

RA 253 MA® is a lean austenitic heat resistant alloy with high strength and outstanding oxidation resistance. RA 253 MA obtains its heat resistant properties by advanced control of microalloying additions. The use of rare earth metals in combination with silicon gives superior oxidation resistance to 2000°F. Nitrogen, carbon and to some extent, rare earth and alkali metal oxides, combine to provide creep rupture strength comparable to the nickel base alloys. RA 253 MA has only fair resistance to carburization. 309 is somewhat better in this respect. Austenite stability in RA 253 MA is enhanced by the nitrogen addition, so that formation of embrittling sigma phase is retarded.

RA 253 MA is welded using matching composition RA 253 MA AC/DC covered electrodes, fluxcored and bare wire. GMAW shielding gas may be 100% argon. Improved wetting and bead contour may be had with a mix of 80% minimum argon, 18% maximum helium and 2% maximum CO<sub>2</sub>. For shortcircuiting arc transfer 68% Ar 30% He 2% CO<sub>2</sub> has been satisfactory.

### Questions

### Answers

1. What are some typical applications where RA 253 MA is successfully used?

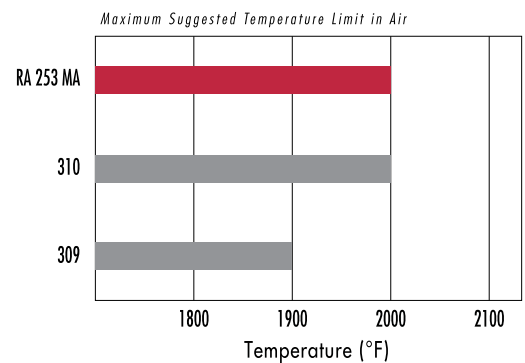
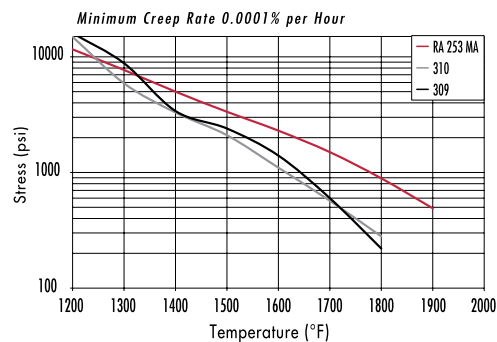
RA 253 MA has found significant usage in heat treating environments. It has become the alloy of choice for radiant tube furnaces and is a great selection for corrugated boxes used in heat treating applications. RA 253 MA has also been fabricated into dip tubes inside fluidized bed boilers. RA 253 MA could be considered for any application needing a high strength alloy with good oxidation resistance up to 2000°F without paying the price of the high nickel alloys.

2. What alloys would I consider RA 253 MA to potentially replace?

RA 253 MA is commonly used as an upgrade to 309 and 310. The main reason for this is a similar chemistry with superior properties. It is able to maintain competitive pricing with 309 and 310 due to its similar chemistry. RA 253 MA is superior with creep strength twice that of 309 and 310 above 1600°F. RA 253 MA also has good oxidation resistance up to 2000°F due to the addition of cerium into the alloy.

3. How does RA 253 MA compare to other similar grades like 309 and 310?

The main difference between RA 253 MA and both 309 and 310 stainless steel is the addition of cerium, silicon and nitrogen to RA 253 MA. RA 253 MA also has a lower alloy content of nickel and chromium making it less susceptible to fluctuating commodity prices. The micro alloy addition of cerium as well as silicon gives RA 253 MA good oxidation resistance up to 2000°F, which is comparable to 310 stainless and superior to 309 stainless. Due to the additions of both carbon and nitrogen, the creep strength of RA 253 MA is more than twice that of both 309 and 310 stainless at temperatures above 1600°F.



4. What is the relative cost of RA 253 MA to some common heat resistant alloys?

Generally RA 253 MA will be slightly more expensive than 309 or 310 in most product forms, however RA 253 MA round bar is less costly than 310. It is significantly less expensive than RA330, RA 602 CA and RA333. Pricing ratios can fluctuate significantly with the cost of raw materials such as nickel, molybdenum, and chromium as well as by product form. Current price information to other grades in the appropriate size, quantity, and product form can be found on our website at [www.rolledalloys.com](http://www.rolledalloys.com), or by contacting our sales department at 1-800-521-0332.

5. What material specifications cover RA 253 MA?

UNS	S30815
W.Nr./EN	1.4835
ASME	SA-182(F45), SA-213, SA-240, SA-249, SA-312, SA-358, SA-409, SA-479 / Section IX P-No. 8, Group No. 2
ASTM	A 167, A 182, A 213, A 240, A 249, A 276, A 312, A 358, A 409, A 473, A 480, A813, A 814

6. Is RA 253 MA included in the ASME code?

Yes, RA 253 MA is approved up to 1650°F under ASME Section VIII Division 1, whereas 309H and 310H stainless are only approved to 1500°F.

Temp, °F	100	400	700	1000	1300	1500	1650
RA 253 MA	24.9	22.4	21.0	14.9	3.1	1.3	0.71
304L	16.7	10.9	10.0	7.8	—	—	—
309H	20.0	20.0	18.0	9.9	0.80	0.75	—
310H	20.0	19.9	17.9	9.9	0.80	0.75	—
RA330	20.0	19.6	18.1	12.7	3.1	1.1	0.48

7. What is the useful temperature range for RA 253 MA

RA 253 MA can be used in high temperature applications up to 2000°F. The use of cerium in combination with the silicon results in superior oxidation resistance. Nitrogen, carbon and cerium combine to provide RA 253 MA with twice the creep rupture strength as 309 and 310 stainless at 1600°F.

8. How easy is RA 253 MA to fabricate?

RA 253 MA should be welded with matching welding consumables, which are referred to as RA 253 MA. These are carried in inventory by Rolled Alloys in bare wire for GMAW and GTAW processes, covered electrodes for SMAW and flux core wire for FCAW process. Use of the matching filler ensures that the weld joint matched the strength and corrosion resistance of RA 253 MA base metal. Use of columbium containing filler metals, such as alloy 82, is not suggested due to embrittling phases formed with welding RA 253 MA. A complete fabrication manual is available on our website at [www.rolledalloys.com](http://www.rolledalloys.com)

9. What product forms are available?

Sheet, Plate, Round Bar, Pipe, Bare Weld Wire, Spooled Weld Wire & Coated Electrodes are available from our US locations.

10. Where can I get more information on RA 253 MA?

Our website [www.rolledalloys.com](http://www.rolledalloys.com) provides downloadable brochures in PDF format that include our RA 253 MA alloy data sheet (Rolled Alloys Bulletin 125) and case histories. You may also contact a Rolled Alloys sales representative and request further information.

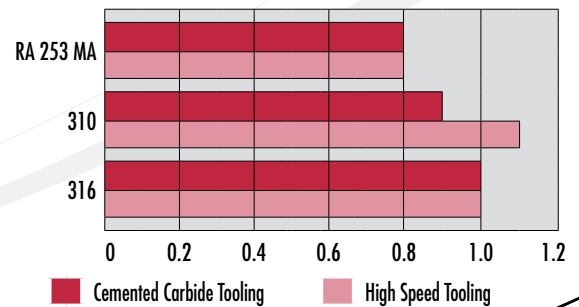
11. How easy is RA 253 MA to machine?

Machining RA 253 MA is comparable to machining 309 or 310. For more information contact a Rolled Alloys sales representative or visit [www.rolledalloys.com](http://www.rolledalloys.com) for the RA 253 MA data sheet (bulletin 1010).

Turning

	Cemented Carbide Roughing	Finishing	High Speed Steel Finishing
Cutting Speed, ft/min	295-395	395-525	46-59
Feed, in/turn	0.012-0.024	0.002-0.012	0.002-0.008
Depth of cut, in	0.08-0.2	0.02-0.08	0.02-0.08
Cemented Carbide Grade	C5, C6	C6, C7	—

Machinability index



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