

13CrMo4-5

Heat-resistant pressure-vessel steels

Material no.	1.7335
according to	DIN EN 10028-2
Tensile strength class	B

General

These steel grades are characterised by a good weldability. They are used above all for manufacturing boilers, pressure vessels and pipes transporting hot liquids.

The user of these steel grades must make sure that his calculation, design and processing methods are appropriate for the material. The grades of this series offer good cold and hot-forming properties.

Chemical composition¹⁾²⁾

(in percent by weight)

	min.	max.
C	0.08 %	0.18 %
Si		0.35 %
Mn	0.40 %	1.00 %
P		0.025 %
S		0.010 %
N		0.012 %
Cu		0.30 % ³⁾
Cr	0.70 %	1.15 %
Mo	0.40 %	0.60 %

1) Heat analysis

2) The Al-content of the melting is to determine and to indicate in the certification.

3) A lower Cu-content and a maximum tin content may be agreed in the order, e. g. with respect to formability.

Mechanical properties⁴⁾

Nom. thick. e	Yield strength R _{eH}
≤ 16 mm	≥ 300 MPa
> 16 mm	≥ 290 MPa

Tensile strength R _m
450 – 600 MPa

Total elongation A
≥ 19 %

Temperature	Notch impact energy ⁵⁾
+ 20 °C	≥ 31 J
0 °C	– ⁶⁾
- 20 °C	– ⁶⁾

Test temperature	Yield point at elev. temp. R _{p0.2}	
	e ≤ 16 mm	e > 16 mm
50 °C	≥ 294 MPa	≥ 285 MPa
100 °C	≥ 285 MPa	≥ 275 MPa
150 °C	≥ 269 MPa	≥ 260 MPa
200 °C	≥ 252 MPa	≥ 243 MPa
250 °C	≥ 234 MPa	≥ 226 MPa
300 °C	≥ 216 MPa	≥ 209 MPa
350 °C	≥ 200 MPa	≥ 194 MPa
400 °C	≥ 186 MPa	≥ 180 MPa
450 °C	≥ 175 MPa	≥ 169 MPa
500 °C	≥ 164 MPa	≥ 159 MPa

4) Transverse samples, normalised

5) Average values of 3 samples; one individual value may fall short of the required minimum value by not more than 30 %. The sample width shall equal the product thickness if the latter is between 6 and 10 mm. The tests are performed by using samples similar to Charpy-V samples. The values specified in the table above are to be reduced proportionally to the sample width.

6) A value can be agreed on in the request and order.

Welding

The steel grades of this series may be welded by means of the usual welding techniques.

Condition of delivery, scope of testing and certificate

The provisions of DIN EN 10028-2, chapters 8.2 and 9 shall apply for delivery and inspection. The steel grade 13CrMo4-5 is delivered in the as-rolled condition; the test is carried out on simulating heattreated samples (normalised and tempered).

Test certificates according to DIN EN 10204 can be supplied as follows: EDP, remote data transmission, fax, e-mail, paper.

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Available dimensions

Hot-rolled coils unpickled, mill edge

Thickness in mm	Width in mm
2.00 – 2.24	900 – 1,400
2.25 – 2.49	900 – 1,450
2.50 – 2.99	900 – 1,500
3.00 – 3.99	900 – 1,680
4.00 – 4.99	900 – 1,750
5.00 – 19.99	900 – 1,900

Thicknesses ≤ 25 mm on request.
Widths ≤ 2,000 mm on request.

Hot-rolled coils pickled, mill edge

Thickness in mm	Width in mm
2.00 – 2.24	900 – 1,400
2.25 – 2.49	900 – 1,450
2.50 – 2.99	900 – 1,500
3.00 – 3.99	900 – 1,680
4.00 – 4.99	900 – 1,750
5.00 – 5.99	900 – 1,900
6.00 – 12.49	900 – 1,530

Hot-rolled coils, slit lengthwise

Thickness in mm	Width in mm
2.00 – 2.24	100 – 690
2.25 – 2.49	100 – 715
2.50 – 2.99	100 – 740
3.00 – 4.60	100 – 800
4.61 – 6.00	116 – 800
6.01 – 7.00	175 – 800
7.01 – 8.00	233 – 800

Widths < 100 mm on request

Hot-rolled coils pickled, trimmed edge

Thickness in mm	Width in mm
2.00 – 2.24	900 – 1,400
2.25 – 2.49	900 – 1,430
2.50 – 2.99	900 – 1,480
3.00 – 3.99	900 – 1,660
4.00 – 4.99	900 – 1,730
5.00 – 5.99	900 – 1,880
6.00 – 6.99	900 – 1,510