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全球钢号百科!

Global Steel Grade Encyclopedia



涵盖的行业或国家与地区类别



国材料与试验协会

GJB

国家军用标准



动力机械工程师协会

EU

前欧洲标准化

AISI

美国钢铁学会



德国工业标准

AMS

航空航天材料规范



国际标准

JASO

日本汽车标准组织

EN

欧洲标准

JB

中国机械行业标准

UNS

统一编号系统

UNI

意大利标准



美国机械工程师协会

SS

瑞典标准



国家标准



日本工业标准

CHEMICAL COMPOSITION

C	Cr	Mo	W	Co	V
1.08	3.8	9.4	1.5	8.0	1.2

SAFETY DATA SHEET SDS: B

STANDARDS

- Europe: HS 2-9-1-8
- Germany: 1.3247
- France: AFNOR Z110DKCWV9.8.4.2.1
- Japan: JIS SKH59
- USA: AISI M42
- Sweden: SS2723
- UK: BM42

DELIVERY HARDNESS

- Typical soft annealed hardness is 270 HB
- Cold drawn and cold rolled material is typically 10-40 HB harder

DESCRIPTION

EM42 is a highly cobalt alloyed high speed steel to be used when the demand for hot hardness is of great importance. EM42 has a good machinability and a good wear resistance.

APPLICATIONS

- Twist drills
- Milling cutters
- End mills
- Broaches
- Reamers
- Bandsaws

FORM SUPPLIED

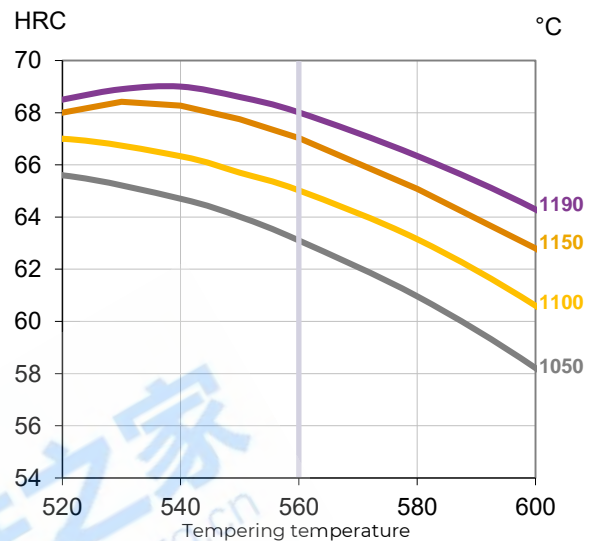
- Wire rod
- Drawn wire
- Round bars
- Flat bars
- Square bars
- Sheets
- Discs
- Bi-metal edge

Available surface conditions: drawn, ground, rolled, hot rolled, cold rolled, peeled, turned.

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 preheating 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



Hardness after hardening, quenching and tempering 3x1 hour

Tool	Hardening	Tempering
Single-edge cutting tools	1190°C	560°C
Multi-edge cutting tools	1150-1180°C	550-570°C
Cold work tools	1050-1150°C	550-570°C

PROCESSING

EM42 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

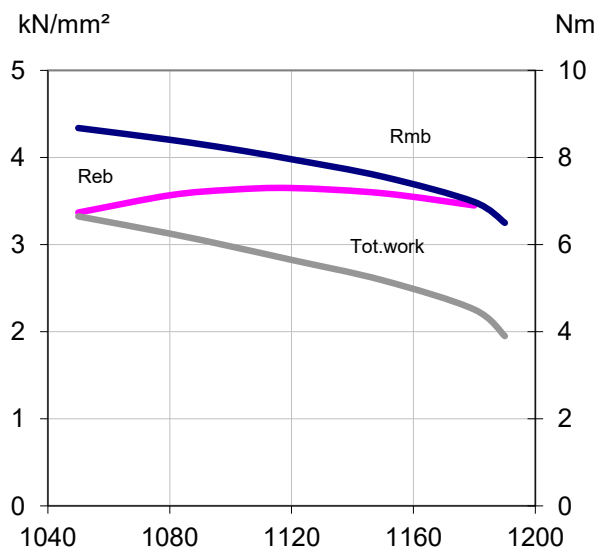
The steel grade is a perfect substrate material for PVD coating. If nitriding is requested, a small diffusion zone is recommended but avoid compound and oxidized layers.

PROPERTIES

PHYSICAL PROPERTIES

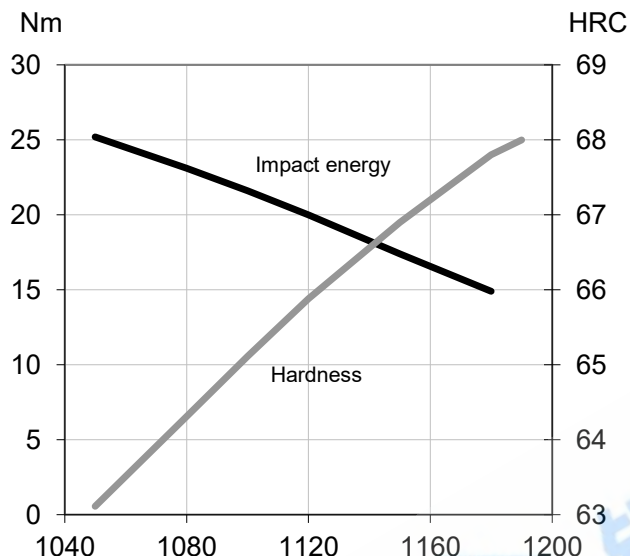
Temperature	20°C	400°C	600°C
Density g/cm ³	8.0	7.9	7.9
Modulus of elasticity kN/mm ²	225	200	180
Thermal expansion ratio per °C	-	11.5x10 ⁻⁶	11.8x10 ⁻⁶
Thermal conductivity W/m°C	24	28	27
Specific heat J/kg °C	420	510	600

4-POINT BEND STRENGTH



Hardening Temperature in °C
 Tempering 3 x 1 hour at 560°C
 Dimension of test piece Ø 4.7 mm
 Rmb = Ultimate bend strength in kN/mm²
 Reb = Bend yield strength in kN/mm²
 Tot. work = Total work in Nm

IMPACT TOUGHNESS



Hardening temperature in °C
 Tempering 3 x 1 hour at 560° C
 Unnotched test piece 7 x 10 x 55 mm

COMPARATIVE PROPERTIES

