

### 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

- Typical soft annealed hardness is 320 HB
- Cold drawn and cold rolled material is typically 10-40 HB harder

### DESCRIPTION

ASP<sup>®</sup>2055 is a high alloyed grade with a refined carbide structure for high demanding cutting tools and cold work applications like fine blanking requiring high hardness.

### APPLICATIONS

- Hobs
- Shaper cutters
- Broaches
- End mills
- Taps
- Cold work
- Fine blanking

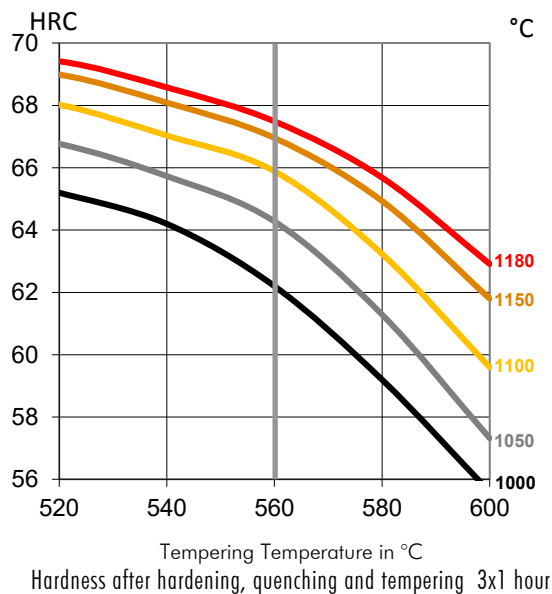
### FORM SUPPLIED

- 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<sup>®</sup>2055 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

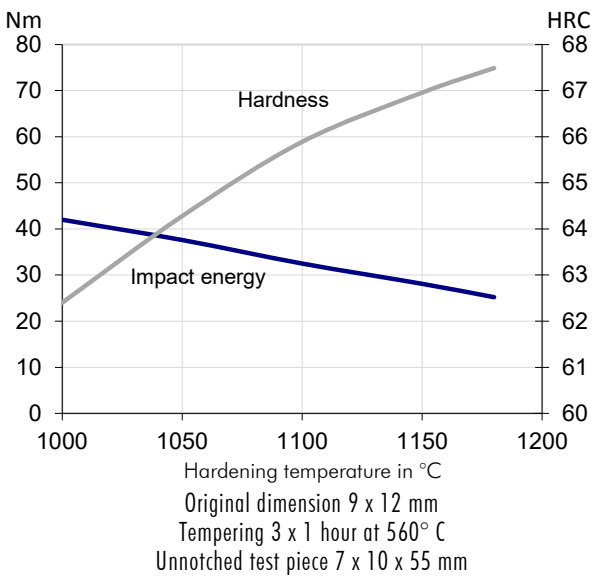
## PHYSICAL PROPERTIES

| Temperature                                  | 20°C | 400°C                 | 600°C                 |
|----------------------------------------------|------|-----------------------|-----------------------|
| Density g /cm <sup>3</sup> (1)               | 8.0  | 7.9                   | 7.9                   |
| Modulus of elasticity kN/mm <sup>2</sup> (2) | 240  | 214                   | 192                   |
| Thermal expansion ratio per °C (2)           | -    | 11.8x10 <sup>-6</sup> | 12.3x10 <sup>-6</sup> |
| Thermal conductivity W/m°C (2)               | 24   | 28                    | 27                    |
| Specific heat J/kg °C (2)                    | 420  | 510                   | 600                   |

(1)=Soft annealed

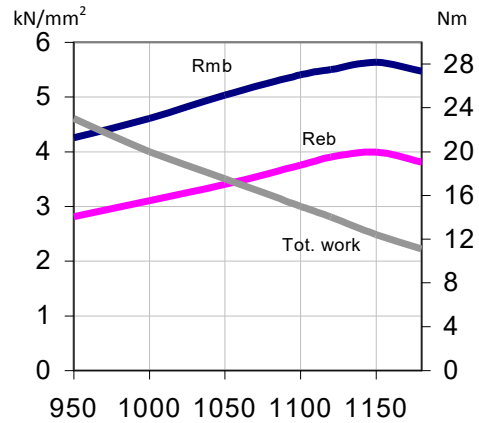
(2)=Hardened 1180°C and tempered 560°C, 3x1 hour

## IMPACT TOUGHNESS



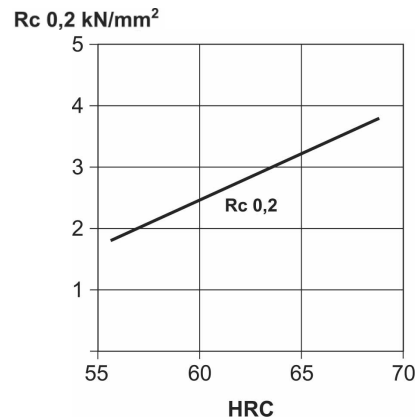
## SAFETY DATA SHEET SDS: B

## 4-POINT BEND STRENGTH



Rmb = Ultimate bend strength in kN/mm<sup>2</sup>  
Reb = Bend yield strength in kN/mm<sup>2</sup>  
Tot. work = Total work in Nm

## COMPRESSION YIELD STRESS



## COMPARATIVE PROPERTIES

