

MATERIAL NUMBER 1.4021 · CLASS 1.4

F.310.J

Material no. 1.4021

also listed as X20Cr13

Chemical composition, mechanical and physical property values, and 56 standard designations from 17 regions.

DENSITY	ELASTIC MODULUS	OTHER DESIGNATIONS	PROPERTY VALUES
7.7 g/cm ³	200 GPa	56 in 17 regions	18 on file

Chemical composition

Mass fraction in %

What this alloy is



● Iron — the balance, never listed by a standard — 84.7 % ● Cr — 13 % ● Si — 1 % ● Mn — 1 % ● Traces & impurities · 0.3 %

Logarithmic scale, 0.01 % to 100 % — every value here compares directly, decade by decade.



The scale is logarithmic, not the element's raw share of the alloy — the only honest way to fit 0.01 % and 100 % in one picture, and it means every value here can be compared with every other.

Predicted transformation temperatures

Not enough recorded composition to predict a transformation temperature for this grade — missing: Ni, Mo.

Mechanical properties

39 values across 9 conditions

CONDITION · DIMENSION			RM N/mm ²		A5 %		HB			
Bar, GOST 18907-73			510–780		14		–			
20KH13 (20X13) (annealing) , Bar GOST 5949-75			–		–		126–197			
20KH13 (20X13) (normalize, tempering) , Bar GOST 18968-73			–		–		207–241			
20KH13 (20X13) , Forging GOST 25054-81			–		–		197–248			
CONDITION · DIMENSION			RM N/mm ²	RE N/mm ²	A %	Z %	AK J/cm ²	HB	HRB	HV
Plate/Sheet Hot-rolled			520	225	18	–	–	–	–	–
Bars/Rods			640	440	20	50	78	–	–	–
Hot-rolled			–	–	–	–	–	223	97	234
SOFT ANNEALED					HB					HV
Soft annealed					230					190–240
QUENCHED AND TEMPERED										HV
Quenched and tempered										480–520
DRAWING 740 - 800°C							RM N/mm ²		A5 %	
1 - 4							490		20	
CONDITION · DIMENSION			RM N/mm ²	RE N/mm ²	A5 %		Z %		KCU kJ/m ²	
Bar, GOST 5949-75			650–830	440–635	10–16		50–55		590–780	
CONDITION · DIMENSION			RM N/mm ²	RE N/mm ²	A5 %		Z %		KCU kJ/m ²	
Bar, GOST 18968-73			670	490–655	18		50		690	
QUENCHING AND DRAWING			RM N/mm ²	RE N/mm ²	A5 %		Z %		KCU kJ/m ²	
to 600			647	441	14–16		40–50		390–640	
CONDITION · DIMENSION				RM N/mm ²	RE N/mm ²			A5 %		
Sheet trick, GOST 7350-77				510	375			20		

Physical properties

12 values

CONDITION · DIMENSION	RHO g/cm ³	E GPa	ALPHA 10 ⁻⁶ /K	LAMBDA W/(m·K)	CP J/(kg·K)	RHO_EL nΩ·m
20	7.67	218	–	23	–	588
100	7.66	214	10.1	26	461	653
200	7.63	208	11.2	26	523	730
300	7.6	200	11.5	26	565	800
400	7.57	189	11.9	26	628	884
500	7.54	181	12.2	27	691	952
600	7.51	169	12.8	26	775	1022
700	7.48	–	12.8	26	963	1102
800	7.45	–	13	27	–	–
900	–	–	–	28	–	–

PROPERTY	VALUE	UNIT
Density	7.7	g/cm ³
Elastic modulus	200	GPa
Thermal expansion coefficient	10.3	10 ⁻⁶ /K
Thermal conductivity	30	W/(m·K)
Specific heat capacity	460	J/(kg·K)
Electrical resistivity	600	nΩ·m
Transformation point Ac1	820	°C
Transformation point Ac3	950	°C
Transformation point Ar1	780	°C

Technological properties

PROPERTY	VALUE	UNIT
Weldability	limited weldability.	
Flake sensitivity	not predisposed	
Temper brittleness	predisposed	

Heat treatment

8 regimes

STEP	TEMPERATURE	MEDIUM
Annealing	Temperature not stated	—

STEP	TEMPERATURE	MEDIUM
Annealing	Temperature not stated	—
source joins the operations with + / procedural order		
Quenching	Temperature not stated	—
Tempering	Temperature not stated	—
Quenching	Temperature not stated	—
Quenching	1000–1050 °C	Oil
source joins the operations with + / procedural order		
Quenching	Temperature not stated	—
Solution annealing	1000–1060 °C	—
Tempering	Temperature not stated	—
Ageing	600–700 °C	Oil
source joins the operations with (or)		
Annealing	Temperature not stated	—
Tempering	Temperature not stated	—
source joins the operations with + / procedural order		
Quenching	Temperature not stated	—
Solution annealing	Temperature not stated	—
Tempering	Temperature not stated	—
Ageing	Temperature not stated	—

Designations across standards

56 designations · 1 documented as identical

United States	14	Russia / CIS	11
S42000	uns	20Ch13	gost
420	aisi-sae	20KH13	gost
51420	aisi-sae	20X13	gost
S42000	aisi-sae	20X13	gost
S42010	aisi-sae	2X13	gost
A1049	astm	PK20Kh13	gost
A176	astm	Sv-20Kh13	gost
A182	astm	ПК20X13-6.4	gost
A276	astm	ПК20X13-6.8	gost
A314	astm	ПК20X13-7.4	gost
A473	astm	ст.20X13	gost
A580	astm		
F1079	astm		
F2215	astm		

United Kingdom	4	China	2
420 S 37 En56C	bs	2Cr13	gb
420S29	bs	X20Cr13	gb
420S37	bs		
En56C	bs	Poland	2
France	4	2H13	pn
X20Cr13	afnor	2H14	pn
Z20C13	afnor	Italy	1
Z20Cr13	afnor	X20Cr13	uni
Z8CA12	afnor		
Spain	4	Sweden	1
F.310.J	une	2303	ss
F.3402	une	Czechia	1
F.3402-X20Cr 13	une	17022	csn
X20Cr13	une	Slovakia	1
Europe	3	17 022	stn
1.4021	din-en	Brazil	1
S42010	din-en	420	abnt
X20Cr13 This grade's own name	din-en	Serbia	1
Japan	3	Č.4172	srps
SUS 420J1	jis	former Yugoslavia	1
SUS 420J1FB	jis	Č.4172	jus
SUS 420J1TKA	jis		
United States / Aerospace	2		
5506	ams		
5621	ams		

Note on use. The data is compiled to the best of our knowledge from publicly available standards and manufacturer documentation. It replaces neither material testing nor an inspection document to EN 10204. Please request a mill certificate to EN 10204 2.1, 3.1 or 3.2 together with your enquiry. The standard in its current valid edition always prevails.

Enquiry about F.310.J

Quotation, availability, mill certificate or a technical question — directly on the material page.

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GRADE SEARCH

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ISSUED

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