SALOMON'S METALEN B.V.

253MA

253MA is a grade combining excellent service properties at high temperatures with ease of fabrication. It resists oxidation at temperatures up to 1150°C and can provide superior service to Grade 310 in carbon, nitrogen and sulphur containing atmospheres.
The standard grade designation covering this grade is UNS S30815. 253MA contains a fairly low nickel content, which gives it some advantage in reducing sulphide atmospheres when compared to high nickel alloys and Grade 310. The inclusion of high chromium, silicon, nitrogen and cerium contents gives the steel good oxide stability, high elevated temperature (creep) strength and excellent resistance to sigma phase precipitation. The austenitic structure gives this grade excellent toughness, even down to cryogenic temperatures.

Corrosion Resistance

Although not designed for aqueous corrosion resistance, the high chromium and nitrogen contents give the grade a pitting resistance approximating that of 316. 253MA does however have a high carbon content so is highly susceptible to sensitisation; this is likely to reduce aqueous corrosion resistance after high temperature service or fabrication.

Heat Resistance

Oxidation - excellent resistance to air, at temperatures up to 1100°C. At high temperatures the steel quickly forms a thin, highly adherent and elastic oxide. This oxide gives good protection even under cyclic conditions, much better than is the case for Grade 310. Best resistance is under noncycling conditions.
Carburisation - Under oxidising conditions this grade can perform well, but alloys with higher nickel content are preferred if the atmosphere is reducing.
Sulphidation - good resistance to sulphurbearing gases in an oxidising atmosphere, even if only traces of oxygen are present. Reducing gases prevent the protective oxide forming.
253MA has high strength at elevated temperatures so is often used for structural and pressure-containing applications at temperatures above about 500°C and up to about 900°C.
253MA will become sensitised in the temperature range of 425-860°C; this is not a problem for high temperature applications, but will result in reduced aqueous corrosion resistance.

Heat Treatment

Solution Treatment (Annealing)

Heat to 1050-1150°C and cool rapidly. It is recommended that the material be solution treated after 10-20% cold work to achieve maximum creep strength in service.
This grade cannot be hardened by thermal treatment.

Welding

Excellent weldability by all standard fusion methods. Pure argon shielding gas should be used.

Machining

As for other austenitic stainless steels, the machining requires sharp tools, slow speeds and heavy feeds.

Typical Applications

Furnace components including burners, retorts, conveyor belts, fans, jigs and baskets, rollers, walking beams, radiant tubes, electric heater elements, refractory anchors, hoods, flues, grates, expansion bellows. Petrochemical and refinery tube hangers.

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Specified Properties

These properties are specified for flat rolled product (plate, sheet and coil) as Grade S30815 in ASTM A240/A240M.
Similar but not necessarily identical properties are specified for S30815 in other products such as pipe and bar in their respective specifications, and for Grade 1.4835 in specifications such as EN 10095.

Composition Specification (%)

Grade		C	Mn	Si	P	S	Cr	Ni	N	Ce
S30815	min.	0.05	-	1.40	-	-	20.0	10.0	0.14	0.03
	max.	0.10	0.80	2.00	0.040	0.030	22.0	12.0	0.20	0.08

Mechanical Property Specification (single values are minima except as noted)

Grade	Tensile Strength (MPa) min	Yield Strength 0.2% Proof (MPa) min	Elongation (% in 50mm) min	Hardness	
				Rockwell B (HR B) max	Brinell (HB) max
S30815	600	310	40	95	217

Physical Properties (typical values in the annealed condition)

Grade	Density (kg/m3)	Elastic Modulus (GPa)	Mean Coefficient of Thermal Expansion			Thermal Conductivity		Specific Heat	Electrical Resistivity
			0-100°C (µm/m/°C)	0-600°C (µm/m/°C)	0-1000°C (µm/m/°C)	at 20°C (W/m.K)	at 800°C (W/m.K)	0-100°C (J/kg.K)	(nΩ.m)
S30815	7800	200	17.0	18.5	19.5	15.0	25.5	500	850

Grade Specification Comparison

Grade	UNS No	Euronorm		Swedish SS	Japanese JIS
		No	Name		
S30815	S30815	1.4835	X9CrNiSiNCe21-11-2	2368	-

These comparisons are approximate only. The list is intended as a comparison of functionally similar materials **not** as a schedule of contractual equivalents. If exact equivalents are needed original specifications must be consulted.

Possible Alternative Grades

Grade	Why it might be chosen instead of S30815
310	Carburising atmospheres require a higher nickel content
321H	Lower cost alternative, with lower creep strength, for use up to about 800°C
Nickel Alloys	Carburising atmospheres or temperatures above the 1100 - 1150°C maximum of S30815.