HASTELLOY® S alloy

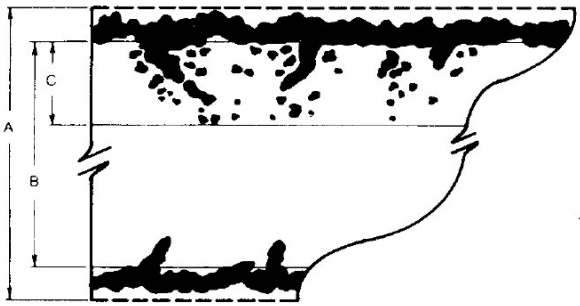
Oxidation Resistance

Comparative Static Oxidation Resistance 1008 Hour Static Oxidization in Flowing Air*

Test Temperature		Alloy	Metal Loss		Metal Loss and Internal Penetration		Linearly Extrapolated Rate of Attack	
°F	°C	-	mils	mm	mils	mm	mils	mm
1800	982	**214®**	0.07	0.002	0.20	0.005	1.7	0.043
		S	**0.18**	**0.005**	**0.49**	**0.012**	**4.3**	**0.109**
		188	0.18	0.005	0.58	0.015	5.0	0.127
		230®	0.25	0.006	0.71	0.018	6.2	0.158
		625	0.32	0.008	0.72	0.018	6.3	0.160
		600	0.32	0.008	0.90	0.023	7.8	0.198
		X	0.34	0.009	0.94	0.024	8.2	0.208
		556®	0.39	0.010	1.05	0.027	9.1	0.218
		310 SS	0.35	0.009	1.13	0.029	9.8	0.249
		800H	0.94	0.024	1.79	0.045	15.6	0.396
2000	1093	**214®**	0.08	0.002	0.08	0.002	0.7	0.018
		230®	0.45	0.011	1.27	0.032	11.0	0.279
		S	**0.44**	**0.011**	**1.29**	**0.033**	**11.2**	**0.285**
		310 SS	0.97	0.023	1.30	0.033	11.3	0.287
		188	0.43	0.010	1.33	0.033	11.6	0.290
		600	1.10	0.027	1.63	0.041	14.1	0.358
		556®	0.97	0.027	2.57	0.065	22.3	0.566
		X	1.49	0.038	2.72	0.069	23.6	0.599
		625	3.27	0.083	4.80	0.122	41.7	1.059
		800H	5.39	0.137	7.39	0.188	64.2	1.631
2100	1149	**214®**	0.15	0.004	0.31	0.008	2.7	0.069
		S	**1.01**	**0.026**	**1.66**	**0.042**	**14.4**	**0.366**
		600	1.73	0.044	2.86	0.073	24.9	0.633
		230®	2.29	0.058	3.44	0.087	29.9	0.760
		310 SS	2.97	0.075	4.44	0.113	38.6	0.980
		X	4.50	0.114	5.83	0.148	50.6	1.285
		188	7.23	0.184	8.03	0.204	69.8	1.773
		800H	7.52	0.191	8.86	0.225	77.0	1.956
		556®	9.31	0.237	11.64	0.296	101.2	2.571
		625	15.96	0.405	18.20	0.462	158.2	4.018

*Cycled to room temperature once a week

Schematic of Metallographic Technique Used for Dynamic Oxidation and Hot Corrosion Evaluations



Metal Loss (mils/side) $\left[\left(\frac{A-B}{2}\right)\right]$

Maximum Penetration (mils/side) [C]

Total Metal Affected (mils/side) $\left[\left(\frac{A-B}{2} + C\right)\right]$

Average Dynamic Oxidation Resistance*

Test Temperature		Test Period	Metal Loss/Slide		Maximum Penetration Side		Total Metal Affected/Side	
°F	°C	h	mils	mm	mils	mm	mils	mm
1600	871	100	1.0	0.03	0.3	0.01	1.3	0.03
1800	982	100	1.4	0.04	0.7	0.02	2.2	0.06
2000	1093	100	1.6	0.04	2.2	0.06	3.8	0.10

*Samples exposed to the combustion products of No. 2 fuel oil (0.4 percent sulfur). Hot gas velocity was 280ft./sec. (85mm/sec). Thermal shock frequency was 2 cycles per hour, consisting of cooling from test temperature to <500ºF (<260ºC) and back to test temperature in two minutes.

Comparative Average Dynamic Oxidation Resistance

Test Temperature		Test Period	Maximum Metal Affected/Side							
			S		230®		X		25	
°F	°C	h	mils	mm	mils	mm	mils	mm	mils	mm
1800	982	1000	6.6	0.17	3.5	0.09	6.4	0.16	7.6	0.19
2000	1093	500	15.2	0.39	5.7	0.14	13.5	0.34	<31.0***	0.79***

*Samples exposed to the combustion products of No. 2 fuel oil (0.4 percent sulfur). Hot gas velocity was 280ft./sec. (85mm/sec). Thermal shock frequency was 2 cycles per hour, consisting of cooling from test temperature to <500ºF (<260ºC) and back to test temperature in two minutes.

**Metal loss plus maximum internal penetration

***Sample was consumed