ROLLED ALLOYS

DATA SHEET
RA 602 CA®

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/in^3 **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/ft2 • 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, hous	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