

Quality	X210Cr12	Supply conditions:	<i>Technical card</i>
According to standards	UNI EN ISO 4957: 2002	Annealed HB max 248	Lucefin Group
Number	1.2080		rev. 2018

Chemical composition

C%	Si%	Mn%	P% max	S% max	Cr%
1,90-2,20	0,10-0,60	0,20-0,60	0,030	0,030	11,0-13,0
± 0.05	± 0.03	± 0.04	+ 0.005	+ 0.005	± 0.15

Product deviations are allowed

Temperature °C

Hot-forming	Stress-relieving after machining and before quenching	Pre-heating	Quenching ¹⁾	Quenching ²⁾	Tempering for ¹⁾ and ²⁾		
1050-950	650 furnace cooling to 320, then air	400, pause, then 800, pause, then ▲ ¹⁾ or ²⁾	+Q ▲ 940-970 oil or polymer s.b. 500-550	+Q ▲ 960 air or s.b. (220-250) forthickness < 25 mm	150-300 calm air minimum 2 cycles		
Soft annealing +A	Isothermal annealing +I		+TH annealing	Pre-heating welding	Stress-relieving after welding		
790-820 calm air	850 furnace cooling to 770, pause, furnace cooling 10 °C/h to 720, then air		870-900 cooling 22 °C/h	250-300	650 furnace cooling		
(HB max 248)	HB max 240)		(HB 217-255)	Ac1 800	Ac3 830	Ms 200	Mf -10 ^{b)}

^{b)} subcooling

s.b. = salt bath

the symbol ▲ indicates the temperature rise to°C ▲

Table of tempering after quenching at 970 °C in oil

HB	730	722	722	706	688	662	634	615	577	543	496	432
HRC	64.5	64	64	63	62	60.5	59	58	56	54	51	46
R N/mm ²	-	-	-	-	-	-	2420	2330	2160	2010	1820	1520
Tempering at °C	50	100	150	200	250	300	350	400	450	500	550	600
Thermal expansion	10 ⁻⁶ • K ⁻¹			▶	10.5	11.0	11.0	11.5	12.0	12.0		
Modulus of elasticity	longitudinal GPa			210								
Specific heat capacity	J/(Kg•K)			460								
Thermal conductivity	W/(m•K)			20.0								
Density	Kg/dm ³			7.70								
Specific electric resist.	Ohm•mm ² /m			0.65								
Electrical conductivity	Siemens•m/mm ²			1.54								
°C				20	100	200	300	400	500	600		

The symbol ▶ indicates temperature between 20 °C and 100 °C, 20 °C and 200 °C ...

Europe	Germany	China	Japan	India	R. of Korea	Russia	USA
EN	DIN	GB	JIS	IS	KS	GOST	AISI/SAE
X210Cr12	X210Cr12	Cr12	SKD 1	XT215Cr12	STD 1	Ch12	A681 D 3

Cold-work tool steels

- indeformable steel with excellent wear resistance
- very resistant to compression, marked lack of deformation
- good abrasion resistance
- indeformable during heat treatment
- suitable for nitriding treatments and/or P.V.D.(Physical Vapour Deposition)
- for grinding, it is recommended to use soft grinding wheels with an open structure, with abundant cooling and light removal
- applications: *dies in the ceramics sector, drawing dies, shears, rollers and cylinders for cold rolling mills, wire guide tools, cutting tools, sintering dies, high quantity efficiency dies, dies for plastics, dies for cold-drawing, broaches and timber millings*