

Appendix A: Table A1 (Electrodes Used in Part II)

Table A1
List of electrodes investigated during program

Electrode classification	Electrode no. ¹	Electrode type	Electrode diam.,		Welding current, A (nominal)	Purpose	Table
			mm	in.			
Covered electrodes							
E6010 (IP)	1	Carbon steel	4	5/32	145-150	Fume generation characteristics; current density, diameter, arc length, and electrode angle effects	B1, B33, B36, and B39
E6010 (IP)	2	Carbon steel	4	5/32	145-150	Fume generation characteristics	B1
E6010 (IP)	11	Carbon steel	4	5/32	155-160	Fume generation characteristics, current and voltage effects	B1, B27, and B35
E6010 (IP)	1	Carbon steel	2.4	3/32	55	Current density and diameter effects	B33
E6010 (IP)	1	Carbon steel	3.2	1/8	85-90	Current density and diameter effects	B33
E6010 (IP)	1	Carbon steel	4.8	3/16	180-190	Current density and diameter effects	B33
E6013	3	Carbon steel	4	5/32	160	Fume generation characteristics; arc length, and electrode angle effects	B2, B36, and B39
E6013	4	Carbon steel	4	5/32	150-155	Fume generation characteristics	B2
E6013	6	Carbon steel	4	5/32	145-150	Fume generation characteristics	B2
E6013	4	Carbon steel	3.2	1/8	155	Current density, polarity, and diameter effects	B30 and B31
E6013	4	Carbon steel	4.8	3/16	140-150	Current density, polarity, and diameter effects	B30 and B31
E6013	4	Carbon steel	2.4	3/32	50-53	Current density and diameter effects	B34
E6013	4	Carbon steel	3.2	1/8	83	Current density and diameter effects	B34
E6013	4	Carbon steel	4	5/32	135-150	Current density and diameter effects	B34
E6013	4	Carbon steel	4.8	3/16	200-205	Current density and diameter effects	B34
E6013	34	Carbon steel	4	5/32	160-170	Fume generation characteristics - iron powder additions	B37
E7014	30	Carbon steel	4	5/32	170-180	Fume generation characteristics - iron powder additions	B37
E7016	29	Carbon steel	4	5/32	170-175	Fume generation characteristics - iron powder additions	B38
E7018	5	Carbon steel	4	5/32	175-180	Fume generation characteristics	B3
E7018	10	Carbon steel	4	5/32	165-175	Fume generation characteristics; arc length and electrode angle	B3, B36, and B39
E7018	12	Carbon steel	4	5/32	170-175	Fume generation characteristics	B3
E7018	10	Carbon steel	4	5/32	130-210	Current effects	B26
E7018	10	Carbon steel	2.4	3/32	60-65	Current density and diameter effects	B32
E7018	10	Carbon steel	3.2	1/8	100	Current density and diameter effects	B32
E7018	10	Carbon steel	4	5/32	155-160	Current density and diameter effects	B32
E7018	10	Carbon steel	4.8	3/16	220-230	Current density and diameter effects	B32
E7018	36	Carbon steel	4	5/32	175-180	Fume generation characteristics - iron powder effects	B38
E7018	72	Carbon steel	6.4	1/4	390-400	Fume generation characteristics at high current	B40

Table A1 (cont.)
List of electrodes investigated during program

Electrode classification	Electrode no. 1	Electrode type	Electrode diam., in.		Welding current, A (nominal)	Purpose	Table
			mm				
E7024	7	Carbon steel	4	5/32	200-220	Fume generation characteristics	B4
E7024	8	Carbon steel	4	5/32	205-230	Fume generation characteristics	B4
E7024	9	Carbon steel	4	5/32	205-215	Fume generation characteristics	B4
E7024	35	Carbon steel	4	5/32	205-220	Fume generation characteristics - iron powder additions	B37
E7028	32	Carbon steel	4	5/32	225-240	Fume generation characteristics - iron powder additions	B38
E7028	73	Carbon steel	6.4	1/4	385-395	Fume generation characteristics at high currents	B40
E8018 C3	13	Low alloy steel	4	5/32	155-160	Fume generation characteristics	B5
E8018 C3	14	Low alloy steel	4	5/32	175-180	Fume generation characteristics	B5
E8018 C3	15	Low alloy steel	4	5/32	165	Fume generation characteristics	B5
E9018 B3	18	Low alloy steel	4	5/32	165	Fume generation characteristics	B6
E9018 B3	17	Low alloy steel	4	5/32	175-180	Fume generation characteristics	B6
E9018 B3	16	Low alloy steel	4	5/32	160-165	Fume generation characteristics	B6
E316-15	22	Stainless steel	4	5/32	148	Fume generation characteristics	B7
E316-15	20	Stainless steel	4	5/32	155	Fume generation characteristics	B7
E316-15	19	Stainless steel	4	5/32	150	Fume generation characteristics	B7
E316-16	26	Stainless steel	4	5/32		Fume generation characteristics	B8
E316-16	20	Stainless steel	4	5/32		Fume generation characteristics	B8
E316-16	25	Stainless steel	4	5/32		Fume generation characteristics	B8
E410-16	21	Stainless steel	4	5/32	145	Fume generation characteristics	B9
E410-16	23	Stainless steel	4	5/32	160	Fume generation characteristics	B9
E410-16	24	Stainless steel	4	5/32	160	Fume generation characteristics	B9
ENI-CI	28	Nickel-base	4	5/32	135	Fume generation characteristics	B10
ENICU-2	33	Nickel-base	4	5/32	145	Fume generation characteristics	B10
Inconel 625	62	Nickel-base	4	5/32	140-155	Fume generation characteristics	B10
Haynes C-276	69	Nickel-base	4	5/32	130-135	Fume generation characteristics	B10
Haynes 25	70	Cobalt-base	4	5/32	135-140	Fume generation characteristics	B10

Table A1 (cont.)
List of electrodes investigated during program

Electrode classification	Electrode no. ¹	Electrode type	Electrode diam.,		Welding current, A (nominal)	Purpose	Table
			mm	in.			
Flux cored electrodes							
E70T-1	40	Carbon steel	2.4	3/32	470-485	Fume generation characteristics; current density and diameter effects	B11 and B41
E70T-1	42	Carbon steel	2.4	3/32	435-445	Fume generation characteristics	B11
E70T-1	41	Carbon steel	2.4	3/32	455-465	Fume generation characteristics	B11
E70T-1	46	Carbon steel	2.4	3/32	435-445	Fume generation characteristics	B11
E70T-1	47	Carbon steel	2.4	3/32	435	Fume generation characteristics	B11
E70T-1	41	Carbon steel	2.4	3/32	345-600	Current and voltage effects	B28
E70T-1	45	Carbon steel	1.6	1/16	325-345	Current density and diameter effects	B41
E70T-1	40	Carbon steel	2.4	3/32	445-460	Shielding gas effects	B25
E70T-1	42	Carbon steel	2.4	3/32	445	Shielding gas effects	B25
E70T-4	48	Carbon steel	2.4	3/32	385-390	Fume generation characteristics	B12
E70T-4	56	Carbon steel	2.4	3/32	370-390	Fume generation characteristics	B12
E70T-4	49	Carbon steel	2.4	3/32	400-410	Fume generation characteristics	B12
E70T-5	44	Carbon steel	2.4	3/32	425-445	Fume generation characteristics	B13
E70T-5	50	Carbon steel	2.4	3/32	440-450	Fume generation characteristics	B13
81-C3	51	Low alloy steel	2.4	3/32	440-445	Fume generation characteristics	B14
91-B3	52	Low alloy steel	2.4	3/32	450	Fume generation characteristics	B14
308L	53	Stainless steel	2.4	3/32	380-400	Fume generation characteristics	B15
316L	55	Stainless steel	2.4	3/32	340-390	Fume generation characteristics	B15
316L	67	Stainless steel	2.4	3/32	390-405	Fume generation characteristics	B15

Table A1 (cont.)
List of electrodes investigated during program

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List of electrodes investigated during program							
Electrode classification	Electrode no. ¹	Electrode type	Electrode diam.,		Welding current, A (nominal)	Purpose	Table
			mm	in.			
Solid electrodes							
E70S-3	54	Carbon steel	1.1	0.045	Note 2	Fume generation characteristics – shielding gas and metal transfer effects	B16
E70S-3	57	Carbon steel	1.1	0.045	Note 2	Fume generation characteristics – shielding gas and metal transfer effects	B17
E70S-3	58	Carbon steel	1.1	0.045	Note 2	Fume generation characteristics – shielding gas, metal transfer, and current effects	B18 and B29
E70S-5	59	Carbon steel	1.1	0.045	Note 2	Fume generation characteristics – shielding gas and metal transfer effects	B19
ER316	65	Stainless steel	0.9	0.035	165-175	Fume generation characteristics	B20
Inconel 625	63	Nickel-base	1.1	0.045	190-195	Fume generation characteristics	B21
ERNiCu-7	64	Nickel-base	1.1	0.045	250-260	Fume generation characteristics	B21
Haynes C-276	68	Nickel-base	0.9	0.035	165	Fume generation characteristics	B21
Haynes 25	71	Cobalt-base	1.1	0.045	200-205	Fume generation characteristics	B21
ER4043	61	Aluminum-base	1.2	3/64	160-165	Fume generation characteristics	B22
ER5356	60	Aluminum-base	1.2	3/64	150-165	Fume generation characteristics	B23
ERCu	76	Copper-base	1.1	0.045	205-210	Fume generation characteristics	B24
ERCu A1-A2	75	Copper-base	1.1	0.045	210-215	Fume generation characteristics	B24

1. The electrode number identifies the specific electrode and its manufacturer. One manufacturer may be represented by more than one electrode number.

2. The welding current is dependent upon the shielding gas and metal transfer mode (see appropriate tables for current levels).