Doerrenberg

Material No.: **1.2312**

Code: **40CrMnNiMo8-6-4**

DE - Brand: **MCMS**

In the DIN EN ISO 4957 the grades 1.2311 (AISI P20), 1.2312 (AISI P20+S) and 1.2738 (AISI P20+Ni) covered by the above mentioned code were amalgamated. The grade 1.2312 contain additional quantities of S and no additional quantities of Ni.

Chemical composition:
(Typical analysis in %)

C	Mn	Cr	Mo	S			
0,40	1,50	1,90	0,20	0,05			

Steel properties:

Plastic mould steel with additional sulphur, usually supplied in a quenched and tempered condition. Polishable, better machinibility compared to 1.2311. Similar to AISI P20+S.

Applications:

Plastic moulds, frames for plastic pressure dies, hydro-forming tools.

Condition of delivery:

Quenched and tempered, 280 - 325 HB
(950 - 1100 N/mm² according to DIN EN ISO 18265 Table A.1)

Physical properties:

Thermal expansion coefficient

$\left[\frac{10^{-6}\cdot m}{m \cdot K}\right]$	20-100°C	20-200°C	20-300°C	20-400°C
	12,3	12,9	13,3	13,5

Thermal conductivity

$\left[\frac{W}{m \cdot K}\right]$	20°C	350°C
	34,6	34,3

Heat treatment:

Soft annealing

Temperature	Cooling	Hardness
710 - 740°C	furnace	max. 235 HB

Stress relief annealing
The recommendation 500 - 550°C is valid for quenched and tempered condition. In the soft annealed condition stress relieving between 600 - 650°C is possible.

Temperature	Cooling	
500 - 550°C	furnace	

Hardening

Temperature	Cooling	Tempering
830 - 870°C	oil or hot bath 180 - 220°C	see tempering diagram

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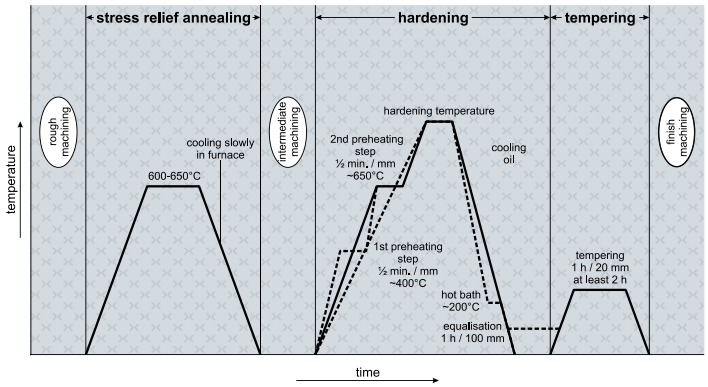
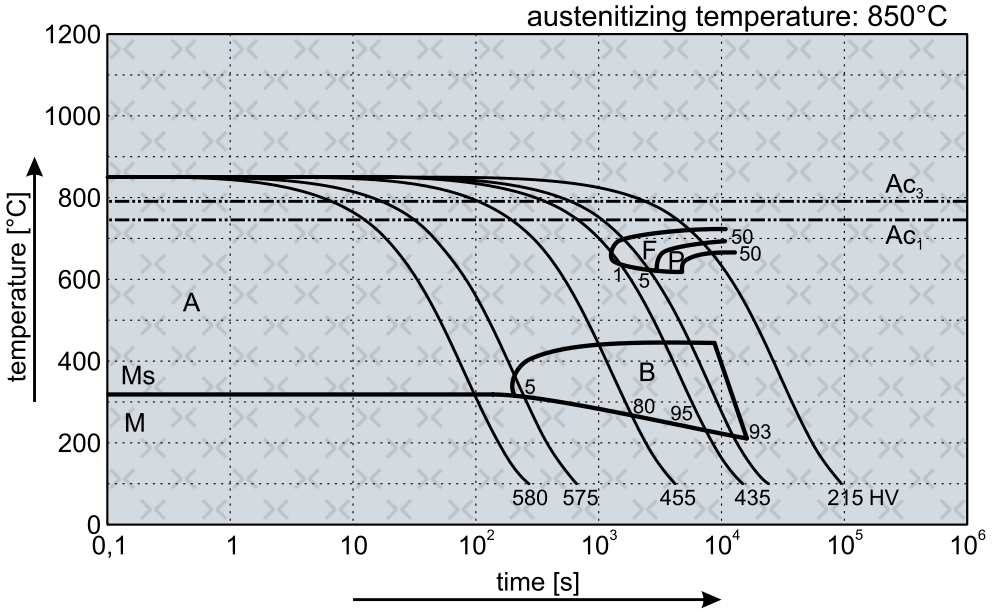
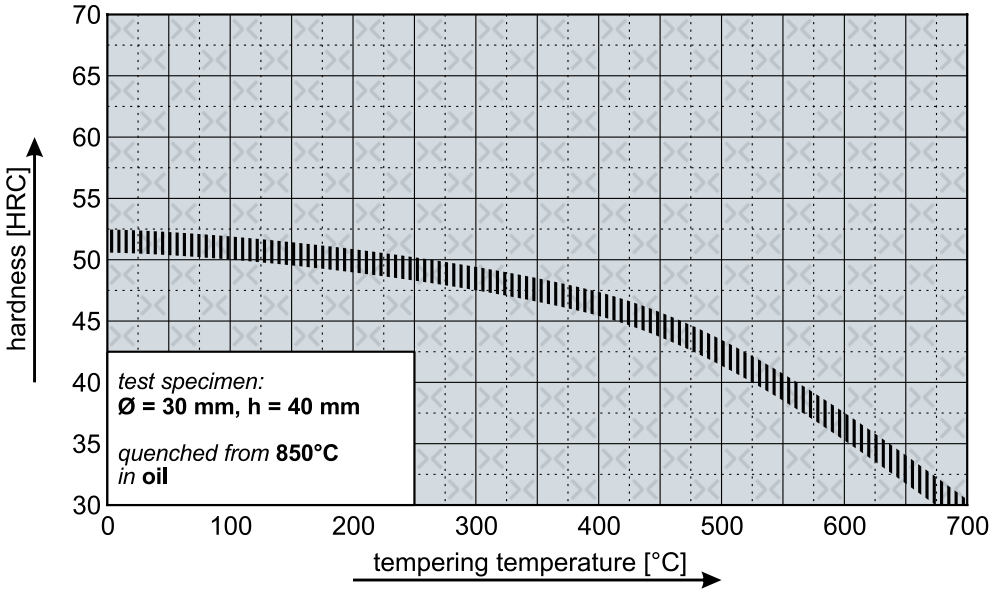
(1.2312) Thermal Cycle Diagram



Continuous Cooling Transformation Diagram (CCT)



Tempering Diagram



Remarks: All technical information is for reference only.