



Technical Data Sheet	Grade	Code (SEL)	Cold work tool steel
	1.2311+QT	40CrMnMo7	

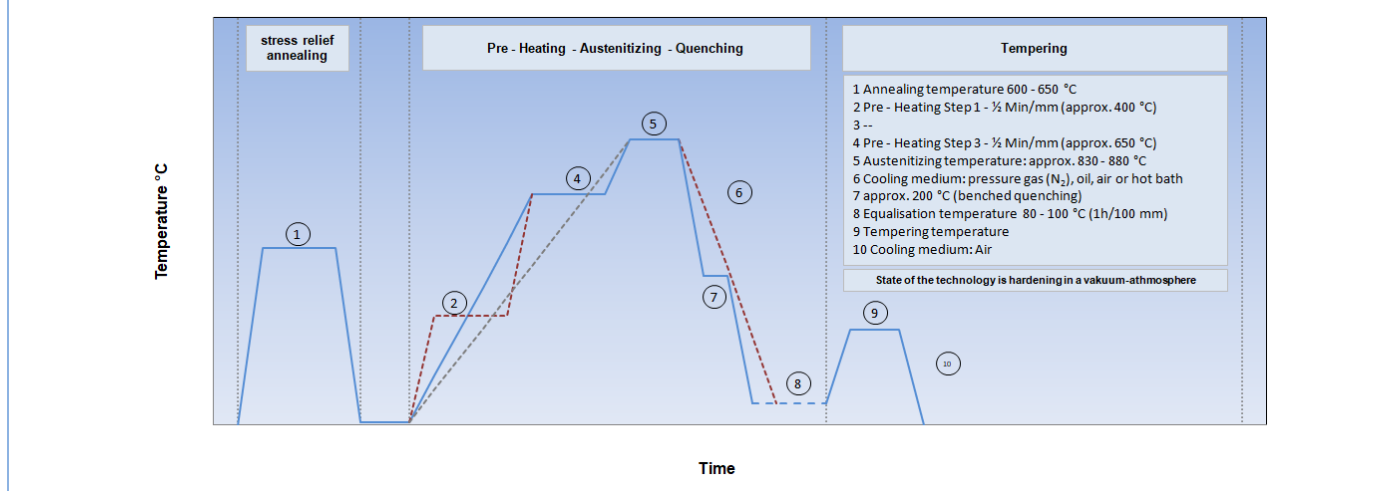
Standards	Steel properties
EN ISO 4957 -	Pre-hardened plastic mould steel, good machinability, suitable for texturing, highly through hardenable.
AFNOR 35CMD7	
BS -	
UNE -	
UNI -	
AISI P 20	
GOST 40XГMA	Suitable for: Plastic moulds, mould frames for plastic moulds and pressure casting moulds and recipient sleeves

C	Si	Mn	Cr	Mo	Ni	V	W	Co	Sonst.
0,40	0,30	1,45	1,95	0,20	-	-	-	-	-

Melting	EAF + VOD	Remarks Tensile strength converted acc. DIN EN ISO 18265 Tab. A.1 Better polishable than 1.2312. Preheating before use: 200 - 300 °C – is recommended. For material with a thickness > 400 mm we recommed 1.2738 (better trough hardenability)
Density (g/cm³)	7,85	
Supply condition	quenched+tempered	
Hardness (HB)	280 - 325	
Tensile strength (N/mm²)	950 - 1100	
Work hardness (HRC)	-	
Structure	-	
Cleanness (DIN 50602)	-	

Physical properties		20 °C	100 °C	200 °C	300 °C	350 °C	400 °C	500 °C	600 °C	700 °C
Thermal expansion coefficient	10 ⁻⁶ * K (20 °C bis ...)	-	12,6	13,0	13,5	13,7	13,9	-	14,3	-
Thermal conductivity (W / m * K)	annealed	-	-	-	-	-	-	-	-	-
	quenched + tempered	-	-	-	-	30,2	-	-	-	-

Thermal Cycle Diagram (Heat treatment)



Hinweis: Die in diesem Datenblatt enthaltenen Angaben dienen der Beschreibung, eine Haftung ist ausgeschlossen.



Heat treatment	Temperature (°C)	Cooling	Remarks heat treatment
Soft annealing	710 - 740	Furnace	Controlled slow cooling in furnace
Stress-relief annealing	500 - 550	Furnace	The recommended temperature of 500 - 550 °C is valid for the quenched and tempered condition.
Hardening	830 - 880		After through-heating hold for 15-30 minutes If subsequent QT - process required. Time in furnace 1 hour for each 20 mm of workpiece thickness but at least 2 hours. Cooling in air.
Pre - heating Step 1	appr. 400		
Pre - heating Step 2	appr. 650		
Pre - heating Step 3			
Quenching	appr. 200	hot bath	Enhanced stress corrosion cracking susceptibility in case of oil hardening; interrupt at appr. 300 - 400 °C
	appr. 80	Oil	To reduce as possible thermal stress, size alteration and distortion it is recommended to use the softest quenching medium. Oftentimes a hot bath hardening with the advantage of less thermal stress.
	-	-	
	-	-	To avoid stress corrosion cracks the steel has to be carried out immediately after hardening and when the steel is at appr. 80 °C. Cooling down to RT has to be disabled.

Tempering Chart		Tempering - Hardness after tempering									
	Temperature °C	100	200	300	400	500	550	600	650	700	
	HRC	51	50	48	46	42	-	36	32	28	
Remarks for tempering											
Slow heating to tempering temperature immediately after hardening. Time in furnace 1 hour for each 20 mm of workpiece thickness but at least 2 hours.											

