RA 253 MA® is a fully austenitic, cerium-bearing heat resistant alloy. Matching weld fillers are designed to deposit approximately 4-10 FN to assure a sound, crack-free weld deposit.

Specifications

UNS: S30815 [Base Metal/Solid Wire], W30816 [Electrodes] **W. Nr./EN:** 1.4835 **ASME:** SA-240, SA-479, SA-312, SA-249
ASTM: A 240, A 276, A 312, A 358, A 409, A 473, A 479, A 813, A 814

Chemical Composition, %

	Cr	Ni	Mn	Si	C	N	Ce	Fe
MIN	20.0	10.0	–	1.4	0.05	0.14	0.03	–
MAX	22.0	12.0	0.8	2.0	0.1	0.2	0.08	balance

Heat

Neither preheat nor postheat is necessary for welding RA 253 MA. Of course, there will be times when it is necessary to heat warm to the touch in order to dry the metal. Interpass temperatures should be kept low. A maximum 300°F interpass will avoid possibility of hot cracking. Likewise, relatively low welding heat input is preferred.

Filler Metals

Matching RA 253 MA AC/DC titania covered electrodes are available in 3/32, 1/8 and 5/32" diameters. Bare RA 253 MA wire for GTAW is available as 36" lengths in 3/32 and 1/8" diameter. For GMAW or SAW, RA 253 MA wire is available on 25 lb. spools in 0.035", 0.045" and 0.063" diameters. Flux cored wire is available in 0.045" diameter spools as well.

GTAW
Gas Tungsten Arc Welding

100% argon shielding gas is preferred for manual GTAW, helium may be added to increase speed in automatic welding. Electrodes should be 2% thoriated tungsten (AWS EWTh-2) with direct current straight polarity (electrode negative). For good arc control, grind the electrode tip to a 30 to 60 degree point, with a small flat at the tip. Grind lines should be parallel to the electrode, not circumferential. Finish grind on a 120 grit wheel. Adjust the arc on clean scrap metal, with no scale.

Typical GTAW Parameters

2% Thoriated Tungsten Electrode, diameter, in	Direct Current Polarity (Electrodes Negative), Amperes	Volts	Shielding Gas Argon or Argon-Helium Mixes, CFH
0.040	25-80	10-14	25
0.062	50-145	12-16	25
0.094	135-235	12-20	25

GMAW
Gas Metal Arc Welding

RA 253 MA wire may be used in the spray-arc, pulsed-arc, globular and short-circuiting arc transfer modes.

Shielding gas for the spray-arc transfer mode may be 100% argon. For improved wetting and bead contour we suggest an Ar-He-CO_2 mix containing 80% minimum argon and no more than 2%CO_2. One such mix is Air Liquide®'s BlueShield 20, 81% Ar 18% He 1% CO_2. This gas may also be used for globular or short-arc welding.

Do NOT use 98% Ar 2% O_2 shielding gas with RA 253 MA welding wire. This will reduce cerium transfer across the arc, hence lower the oxidation resistance and creep-rupture properties of the weld bead. ABSOLUTELY do NOT use 75% Ar 25% CO_2.

Gases used only for short-circuiting arc or globular transfer include 75% Ar 25% He, the commonly available 90% He 7-1/2% Ar 2-1/2% CO_2 or a mixture of 68%Ar 30% He 2% CO_2. The lower helium mixtures give a cooler arc and are preferred for out of position work.

Wire Diameter, in	Current DCRP, Amperes	Volts
0.035	160-210	26
0.045	180-240	27
0.062	240-320	29

Globular Transfer, 75% Ar 25% He

Wire Diameter, in	Current DCRP, Amperes	Volts
0.045	140	30-31

Short Circuit Transfer, 75% Ar 25% He

Wire Diameter, in	Current DCRP, Amperes	Volts
0.035	120-130	18

SMAW
Shielded Metal Arc Welding

RA 253 MA AC/DC titania electrodes, UNS W30816, may be used with either alternating current or with direct current, reverse polarity (electrode positive). The presence of cerium in RA 253 MA electrodes gives the weld bead a somewhat rougher appearance as compared with ordinary stainless welds.

It is important to maintain the arc length as short as possible, as it minimizes loss of cerium through the arc and improves penetration. Starts and craters should be filled in. Stringer beads with only a slight weave, not more than twice the electrode diameter are preferred. Weaving is necessary for vertical welds. All welding flux must be removed from each deposit, between passes and after the final pass. Residual welding flux may corrode the material when placed in high temperature service.

Typical SMAW Parameters (The lower end of the range is used for out-of-positioning welding)

Suggested Current Ranges - At 24-30 Volt			
Inch	3/32	1/8	5/32
Amperes	45-70	70-110	100-140

RA 253 MA electrodes are packaged in hermetically sealed containers to assure freedom from contamination and moisture absorption. After opening, the electrodes should be stored at 150- 250°F to prevent the coating from absorbing moisture. Electrodes damaged by exposure to atmospheric humidity should be reconditioned for two to four hours at 500-600°F. It is important to heat and cool slowly. Porosity and excessive spatter may result if electrodes are not completely dry.

FCAW
Flux Cored Wire

Intended for service up to 2000°F. Neither preheat or post weld treatment is necessary. Unused wire should be stored in a moisture resistant environment. Starting welding parameters for flat/horizontal position: 100-200 amps, 25-35 volts. Suggestions for welding:

Shielding Gas: 75% Argon 25% CO_2 **Gas Flow Rate:** 40 ft^3/hour **Wire Extension:** 1/2" - 1"

SAW
Submerged Arc Welding

RA 253 MA is sub-arc welded using the neutral basic Avesta Flux 805, basicity index 1.7. This is an agglomerate type welding flux characterized by neat deposit surfaces, a smooth transition zone between parent and weld metal, easy slag removal and excellent resistance to moisture absorption during storage.

Correct joint geometry must be used to avoid hot cracking in sub-arc welding. This means that the width of the joint must be greater than the depth. Width should be about 2-3 times depth. Also, interpass temperature should be kept well below 200°F. For all welding processes make stringer beads, do not weave. Do not preheat, except as necessary to ensure the metal is dry.

Typical SAW Parameters

Wire Diameter, in	Direct Current Reverse Polarity, Amperes	Volts	Wire Stickout, in	Travel Speed, in/min
0.062	160-210	29	3/4	8-12
0.094	180-240	27-32	1	16-24
0.125	240-320	30-32	1	16-24

Dissimilar Metal Welding

For Joining RA 253 MA Base Metal to	Weld Filler
Carbon Steel	309
Stainless 304, 316, 309, 310	RA 253 MA or 309
RA330®	RA330-04 or RA333®

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