NOTZ METALL SERVICE CENTER

NOTZ group advanced metal solutions

1.4310

Description	Spring stainless steel rust resistant according to EN 10151	EN-Norm 1.4310	AFNOR Z12CN1707	AISI 301	DIN 1.4301

Chemical analysis

Fe	C	Si	Mn	P	S	Cr	Mo	Ni	N	PREN
Rest	0.05 – 0.15	max. 2.0	max. 2.0	max. 0.045	max. 0.015	16.0 – 19.0	max. 0.80	6.0 – 9.5	max. 0.10	17

Chemical analysis according to the European standard EN in mass percentages. / *Other

Usage

Rust-resistant spring steel strip is mainly used for stamped and bent spring parts. The generally good corrosion resistance and the still quite good workability even in the hard-rolled condition characterise this material. The material 1.4310 achieves its high hardness through strong work hardening (cold rolling). Hardening in the usual sense is not possible. Depending on the strain hardening stages, this material has excellent toughness and formability.

Corrosion resistance

Its austenitic structure is rather unstable, and the corrosion resistance is lower than e.g., material 1.4301. Material 1.4310 is resistant to water, water vapor, humidity, food acids as well as weak organic and inorganic acids. Use with substances containing chloride (table salt, chlorinated cleaning agents, etc.) should be avoided as there is a risk of corrosion. Especially the use for load-bearing elements should be avoided (Attention: Stress crack corrosion).

Weldability

In principle, the steel 1.4310 is not weldable, as intercrystalline corrosion can be provoked by the increased carbon content and cold forming is lost. The spring steel can be brazed.

Limit temperature

Depending on the mechanical load, the maximum use temperature is between 120°C and 250°C.

Mechanical Properties

Version	Tensile strength MPA (N/mm^2)	Hardness HV ca. Wert	0.2 % Yield strength MPa (N/mm^2)	Elongation at break A 80 longitudinal
C1000	1'000 - 1'150	300 - 370	780 - 1'020	min. 20%
C1150	1'150 - 1'300	350 - 415	1'020 - 1'180	min. 15%
C1300	1'300 - 1'500	390 - 475	1'180 - 1'400	min. 10%
C1500	1'500 - 1'700	450 - 530	1'400 - 1'600	min. 5%
C1700	1'700 - 1'900	510 - 585	Min. 1'600	min. 2%
C1900	1'900 - 2'100	560 - 635		min. 1%

The conversion of tensile strength into HV hardness is always subject to inaccuracies and only gives approximate values. In case of doubt, the test method stated in the product specification applies, the tensile strength is to be preferred. Other strength levels on request.

Physical Properties at room temperature according to EN 10088-1

Density	ca. 7.9 kg / dm^3
Specific heat capacity	500 J / (kg*K)
Thermal conductivity	15 W / (m*K)
Mean coefficient of thermal expansion between 20° and 100°C 16.0 (10^{-6} * K^{-1})	16.0 (10^{-6} * K^{-1})
Specific electrical resistance	0,73 (Ohm*mm^2) / m
Young's modulus in GPa	Delivery condition: 185 / Tempered: 195
Shear modulus in GPa	Delivery condition: 68 / Tempered: 71
Polishing ability	Good

Magnetisability Can be more or less strong due to cold deformation. With stronger cold deformation it increases.

Heat treatment Hardening in the usual sense is not possible with this quality. The strength values are achieved in the base by work hardening (rolling). To achieve good elastic properties, the formed spring parts can be tempered at 200°C - 400°C for 1-3 hours. The heat treatment of the finished spring increases the spring force (approx.3-10 %), the relaxation resistance (setting) and the fatigue strength (fatigue). Tempering also relieves the stresses introduced during cold forming.

Solution annealing 1'010°C - 1'090°C, quenching.

Structure Austenitic, in the work-hardened state deformation martensite.

Surface Finish

Description	According to EN 10088-2	DIN	ASTM
Work-hardened to higher strength level, "temper rolled", bright	2H	f (IIIa)	TR

Diameter

Strip steel
Thickness in coils 0.05 - 2.00 mm
Thickness in sheets 0.05 - 3.00 mm

Delivery form:

- In coils
- Coiled on spools
- In straightened strips

- With cut edges
- with deburred edges
- with rounded edges

Sheets

Diameter (mm)	Weight of sheet (kg)
0.05 x 300 x 2000	0.24
0.08 x 300 x 2000	0.38
0.10 x 300 x 2000	0.48
0.12 x 300 x 2000	0.58
0.15 x 300 x 2000	0.72
0.18 x 300 x 2000	0.86
0.20 x 300 x 2000	0.96
0.25 x 300 x 2000	1.20
0.30 x 300 x 2000	1.44
0.40 x 300 x 2000	1.92
0.50 x 300 x 2000	2.40
0.60 x 300 x 2000	2.88
0.70 x 300 x 2000	3.36
0.80 x 300 x 2000	3.84
0.90 x 300 x 2000	4.32
1.00 x 300 x 2000	4.80
1.20 x 300 x 2000	5.76
1.50 x 300 x 2000	7.20
2.00 x 300 x 2000	9.60
2.50 x 300 x 2000	12.00
3.00 x 300 x 2000	14.40

- In some cases, we also have larger formats from stock.
- Other strip dimensions can be produced in our Service Centre.

Diameter tolerances

Precision strip rolled according to DIN EN ISO 9445-1			
Nominal thickness [mm]	Tolerance [mm]	Nominal thickness [mm]	Tolerance [mm]
0.05 - 0.099	± 0.008	0.60 - 0.629	± 0.025
0.10 - 0.149	± 0.010	0.63 - 0.799	± 0.025
0.15 - 0.199	± 0.012	0.80 - 0.999	± 0.025
0.20 - 0.249	± 0.012	1.00 - 1.199	± 0.040
0.25 - 0.319	± 0.015	1.20 - 1.499	± 0.045
0.32 - 0.399	± 0.015	1.50 - 1.999	± 0.050
0.40 - 0.499	± 0.018	2.00 - 2.499	± 0.060
0.50 - 0.599	± 0.020	2.50 - 3.000	± 0.070

Width tolerances: according to DIN EN ISO 9445

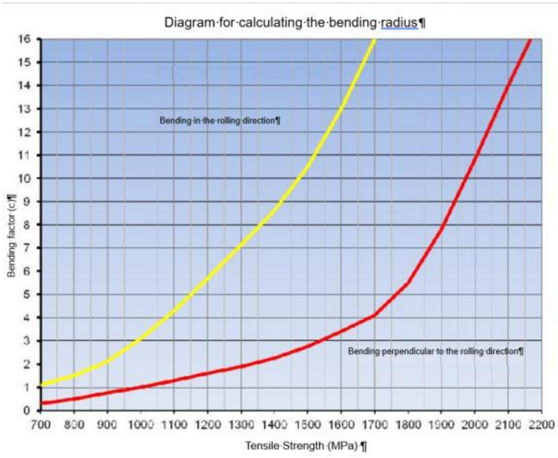
Special tolerances: Tighter or special thickness and width tolerances as well as special strength values can be produced in our service center according to your specifications and on request.

Calculation of the bending radius for stainless austenitic steel 1.4310 in cold-worked condition. Condition

The smallest possible bending radius depends mainly on the sheet/strip thickness and the initial strength. The position of the bending edge in relation to the rolling direction is also of decisive importance. In practice, it has been shown for strips with high strength that bending parallel to the rolling direction is often not feasible at all and should therefore be avoided when designing the tool. On the other hand, strips with high strengths can still be formed well transversely to the rolling direction.

Recommendation for calculating the smallest possible bending radius
Depending on the tensile strength, the **bending factor C** is determined from the diagram below.
The bending factor **C** and the strip thickness **S** can be used to calculate the radius **Rmin**, as the following relationship exists:

Smallest bending radius (Rmin): Bending factor © x strip thickness (s).
Example:
Bending edge transverse to the rolling direction
Strip thickness **S** = 0.2 mm
Tensile strength Rm = 1'300 - 1'500 N/mm^2 (grade C1300)
from the diagram a bending factor **C** of 2.7 is thus determined
is determined (maximum possible tensile strength 1500MPa).
In the present case, **Rmin** is therefore = 2.7 x 0.2 = **0.54 mm**.



These values were determined from laboratory tests and information from the literature. They are intended as a guide only. The use of the data is at the user's own risk. No liability is accepted.

Available belt thicknesses per strength class

Strength mm	C1000	C1150	C1300	C1500	C1700	C1900
0.05		x		x		
0.10 - 0.50		x				x
0.60 - 0.80	x	x	x	x	x	
1.00 - 1.50						
2.00						
2.50	x		x			
3.00	x		(x)			

X= Standard

Note

All information provided in this data sheet is based on the best knowledge and the latest state of the art, but without guarantee. The use of materials should always be discussed with our sales specialists or our materials laboratory on a product- and application-specific basis.

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