Electrodur 4105

TECHNICAL DATA SHEET
X6CrMoS17
1.4105

FERRITIC STAINLESS STEEL

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

	C	Si	Mn	P	S	Cr	Mo
min.	-	-	-	-	0.15	16.0	0.2
max.	0.08	1.5	1.5	0.04	0.35	18.0	0.6

Costumer specific limitations of standard analysis are possible after consultation.

APPLICATIONS

Electrodur 4105 is a ferritic stainless steel with an additional content of sulphur. Due to the sulphur content the machinibility is positive affected. Therefore, this grade is used for components in the automotive industry and for electronical equipment. However, the corrosion resistance is reduced by the sulphur content. This is particularly noticeable in media with chlorides. Due to the low carbon content in Electrodur 4105, an improvement in mechanical properties by annealing is possible. With a targeted heat treatment, soft magnetic properties can be adjusted.

GENERAL PROPERTIES

Corrosion resistance	low
Mechanical properties	poor
Forgeability	poor
Weldability	poor
Machinability	very good

SPECIAL PROPERTIES

- Magnetically soft (H_c < 200 A/m) in annealed condition
- Notched impact strength ≤ 1.6·T
- Magnetic permeability μ_r ≤ 1,500

STANDARDS AND DESIGNATIONS

DIN EN 10088-3	1.4105 X6CrMoS17
AISI	430F
UNS	S43020
AFNOR	Z8CF17
JIS	SUS430F

TYPICAL APPLICATIONS

- Automotive industry
- Electronical equipment

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PHYSICAL PROPERTIES

Density in kg/dm³	7.7
Electrical resistivity at 20°C in (Ω mm²)/m	0.7
Magnetisability	existent
Thermal conductivity at 20°C in W/(m K)	25
Specific heat capacity at 20°C in J/(kg K)	460
Young's modulus in GPa at	
» 20°C	220
» 100°C	215
» 200°C	210
» 300°C	205
» 400°C	195
Thermal expansion coefficient in 10^{-6} K^{-1}	
» 20 - 100°C	10.0
» 20 - 200°C	10.5
» 20 - 300°C	10.5
» 20 - 400°C	10.5
» 20 - 500°C	11.0

PROCESSING PROPERTIES

Machining	yes
Hammer and die forging	seldom
Cold forming	seldom
Cold heading	seldom
Polishability	yes

TEMPERATURES FOR HOT FORMING AND HEAT TREATMENT

Due to the high sulphur content and the ferritic-austenitic microstructure at forging temperature, caution during hot forming is required.

HOT FORMING

	Temperature in °C	Cooling
	1,100 - 800	Air

Due to the tendency to form coarse grains, the temperatures should be kept as low as possible and not exceed 850°C.

HEAT TREATMENT

	Temperature in °C	Cooling
Soft annealing (+A)	750 - 850	Air

Note: To adjust the soft magnetic properties special heat treatment parameters are required.

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

Ø in mm	Hardness in HB	$R_{p0,2}$ in MPa	R_m in MPa	A_5 in %	
				longitudinal	transverse
≤ 100	≤ 200	≥ 250	430 - 630	≥ 20	-

For thicker dimensions (d > 100 mm) the mechanical properties have to be agreed.

MECHANICAL PROPERTIES IN SOLUTION ANNEALED CONDITION (+A) AT HIGHER TEMPERATURES ACCORDING TO DIN EN 10088-3

Temperature in °C	100	150	200	250	300	350	400
$R_{p0,2}$ in MPa	≥ 230	≥ 220	≥ 215	≥ 210	≥ 205	≥ 200	≥ 195

FORGING

The high sulphur content and the ferritic-austenitic microstructure at forging temperature makes Electrodur 4105 difficult to forge. The material is first heated slowly to 850°C, then rapidly to 1,100°C - 1,130°C.
The temperature range for forging is 1,130°C - 1,050°C.

WELDING

In general Electrodur 4105 is not weldable, except by resistance welding. Without an additional heat treatment, the mechanical-technological properties in the heat affected zone and in the weld can be greatly different from those of the base material.

COLD FORMING

An average cold forming of Electrodur 4105 is possible, but not common.

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CORROSION RESISTANCE
(PREN[1] = 16.0 - 18.0)

The corrosion resistance of this 17% chromium alloyed steel is reduced by the higher sulphur content, especially in media which causes pitting or crevice corrosion. Electrodur 4104 is resistant to atmosphere, water, steam or other less aggressive media. However, Electrodur 4104 is not resistant to intergranular corrosion, neither in delivery as well as in the welded condition.

[1] Because the PREN formula disregard the influence of sulphur, the specified values must be seen critically.

MACHINING

Due to the sulphur content the machinability, especially the chip-breaking behaviour, is improved.

DELIVERY CONDITIOS

Wire rod	Ø 5.5 - 30.0 mm
Bright steel in bars	Ø 2.0 - 28.0 mm
Bright steel in coils	Ø 2.0 - 20.0 mm
Bars	after consultation

Completion: solution annealed, pickled, drawn, straightened and grounded.
Dimensions > 30 mm available after consultation.

You can find our complete delivery programme in the brochure „high-tech Steel Solutions for Tomorrows's World (Products and Services)“ on www.dew-stahl.com.

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