONS

- Hobs
- Shaper cutters
- Milling cutters

## FORM SUPPLIED

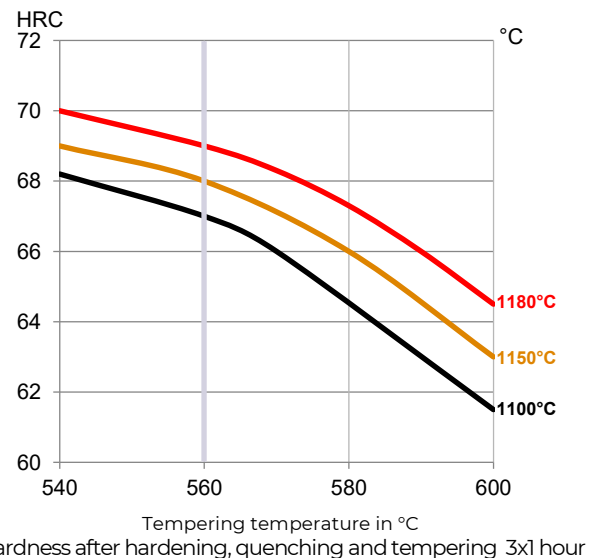
- Round bars

Available surface conditions: ground, peeled, rough machined.

## 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® 2078 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.

## PROPERTIES

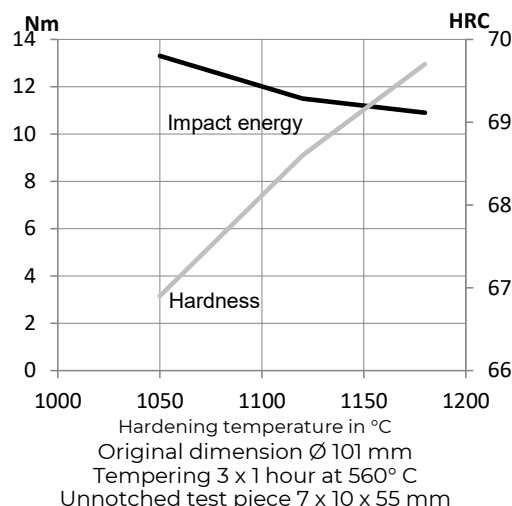
### PHYSICAL PROPERTIES

Temperature	20°C	400°C	600°C
Density g/cm <sup>3</sup> (1)	7.9	7.9	7.8
Modulus of elasticity kN/mm <sup>2</sup> (2)	250	222	200
Thermal expansion ratio per °C (2)	-	10.6x10 <sup>-6</sup>	11.1x10 <sup>-6</sup>
Thermal conductivity W/m°C (2)	24	28	27
Specific heat J/kg °C (2)	420	510	600

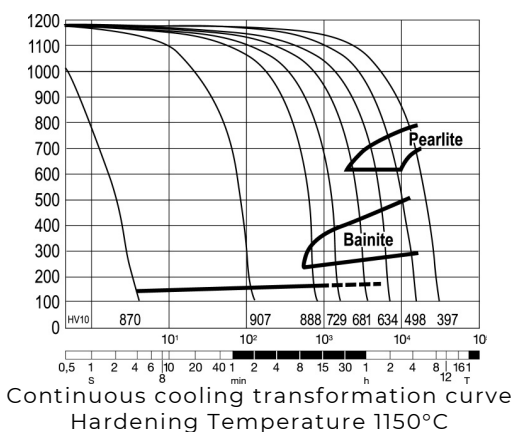
(1)=Soft annealed

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

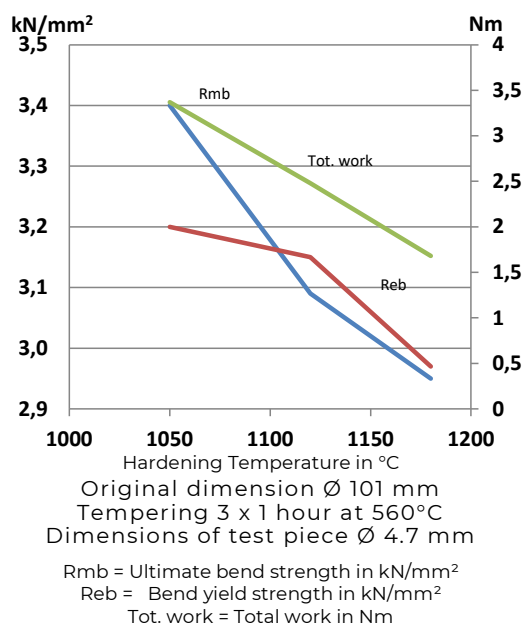
### IMPACT TOUGHNESS



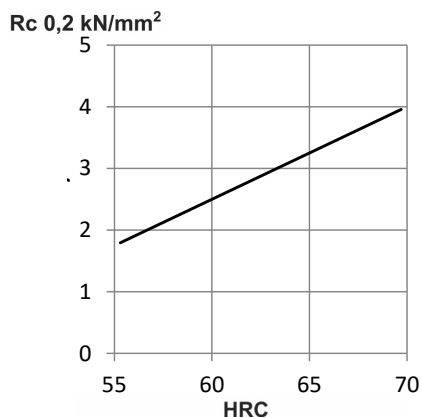
### CCT CURVE



### 4-POINT BEND STRENGTH



### COMPRESSION YIELD STRESS



### COMPARATIVE PROPERTIES

