

# 1.2311

PLASTIC MOULD STEEL



## Main characteristics and applications

Pre-hardened plastic mould steel with hardening penetration up to 400mm, with good polishing and texturing properties.

This steel is suitable for nitriding (around 800 HV), chrome and nickel PVD plating.

Used for plastic moulds with excellent surface finishing properties. It is also used for mould frames, plates, dies box, etc.

## Comparable standards

UNI	W.Nr	DIN	AFNOR	AISI/SAE	BS
-	1.2311	X40CrMn-Mo7	40CMD8	~P20	~P20

## Chemical composition (typical; in weight %)

C	Mn	Si	Cr	Mo	P	S
0.38	1.5	0.30	2	0.2	0.025	0.003

## Heat treatment

TREATMENT	TEMPERATURE	HOLDING TIME (HT)	COOLING	COMMENTS
Annealing	Heat to 700 - 720 °C	Min. H.T. for 2 minute /mm	Air or furnace	In order to obtain hardness lower than 250 HB ( 24 HRC) to improve machinability
Stress relieving	Heat to 560 - 600°C (max 30 °C below tempering temperature)	Min. H.T. for 2 minute /mm	Air or furnace	To be carried out after machining, is recommended to eliminate the residual stresses induced by mechanical working
Hardening	Heat to 860 - 880 °C	Min. H.T. for 1 minute /mm	Polymer	-
Tempering	Heat to 550 - 620 °C	Min. H.T. for 3 minute /mm	Air or furnace	To be carried out after hardening. 2nd Tempering must be performed to max 30°C below tempering temperature

## Critical points

Ac1	Ac3	Ms
740 °C	820 °C	310 °C

## Production technology

EAF – LF – VD - Forging – Heat treatment QT

## US specification

In according to standard EN10228-3 Class 4 and standard SEP 1921 Class E/e

## Delivery condition

W1.2311 is delivered in quenched and tempered condition, with hardness range 280 - 325 HB (29 - 35 HRC).

## Physical properties (reference values)

	20°C	100°C	250°C	500°C
Thermal expansion coefficient (10 <sup>-6</sup> /K)	12.1	12.4	12.9	14.1
Thermal conductivity (W/mk)	36.1	36.2	36.4	33.5
Young modulus (Kn/mm <sup>2</sup> )	212	205	200	175

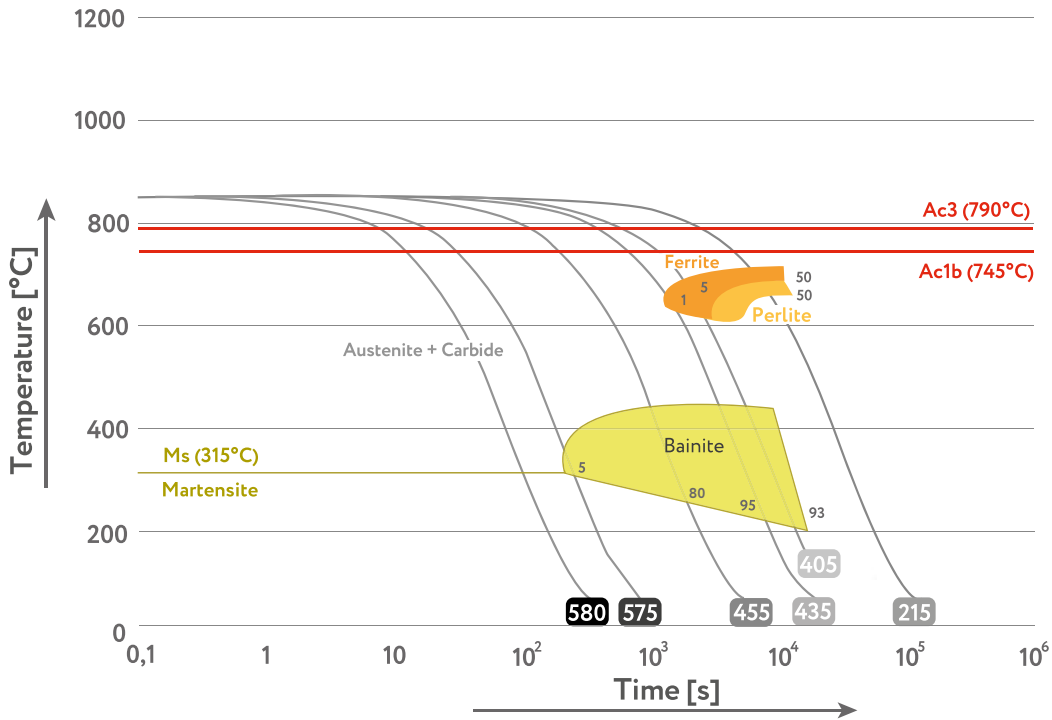
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## C.C.T. curve

Austenitisation: 850°C



## Tempering curve

25 mm dmr / 850°C → oil

