LAMINERIES MATTHEY
NOTZ group advanced metal solutions

Hastelloy®
Alloy C-22

		EN Nr.	UNS (ASTM)	AISI	LMSA
Designation	**NiCr21Mo14W**	2.4602	N06022	-	**B650**

Chemical composition

Ni	Mo	Cr	Fe	W	Co	V
Balance	12.5 - 14.5	20.0 - 22.5	2.0 - 6.0	2.5 - 3.0	0.50 max.	0.35 max.
C	Mn	P	S	Si	Cu	-
0.015 max.	0.50 max.	0.020 max.	0.025 max.	0.080 max.	-	-

Values (Weight %). In order to achieve maximum homogeneity and consistent quality, the actual manufacturing tolerances are tighter and more precise than the composition indicated.

Main technical properties and features

Hastelloy® C-22 is a Nickel-Molybdenum-Chromium-Tungsten alloy renowned for its outstanding pitting, crevice resistance in severe environments. The molybdenum, tungsten and chromium content provide an excellent resistance to pitting, crevice and stress corrosion at high temperatures under oxidizing and reducing conditions. Alloy C-22 has an excellent resistance to oxidizing environments including wet chlorine and mixtures containing oxidizing and nitric acids with chlorine ions. Moreover, C-22 alloy has an exceptional resistance to different medias such as hot contaminated solutions (organic and inorganic), to iron (II) and copper (II) chlorides, formic and acetic acids, seawater and brine solutions. The alloy C-22 offers better resistance to pitting, crevice and stress corrosion than Hastelloy® C-276 and most Ni-Cr-Mo alloys.

The low carbon and silicon content in the C22 alloy minimizes carbide precipitation in the heat-affected zone (HAZ) during welding and maintains high corrosion resistance in the as-welded condition. Hastelloy® C-22 has excellent thermal stability, it can be used in the welded condition without further heat treatment.

Annealing is commonly carried out at temperatures between 1105 - 1135 ºC, followed by rapid cooling (water or air).

Typical uses

Hastelloy® C-22 is suitable for chemical applications and severe environments such as mixed acid treatment and pollution control. Pulp and paper industry, for digestion and bleaching tanks. Acetic acid production and the pharmaceutical industry, e.g. reactor vessels, pumps and valves. Hastelloy® C-22 is also used to manufacture diaphragms for Ultra-High Purity (UHP) valves and regulators in the demanding semiconductor, solar and medical industries.

Typical manufacturing range

		Thickness (mm)	Width (mm)	Length (mm)
Rolled products	Strip in coils [1]	0.010 - 0.500	1.5 - 200.0	-
	Strip as sheets [1]	0.010 - 0.500	10.0 - 200.0	100 - 3000

[1] Not all our production possibilities are presented here. Other dimensions or product forms available upon request. Some combinations of thicknesses and widths are not possible.

Mechanical properties of strips

Temper		R_m (N/mm²)	$Rp_{0.2}$ (N/mm²)	A_{50mm} (%)	Hardness HV
R690	soft	690 - 950	310 min.	45 min.	200 - 260
R950	½ hard	950 - 1250	700 min.	-	260 - 380
R1250	hard	1250 min.	-	-	380 min.

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Physical properties

Modulus of elasticity	kN/mm^2	206
Density	g/cm^3	8.70
Melting point / Melting range	°C	1360 - 1400
Linear dilatation coefficient (20 to 100ºC)	10^{-6}·/ ºC	12.4
Thermal conductivity at 20°C	W/m °K	9.4
Heat Capacity at 20°C	J/(kg. K)	406
Electrical resistivity at 20°C	μΩcm	121

Tolerances (strip and foil)

Thickness

The table shown is an outline of our typical thickness tolerances available. They are tighter than industry standards.

Our "LMSA Precision" and "LMSA Extreme" tolerances are available upon request.

Thickness (mm)		EN Standard		Lamineries MATTHEY		
≥	<	10140 Precision	10258 Precision	LMSA Standard	LMSA Precision	LMSA Extreme
	0.025	-	-	-	-	± 0.001
0.025	0.050	-	-	± 0.003	± 0.002	± 0.0015
0.050	0.065	-	± 0.003	± 0.003	± 0.0025	± 0.002
0.065	0.100	-	± 0.004	± 0.004	± 0.0035	± 0.003
0.100	0.125	± 0.005	± 0.006	± 0.005	± 0.004	± 0.003
0.125	0.150	± 0.005	± 0.006	± 0.005	± 0.005	± 0.004
0.150	0.250	± 0.010	± 0.008	± 0.008	± 0.006	± 0.004
0.250	0.300	± 0.010	± 0.009	± 0.009	± 0.007	± 0.005
0.300	0.400	± 0.010	± 0.010	± 0.010	± 0.007	± 0.005
0.400	0.500	± 0.015	± 0.012	± 0.012	± 0.008	± 0.006
0.500	0.600	± 0.015	± 0.014	± 0.014	± 0.010	± 0.007
0.600	0.800	± 0.015	± 0.015	± 0.015	± 0.010	± 0.007
0.800	1.000	± 0.015	± 0.018	± 0.018	± 0.012	± 0.009
1.000	1.200	± 0.020	± 0.020	± 0.020	± 0.015	± 0.012
1.200	1.250	± 0.020	± 0.020	± 0.020	± 0.015	± 0.012
1.250	1.500	± 0.020	± 0.020	± 0.020	± 0.015	± 0.014

Width

Our width tolerances "Standard" is +0.2, -0.0 (or ± 0.1 mm upon request). They are available for slit widths < 125 mm and thicknesses < 1.00 mm. Special tolerances upon request.

Camber

Our tolerance "LMSA Standard" respects the EN Standard 1654 (Length of measurement 1000 mm).
Other tolerances upon request.

Width (mm)		Camber max. (mm/m)			
		LMSA Standard		LMSA Extreme	
>	≤	≤ 0.5 mm	> 0.5 mm	≤ 0.5 mm	> 0.5 mm
3	6	12	-	6	-
6	10	8	10	4	5
10	20	4	6	2	3
20	250	2	3	1	1.5

Surface

Special surface qualities upon request

Flatness

Special requirement on the longitudinal or transversal flatness upon request

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