



Technical Data Sheet	Grade	Code (SEL)	Cold work tool steel
	1.2379	X153CrMoV12	

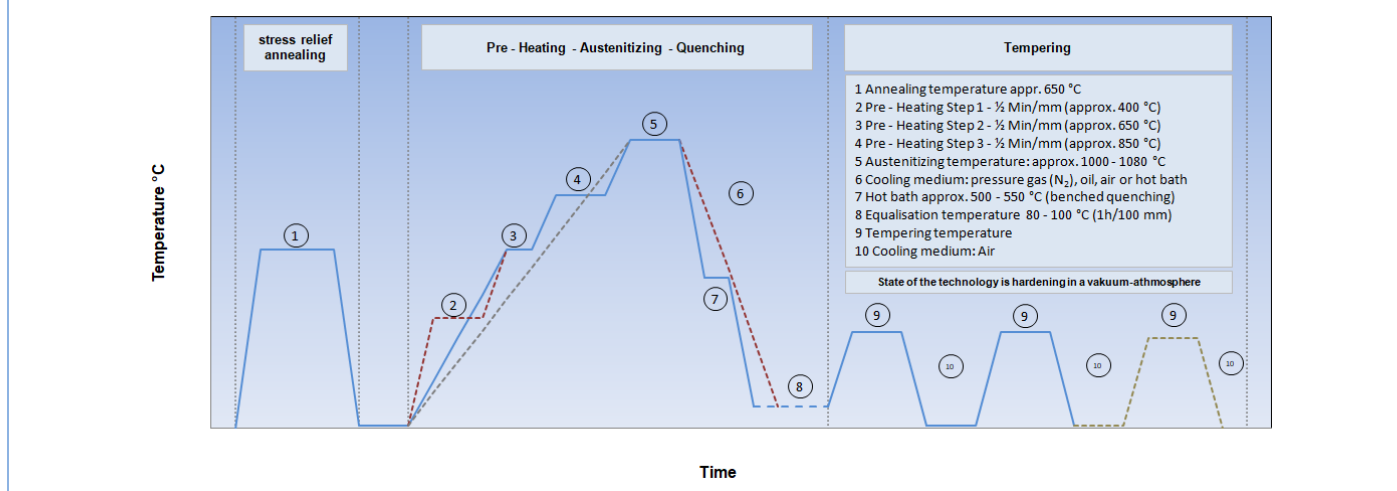
Standards	Steel properties
EN ISO 4957 X153CrMoV12	Ledeburitic, secondary hardenable cold working tool steel (12% Cr). Good dimensional stability and toughness. Combines maximum wear resistance, good toughness, outstanding cutting edge retention and tempering resistance. It can be nitrided after special heat treatment.
AFNOR Z160CDV12	
BS BD 2	
UNE F.520.A	
UNI X155CrVMo121KU	
AISI D 2	
GOST X12MΦ	
Suitable for:	
Applications similar to those of steels 1.2436 and 1.2080 with higher requirements regarding toughness. Dimensionally stable high performance cutting steel, fracture sensitive cutting dies, metal saws, press trimmers, bending dies, guillotine blades for a sheet thickness up to 6 mm, cold shearing blades, flash trimming dies, thread rolling tools, highly stressed woodworking tools, hobbing tools, extruding tools.	

C	Si	Mn	Cr	Mo	Ni	V	W	Co	Sonst.
1,55	0,30	0,40	12,00	0,80	-	0,80	-	-	-

Melting	EAF + VOD	Remarks -
Density (g/cm³)	7,70	
Supply condition	soft annealed	
Hardness (HB)	max. 255	
Tensile strength (N/mm²)	-	
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 ...)	-	10,5	11,5	11,9	-	12,2	-	-	-
Thermal conductivity (W / m * K)	annealed	16,7				20,5				24,2
	quenched + tempered	-				-				-

Thermal Cycle Diagram (Heat treatment)

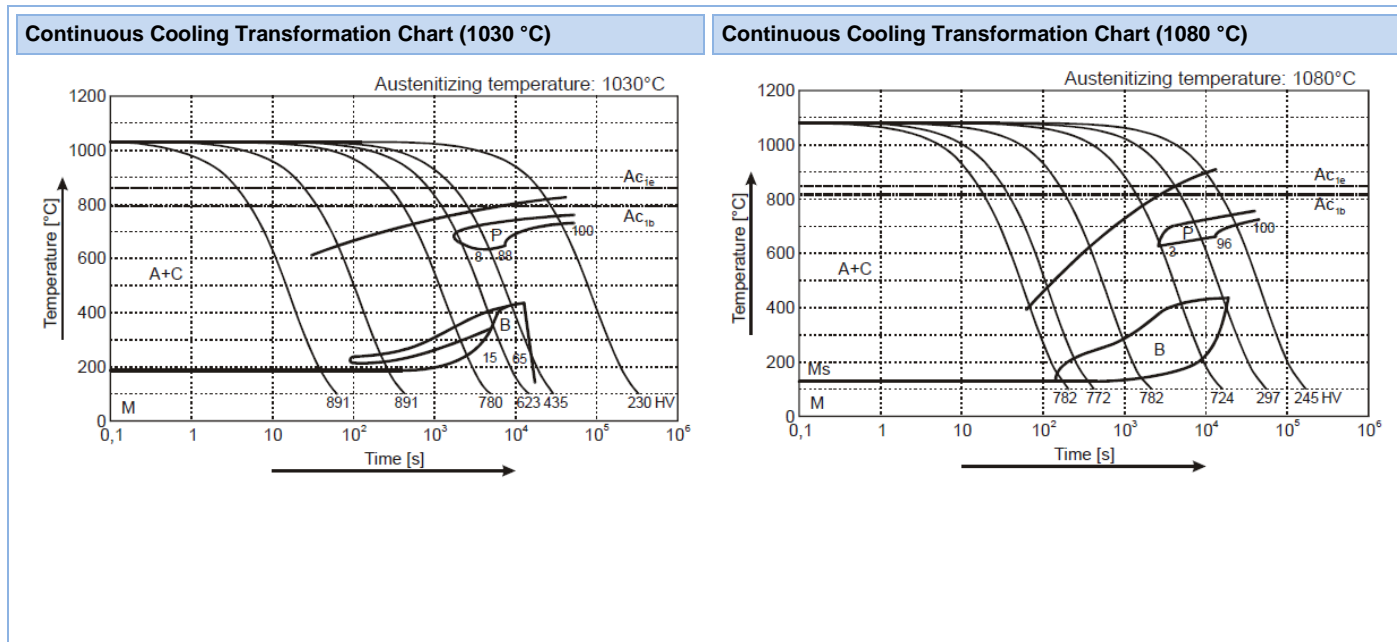


Hinweis: Die in diesem Datenblatt enthaltenen Angaben dienen der Beschreibung, eine Haftung ist ausgeschlossen.



Heat treatment	Temperature (°C)	Cooling	Remarks heat treatment
Soft annealing	800 - 850	Furnace	Controlled slow cooling in furnace
Stress-relief annealing	ca. 650	Furnace	Slow cooling in furnace. After extensive machining process or complex shapes
Hardening	1000 - 1040 1050 - 1080		After through-heating hold for 15-30 minutes Austenitizing temperature 1050 - 1080 °C for secondary hardening.
Pre – heating Step 1	appr. 400		
Pre – heating Step 2	appr. 650		
Pre – heating Step 3	appr. 850		
Quenching	500 - 550 appr. 80 220 - 250 appr. 80	hot bath Oil Air pressure gas	To reduce as possible thermal stress, size alteration and distorsion 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.

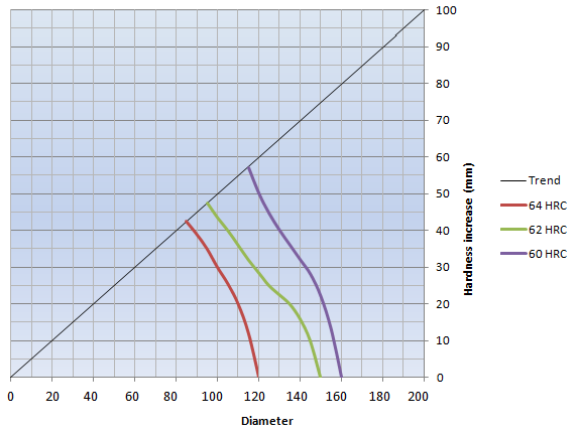
Tempering Chart		Tempering – Hardness after tempering									
		Temperature °C	100	200	300	400	500	550	600	650	700
		HRC	63	61	58	58	58	-	50	-	-
Remarks for tempering Slow heating to tempering temperature immediately after hardening. Time in furnace 1 hour for each 20 mm of workpiece thickness but at least 2 hours. For following coating or nitriding we recommend elevated hardening temperature (1050 - 1080 °C) with sub											





Potential Hardness Increase

Potential Hardness Increase 1.2379 (Air)



Potential Hardness Increase 1.2379 (Oil)

