



ASP 2023 HIGH SPEED STEEL

COMPOSITION %	C	Cr	Mo	W	V
	1.28	4.2	5.0	6.4	3.1
STANDARDS	(AISI M3:2; Werkstoff Nr 3344; JIS SKH 53; S 6-5-3; AFNOR 2130 KWDCV 9.6.5.4.3; ISO S5) SS-Stål 2725				
CONDITION AS SUPPLIED	Soft Annealed		Max 260 HB		
	Drawn		Max 300 HB		
	Cold Rolled		Max 320 HV		

ASP 2023 is a high-alloy high-speed steel, Manufactured powder metallurgically using the ASP Process. The steel is atomized, compacted and processed to the dimensions required. The result is an extremely homogeneous steel with a unique combination of properties. ASP 2023's homogeneous structure enhances such properties as dimensional stability and shape stability during heat treatment, as well as improving grindability and toughness. Toughness is good even for large dimensions. ASP 2023's method of manufacture and composition means that it can provide high hardness and good wear resistance.

PHYSICAL PROPERTIES

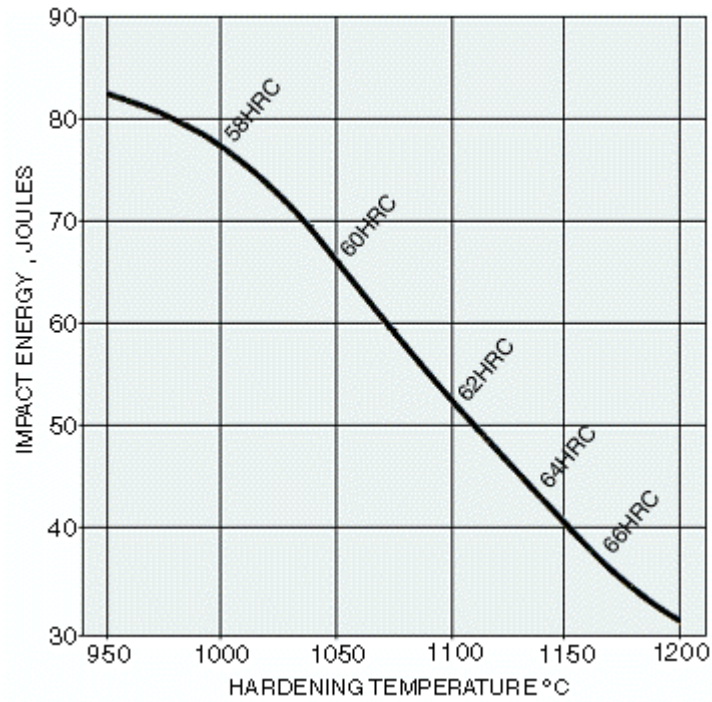
			Temperature °C		
			20	400	600
DENSITY	Kg/m ³	1	8050	7940	7875
MODULUS OF ELASTICITY	kN/mm ²	2	230	205	184
COEFFICIENT OF THERMAL EXPANSION FROM	20°C, per °C	2	-	12.1x10 ⁻⁶	12.7x10 ⁻⁶
THERMAL CONDUCTIVITY	W/m °C	2	24	28	27
SPECIFIC HEAT	J/kg °C	2	420	510	600

1 = Soft annealed

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

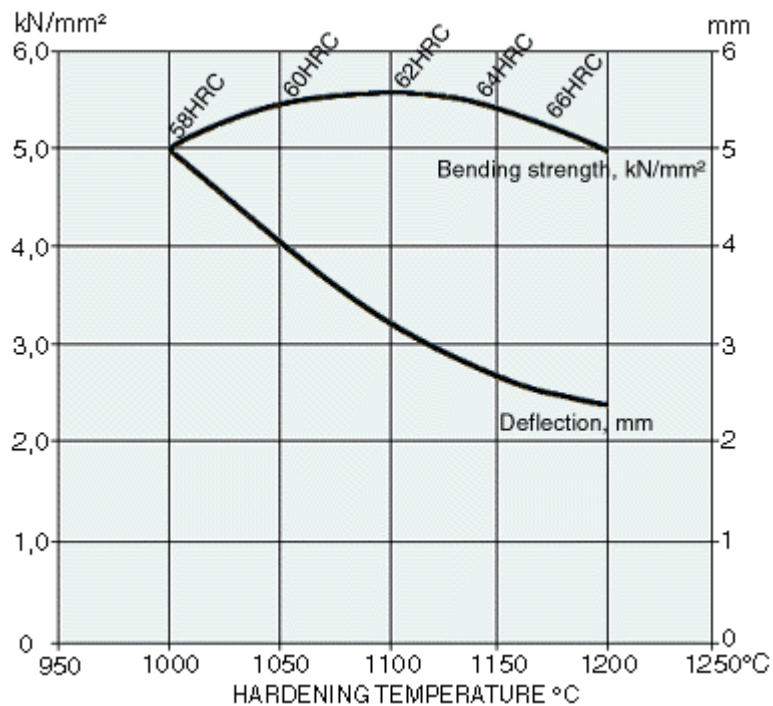
IMPACT STRENGTH

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



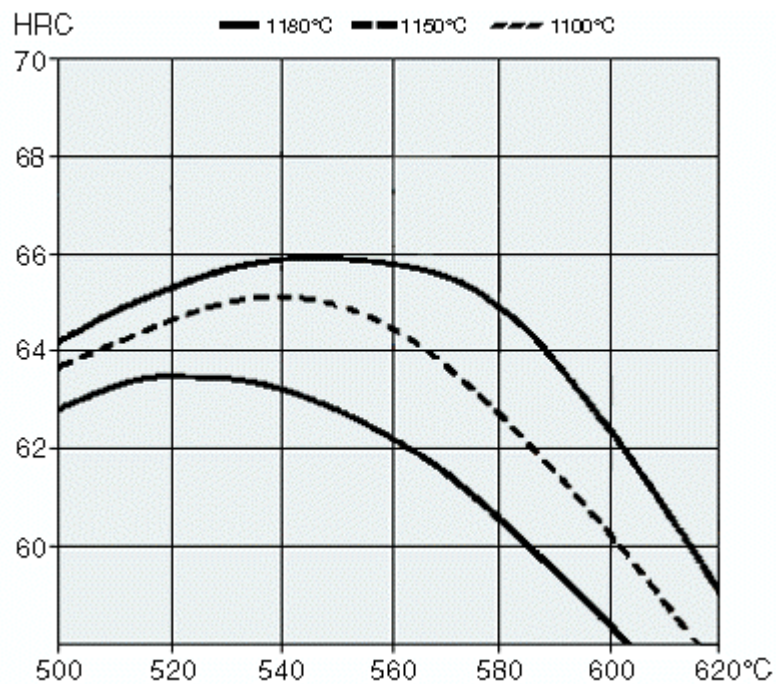
4 – POINT BENDING TEST

Original dimensions 6 mm Ø
Tempering 560°C, 3 x 1 hour
Dimensions of test piece 4.7 mm Ø



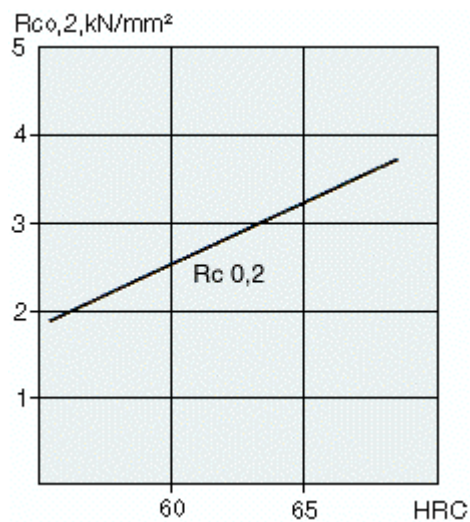
HEAT TREATMENT

- Soft-annealing 850°C – 900°C, slow cooling 10°C/h to 700°C, hardness max 260 HB.
- Stress-relieving annealing 600°C – 700°C, approx. 2 hours at temperature, slow cooling to 500°C.
- Hardening according to table.
Cooling to 40°C / 50°C.
- Tempering at 560°C 3 times for at least 1 hour each time. Cooling to room temperature (25°C) between temperings.

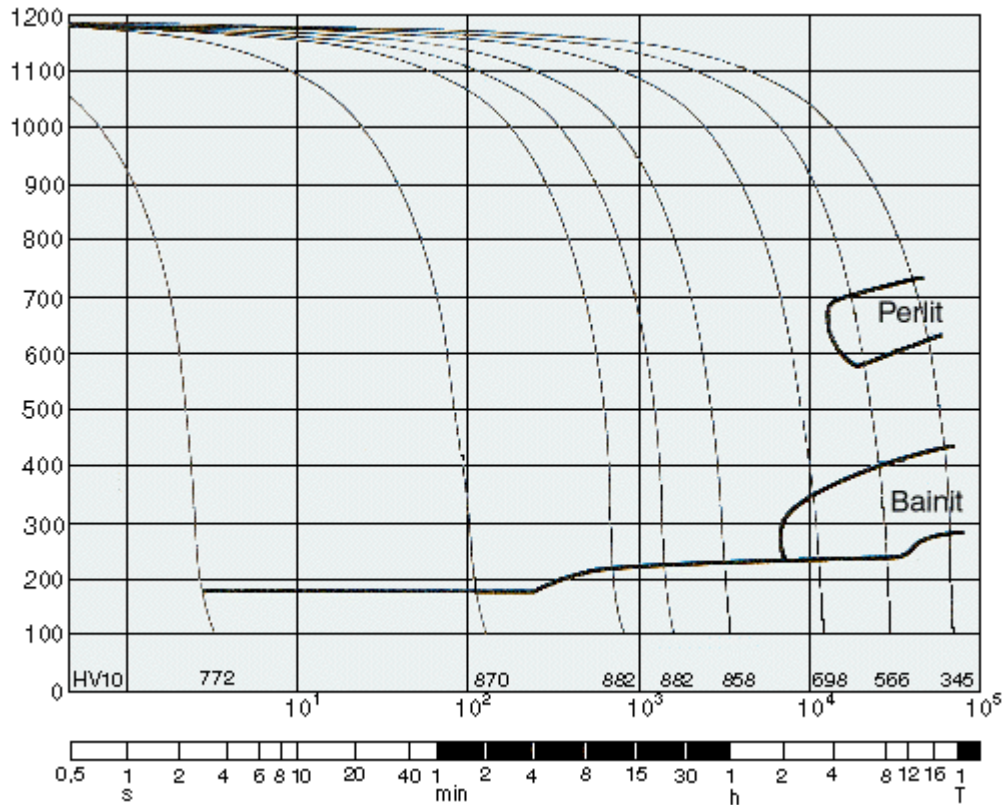


COMPRESSION YIELD STRESS

Test piece: hour glass with 10 mm Ø waist



CONTINUOUS COOLING TRANSFORMATION CURVE



GUIDELINES FOR HARDENING

* Tempering time 3x1 hour at 560 °C

Hardness HRC *	Hardening Temp °C
56	975
58	1000
59	1030
60	1050
61	1075
62	1100
63	1120
64	1140
65	1160
66	1180

MANUFACTURING PROGRAMME

Form Supplied	Dimensional range mm
Coils	1 - 22 Ø
Round bars	1 - 385 Ø
Square bars	max 580 Ø
Forged blanks	1,5 x 7-50 x 380
Flat bars	4,5 - 345
Sections	
Strip	
Sheet	
Discs	

Products are available drawn, centerless-ground, hot-worked, peeled, rough-machined, cold-rolled or hot-rolled depending on dimensions and requirements.

SURFACE TREATMENT

ASP 2023 can be nitrided (a small diffusion zone of 2–20 µm, recommended) or steam-tempered if so desired. ASP 2023 is excellent as substrate material for PVD and CVD surface coating.