



## ATT 2311 (2311 ISO-BM)

### CHEMICAL ANALYSIS (PERCENTAGE BY MASS)

	C	Si	Mn	P	S	Cr	Mo
Guide analysis	0.38	0.30	1.50	0.020	0.003	2.00	0.20
Standard	0.35 - 0.45	0.20 - 0.40	1.30 - 1.60	≤ 0.035	≤ 0.035	1.80 - 2.10	0.15 - 0.25

### CHARACTERISTICS

Standard mold steel, economical to machine, easy to polish, hard-chrome platable, grain-reliable, for dimensions ≤ 400 mm thick.

For:

- higher hardness and better through-hardening
- polishability > grain size 320
- delicate grain designs (e.g. HNO<sub>3</sub>)
- higher thermal conductivity

we recommend ATT 2738 MOD TS HH

### APPLICATION

Small and medium-sized injection molds, compression molds and mold frames up to 400 mm thick.

### DELIVERED CONDITION

Hardened and tempered to 280 - 325 HB (950 - 1,100 MPa)\*

### PHYSICAL PROPERTIES

Thermal Conductivity (W/m.K) at	20°C 34.0	250°C 33.5	500°C 33.0
Thermal Expansion (µm/m) from 20°C to	20-100°C 11.6	20-250°C 12.8	20-500°C 14.3
Young's modulus (GPa)	20°C 212	250°C 197	500°C 175

SEL	40CrMnMo7
DIN EN ISO 4957	40CrMnMo7
AFNOR	40CMD8
AISI	~P20
BS	~P20

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\* Surface hardness in Brinell, converted to DIN EN ISO 18265 Table A.1.

The information contained herein is intended to provide general knowledge on our products and their uses. It should not be construed as a warranty of specific properties of the products described, or a warranty of fitness for a particular purpose. Each user of products from Advanced Tooling Tek (Shanghai) Co Ltd ("ATT") is responsible for making its own determination as to the suitability of ATT's products and services.



www.att-metal.com



WeChat

### Advanced Tooling Tek (Shanghai) Co Ltd

No. 255 Xinxiao Road, Xinqiao Town, Songjiang Dist.,  
Shanghai 201612 China  
Tel: +86 21 3373 8146 | Fax: +86 21 3373 8193

### Guangdong branch

No.1G, Sanhe Road, Hecheng Sub-district, Gaoming Zone, Foshan,  
Guangdong 528511 China  
Tel: +86 757 8862 2983 | Fax: +86 757 8862 2983

info@att-metal.com

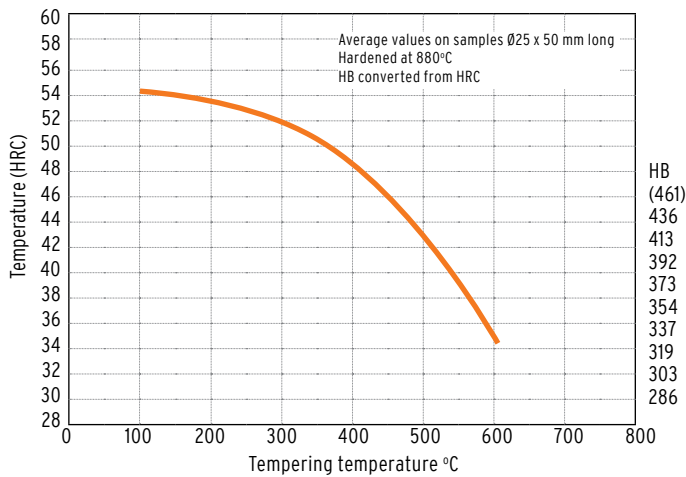


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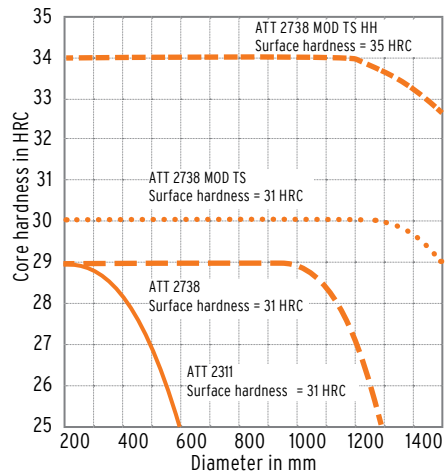
**HEAT TREATMENT**

Stress relieving	Temperature	Approx. 550°C in the quenched and tempered state
	Duration	1 hour per 50 mm wall thickness
	Cooling	Furnace
Soft annealing	Temperature	720°C
	Duration	1 hour per 25mm wall thickness
	Cooling	Furnace
Hardening	Temperature	880°C
	Duration	1 min per mm wall thickness
Quenching hardness	Max. 54 HRC	in oil, hot bath or vacuum
	Temperature	See tempering curve
Tempering	Duration	1 hour per 25 mm wall thickness
	Cooling	Air
Working hardness	280-325 HB	

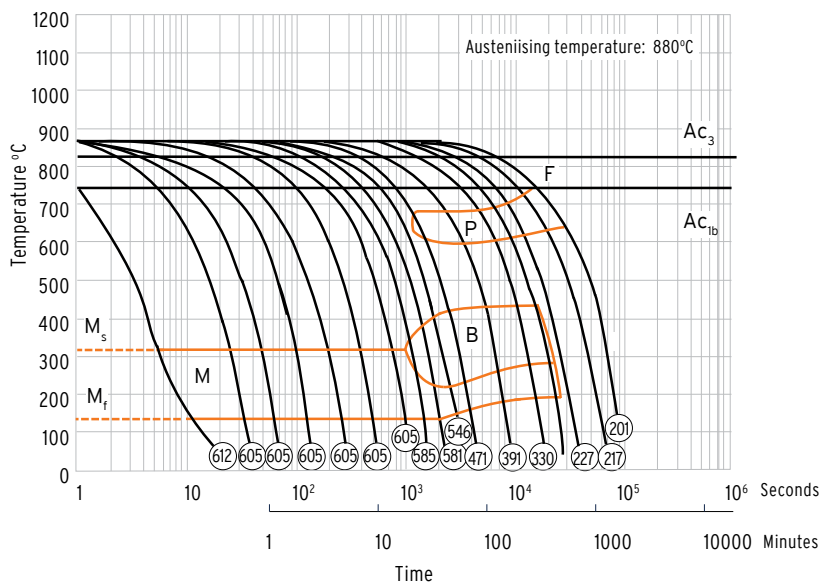
**Tempering curve**



**Through-hardability (Schematic)**



**TTT curve (continuous)**



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