

Stainless Steels

DATA SHEET

B-34

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318 STAINLESS STEEL

Alloy type

Nb stabilised, Mo-bearing stainless steel.

Materials to be welded

	wrought	cast
ASTM/ASME	316Ti, 316Cb	CF10MC
DIN & BS EN	1.4571/1.4573, 1.4580/1.4583	1.4579/1.4581
BS	320S31/33	318C17
UNS	S31635, S31640	

Applications

Use to weld titanium or niobium-stabilised grades of molybdenum-bearing austenite stainless steels, or as an alternative electrode for unstabilised grades such as 316/316L. It is not recommended for structural service above about 400°C.

It is also used for depositing **corrosion resistance overlays** and valve seat inlays on medium carbon alloy steels, and for this reason the electrode is normally supplied with a typical ferrite content of 3-14FN.

Microstructure

Austenite with 3-14FN (3-12% ferrite), typically 10FN.

Welding guidelines

No preheat, maximum interpass temperature 250°C.

Additional information

Supermet 318 is not recommended for cryogenic applications, nor elevated temperature structural service.

Related alloy groups


The 316L consumables can be used for many of the same base materials and applications (data sheet B-32). For cryogenic applications see controlled ferrite 316L consumables (data sheet B-32) and for elevated temperature see 316H (C-13) or 16.8.2 (C-12) consumables.

Products available

Process	Product	Specification
MMA	Supermet 318	AWS E318-17
TIG/MIG/SAW	318S96	AWS ER318
SAW flux	SS300	BS EN SA AF2
	SSB	BS EN SA AF2
	LA491	BS EN SA FB255

SUPERMET 318

Nb stabilised Mo-bearing stainless steel MMA electrode

Product description	<p>Rutile-aluminosilicate flux on high purity 304L core wire giving very low (<0.025%) typical carbon levels. Designed for ease of use, exceptional weld bead appearance, and high weld metal integrity, primarily in the downhand and H-V welding positions. Smaller sizes up to 3.2mm offer excellent all-positional operability.</p> <p>Low hydrogen manufacturing technology ensures high resistance to weld metal porosity.</p> <p>Recovery is about 120% with respect to core wire, 65% with respect to whole electrode.</p>											
Specifications	AWS A5.4		E318-17									
	BS EN 1600		E 19 12 3 Nb R 32									
	BS 2926		19.12.3Nb.AR									
	DIN 8556		E 19 12 3 Nb R 23									
ASME IX Qualification	QW432 F-No 5, QW442 A-No 8											
Composition (weld metal wt %)		C	Mn	Si	S	P	Cr	Ni	Mo	Nb	Cu	FN
	min	--	0.5	--	--	--	17.0	11.0	2.5	10 x C	--	6
	max	0.04	2.0	0.90	0.025	0.030	20.0	13.0	3.0	1.0	0.50	13
	typ	0.025	0.8	0.7	0.01	0.02	19	11.5	2.7	0.6	0.1	9
All-weld mechanical properties	As welded					min		typical				
	Tensile strength					MPa		560 630				
	0.2% Proof stress					MPa		350 500				
	Elongation on 4d					%		25 36				
	Elongation on 5d					%		25 35				
	Reduction of area					%		-- 55				
	Impact energy					+ 20C J		-- 65				
Operating parameters	DC +ve or AC (OCV: 55V min)											
												
	ø mm	2.5		3.2		4.0		5.0				
	min A	60		75		100		130				
	max A	90		120		155		210				
Packaging data	ø mm	2.5		3.2		4.0		5.0				
	length mm	300		350		350		450				
	kg/carton	11.4		14.1		13.2		18.0				
	pieces/carton	564		387		237		165				
Storage	<p>3 hermetically sealed ring-pull metal tins per carton, with unlimited shelf life. Direct use from tin is satisfactory for longer than a working shift of 8h. Excessive exposure of electrodes to humid conditions will cause some moisture pick-up and increase the risk of porosity.</p> <p>For electrodes that have been exposed: Redry 200 – 300°C/1-2h to restore to as-packed condition. Maximum 400° C, 3 cycles, 10h total. Storage of redried electrodes at 50 – 200°C in holding oven or heated quiver: no limit, but maximum 6 weeks recommended. Recommended ambient storage conditions for opened tins (using plastic lid): < 60% RH, > 18°C.</p>											
Fume data	Fume composition, wt % typical:											
		Fe	Mn	Ni	Cr	Mo	Cu	F	OES (mg/m ³)			
		8	7	1	5	0.5	<0.2	16	1			

318S96

Solid 318 stainless steel wire for TIG, MIG and SAW

Product description	Solid wire for TIG, MIG and SAW.											
Specifications	AWS A5.9		ER318									
	BS 2901: Pt2		318S96									
	DIN 8556		SG X5CrNiMoNb 19 12 (1.4576)									
	BS EN ISO 14343-A		19 12 3 Nb									
	BS EN ISO 14343-B		SS318									
ASME IX Qualification	QW432 F-No 6, QW442 A-No 8											
Composition (wire wt %)		C	Mn	Si	S	P	Cr	Ni	Mo	Nb	Cu	FN
	min	--	1.0	0.30	--	--	18.5	11.0	2.5	10xC	--	3
	max	0.07	2.0	0.65	0.02	0.030	20.0	13.0	3.0	1.0	0.3	12
	typ	0.035	1.8	0.45	0.01	0.02	19.5	11.5	2.5	0.6	0.2	10
All-weld mechanical properties	Typical values as welded						TIG					
	Tensile strength						MPa	655				
	0.2% Proof stress						MPa	440				
	Elongation on 4d						%	42				
	Elongation on 5d						%	35				
	Impact energy						+ 20°C	J	90			
	Hardness cap/mid						HV	200/215				
Typical operating parameters		TIG			MIG			SAW				
	Shielding	Argon *			Ar+2%O ₂ **			SS300 ***				
	Current	DC-			DC+			DC+				
	Diameter	2.4mm			1.2mm			2.4mm				
	Parameters	100A, 12V			260A, 26V			350A, 28V				
	* Also required as a back purge for root runs.											
	** Also proprietary Ar and Ar-He mixtures with <3%CO ₂ .											
	*** SSB, LA491 and L2N also suitable.											
Packaging data	ø mm	TIG			MIG			SAW				
	1.2	--			15kg spool			--				
	1.6	2.5kg tube			--			--				
	2.4	2.5kg tube			--			25kg coil				
Fume data	MIG fume composition (wt %) (TIG and SAW fume negligible):											
		Fe	Mn	Cr ³	Ni	Mo	Cu	OES (mg/m ³)				
		30	12	15	11	1.5	<0.5	3.3				