

# Inconel 600 | Alloy 600 | W.Nr. 2.4816 Chemical Compositions- Data Sheet

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## Alloy 600

- is a non-hardenable nickel-chromium-iron alloy for application in wet chemistry areas and at high temperatures. The versatility of this material results in a broad range of applications, from freezing temperatures up to approx. 1050 °C. The chromium content makes the material usable under oxidizing conditions. Its high nickel content ensures resistance under reducing conditions. The alloy also exhibits outstanding properties – also at high temperatures – in ammonia-containing gases as well as in nitrating or carburizing atmospheres. Its high hot strength and corrosion resistance at elevated temperatures and its good processability make alloy 600 the standard material for furnace construction.
- also proves useful, however, in chemical engineering, e.g. for use in the presence of sodium hydroxides, formic acids, acetic acids and fatty acids. In dry gases such as hydrogen chloride or chlorine gas, Material 600 has withstood temperatures of up to 550 °C. Its good resistance in ultra-pure water enables the use of a slightly modified form of this material in nuclear engineering. Material 600 is also used in electrical engineering.

## Application

- Ammonia cracking plants
- Gas carburization plants
- Nitriding furnaces
- Plants for the production of chlorinated and fluorinated hydrocarbons
- Ethylene dichloride crack tubes
- Production plants for alkalis
- Reactors and heat exchangers in plants for production of vinyl chlorides
- Plant equipment for the production of sodium sulfide
- Steam generation tubes in nuclear technology

## Specifications

DIN Designation	NiCr15Fe
DIN Material Number	2.4816
VdTÜV Datasheet	305
UNS	N06600
DIN	17742, 17750, 17751, 17752, 17753, 17754
BS	3072/NA 14, 3073/NA 14, 3074/NA 14, 3075/NA 14, 3076/NA 14
ASTM	B 163, B 166, B 167, B 168, B 564
ASME	SB 163, SB 166, SB 167, SB 168, SB 564
SAE	AMS 5540, AMS 5580, AMS 5665

## 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, pickled or bright annealed
rod	rolled or forged, heat treated
Wire	rolled and 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 600 is cold and hot formable. Its cold formability is similar to that of austenitic steels. With high degrees of cold forming, intermediate annealing steps must be carried out. For degrees of deformation  $\geq 5\%$  in the forming processes of rolling, bending, pressing and forging, the hot forming temperature ranges from 1230 to 1030 °C. For degrees of deformation below 5%, the temperature range from 1030 to 900 °C applies for all processes. All workpieces should be freed 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. alloy 600 is easily machinable if guidelines are followed.

## Heat Treatment

Annealing: 920 – 1000 °C,  
 Solution annealing: 1080 – 1150 °C,  
 Cooling: Air, inert gas or water

## Welding

The welding of alloy 600 is preferably carried out on like materials using standard processes such as GTAW, GMAW and the manual arc welding process. The semi-finished products to be welded should be processed in a stress-free, metallicly bright condition and be free of dirt. Preheating or secondary heat treatment is generally unnecessary.

Please get further information under:  
<https://www.ncalloys.com/alloys/inconel/inconel-600/>

## Chemical Composition\*

	C	Cr	Cu	Fe	Mn	Si
Min.	-	14.0	-	6.0	-	-
Max.	0.08	17.0	0.50	10.0	1.0	0.50
	Ti	P	Al	S	Ni	
Min.	-	-	-	-	Bal.	
Max.	0.3	0.015	0.3	0.015	Bal.	

\* weight %

## Physical Properties

Melting temperature range	1370-1425 [°C]
Density*	8450 [kg · m <sup>-3</sup> ]
Modulus of elasticity* (approximately)	206 [GPa]
Specific heat*	460 [J · kg <sup>-1</sup> · K <sup>-1</sup> ]
Thermal conductivity*	14.8 [W · m <sup>-1</sup> · K <sup>-1</sup> ]
Coefficient of thermal expansion 20 - 100°C	13.3 x 10 <sup>-6</sup> [K <sup>-1</sup> ]
Specific electrical resistivity*	1.03 [Ω · mm <sup>2</sup> · m <sup>-1</sup> ]

\* at room temperature

## Mechanical Properties at Room Temperature

Delivery condition	R <sub>p0.2</sub> min [MPa]	R <sub>m</sub> [MPa]	A min [%]
Annealed	200	550 - 750	30
Solution annealed	180	500 - 700	35

## Mechanical Properties at Elevated Temperatures\*

Strength parameter	Delivered condition	Temperature °C				
		100	200	300	400	450
R <sub>p0.2</sub> [MPa]	soft	180	165	155	150	145
R <sub>m</sub> [MPa]	annealed	520	500	485	480	475
R <sub>p0.2</sub> [MPa]	solution	170	160	150	150	145
R <sub>m</sub> [MPa]	annealed	480	460	445	440	435

\* approximately

## Welding Filler Metal

	DIN EN ISO	Alloy Designation
Bar (GWAT)	18274	Ni6082
Wire (GMAW)	18274	Ni6082
Coated rod electrode (MMA)	14172	Ni6182

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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