

**REQUIREMENTS FOR WELDING AND BRAZING FILLER MATERIALS**

**1.0 PROCUREMENT**

Electrodes and filler materials purchased for use at LANL shall be manufactured in accordance with the appropriate ASME SFA or AWS welding filler metal specification. The procurement document shall require the manufacturer or vendor to supply a Certified Material Test Report (CMTR) for the filler materials. It shall further require that the CMTR shall include the actual results of all chemical analyses, mechanical tests, and examinations relative to requirements of the applicable code and the material specification.

Filler materials to be used for Safety Significant or Safety Class SSCs (ML-1 & ML-2) shall be procured with a Certified Material Test Report (CMTR) in accordance with ASME SFA or AWS codes with actual chemical composition and mechanical properties along with any additional testing requirements specified in the purchase document. The Certificate of Compliance (C of C) is not sufficient unless LANL WPA approves.

A C of C may be substituted for a CMTR if permitted by the engineering specification. The Certificate of Compliance (C of C) shall state that the welding filler material was manufactured in accordance with the requirements of the appropriate filler metal specification for each filler metal type, size, heat, and lot number. This requirement may be fulfilled by the manufacturer or vendor labeling each container with a statement that the material conforms to the appropriate ASME SFA or AWS specification. If material containers are not labeled, the vendor or manufacturer shall supply a written Certificate of Compliance (C of C) on company letterhead.

Special chemistry filler materials not included in ASME SFA or AWS “A” specification shall be purchased only after LANL WPA approval and shall be procured with Certified Material Test Report (CMTR) along with any additional requirements specified in the purchase order document.

**2.0 FILLER MATERIAL SPECIFICATIONS**

The following table lists filler materials and the corresponding ASME specification and AWS classification based on ASME Section IX, Table QW-432:

Material Type	AWS Classification	ASME Specification	F-No.	A-No.	Specification Title
E6010	A5.1	SFA-5.1	F3	A1	Carbon Steel Electrodes for Shielded Metal Arc Welding
E6011	A5.1	SFA-5.1	F3	A1	
E7018	A5.1	SFA-5.1	F4	A1	
E7018M	A5.1	SFA-5.1	F4	A1	
E308-15	A5.4	SFA-5.4	F5	A8	Stainless Steel Electrodes for Shielded Metal Arc Welding
E308-16	A5.4	SFA-5.4	F5	A8	
E308L-15	A5.4	SFA-5.4	F5	A8	
E308L-16	A5.4	SFA-5.4	F5	A8	
E309-15	A5.4	SFA-5.4	F5	A8	
E309-16	A5.4	SFA-5.4	F5	A8	
E316-15	A5.4	SFA-5.4	F5	A8	
E316-16	A5.4	SFA-5.4	F5	A8	

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Attachment 1, Requirements for Welding & Brazing Filler Materials

Material Type	AWS Classification	ASME Specification	F-No.	A-No.	Specification Title
E316L-15	A5.4	SFA-5.4	F5	A8	Stainless Steel Electrodes for Shielded Metal Arc Welding
E316L-16	A5.4	SFA-5.4	F5	A8	
E317-15	A5.4	SFA-5.4	F5	A8	
E317-16	A5.4	SFA-5.4	F5	A8	
E317L-15	A5.4	SFA-5.4	F5	A8	
E317L-16	A5.4	SFA-5.4	F5	A8	
E347-15	A5.4	SFA-5.4	F5	A8	
E347-16	A5.4	SFA-5.4	F5	A8	
E347L-15	A5.4	SFA-5.4	F5	A8	
E347L-16	A5.4	SFA-5.4	F5	A8	
E7010-A1	A5.5	SFA-5.5	F3	A2	Low Alloy Electrodes for Shielded Metal Arc Welding
E7018-A1	A5.5	SFA-5.5	F4	A2	
E7018-G	Contact LANL Engineering prior to use of this filler material.				
E8018-B2	A5.5	SFA-5.5	F4	A3	
E8018-B2L	A5.5	SFA-5.5	F4	A3	
E8018-C1	A5.5	SFA-5.5	F4	A10	
E8018-G	Contact LANL Engineering prior to use of this filler material.				
E9015-B9	A5.5	SFA-5.5	F4	A5	
E9018-B3	A5.5	SFA-5.5	F4	A4	
E9018-B3L	A5.5	SFA-5.5	F4	A4	
E9018-B9	A5.5	SFA-5.5	F4	A5	
E9018-G	Contact LANL Engineering prior to use of this filler material.				
BCuP-5	--	SFA-5.8	F103	--	
ER4043	A5.10	SFA-5.10	F23	--	Bare Aluminum and Aluminum Alloy Filler Metals
ENiCrFe-2	A5.11	SFA-5.11	F43	--	Nickel and Nickel Alloy Welding Electrodes for Shielded Metal Arc Welding
ENiCrFe-3	A5.11	SFA-5.11	F43	--	
ENiCrMo-3	A5.11	SFA-5.11	F43	--	
ERNiCr-3	A5.14	SFA-5.14	F43	--	Nickel and Nickel Alloy Bare Welding Electrodes and Rods
ERNiCrMo-3	A5.14	SFA-5.14	F43	--	
ERNiMo-1	A5.14	SFA-5.14	F44	--	
ERNiMo-7	A5.14	SFA-5.14	F44	--	
ERNiMo-10	A5.14	SFA-5.14	F44	--	
ER70S-2	A5.18	SFA-5.18	F6	A1	Carbon Steel Electrodes and Rods for Gas Shielded Arc Welding
ER70S-3	A5.18	SFA-5.18	F6	A1	
ER70S-6	A5.18	SFA-5.18	F6	A1	

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E70T-1	A5.20	SFA-5.20	F6	--	Carbon Steel Electrodes for
E71T-1	A5.20	SFA-5.20	F6	--	Flux Cored Arc Welding

Material Type	AWS Classification	ASME Specification	F-No.	A-No.	Specification Title
E308T-1	A5.22	SFA-5.22	F6	A8	Stainless Steel Electrodes for Flux Cored Arc Welding and Stainless Steel Flux Cored Rods for Gas Tungsten Arc Welding
E308LT-1	A5.22	SFA-5.22	F6	A8	
E316T-1	A5.22	SFA-5.22	F6	A8	
E316LT-1	A5.22	SFA-5.22	F6	A8	
E317T-1	A5.22	SFA-5.22	F6	A8	
E317LT-1	A5.22	SFA-5.22	F6	A8	
E347T-1	A5.22	SFA-5.22	F6	A8	
ER80S-B2	A5.28	SFA-5.28	F6	A3	Low Alloy Electrodes and Rods for Gas Shielded Arc Welding
ER80S-B2L	A5.28	SFA-5.28	F6	A3	
ER90S-B3	A5.28	SFA-5.28	F6	A4	
ER90S-B3L	A5.28	SFA-5.28	F6	A4	
ER90S-B9	A5.28	SFA-5.28	F6	A5	
E91T1-B9	A5.29	SFA-5.29	F6	--	Low Alloy Steel Electrodes
E101T1-B9	--	pending	F6	--	For Flux Cored Arc Welding