

MATERIAL NUMBER 1.4731 · CLASS 1.4

VM12D

Material no. 1.4731

also listed as X40CrSiMo10-2

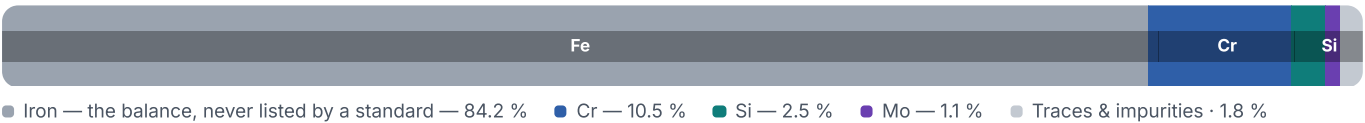
Chemical composition, mechanical and physical property values, and 26 standard designations from 13 regions.

DENSITY 7.85 g/cm ³	OTHER DESIGNATIONS 26 in 13 regions	PROPERTY VALUES 16 on file
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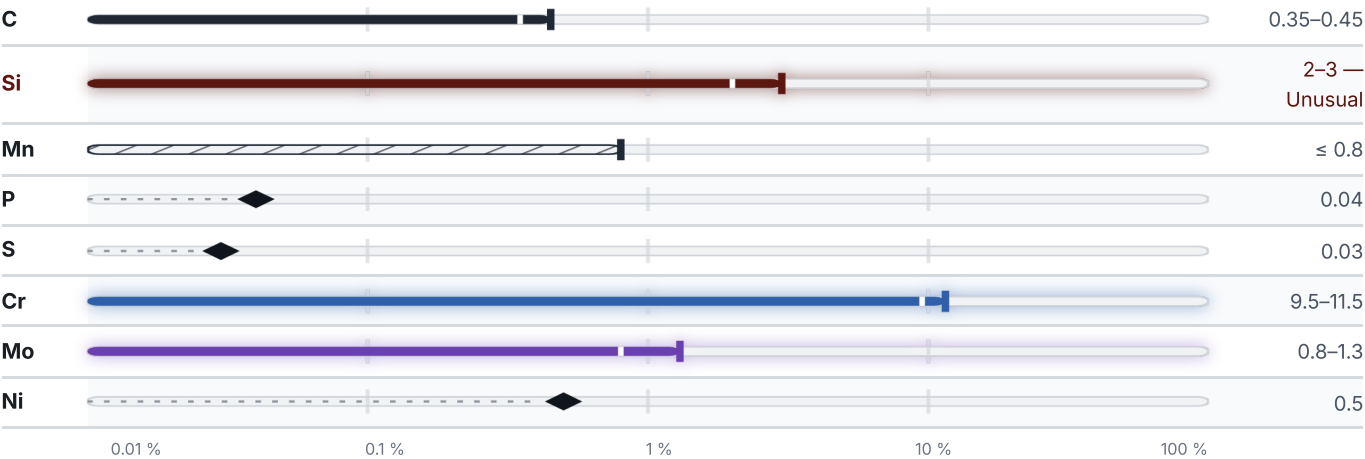
Chemical composition

Mass fraction in %

What this alloy is



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

This grade's composition falls outside the published model's validated range (a low-alloy composition window), so no transformation temperature is predicted here.

Mechanical properties

14 values across 5 conditions

CONDITION · DIMENSION	RM N/mm ²	RE N/mm ²	A %	Z %	AK J/cm ²	HB
Bars/Rods Quenching and tempering	880–930	635–685	15	35	20	–
Quenched and tempered	–	–	–	–	–	262–269
QUENCHED AND TEMPERED						HB
Quenched and tempered						266–325
SOFT ANNEALED						HB
Soft annealed						300
QUENCHING 1010 - 1050°C, AIR, DRAWING 720 - 780°C, OIL	RM N/mm ²	RE N/mm ²	A5 %		Z %	KCU kJ/m ²
Ø 60	930	735	10		35	200
CONDITION · DIMENSION						HB
40KH10S2M (40X10C2M) (annealing) , Bar GOST 5949-75						197–269

Physical properties

8 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	7.62	214	–	17	–	–
100	7.61	211	10	18	–	906
200	–	205	11	20	–	958
300	–	202	11	22	–	1010
400	–	196	11	22	532	1062
500	–	187	–	24	561	1114
600	–	172	–	25	586	1166
700	–	151	–	26	–	1216
800	7.43	129	11	–	–	–
PROPERTY				VALUE	UNIT	
Density				7.85	g/cm ³	
Transformation point Ac1				810	°C	
Transformation point Ac3				950	°C	
Transformation point Ar3				845	°C	

PROPERTY	VALUE	UNIT
Transformation point Ar1	700	°C

Technological properties

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

Designations across standards

26 designations · 3 documented as identical

Russia / CIS	7	Bulgaria	2
40Ch10S2M	gost	4Ch10S2M	bds
40H10S2M	gost	X40CrSiMo10-2	bds
40KH10S2M	gost		
40X10C2M	gost	Europe	1
4X10C2M	gost	X40CrSiMo10-2	This grade's own name din-en
ЭИ107	gost		
ЭЛ 107	gost	United States	1
		SUH3	This grade's own name aisi-sae
Spain	4		
10-02	une	France	1
F.3221	une	Z40CSD10	afnor
F.3221-X40CrSiMo	une		
X40CrSiMo10-02	une	Japan	1
		SUH3	This grade's own name jis
China	3		
1Cr18Mn8Ni5N	gb	Italy	1
4Cr10Si2Mo	gb	VM12D	uni
S48140	gb		
		Poland	1
United Kingdom	2	H10S2M	pn
0/4	bs		
X40CrSiMo10-2	bs	Hungary	1
		SZ4	msz
		South Korea	1
		STR3	ks

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 VM12D

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

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ISSUED

Aug 20, 2026