

AUSTENITIC STAINLESS STEEL

CHEMICAL COMPOSITION (IN WEIGHT-% ACCORDING TO DIN EN 10088-3)

	C	Si	Mn	P	S	Cr	Ni	Mo	Ti
min.	-	-	-	-	-	16.5	10.5	2.0	5xC
max.	0.08	1.0	2.0	0.045	0.03	18.5	13.5	2.5	0.7

CHEMICAL COMPOSITION (IN WEIGHT-% ACCORDING TO ASTM A276)

	C	Si	Mn	P	S	Cr	Ni	Mo	Ti	N
min.	-	-	-	-	-	16.0	10.0	2.0	5x(C+N)	-
max.	0.08	1.0	2.0	0.045	0.03	18.0	14.0	3.0	0.7	0.1

Customer specific limitations of the standard analysis are possible after consultation with Deutsche Edelstahlwerke.

APPLICATIONS

The corrosion resistance and the mechanical properties of Acidur 4571 are comparable to those of Acidur 4404. If high strength at elevated temperatures is required, Acidur 4057 is the right choice. Due to the low carbon content, Acidur 4571 can be used without heat treatment after welding.

GENERAL PROPERTIES

Corrosion resistance	very good
Mechanical properties	average
Forgeability	good
Weldability	excellent
Machinability	average to poor

STANDARDS AND DESIGNATIONS

DIN EN 10088-3	1.4571 X6CrNiMoTi17-12-2
AISI	316Ti
UNS	S31635
B.S.	320S18, 320S31
JIS	SUS316Ti
AFNOR	Z6CNDT17-12
SS	2350
GOST	10Ch17N13M2T
UNE	F.3535

SPECIAL PROPERTIES

- » Magnetic properties $\mu_r \leq 1,3$
- » Suitable for low temperatures
- » Suitable for use at temperatures up to 550°C

PHYSICAL PROPERTIES

Density in kg/dm ³	8.0
Electrical resistivity at 20°C in (Ω mm ²)/m	0.75
Magnetisability	low ¹
Thermal conductivity at 20°C in W/(m K)	15
Specific heat capacity at 20°C in J/(kg K)	500
Young's modulus in GPa at	
» 20°C	200
» 100°C	194
» 200°C	186
» 300°C	179
» 400°C	172
» 500°C	165
Thermal expansion coefficient in 10 ⁻⁶ K ⁻¹	
» 20°C - 100°C	16.5
» 20°C - 200°C	17.5
» 20°C - 300°C	18.0
» 20°C - 400°C	18.5
» 20°C - 500°C	19.0

¹ The material can be magnetised in quenched condition.
With increasing cold forming the magnetisability increases, too.

PROCESSING PROPERTIES

Machining	yes
Open die and drop forging	yes
Cold forming	yes
Cold heading	yes
Polishable	no

TEMPERATURES FOR HOT FORMING AND HEAT TREATMENT

HOT FORMING

	Temperature in °C	Cooling
	1,200 - 900	Air

HEAT TREATMENT

	Temperature in °C	Cooling
Solution annealing (+AT)	1,020 - 1,120	Air, water

TYPICAL APPLICATIONS

- » Apparatus and pipeline construction
- » Construction industry
- » Chemical industry
- » Food industry
- » Mechanical engineering
- » Medical and pharmaceutical industry
- » Shipbuilding industry

Note: Delivery in accordance with building supervisory approval
Z-30.3-6 and pressure vessel standard DIN EN 10272.

CORROSION RESISTANCE (PREN = 23.1 – 26.7)

Acidur 4571 has a good corrosion resistance in most natural waters from low to medium concentrations of chlorides, salt and hydrochloric acid and organic acids. Acidur 4571 is also resistant to intergranular corrosion after welding. Therefore it complies with the following standardized test methods: AFNOR NF 05-159, ASTM A262 Practice E and DIN EN ISO 3651 Part 2.

Corrosive medium	Concentration	Temperature	Resistance
NaCl	saturated	20°C	risk of pitting corrosion
Seawater	-	20°C	risk of pitting corrosion
Water vapour	-	400°C	resistant
Nitric acid	7 %	20°C	resistant
Sulphur acid	1 %	20°C	resistant
Formic acid	10 %	20°C	resistant

Laboratory experiments with pure corrosive agent and optimal specimens are the basis of the corrosion resistance test. Note. These results are a non-binding indication.

WELDING

Acidur 4571 is weldable with or without filler material by typical welding methods. If filler material is necessary, we recommend the use of 1.4430. A heat treatment after welding is not required. The intermediate layer temperature should not exceed 200°C. Tempering colors must be removed mechanically or chemically.

FORGING

Acidur 4572 is usually heated slowly to 1,150°C - 1,180°C. The temperature range for forging is 1,180°C - 950°C. After forging the material is cooled in water.

MECHANICAL PROPERTIES IN SOLUTION ANNEALED CONDITION (+AT) AT ROOM TEMPERATURE ACCORDING TO DIN EN 10088-3

Ø in mm	Hardness in HB	R _{p0.2} in MPa	R _{p1.0} in MPa	R _m in MPa	A ₅ in %	AV in J		
						longitudinal	transverse	longitudinal
≤ 160	≤ 215	≥ 200	≥ 235	500 - 700	≥ 40	-	≥ 100	-
160 < d ≤ 250	≤ 215	≥ 200	≥ 235	500 - 700	-	≥ 30	-	≥ 60

For thicker dimensions (d > 250 mm) the mechanical properties must be agreed. Otherwise the delivery is based on this specific values.

MECHANICAL PROPERTIES IN SOLUTION ANNEALED CONDITION (+AT) AT ROOM TEMPERATURE ACCORDING TO ASTM A276

Ø in mm	R _{p0.2} in MPa	R _m in MPa	A ₂ in %	Z in %
all	≥ 205	≥ 515	≥ 40	≥ 50

MECHANICAL PROPERTIES IN SOLUTION ANNEALED CONDITION (+AT) AT ELEVATED TEMPERATURE ACCORDING TO DIN EN 10088-3

Temperature in °C	100	150	200	250	300	350	400	450	500	550
R _{p0.2} in MPa	≥ 185	≥ 175	≥ 165	≥ 155	≥ 145	≥ 140	≥ 135	≥ 131	≥ 129	≥ 127
R _{p1.0} in MPa	≥ 215	≥ 205	≥ 192	≥ 183	≥ 175	≥ 169	≥ 160	≥ 160	≥ 158	≥ 157

Customer specific values, deviating the mechanical properties according standards are possible after consultation Deutsche Edelstahlwerke.

MACHINING

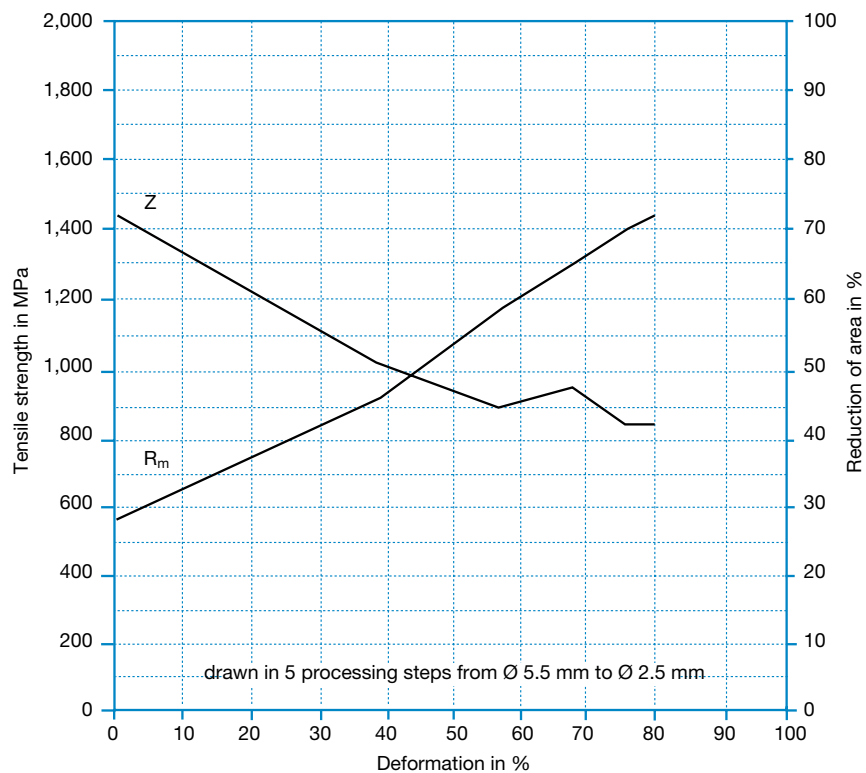
The addition of titanium leads the formation of titanium carbonitrides, which increase tool wear during machining of Acidur 4571.

CUTTING CONDITIONS

Processing type	Cutting speed in m/min	Depth of cut in mm	Feed rate in mm/U	Tool angle		
				Cutting angle	Clearance angle	Inclination angle
Drilling	40 - 100	-	0.05 - 0.16	140° Tip angle	140° Tip angle	-
Turning	70 - 175	6	0.1 - 0.5	10° - 16°	6° - 8°	-4° and 4°
Milling	125 - 260	-	0.15 - 0.3	-	-	-

Cutting data can be seen as an indication and are only for an assessment of the processing parameters.
Analysis variants to optimize the machining properties on request.

STRAIN HARDENING DIAGRAM



DELIVERY CONDITIONS

Wire rod	Ø 5.5 - 30.0 mm
Bars	Ø 7.0 - 500.0 mm
Bright steel in bars	Ø 2.0 - 250.0 mm
Bright steel in coils	Ø 2.0 - 20.0 mm

Completion: solution annealed, quenched, pickled, drawn, forged, rolled, straightened, peeled and grounded. Dimensions > 500 mm available after consultation.

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