

HASTELLOY® B-3® alloy

HASTELLOY® B-3® alloy is an additional member of the nickel-molybdenum family of alloys with a special chemistry designed to achieve a level of thermal stability greatly superior to that of its predecessors, e.g. HASTELLOY® B-2 alloy. The improved thermal stability of B-3® alloy over that of B-2 alloy should minimize the problems associated with the fabrication of components. This is due to the reduced tendency to precipitate deleterious intermetallic phases in B-3® alloy, thereby, providing lower loss of ductility than B-2 during and following various heat treating operations.

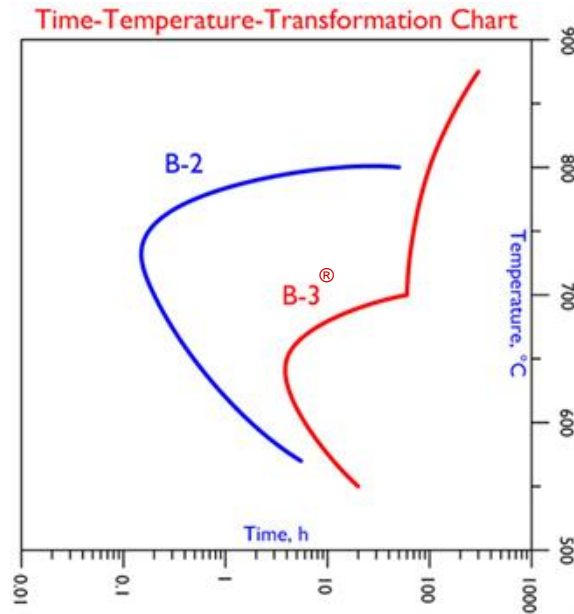
HASTELLOY® B-3® alloy has low carbon content, which should permit its use in the as-welded condition. In addition, B-3® alloy has improved corrosion resistance to many non-oxidizing acidic environments (Acetic, Formic, and Hydrochloric acids). Furthermore, B-3® alloy offers improved resistance to HAZ corrosion attack and to stress corrosion cracking when compared to B-2 alloy.

Nominal Composition (wt%):

Ni	Mo	Cr	Fe	W	Mn	Co	Al	Ti	Si	C	Nb	V	Cu	Ta	Zr
65 ^b	28.5	1.5	1.5	3*	3*	3*	0.5*	0.2*	0.1*	0.01*	0.2*	0.2*	0.2*	0.2*	0.01*

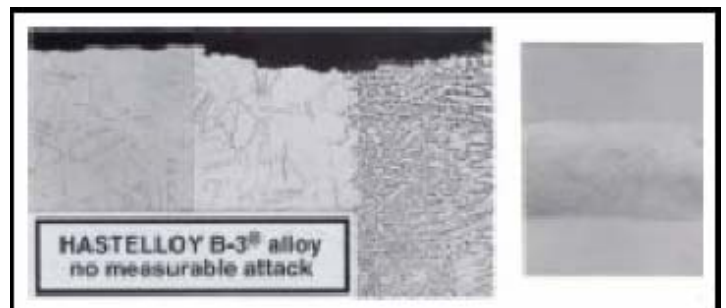
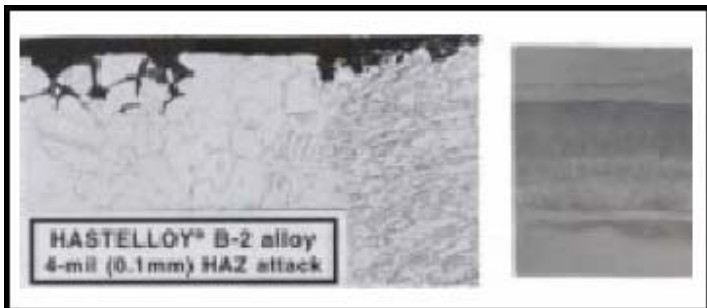
^bMinimum *Maximum

Thermal Stability:



Field Test:

20-30% H₂SO₄ + Ferrous Sulfate—230°F (110°C) - 96 Days—pH < 1



Uniform Corrosion Resistance in Boiling Acids:

Acid Medium	Average Corrosion Rate Per Year, mils*			
	B-3 [®]	B-2	316L	MONEL [®]
50% Acetic Acid	0.1	0.4	0.2	-
40% Formic Acid	0.5	0.7	41	2.1
50-55% Phosphoric Acid	1.2	6	18	4.5
50% Sulfuric Acid	1.1	1.0	>20,000	185
20% Hydrochloric Acid	11	15	>20,000	1587

*To convert mils per year (mpy) to mm per year, divide by 40.

Stress Corrosion Cracking Tests:

U-Bend Specimens (ASTM G-30 Stress Method)

Boiling 60% H₂SO₄



HASTELLOY[®] B-3[®] alloy
Annealed + 1 hour at 700°C
(No cracking, 24 hours)



HASTELLOY[®] B-2 alloy
Annealed + 1 hour at 700°C
(Intergranular cracking, 3 hours)

Tests after 1,008 Hours

(six weeks)

Alloy	Time to Cracking
316L	2 h
254SMO	24 h
625	No cracking in 1,008 h
C-276	No cracking in 1,008 h
B-3 [®]	No cracking in 1,008 h

Tensile Strength and Elongation:

Form	Thickness		Test		0.2% Offset		Ultimate Tensile		Elongation
	in	mm	°F	°C	ksi	MPa	ksi	MPa	%
Sheet	0.125	3.2	RT	RT	61	421	125	862	53
Sheet	0.125	3.2	200	93	55	379	121	834	57
Sheet	0.125	3.2	400	204	47	324	110	758	60
Sheet	0.125	3.2	600	316	44	303	104	717	63
Sheet	0.125	3.2	800	427	42	290	102	703	62
Sheet	0.125	3.2	1000	538	39	269	98	676	59
Sheet	0.125	3.2	1200	649	46	317	104	717	56
Plate	Multiple*		RT	RT	58	400	128	883	58
Plate	Multiple*		200	93	54	372	122	841	58
Plate	Multiple*		400	204	48	331	115	793	61
Plate	Multiple*		600	316	44	303	111	765	62
Plate	Multiple*		800	427	41	283	108	745	62
Plate	Multiple*		1000	538	40	276	106	731	62
Plate	Multiple*		1200	649	42	290	107	738	65

Disclaimer:

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