SALZGITTER FLACHSTAHL
A member of the Salzgitter Group

58CrV4

Quenched and tempered steels

Material no.	1.8161
according to	DIN EN ISO 683-2
Tensile strength class	D

General

Quenched and tempered steels are used for components subjected to high stresses where the combination of high strength, wear resistance and toughness is particularly important.

Quenching and tempering gives the materials their special properties. The user of these steel grades must make sure that his calculation, design and processing methods are appropriate for the material. Temperature control during quenching and tempering is essential to achieve the desired component properties, however, it must be matched to the respective application.

The steel grade 58CrV4 is supplied as input stock for cold rolling. As the melting and hot-rolling conditions have an effect on further treatment at the customer, the customer should always state the intended use when placing an order.

Chemical composition[1)2)]

(in percent by weight)

	min. in %	max.
C	0.55 %	0.62 %
Si	0.15 %	0.40 %
Mn	0.70 %	1.10 %
P		0.025 %
S[3)]		0.008 %
Cr	0.90 %	1.20 %
V	0.10 %	0.20 %

1) Heat analysis
2) Reference analysis
3) According to DIN EN ISO 683-2 the following is applicable: P ≤ 0.025 % und S ≤ 0.025 %.

Mechanical properties[4)]

Test direction	Yield strength $R_{p0.2}$
longitudinal	700 – 1,000 MPa
transversal	750 – 1,200 MPa

Test direction	Tensile strength R_m
longitudinal	1,000 – 1,300 MPa
transversal	1,000 – 1,320 MPa

Test direction	Total elongation A_{80}[5)]
longitudinal	5 – 13 %
transversal	4 – 11 %

Test direction	Total elongation A_5[5)]
longitudinal	8 – 15 %
transversal	6 – 14 %

4) The values in the table above are mainly from coil ends. Slightly lower values are to be expected in the middle of the coil.

The mechanical properties are not standardized for the condition of delivery.

5) The following applies to the nominal thickness e:
e < 3 mm: A_{80}
e ≥ 3 mm: A_5

Available dimensions

Hot-rolled coils unpickled, mill edge

Thickness in mm	Width in mm
2.00 – 2.24	900 – 1,300
2.25 – 2.99	900 – 1,350
3.00 – 3.99	900 – 1,450
4.00 – 4.99	900 – 1,500
5.00 – 5.99	900 – 1,650
6.00 – 15.00	900 – 1,700

Thicknesses ≤ 25 mm and < 2 mm on request.
Widths ≤ 2,000 mm on reques

Hot-rolled coils unpickled, mill edge

Thickness in mm	Width in mm
2.00 – 2.99	900 – 1,300
2.25 – 2.99	900 – 1,350
3.00 – 3.99	900 – 1,450
4.00 – 4.99	900 – 1,500
5.00 – 9.99	900 – 1,530
10.00 – 10.99	900 – 1,400
11.00 – 11.99	900 – 1,250
12.00 – 12.49	900 – 1,150

Thicknesses < 2 mm and > 12.70 mm on request.
Trimmed edge material on request.

Hot-rolled coils, slit lengthwise

Thickness in mm	Width in mm
2.00 – 2.99	100 – 640
3.00 – 4.60	100 – 690
4.61 – 6.00	140 – 740

Widths < 100 mm on request.
Thicknesses > 6 mm on request.

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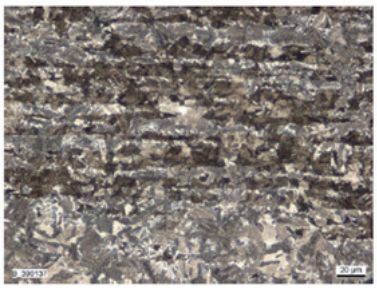
Microstructure

Hot-rolled, the 58CrV4 typically develops a ferritic-pearlitic microstructure. The typical grain size is >12, according to ASTM E45.

HNO_3 100:1

Longitudinal grinding, overview



HNO_3 500:1

Microstructure:
approx. 0 % Ferrite
approx. 35 % Perlite
approx. 65 % Bainite
approx. 0 % Martensite
Grain size: 12 – 13

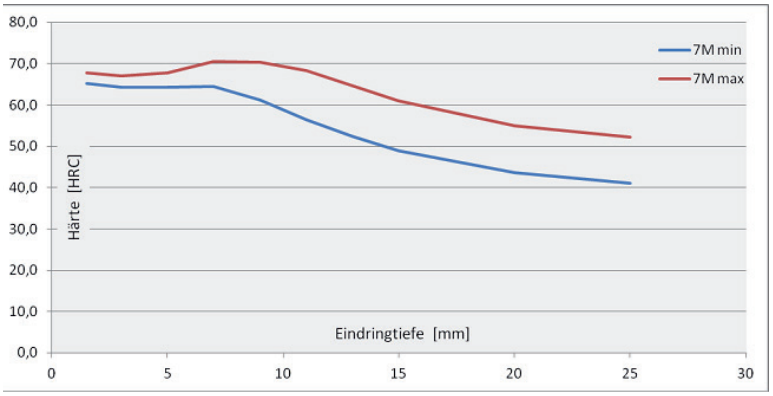
Special features

Due to its analytics, the material must be processed in hot application in order to prevent cracks or fractures from occurring during slab cooling. Due to the very high strength, high residual stresses can occur, which can impair processability. This can lead to problems during threading or reeling during pickling. At the customer's, breaks over the strip width at the end of unwinding are not uncommon. Annealing raw strip before further processing steps is recommended, but tensions may still be present even after this. CrV steels are also susceptible to the occurrence of shells.

Heat treatment :
Hardening : 820 - 860 °C (oil)
Soft annealing : 680 - 720 °C
Normalize : 850 - 880 °C

Hardenability

The material can achieve a hardness of up to 72HRC under appropriate annealing and quenching conditions. The hardenability calculated according to SEP 1664 is shown in the following diagram depending on the penetration depth:



For information only

Examples of application

Highly wear-resistant parts of larger dimensions in automotive and transmission engineering, e.g. clutch plates.

shock absorber for gearboxes

diaphragm clutch

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