

RA 602 CA® is one of the most oxidation resistant high strength nickel heat resistant alloys available. High chromium, aluminum, and an yttrium addition permit it to develop a tight chromium oxide scale with an alumina subscale. RA 602 CA may be considered where it is important to minimize product contamination at extreme temperatures. A nominal 0.2% carbon content contributes to high creep rupture strength. Microalloying with zirconium minimizes grain growth upon exposure to temperatures above 1800°F.

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	bal	0.1	0.02	0.01	11.0	0.25	2.4	0.2	0.12	0.1	0.5	0.15

Physical Properties

 Density: 0.285 lb/in³ Melting Range: 2350 - 2550°F

Temperature, °F	68	1000	1200	1400	1600	1800	2000
Coefficient* of Thermal Expansion, in/in°F x 10 ⁻⁶	-	8.2	8.5	9.0	9.5	9.7	9.8
Thermal Conductivity Btu • ft/ft ² • hr • °F	6.5	11.6	12.3	13.8	14.8	15.8	16.9
Modulus Of Elasticity, Dynamic psi x 10 ⁶	30.0	25.4	24.1	22.5	20.6	18.4	16.1

*68°F to indicated temperature.

Mechanical Properties
Representative Tensile Properties

Temperature, °F	68	1000	1500	1600	1800	2000	2200
Ultimate Tensile Strength, ksi	105	93.4	41.2	32.8	17.1	13	5.8
0.2% Yield Strength, ksi	50.5	38.3	34.8	28.7	15.2	11.6	5.0
Elongation, %	38	43	78	82	78	85	96

Typical Creep-Rupture Properties

Temperature, °F	1400	1600	1800	1900	2000	2100
Minimum Creep 0.0001%/Hour, ksi	9.4	2.4	0.96	0.59	-	-
10,000 Hour Rupture Strength, ksi	11.3	3.2	1.5	0.99	0.67	0.44

Effects of High Temperature Exposure ASTM Grain Size 2050°F

Time, hours	0	2	24	72	184	344	510	670	830	990
RA 602 CA®	7	7	7	7	6.5	6.5	6.5	6.5	6.5	6.5
601	5	5	1.5	1	1	0	0	0	0	0
RA330®	7	3.5	3.5	3	3	2.5	2	2	2	1.5
RA333®	4	4	3.5	3	2.5	2	2	2	2	1
600	8	4	1	0	0	0	0	0	0	0

Features

- Outstanding resistance to cyclic oxidation through 2250°F
- Excellent high temperature creep-rupture strength
- Resistance to carburization
- Superior resistance to oxidizing/chloridizing environments
- ASME Code Case to 1800°F

Applications

- Calciners for mineral processing
- Heat treating muffles and retorts
- Chemical vapor deposition retorts
- Vacuum furnace fixtures
- Nitric acid catalyst support grids
- Molten glass processing equipment
- Radiant heating tubes
- Carbon fiber production

Rolled Alloys and RA are registered trademarks of Rolled Alloys. The data and information in this printed matter are believed to be reliable. However, this material is not intended as a substitute for competent professional engineering assistance which is a requisite to any specific application. Rolled Alloys makes no warranty and assumes no legal liability or responsibility for results to be obtained in any particular situation, and shall not be liable for any direct, indirect, special, or consequential damage therefrom. This material is subject to revision without prior notice.