



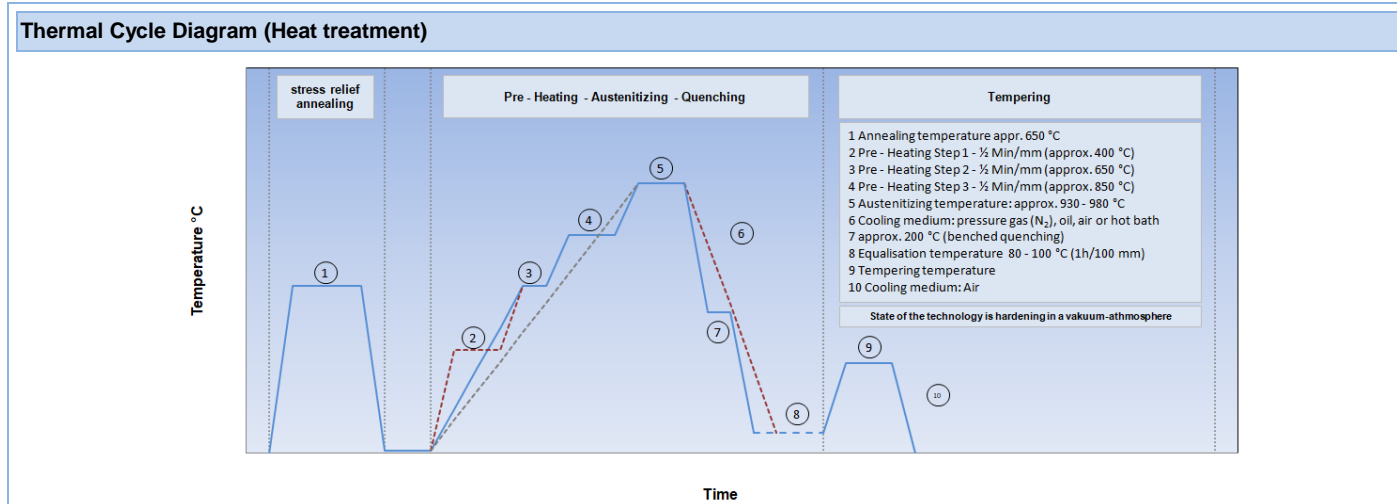
Technical Data Sheet	Grade	Code (SEL)	Cold work tool steel
	1.2080	X210Cr12	

Standards	Steel properties
<b>EN ISO 4957</b> X210Cr12	Ledeburitic 12% chromium steel, very high wear resistance against abrasive and adhesive wear (high volume of carbides), normal toughness, dimensionally stable, high compressive strength.
<b>AFNOR</b> Z200C12	
<b>BS</b> BD 3	
<b>UNE</b> F.521 (F.5212)	
<b>UNI</b> X205Cr12KU	
<b>AISI</b> D 3	
<b>GOST</b> X12	
<b>Suitable for:</b>	
High stressed cutting tools for sheets up to 4 mm thickness, profile rolls, drawing - and deep drawing tools, shear knives, knives for paper and plastics. Cutting tools, guillotine blades for cutting steel sheet up to about 3 mm thick and for cutting hardened steel strip, broaches, highly stressed woodworking tools where the toughness requirement is not too high, shaping and flanging tools, blades for producing chopped wire, thread rolling tools, deep drawing tools, press tools for the ceramic and pharmaceutical industry, drawing cones for wire drawing, extruding tools and guide strips, sand blasting nozzles.	

C	Si	Mn	Cr	Mo	Ni	V	W	Co	Sonst.
2,10	0,30	0,30	12,00	-	-	-	-	-	-

<b>Melting</b>	EAF + VOD	<b>Remarks</b> 1.2080 isn't secondary hardenable  Same applications as steel 1.2436 with reduced hardenability.
<b>Density (g/cm³)</b>	7,70	
<b>Supply condition</b>	soft annealed	
<b>Hardness (HB)</b>	max. 248	
<b>Tensile strength (N/mm²)</b>	-	
<b>Work hardness (HRC)</b>	-	
<b>Structure</b>	-	
<b>Cleaness (DIN 50602)</b>	-	

Physical properties		20 °C	100 °C	200 °C	300 °C	350 °C	400 °C	500 °C	600 °C	700 °C
<b>Thermal expansion coefficient</b>	10 <sup>-6</sup> * K (20 °C bis ...)	-	10,8	11,7	12,2	-	12,6	12,8	13,1	13,3
<b>Thermal conductivity (w / m * K)</b>	annealed	16,7				20,5				24,2
	quenched + tempered	-				-				-



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

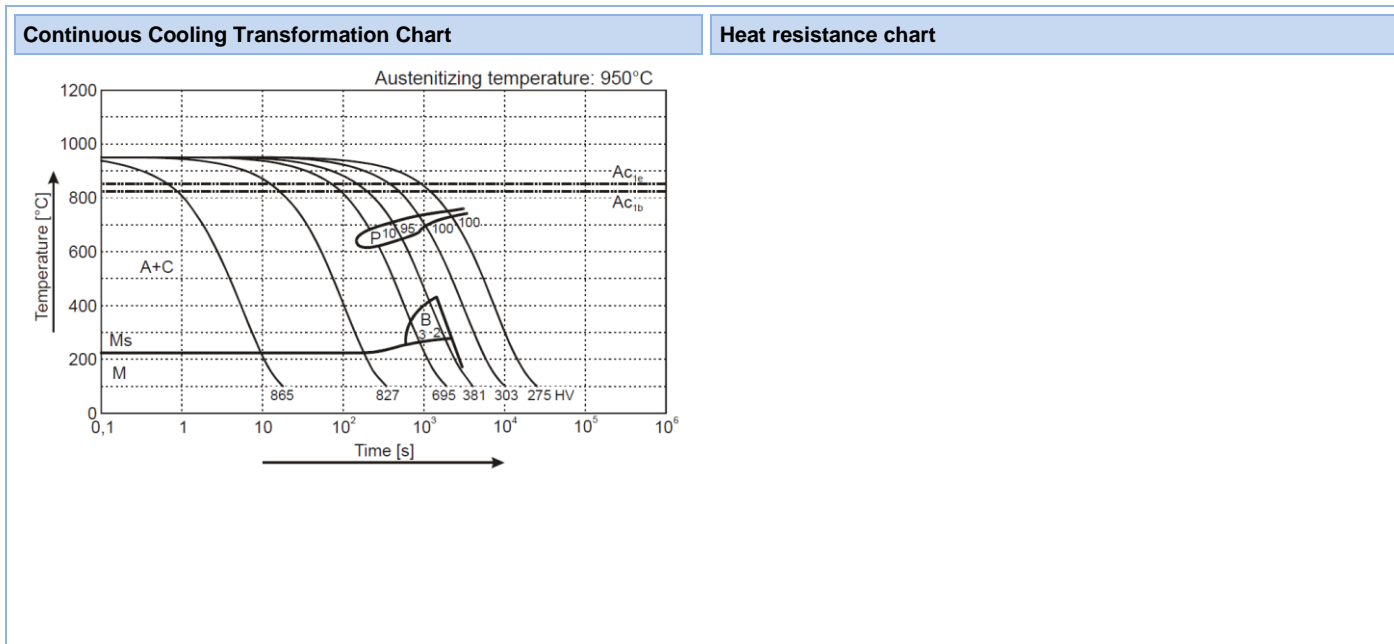
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Heat treatment	Temperature (°C)	Cooling	Remarks heat treatment
<b>Soft annealing</b>	800 - 840	Furnace	Controlled slow cooling in furnace
<b>Stress-relief annealing</b>	ca. 650	Furnace	Slow cooling in furnace. After extensive machining process or complex shapes
<b>Hardening</b>	930 - 980		After through-heating hold for 15-30 minutes
Pre – heating Step 1	appr. 400		
Pre – heating Step 2	appr. 650		
Pre – heating Step 3	appr. 850		
<b>Quenching</b>	500 - 550	hot bath	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.
	appr. 80	Oil	
	appr. 80	Air	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.
	appr. 80	pressure gas	

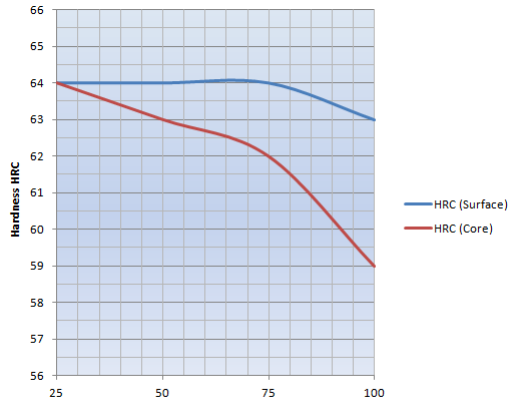
Tempering Chart		Tempering – Hardness after tempering									
	Temperature °C	100	200	300	400	500	550	600	650	700	
	HRC	63	62	59	57	54	-	46	-	-	
<b>Remarks for tempering</b> Slow heating to tempering temperature immediately after hardening. Time in furnace 1 hour for each 20 mm of workpiece thickness but at least 2 hours.											





Potential Hardness Increase

Several diameter



Several hardness figures

