

RA 602 CA® Alloy Displays Superiority to Alloy 600 in Diffusion Coating Retort Trials



Specifications

UNS: N06025 W. Nr./EN: 2.4633 ASTM: B 168, B 166 ASME: SB-168, SB-166, Code Case 2359

Chemical Composition, %

	Cr	Ni	Cu	P	S	Fe	C	Al	Ti	Y	Zr	Si	Mn
MIN	24.0	—	—	—	—	8.0	0.15	1.8	0.1	0.05	0.01	—	—
MAX	26.0	Balance	0.1	0.02	0.01	11.0	0.25	2.4	0.2	0.12	0.1	0.5	0.15

Case History

The aluminide coating operation of one gas turbine component supplier has long used alloy 600 for its diffusion coating retorts. With internal temperatures approaching 2000°F and external temperatures likely in excess of 2100°F, distortion has been a common problem. Additions of alloy 600 reinforcing channels on the exterior of the hot section have helped to some degree; however, considerable maintenance continues to be necessary.

The development of RA 602 CA alloy, a nickel based alloy designed specifically for extreme temperature use, gave this company an option to upgrade their material of construction with improved creep strength and oxidation resistance. The end user company agreed to the a test series, which used three RA 602 CA channels and two alloy 600 channels constructed from ¼" plate and used as belly bands on the retort.

The retorts were run for several months until the alloy 600 channels required repair. At this time, the retort was removed from service and inspected. The RA 602 CA channels appear to be in almost new condition, very little distortion or scaling was noted. The alloy 600 channels on the other hand were grossly distorted and thinned from scaling and required replacement. The original RA 602 CA channels have continued in service, while the alloy 600 channels were with new ones in RA 602 CA. Future reinforcement channels were specified to use RA 602 CA. RA 602 CA is also being used for other fixtures in the coating process.



Case History, Continued

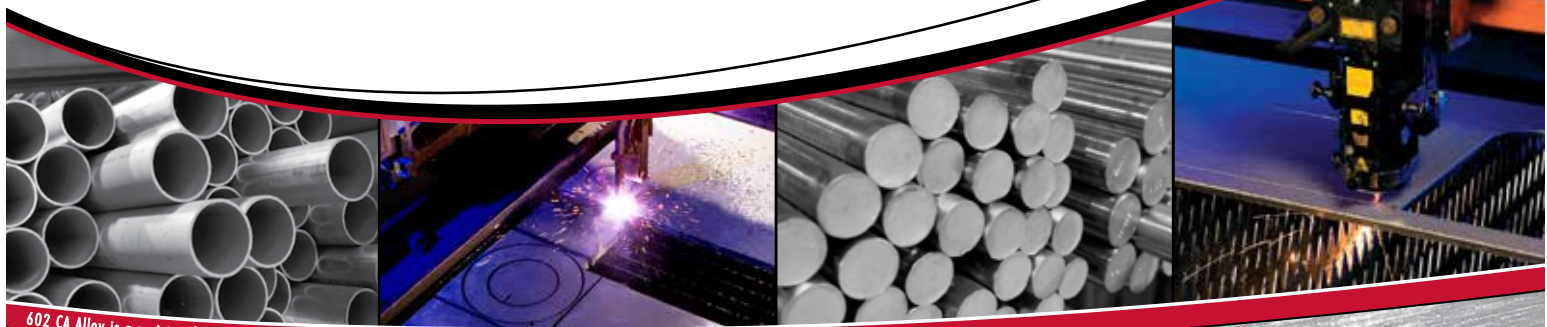
The higher strength of the RA 602 CA, later allowed a new design that eliminates the need for external reinforcement. This has greatly simplified fabrication and reduced the overall weight by 30%. The newer smooth wall design using RA 602 CA has quadrupled the life of these retorts.

The additional benefits of using RA 602 CA have significantly reduced scaling of the retort. Less scaling has reduced contamination of the parts being coated and has improved housekeeping.

RA 602 CA alloy is a 62Ni-25Cr-2.2Al-Y-Zr-Ti alloy. It is stocked by Rolled Alloys in plate, sheet, round bar, and welding consumables.

10,000 Hour Average Stress to Rupture, psi

Temperature, °F	RA 602 CA	Alloy 600
1200	31,200	9,400
1400	11,300	3,600
1600	3,200	1,900
1800	1,490	1,150
2000	670	620



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