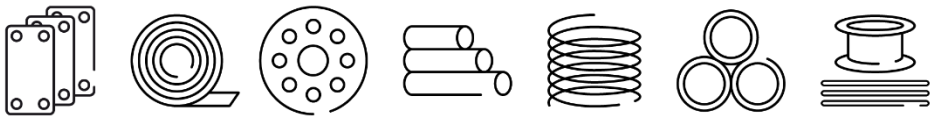
Alloy 601 I NiCr23Fe I 2.4851
High Performance Alloys Data Sheet

Zapp is Certified to ISO 9001



Alloy 601

- is a nickel-chromium-iron alloy that contains aluminum. Under oxidizing conditions at high temperatures, the high proportion of chromium and the addition of aluminum lead to the formation of a dense, securely bonded oxide layer.
- can be used in any application requiring resistance to aggressive gases and high temperatures in oxidizing atmospheres. The excellent hot strength combined with outstanding scaling resistance permits operating temperatures of up to 1150 °C.

Application

- Components for heat treatment plants, such as conveyor belts, suspension devices and furnace rollers
- Burner parts and steel tubes
- Brackets for steam superheater tubes
- Components for ash conveyor systems
- Catalytic converter components in exhaust systems for gasoline engines
- Catalyst regenerators and air preheaters used in the production of polyethylene
- Components for diesel engines

Further information under:
https://www.zapp.com/en-us/materials/high-performance-alloys-ni-co-ti

Specifications

DIN Designation	NiCr23Fe
DIN Material Number	2.4851
VdTÜV Datasheet	-
UNS	N06601
DIN	17742, 17750, 17751, 17752, 17753, 17754
SAE	AMS 5715, AMS 5870
ASTM	B166, B168

Delivery Forms

Sheet	hot or cold rolled, heat treated, pickled or de-scaled
Strip	cold rolled, heat treated pickled or cold rolled, bright annealed
Pipe	longitudinally welded or seamless, heat treated de-scaled or bright annealed
Bar	rolled or forged, heat treated
Wire	rolled or drawn
Forging	heat treated, machined on request
Welding filler metal	welding bars, wire electrodes, coated bar electrodes

Do you require other delivery forms or finishes? We will be glad to discuss your needs with you over the phone.

Processing Instructions

Alloy 601 is cold and hot formable. Its cold formability is similar to that of austenitic steels. Nevertheless, the high strength of alloy 601 must be taken into account. With high degrees of cold forming, intermediate annealing steps must be carried out. Suitable tools for such forming include tungsten carbide, tool steels with high carbon or chromium content, and cast iron. Hot forming is performed at temperatures of between 1200 and 900 °C. Workpieces should be free of oil, grease, sulfur-containing contaminants and other contaminants prior to heating. A sulfur-free furnace atmosphere that is neutral or slightly reducing must be maintained. Measures should be taken to avoid a change from reducing to oxidizing conditions. The material can be machined using conventional processes. For these purposes, the material is best processed in its solution-annealed state.

Heat Treatment

Annealing: 920 to 1000 °C
Solution annealing: 1100 to 1190 °C
Cooling: forced air, forced inert gas, or water
Material 601 should be cooled rapidly between 540 °C and 760 °C.

Welding

The welding of alloy 601 is preferably carried out on like materials using GWAT and GMAW gas metal arc welding processes as well as the manual metal arc welding process. The semi-finished products to be welded should be processed in a solution-annealed, metallic bright condition and be free of dirt. Preheating or secondary heat treatment is generally unnecessary. In multipass welding, oxides must be completely removed from the intermediate layers by grinding or brushing with steel brushes.

Chemical Composition*

	Al	B	C	Cr	Cu
Min.	1.0	-	-	21	-
Max.	1.7	0.006	0.1	25	0.5
	Fe	**Mn**	**Si**	**Ti**	**Ni**
Min.	-	-	-	-	58
Max.	18	1.0	0.5	0.5	63

* weight %

Physical Properties

Melting temperature range	1300-1370 [°C]
Density*	8100 [kg · m^{-3}]
Modulus of elasticity* (approximately)	206 [GPa]
Specific heat*	450 [J · kg^{-1} · K^{-1}]
Thermal conductivity*	16.3 [W · m^{-1} · K^{-1}]
Coefficient of thermal expansion 27-100°C	13.75 x 10^{-6} [K^{-1}]
Specific electrical resistivity*	1.22 [Ω · mm^2 · m^{-1}]
Curie point	-190 [°C]

* at room temperature

Mechanical Properties at Room Temperature

Semi-finished product form	Strip and Plate
Condition	solution annealed
$R_{p\ 0.2}$ min [MPa]	205
R_m min [MPa]	550
A min [%]	30

Creep Resistance* Sheet, Heat Treated, Solution Annealed

Sheet	Temperature °C					
	540	**650**	**730**	**870**	**980**	**1100**
$R_{m/10\ 000}$ [MPa]	300	150	48	17	8.0	4.4
$R_{m/100\ 000}$ [MPa]	220	120	34	10	4.8	2.6

* approximately

Welding Filler Metal

Operating temperature		Coated elektrode rod (MMA)	Bar (GTAW)	Wire (GMAW)
	DIN EN ISO	14172	18274	18274
Up to 550 °C	Alloy designation	Ni 6182	Ni 6617	Ni 6082
Up to 980 °C	Alloy designation	Ni 6625	Ni 6617	Ni 6082
Up to 1150 °C	Alloy designation	Ni 6625	Ni 6617	Ni 6625

We will be glad to provide you with information and instructions on machining and processing and on the selection of suitable welding filler metal. Please do not hesitate to call us.

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For further information about our products and locations, please refer to our image brochure or consult our website at www.zapp.com

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