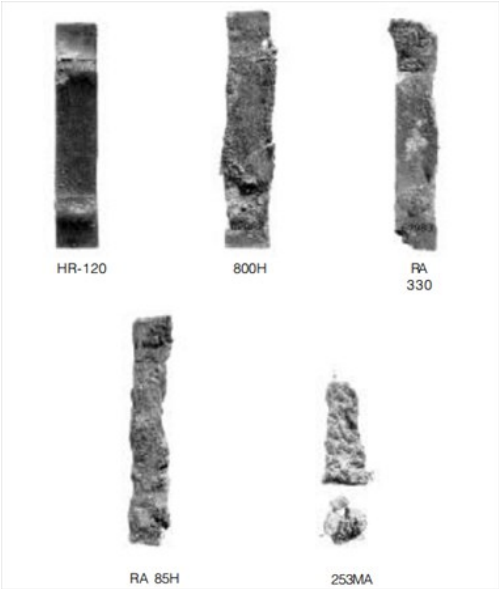
HAYNES® HR-120® alloy

Hot Corrosion Comparison

Hot corrosion is an accelerated oxidation or sulfidation attack due to a molten salt deposit. This form of corrosion is seen in gas turbines as well as in other industrial environments. The hot corrosion resistance of the HR-120® alloy was evaluated by performing laboratory burner rig testing. The burner rig used No. 2 fuel oil with a sulfur content of about 1 weight percent and air to generate the test environment. The air-to-fuel ratio was maintained at 35 to 1. The test was run at 1650°F (900°C) for 500 hours with a two-minute cooling cycle to less than 400°F (205°C) every hour. During testing a synthetic sea salt solution (ASTM D1141-52) was continuously injected into the combustion zone. The following photographs show the appearance of the specimens after testing. Specimens of 253 MA, RA 85H, RA 330, and 800H alloys were either severely corroded or partially destroyed. On the other hand, the HR-120® alloy specimen still looks extremely good, showing little attack.



Hot corrosion test specimens after exposure at 1650°F (900°C) for 500 hours
using 50 ppm sea salt injection and 1 percent sulfur fuel.

Burner Rig Hot Corrosion Data for Alloys at 1650°F (900°C) exposed for 500 hours

Alloy	Time	% S in Fuel	Salt	Metal Loss		Average Metal Affected	
	h		ppm	mils	mm	mils	mm
HR-120®	**500**	**1**	**50**	**0.9**	**0.02**	**5.2**	**0.13**
RA330	500	1	50	1.4	0.04	5.8	0.15
800H	500	1	50	1.0	0.03	10.3	0.26
253MA	500	1	50	>25	>0.64	>25	>0.64
RA85H	500	1	50	>25	>0.64	>25	>0.64

1. Metal Loss = (A-B)/2
2. Average Internal Penetration = C
3. Maximum Internal Penetration = D
4. Average Metal Affected = ((A-B)/2) + C
5. Maximum Metal Affected = ((A-B)/2) + D