

**CHEMICAL COMPOSITION**

C	Cr	Mo	W	Co	V
1.27	4.0	3.6	9.5	10.0	3.2

SAFETY DATA SHEET SDS: B

**STANDARDS**

- USA: AISI M51
- Europe: HS 10-4-3-10
- France: AFNOR Z130WKCDV10.10.4.4.3
- Japan: JIS SKH57
- Germany: 1.3207
- Sweden: SS2736

**DELIVERY HARDNESS**

- Typical soft annealed hardness is 280 HB
- Cold drawn and cold rolled material is typically 10-40 HB harder

**DESCRIPTION**

WKE42 is a proprietary tungsten high speed steel containing 10 percent cobalt. WKE42 is harder than most high-speed steels and has in addition a reasonably good toughness. WKE42 is used mainly for tools requiring maximum abrasion resistance and medium toughness.

**APPLICATIONS**

- Toolbits
- Cold work tools
- Milling cutters
- Form tools
- Bandsaws

**FORM SUPPLIED**

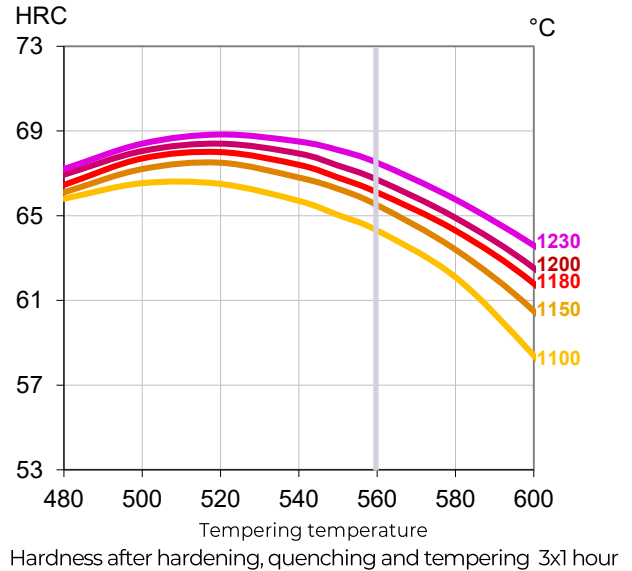
- Wire rod
- Round bars
- Flat bars
- Square bars
- Bi-metal edge

Available surface conditions: ground, hot peeled, rough machined.

**HEAT TREATMENT**

- Soft annealing in a protective atmosphere at 850-900°C for 3 hours, followed by slow cooling 10°C per hour down to 700°C, then air cooling.
- Stress-relieving at 600°C to 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.
- 3 tempers at 560°C are recommended with at least 1 hour holding time each time.

**GUIDELINES FOR HARDENING**



Tool	Hardening	Tempering
Single-edge cutting tools	1230°C	550°C
Multi-edge cutting tools	1220-1225°C	560-580°C
Cold work tools	1150-1200°C	560-590°C

**PROCESSING**

WKE42 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 can alter the temper, must be avoided. Grinding wheel manufacturers can provide advice on the choice of grinding wheels.

**SURFACE TREATMENT**

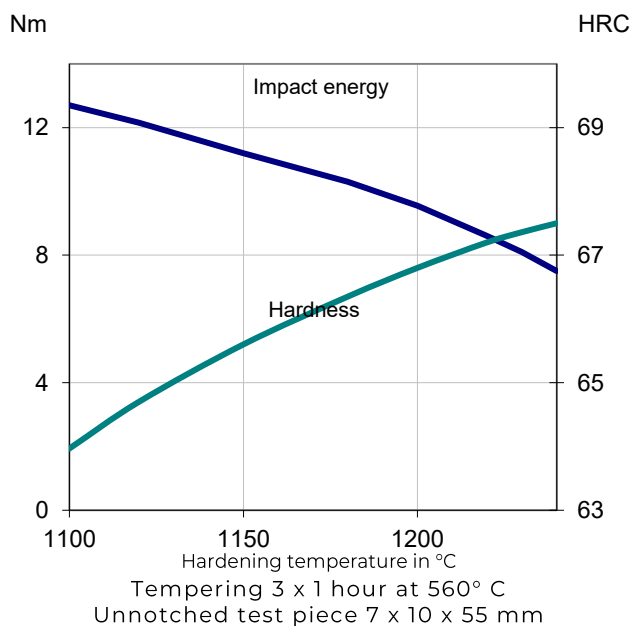
The steel grade is a perfect substrate material for PVD coating. If nitriding is requested, a small diffusion zone is recommended but avoid compound and oxidized layers.

**PROPERTIES**

**PHYSICAL PROPERTIES**

Temperature	20°C	400°C	600°C
Density g /cm <sup>3</sup>	8.2	8.1	8.1
Modulus of elasticity kN/mm <sup>2</sup>	240	215	190
Thermal expansion ratio per °C	-	10.2 x10 <sup>-6</sup>	10.9 x10 <sup>-6</sup>
Thermal conductivity W/m°C	24	28	27
Specific heat J/kg °C	420	510	600

**IMPACT TOUGHNESS**



**COMPARATIVE PROPERTIES**

