HASTELLOY® C-2000® alloy | NiCr23Mo16Cu | 2.4675 | High Performance Alloys Data Sheet

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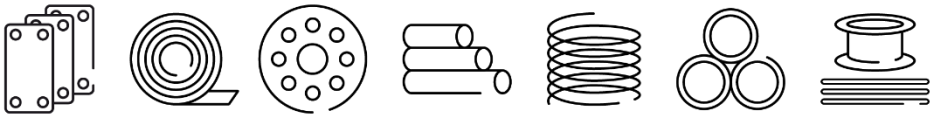

HASTELLOY® C-2000® alloy
belongs to the group of highly corrosion-resistant nickel-chromium-molybdenum alloys. This material is characterized, among other things, by a low yet effective copper content without reducing its thermal micro structural stability.
This alloy shows an extended range of resistance under reducing as well as oxidizing conditions, even at elevated temperatures. The alloy offers very good resistance to sulfuric, hydrofluoric and dilute hydrochloric acids over the broadest range of concentrations and temperatures.

This material can also be used in applications with mixtures of sulfuric acid and oxidizing acids with chloride ions. Due to the high chromium concentrations, resistance is very high in oxidizing media in the presence of iron ions, iron (III) ions or other oxidizing agents.

The material's level of susceptibility to crevice corrosion, pitting and stress-crack corrosion is very low. It is used in the as-welded state without subsequent heat treatment.

Application

- Chemical engineering, e.g. production and processing of sulfuric acid
- Manufacture of pharmaceutical products, e.g. piping, process reactors, heat exchangers, centrifuges, linings, instruments, stop valves, vessels, gate valves and dampers, agitators, mixers
- Environmental engineering, e.g. acid conditioning, flue gas purification systems, evaporation plants, components in waste incineration plants

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

Specifications

DIN Designation	NiCr23Mo16Cu
DIN Material Number	2.4675
VdTÜV Datasheet	539
UNS	N06200
DIN	17744, 17750, 17751, 17752
ASTM	B 366, B 564, B 574, B 619, B 622, B 626
ASME	SB 366, SB 564, SB 574, SB 575, SB 619, SB 622, SB 626

Delivery Forms

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

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

Processing Instructions

HASTELLOY® C-2000® alloy is cold and hot formable. The hot forming temperature is between 1,235 and 950 °C. All forming techniques can be used.

The material tends to work harden. Solution annealing should be repeated after hot forming in general and after cold forming with degrees of deformation greater than > 15%.

Heat Treatment

Solution annealing: 1,120 – 1,149 °C, duration depending on thickness of semi-finished product
Cooling: water, compressed air or protective gas

Welding

The welding of HASTELLOY® C-2000® alloy is preferably carried out on like materials using GTAW and GMAW gas metal arc welding processes as well as the fusion arc welding process.

The semi-finished products should be processed in a stress-free, metallic bright condition and be free of dirt. In order to achieve optimal corrosion resistance, care must be taken to apply a minimum of heat during welding.

Preheating or secondary heat treatment is generally unnecessary.

Chemical Composition*

	C	Si	Mn	P	S	Co
Max.	0.010	0.08	0.50	0.025	0.010	2.0
	Cr	**Fe**	**Mo**	**Cu**	**Al**	**Ni**
Min.	22.0	-	15.0	1.3	-	Bal.
Max.	24.0	3.0	17.0	1.9	0.50	Bal.

* weight %

Physical Properties

Melting temperature range	1,328 – 1,358 [°C]
Density*	8,500 [kg · m^{-3}]
Modulus of elasticity* (approximately)	218 [GPa]
Specific heat*	428 [J · kg^{-1} · K^{-1}]
Thermal conductivity*	9.1 [W · m^{-1} · K^{-1}]
Coefficient of thermal expansion 20 – 100°C	12.4 x 10^{-6} [K^{-1}]
Specific electrical resistivity*	1.28 [Ω · mm^2 · m^{-1}]

* at room temperature

Mechanical Properties at Room Temperature

Semi-finished product form	Sheet ≤ 4 mm thickness	Sheet > 4 - 65 mm thickness, bar ≤ 90mm ⌀ or equivalent area
$R_{p\ 0.2}$ min [MPa]	330	280
R_m [MPa]	710 – 1,000	690 - 950
A min [%]	45	45

Mechanical Properties at Elevated Temperatures*

Semi-finished product form	Strength parameter	Temperature °C 100	200	300	400	450
Sheet ≤ 4 mm thickness	$R_{p\ 0.2}$ [MPa]	295	255	225	195	185
Sheet > 4 to ≤ 65 mm thickness Bar ≤ 90 mm ⌀ or equivalent area	$R_{p\ 0.2}$ [MPa]	250	215	190	165	155

* minimum values

Welding Filler Metal

	DIN Material No.	DIN Designation	VdTÜV Data sheet No.	DIN EN ISO	AWS/ASME
Bar (GTAW)				18274	A5.14
	2.4698	SG-NiCr23Mo16Cu	09678	Ni6200	ER NiCrMo-17
Wire (GMAW)				18274	A5.14
	2.4698	SG-NiCr23Mo16Cu	09679	Ni6200	ER NiCrMo-17
Coated Rod Electrode (MMA)				14172	A5.11
	2.4699	EL-NiCr23Mo16Cu	09677	Ni6200	E NiCrMo-17

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.

® HASTELLOY is a registered trade mark of our contracted manufacturer HAYNES International, Inc., Kokomo, Indiana, USA.

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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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