HASTELLOY® HYBRID-BC1® alloy

HASTELLOY® HYBRID-BC1® alloy possesses much higher resistance to hydrochloric and sulfuric acids than the conventional (HASTELLOY® C-type) nickel-chromium-molybdenum alloys, and can tolerate the presence of oxidizing species, such as dissolved oxygen and ferric ions, which the nickel-molybdenum (HASTELLOY® B-type) alloys cannot. Also, it is microstructurally similar to the C-type alloys, allowing the use of conventional fabrication procedures. Like the C-type alloys, it exhibits exceptional resistance to chloride-induced pitting, crevice attack and stress corrosion cracking.

Nominal Composition (wt%):

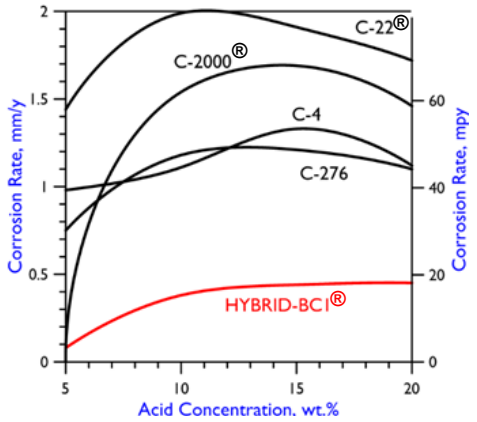
Ni	Mo	Cr	Fe	Co	Al	Mn	Si	C
Balance	22	15	2*	1*	0.5*	0.25	0.08*	0.01*

*Maximum

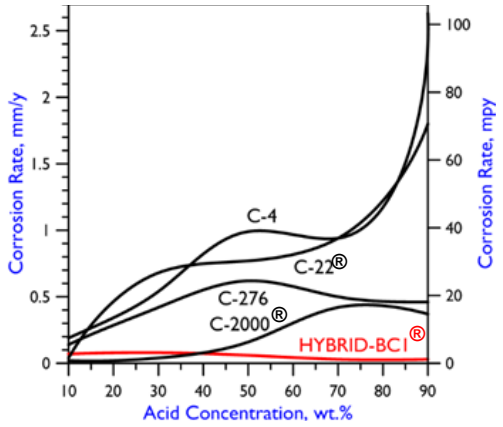
Corrosion Resistance:

Comparison of Corrosion Rates

Hydrochloric Acid at 79°C/175°F



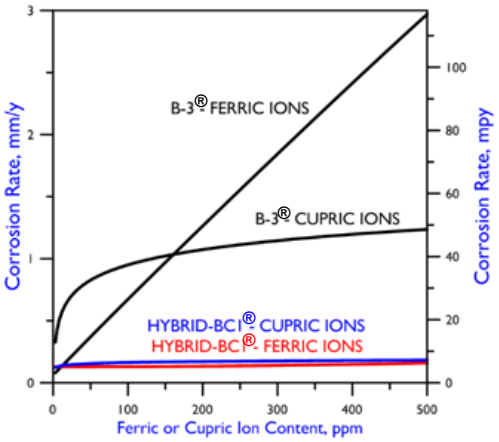
Sulfuric Acid at 93°C/200°F



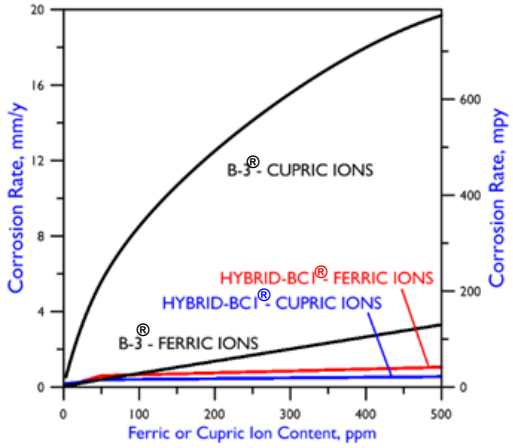
Oxidation Resistance:

Effects of Oxidizing Contaminants

Boiling 2.5% Hydrochloric Acid



Boiling 10% Sulfuric Acid



Critical Pitting Temperature (CPT) and Critical Crevice Temperature (CCT) (ASTM G48 Test):

Alloy	Critical Crevice Temperature		Critical Pitting Temperature	
	°C	°F	°C	°F
HYBRID-BC1®	**125**	**257**	**>140**	**>284**
C-4	50	122	100	212
C-22®	80	176	>140	>284
C-276	55	131	>140	>284
C-2000®	80	176	>140	>284
316L	0	32	15	59
254SMO®	30	86	60	140
625	40	104	100	212

Stress Corrosion Cracking (ASTM G36 Test):

Alloy	Time to Cracking
HYBRID-BC1®	**No Cracking in 1,008 h**
C-4	No Cracking in 1,008 h
C-22®	No Cracking in 1,008 h
C-276	No Cracking in 1,008 h
C-2000®	No Cracking in 1,008 h
316L	2 h
254SMO®	24 h
625	No Cracking in 1,008 h

Tensile Properties:

Form	Thickness	Temperature		0.2% Offset Yield Strength		Ultimate Tensile Strength		Elongation
-	mm/in	°C	°F	MPa	ksi	MPa	ksi	%
Sheet Cold Rolled & Solution Annealed	3.2/0.125	RT	RT	405	58.7	841	122.0	61.6
		93	200	360	52.2	811	117.6	66.1
		149	300	333	48.3	789	114.4	64.5
		204	400	310	45.0	763	110.6	63.3
		260	500	292	42.4	754	109.4	67.9
		316	600	283	41.1	745	108.0	68.5
		371	700	276	40.0	747	108.3	76.9
		427	800	280	40.6	778	112.8	75.3
Plate Hot Rolled & Solution Annealed	19.1/0.75	RT	RT	362	52.5	809	117.4	70.5
		93	200	327	47.4	778	112.9	74.8
		149	300	294	42.7	749	108.7	74.8
		204	400	268	38.8	723	104.8	74.6
		260	500	246	35.7	706	102.4	74.7
		316	600	245	35.6	692	100.4	71.1
		371	700	240	34.8	688	99.8	74.0
		427	800	225	32.7	683	99.0	76.3
Bar Hot Rolled & Solution Annealed	25.4/1.0	RT	RT	385	55.9	832	120.6	63.0
		93	200	347	50.4	798	115.8	73.6
		149	300	311	45.1	769	111.5	72.8
		204	400	289	41.9	743	107.8	72.1
		260	500	273	39.6	725	105.2	72.7
		316	600	256	37.1	714	103.5	72.0
		371	700	252	36.6	712	103.3	72.0
		427	800	256	37.2	705	102.3	74.1

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