

## CHEMICAL COMPOSITION

C	Cr	Mo	W	Co	V
1.2	3.9	5.2	7	-	2.7

SAFETY DATA SHEET SDS: A

## STANDARDS

- Europe: HS 7-5-3
- Germany: W.Nr.1.3347

## DELIVERY HARDNESS

- Typical soft annealed hardness is 265 HB
- Cold drawn and cold rolled material is typically 10-40 HB harder

## DESCRIPTION

GRINDAMAX™V3 is a vanadium-based grade which has been developed to bridge the gap between conventional & PM high speed steels in terms of both performance and grindability. Its chemistry is a very effective combination of alloying elements allowing high wear resistance and excellent toughness.

## APPLICATIONS

- Taps & Dies
- Reamers
- Punches
- Knives

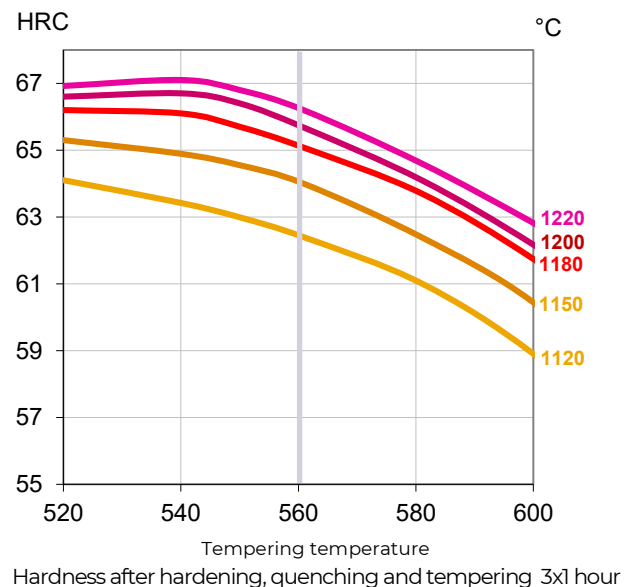
## FORM SUPPLIED

- Drawn bars
- Peeled bars
- Flat bars
- Square bars
- Ground bars

## 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	1220°C	550-570°C
Multi-edge cutting tools	1180-1220°C	550-570°C
Cold work tools	1120-1180°C	550-570°C

## PROCESSING

GRINDAMAX™V3 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

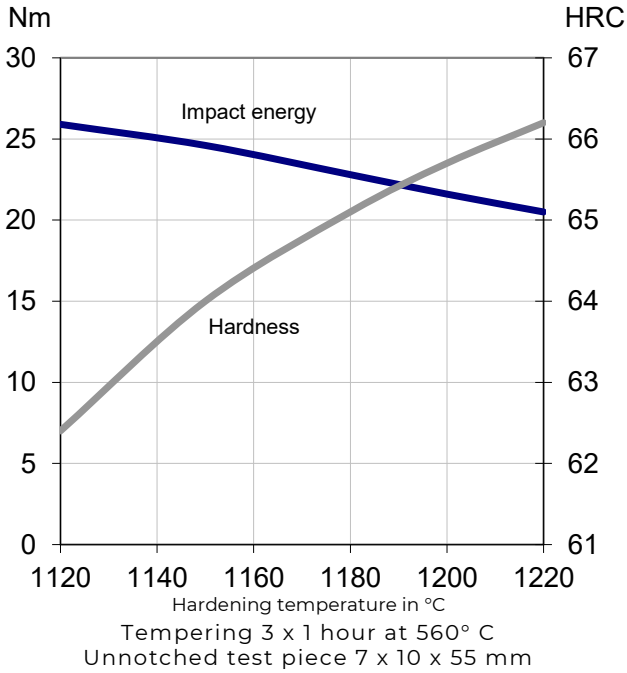
The steel grade is a perfect substrate material for PVD coating. If nitriding is requested, a small diffusion zone is recommended but avoid compound and oxidized layers.

**PROPERTIES**

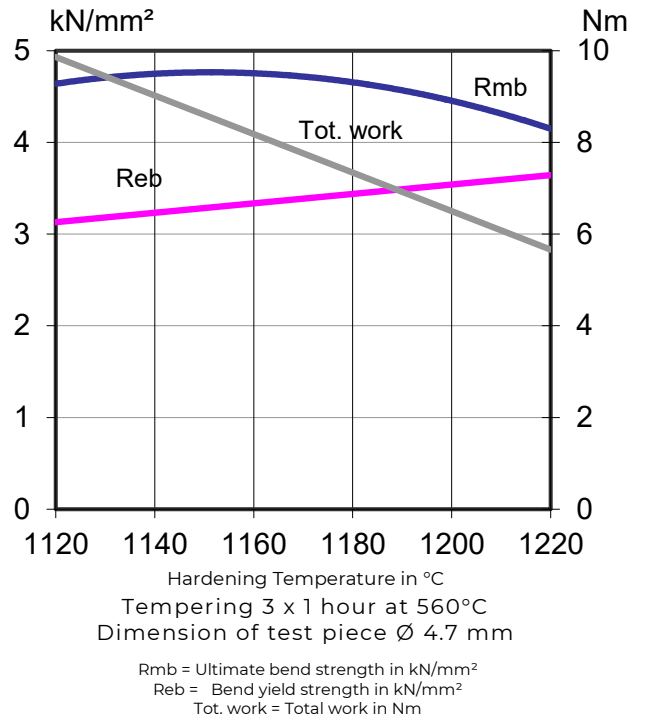
**PHYSICAL PROPERTIES**

Temperature	20°C
Density g/cm <sup>3</sup>	8.0

**IMPACT TOUGHNESS**



**4-POINT BEND STRENGTH**



**COMPARATIVE PROPERTIES**

