

MATERIAL NUMBER 1.7335 · CLASS 1.7

F32

Material no. 1.7335

also listed as 13 CrMo 4 4

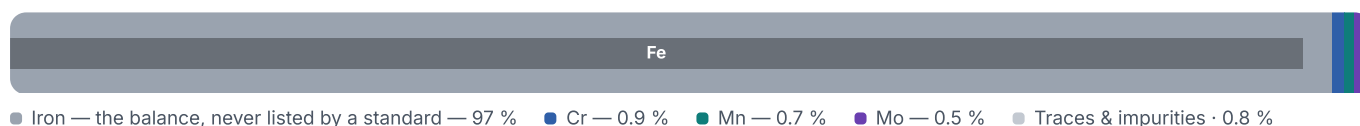
Chemical composition, mechanical and physical property values, and 101 standard designations from 21 regions.

DENSITY	OTHER DESIGNATIONS	PROPERTY VALUES
7.85 g/cm ³	101 in 21 regions	15 on file

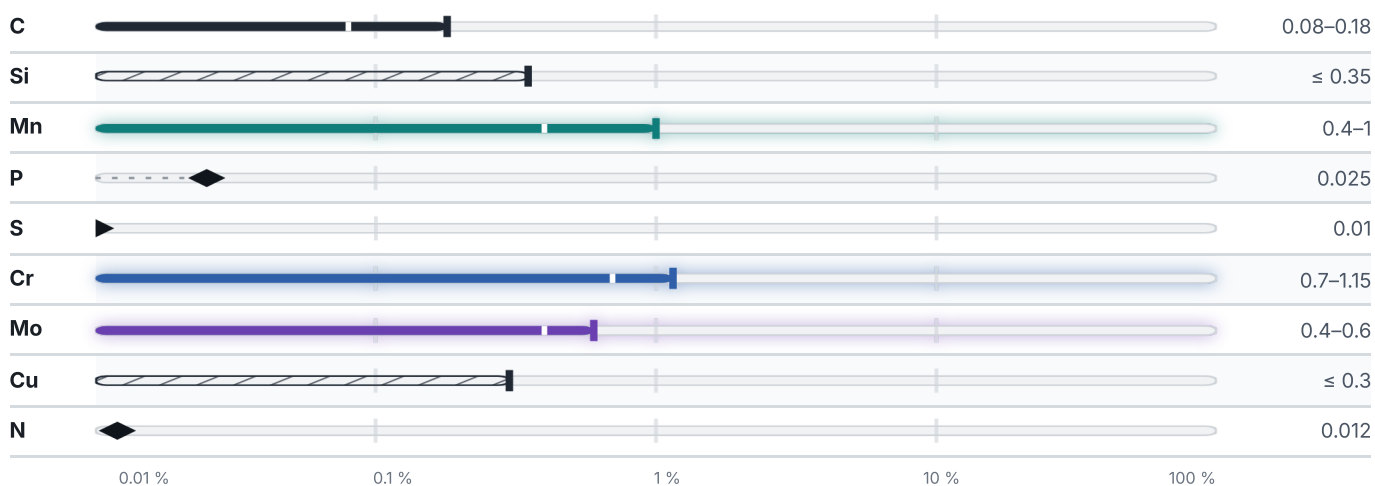
Chemical composition

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

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

Mechanical properties

23 values across 4 conditions

CONDITION · DIMENSION	REH N/mm ²	RM N/mm ²
≤ 16	290–300	–
16 – 60	290	–
≤ 60	–	450–600
60 – 100	270	440–590
100 – 150	255	430–580
150 – 250	245	420–570

CONDITION · DIMENSION	RM N/mm ²	RE N/mm ²	A5 %	HB
Pipe, GOST 8731-87	431	225	21	–
(annealing) , GOST 4543-71	–	–	–	179

CONDITION · DIMENSION	RM N/mm ²	RE N/mm ²	A5 %	Z %	KCU kJ/m ²
Bar	540	350	25	67	2700
QUENCHING 880°C, AIR, DRAWING 650°C, AIR	RM N/mm ²	RE N/mm ²	A5 %	Z %	KCU kJ/m ²
Ø 30	440	275	21	55	1180

Physical properties

6 values

CONDITION · DIMENSION	RHO g/cm ³	E GPa	ALPHA 10 ⁻⁶ /K	LAMBDA W/(m·K)	CP J/(kg·K)
20	7.85	205	–	–	–
100	7.83	–	12.2	44	487
200	7.8	–	13	41	–
300	7.76	–	13.3	41	–
400	7.73	–	13.7	39	–
450	–	172	–	–	–
500	7.7	–	14	36	–
600	7.66	–	14.3	34	–
700	–	–	14.5	–	–
800	–	–	13.4	29	–
900	–	–	11.2	29	–
1000	–	–	12.5	–	–

PROPERTY	VALUE	UNIT
Density	7.85	g/cm ³
Transformation point Ac1	740	°C
Transformation point Ac3	875	°C

Technological properties

PROPERTY	VALUE	UNIT
Weldability	without limitations.	
Flake sensitivity	predisposed	
Temper brittleness	not predisposed	

Heat treatment

13 regimes

STEP	TEMPERATURE	MEDIUM
source joins the operations with + / procedural order		
Isothermal annealing	Temperature not stated	—
Normalizing	Temperature not stated	—
Tempering	650 °C	—
Annealing	650–705 °C	—
Quenching and tempering	Temperature not stated	—
source joins the operations with + / procedural order		
Normalizing	Temperature not stated	—
Tempering	Temperature not stated	—
Quenching and tempering	Temperature not stated	—
source joins the operations with + / procedural order		
Quenching	Temperature not stated	—
Tempering	Temperature not stated	—
source joins the operations with + / procedural order		
Normalizing	920 °C	—
Tempering	680–690 °C	Air
source joins the operations with + / procedural order		
Normalizing	900–960 °C	—
Tempering	670–730 °C	—

STEP	TEMPERATURE	MEDIUM
source joins the operations with + / procedural order		
Normalizing	Temperature not stated	—
Tempering	Temperature not stated	—
source joins the operations with + / procedural order		
Normalizing	Temperature not stated	—
Tempering	Temperature not stated	—
source joins the operations with + / procedural order		
Normalizing	Temperature not stated	—
Tempering	Temperature not stated	—
Quenching	Temperature not stated	—
Tempering	Temperature not stated	—
source joins the operations with + / procedural order		
Normalizing	Temperature not stated	—
Tempering	Temperature not stated	—
source joins the operations with + / procedural order		
Quenching	Temperature not stated	—
Tempering	Temperature not stated	—
source joins the operations with + / procedural order		
Normalizing	Temperature not stated	—
Tempering	Temperature not stated	—
source joins the operations with + / procedural order		
Normalizing	900–960 °C	—
Tempering	660–730 °C	Air

Designations across standards

101 designations · 10 documented as identical

United States		32	France		9
K11547	This grade's own name	uns	12CD4		afnor
K11562	This grade's own name	uns	13CrMo4-5		afnor
K11564	This grade's own name	uns	14CrMo4-5		afnor
K11572		uns	15CD2.05		afnor
K11597	This grade's own name	uns	15CD3.05		afnor
K11757	This grade's own name	uns	15CD3.5		afnor
K11789	This grade's own name	uns	15CD4		afnor
K12062	This grade's own name	uns	15CD4-05		afnor
11562		aisi-sae	15CD4.5		afnor
11564		aisi-sae			
A182		aisi-sae	Russia / CIS		9
A182-F11		aisi-sae	12KHM		gost
A387		aisi-sae	12MKh		gost
A387Gr.12		aisi-sae	12XM		gost
A387Gr.12Cl.2		aisi-sae	12XM		gost
ASTM A182		aisi-sae	15ChM		gost
ASTM A182 F11		aisi-sae	15KHM		gost
Cl.2		aisi-sae	15XM		gost
F11		aisi-sae	ct.12XM		gost
F12		aisi-sae	ct.15XM		gost
Gr.12		aisi-sae			
Gr.P12		aisi-sae	Japan		7
K11562		aisi-sae	SFVA12		jis
K11572		aisi-sae	SFVAF12		jis
K11597		aisi-sae	STBA20		jis
K11757		aisi-sae	STBA22		jis
K12062		aisi-sae	STFA22		jis
A 182 F 12 Class1	This grade's own name	astm	STPA20		jis
A 182 Grade F12		astm	STPA22		jis
A 234 Grade WP12		astm			
A 335 Grade P12		astm	Europe		4
SA182 F12 class 1		astm	1.7335		din-en
			13 CrMo 4 4	This grade's own name	din-en
			13CrMo4-5	This grade's own name	din-en
			Gr.P12		din-en
United Kingdom		10	Spain		4
13CrMo4-5		bs			
1501-620		bs			
1501-620Gr27		bs			
1501-621		bs	14CrMo4.5		une
620		bs	F.2613		une
620-440		bs	F.2631		une
620-470		bs	F.2631 -14CrMo4 5		une
620-540		bs			
620CR . B		bs	Italy		4
620Gr.27		bs	13CrMo4-5		uni
			14CrMo3		uni
			14CrMo45		uni
			16CrMo3		uni

International	3	Hungary	2
14CrMo4-5	iso	13CrMo4-5	msz
F32	iso	KL9	msz
P32	iso		
Bulgaria	3	Sweden	1
13CrMo4-5	bds	2216	ss
14ChM	bds	Slovakia	1
15ChM	bds	15 121	stn
South Korea	3	Poland	1
SFVAF12	ks	15HM	pn
STHA20	ks	Serbia	1
STHA22	ks	Č.7400	srps
China	2	Romania	1
12CrMo	gb	14CrMo4	stas
12CrMoG	gb		
Czechia	2	Austria	1
15021	csn	13CrMo4-4KW	onorm
15121	csn	Belgium	1
		14CrMo45	nbn

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 F32

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

[Start an enquiry](#)

DATASHEET ONLINE

View the material page

GRADE SEARCH

Search all grades

MATERIAL NO.

1.7335

ISSUED

Aug 20, 2026