

APPENDIX B

WELDING PARAMETER RANGES AND SAMPLE MACROGRAPHS

Notes

NA = Not Applicable C10 = 10% CO2 - 90% Argon C25 = 25% CO2 - 75% Argon
2F = Horizontal Fillet 3F dwn = vertical fillet downward progression 3F up = vertical fillet upward progression 5F incl = 45 deg incline fillet 5F oh = 45 deg overhead fillet
Work Angles = 0 deg for BOP and 45 deg for fillet welds

PARAMETER DEVELOPMENT

Bead-on-plate (BOP)

Weld #	Diameter	Electrode	Thickness (T)	Position	Gas	WFS (ipm)	Amps (A)	Volts (V)	TRIM (setting)	Arc Contol (setting)	ESO mm	Travel Speed		Heat Input		Weld Size mm	Observations	Travel Angle
												ipm	mm/min	kJ/in	kJ/mm			
1	2.4	Hobart 718MC E7018-1	3.2	Flat	NA	NA	90	21	NA	10	NA	12	304.8	9.5	0.37	NA	safe	0 deg drag
2				Flat	NA	NA	90	21	NA	10	NA	8.5	215.9	13.3	0.53	NA	marginal	0 deg drag
3				Flat	NA	NA	90	21	NA	10	NA	6	152.4	18.9	0.74	NA	burnthrough	0 deg drag
4			6.4	Flat	NA	NA	90	21	NA	10	NA	10	254	11.3	0.45	NA	safe	0 deg drag
5				Flat	NA	NA	90	21	NA	10	NA	3.75	95.25	30.2	1.19	NA	marginal	0 deg drag
6				Flat	NA	NA	90	21	NA	10	NA	2.75	69.85	41.2	1.62	NA	marginal	0 deg drag
7			8	Flat	NA	NA	90	21	NA	10	NA	10	254	11.3	0.45	NA	safe	0 deg drag
8				Flat	NA	NA	90	21	NA	10	NA	3.75	95.25	30.2	1.19	NA	safe	0 deg drag
9				Flat	NA	NA	90	21	NA	10	NA	2.75	69.85	41.2	1.62	NA	safe	0 deg drag
10			10	Flat	NA	NA	90	21	NA	10	NA	10	254	11.3	0.45	NA	safe	0 deg drag
11				Flat	NA	NA	90	21	NA	10	NA	3.75	95.25	30.2	1.19	NA	safe	0 deg drag
12				Flat	NA	NA	90	21	NA	10	NA	2.75	69.85	41.2	1.62	NA	safe	0 deg drag
13	3.2	Hobart 718MC E7018-1	6.4	Flat	NA	NA	120	20.5	NA	10	NA	11	279.4	13.4	0.53	NA	safe	0 deg drag
14				Flat	NA	NA	120	20.5	NA	10	NA	4.5	114.3	32.8	1.29	NA	safe	0 deg drag
15				Flat	NA	NA	120	20.5	NA	10	NA	2.75	69.85	53.7	2.11	NA	marginal	0 deg drag
16			8	Flat	NA	NA	120	20.5	NA	10	NA	11	279.4	13.4	0.53	NA	safe	0 deg drag
17				Flat	NA	NA	120	20.5	NA	10	NA	4.5	114.3	32.8	1.29	NA	safe	0 deg drag
18				Flat	NA	NA	120	20.5	NA	10	NA	2.75	69.85	53.7	2.11	NA	safe	0 deg drag
19			10	Flat	NA	NA	120	20.5	NA	10	NA	11	279.4	13.4	0.53	NA	safe	0 deg drag
20				Flat	NA	NA	120	20.5	NA	10	NA	4.5	114.3	32.8	1.29	NA	safe	0 deg drag
21				Flat	NA	NA	120	20.5	NA	10	NA	2.75	69.85	53.7	2.11	NA	safe	0 deg drag
22	3.2	AtomArc 10018-M1 E10018-M1	15	Flat	NA	NA	120	20	NA	10	NA	11	279.4	13.1	0.52	NA	safe	0 deg drag
23				Flat	NA	NA	120	20	NA	10	NA	4.5	114.3	32.0	1.26	NA	safe	0 deg drag
24				Flat	NA	NA	120	20	NA	10	NA	2.75	69.85	52.4	2.06	NA	safe	0 deg drag
25			19.1	Flat	NA	NA	120	20	NA	10	NA	11	279.4	13.1	0.52	NA	safe	0 deg drag
26				Flat	NA	NA	120	20	NA	10	NA	4.5	114.3	32.0	1.26	NA	safe	0 deg drag
27				Flat	NA	NA	120	20	NA	10	NA	2.75	69.85	52.4	2.06	NA	safe	0 deg drag
28	1.0	Thyssen K-Nova ER70S-6 RMD Mode	3.2	Flat	C25	155	90	18.5	85	20	13	12	304.8	8.3	0.33	NA	safe	0 deg drag
29				Flat	C25	155	90	18.5	85	20	13	8.5	215.9	11.8	0.46	NA	marginal	0 deg drag
30				Flat	C25	155	90	18.5	85	20	13	6	152.4	16.7	0.66	NA	burthrough	0 deg drag
31			6.4	Flat								Not Evaluated						
32				Flat														
33				Flat														
34				Flat	C10	100	130	17	85	5	13	27	685.8	4.9	0.19	NA	safe	0 deg drag
35	1.2	Thyssen K-Nova ER70S-6 RMD Mode	3.2	Flat	C10	100	130	17	85	5	13	20	508	6.6	0.26	NA	safe	0 deg drag
36				Flat	C10	100	130	17	85	5	13	12	304.8	11.1	0.44	NA	marginal	0 deg drag
37				Flat	C10	160	170	17	85	5	13	16	406.4	10.8	0.43	NA	safe	0 deg drag
38			6.4	Flat	C10	160	170	17	85	5	13	10	254	17.3	0.68	NA	safe	0 deg drag
39				Flat	C10	160	170	17	85	5	13	6	152.4	28.9	1.14	NA	marginal	0 deg drag
40				Flat	C10	185	90	19	55	25	13	12	304.8	8.6	0.34	NA	safe	0 deg drag

41		ER70S-6		Flat	C10	185	90	19	55	25	13	8.5	215.9	12.1	0.48	NA		0 deg drag
42		Accu-Pulse Mode		Flat	C10	185	90	19	55	25	13	6	152.4	17.1	0.67	NA	marginal burnthrough	0 deg drag
43			3.2	Flat	C10	150	70	18	42	45	13	16	406.4	4.7	0.19	NA	safe	30 deg push
44				Flat	C10	150	70	18	42	45	13	12	304.8	6.3	0.25	NA	safe	30 deg push
45				Flat	C10	150	70	18	42	45	13	8.5	215.9	8.9	0.35	NA	safe	30 deg push
46			6.4	Flat	C10	185	90	19	55	25	13	12	304.8	8.6	0.34	NA	safe	0 deg drag
47				Flat	C10	185	90	19	55	25	13	8.5	215.9	12.1	0.48	NA	safe	0 deg drag
48				Flat	C10	185	90	19	55	25	13	6	152.4	17.1	0.67	NA	safe	0 deg drag
49			10	Flat														
50				Flat														
51				Flat														
52	1.0	ESAB 70XTi	15	Flat														
53		ER70S-G		Flat														
54		Accu-Pulse Mode		Flat														
55			19.1	Flat														
56				Flat														
57				Flat														
58	2.0	Fabshield 71K6	6.4	Flat	NA	75	200	18	NA	NA	28	7.5	190.5	28.8	1.13	NA	safe	5 Deg drag
59		E71T8-K6		Flat	NA	75	200	18	NA	NA	28	6.5	165.1	33.2	1.31	NA	marginal	5 Deg drag
60		DCEN Polarity		Flat	NA	75	200	18	NA	NA	28	8	203.2	27.0	1.06	NA	safe	5 Deg drag
61			8	Flat	NA	125	280	19	NA	NA	32	7.5	190.5	42.6	1.68	NA	marginal	5 Deg drag
62				Flat	NA	150	310	19	NA	NA	32	7	177.8	50.5	1.99	NA	marginal	5 Deg drag
63				Flat	NA	200	350	20.5	NA	NA	32	7	177.8	61.5	2.42	NA	max heat input	5 Deg drag
64				Flat	NA	200	350	20.5	NA	NA	32	11.5	292.1	37.4	1.47	NA	safe	5 Deg drag
65			10	Flat	NA	125	280	19	NA	NA	32	7.5	190.5	42.6	1.68	NA	safe	5 Deg drag
66				Flat	NA	150	310	19	NA	NA	32	7	177.8	50.5	1.99	NA	safe	5 Deg drag
67				Flat	NA	200	350	20.5	NA	NA	32	7	177.8	61.5	2.42	NA	marginal	5 Deg drag
68				Flat	NA	200	350	20.5	NA	NA	32	11.5	292.1	37.4	1.47	NA	safe	5 Deg drag
69	2.0	Fabshield 81N2	15	Flat	NA	125	275	19	NA	NA	32	7	177.8	44.8	1.76	NA	safe	5 Deg drag
70		E71T8-Ni1J		Flat	NA	150	270	19	NA	NA	32	7	177.8	44.0	1.73	NA	safe	5 Deg drag
71		DCEN Polarity		Flat	NA	175	280	20	NA	NA	32	7	177.8	48.0	1.89	NA	safe	5 Deg drag
72				Flat	NA	200	315	20.5	NA	NA	32	7	177.8	55.4	2.18	NA	safe	5 Deg drag
73				Flat	NA	200	315	20.5	NA	NA	32	11	279.4	35.2	1.39	NA	safe	5 Deg drag
74			19.1	Flat	NA	175	315	20	NA	NA	32	8	203.2	47.3	1.86	NA	safe	5 Deg drag
75				Flat	NA	200	315	20.5	NA	NA	32	8	203.2	48.4	1.91	NA	safe	5 Deg drag
76				Flat	NA	200	315	20.5	NA	NA	32	8	203.2	48.4	1.91	NA	safe	5 Deg drag
77				Flat	NA	150	260	19	NA	NA	32	11	279.4	26.9	1.06	NA	safe	5 Deg drag

Fillet Welded Sleeve Simulations

78	2.4	Hobart 718MC	3.2	3F up	NA	NA	90	21	NA	5	NA	8	203.2	14.2	0.56	4.0	acceptable bead profile and penetration	5 deg incline
79		E7018-1		5F incl up	NA	NA	90	21	NA	5	NA	8	203.2	14.2	0.56	4.0	acceptable bead profile and penetration	5 deg incline
80				5F oh up	NA	NA	90	21	NA	5	NA	8	203.2	14.2	0.56	4.0	acceptable bead profile and penetration	5 deg incline
81				2F	NA	NA	90	21	NA	5	NA	7.5	190.5	15.1	0.60	4.0	acceptable bead profile and penetration	10 deg drag
82			6.4	3F up	NA	NA	90	21	NA	5	NA	2.5	63.5	45.4	1.79	5.0	acceptable bead profile and penetration	5 deg incline
83				5F incl up	NA	NA	90	21	NA	5	NA	3.5	88.9	32.4	1.28	5.0	acceptable bead profile and penetration	5 deg incline

84				5F oh up	NA	NA	90	21	NA	5	NA	3.5	88.9	32.4	1.28	5.0	acceptable bead profile and penetration	5 deg incline
85				2F	NA	NA	90	21	NA	5	NA	5	127	22.7	0.89	5.0	acceptable bead profile and penetration	10 deg drag
86			8	3F up	NA	NA	90	21	NA	5	NA	2.5	63.5	45.4	1.79	6.0	acceptable bead profile and penetration	5 deg incline
87				5F incl up	NA	NA	90	21	NA	5	NA	3.5	88.9	32.4	1.28	6.0	acceptable bead profile and penetration	5 deg incline
88				5F oh up	NA	NA	90	21	NA	5	NA	3.5	88.9	32.4	1.28	6.0	acceptable bead profile and penetration	5 deg incline
89				2F	NA	NA	90	21	NA	5	NA	5	127	22.7	0.89	6.0	acceptable bead profile and penetration	10 deg drag
90			10	3F up	NA	NA	90	21	NA	5	NA	4	101.6	28.4	1.12	6.0	acceptable bead profile and penetration	5 deg incline
91				5F incl up	NA	NA	90	21	NA	5	NA	3.5	88.9	32.4	1.28	6.0	acceptable bead profile and penetration	5 deg incline
92				5F oh up	NA	NA	90	21	NA	5	NA	4	101.6	28.4	1.12	6.0	acceptable bead profile and penetration	5 deg incline
93				2F	NA	NA	90	21	NA	5	NA	4	101.6	28.4	1.12	6.0	acceptable bead profile and penetration	10 deg drag
94	3.2	Hobart 718MC	6.4	3F up	NA	NA	110	20.5	NA	5	NA	2	50.8	67.7	2.66	5.0	acceptable bead profile and penetration	5 deg incline
95		E7018-1		5F incl up	NA	NA	110	20.5	NA	5	NA	3	76.2	45.1	1.78	5.0	acceptable bead profile and penetration	5 deg incline
96				5F oh up	NA	NA	90	20.5	NA	5	NA	2.5	63.5	44.3	1.74	5.0	acceptable bead profile and penetration	5 deg incline
97				2F	NA	NA	90	20.5	NA	5	NA	4.5	114.3	24.6	0.97	5.0	acceptable bead profile and penetration	10 deg drag
98			8	3F up	NA	NA	120	22	NA	5	NA	3.5	88.9	45.3	1.78	6.0	acceptable bead profile and penetration	5 deg incline
99				5F incl up	NA	NA	120	22	NA	5	NA	4.3	109.22	36.8	1.45	6.0	acceptable bead profile and penetration	5 deg incline
100				5F oh up	NA	NA	120	22	NA	5	NA	3.5	88.9	45.3	1.78	6.0	acceptable bead profile and penetration	5 deg incline
101				2F	NA	NA	120	22	NA	5	NA	5.8	147.32	27.3	1.08	6.0	acceptable bead profile and penetration	10 deg drag
102			10	3F up	NA	NA	120	22	NA	5	NA	3.5	88.9	45.3	1.78	6.0	acceptable bead profile and penetration	5 deg incline
103				5F incl up	NA	NA	120	22	NA	5	NA	4.3	109.22	36.8	1.45	6.0	acceptable bead profile and penetration	5 deg incline
104				5F oh up	NA	NA	120	22	NA	5	NA	3.5	88.9	45.3	1.78	6.0	acceptable bead profile and penetration	5 deg incline
105				2F	NA	NA	120	22	NA	5	NA	5.8	147.32	27.3	1.08	6.0	acceptable bead profile and penetration	10 deg drag
106	3.2	Filarc 108MP	15	3F dwn	NA	NA	160	25	NA	5	NA	6.5	165.1	36.9	1.45	6.0	acceptable bead profile and penetration	10 deg incline
107		E10018-G		5F incl dwn	NA	NA	160	23	NA	5	NA	8.5	215.9	26.0	1.02	6.0	acceptable bead profile and penetration	10 deg incline
108				5F oh dwn	NA	NA	160	23	NA	5	NA	9.5	241.3	23.2	0.92	6.0	acceptable bead profile and penetration	10 deg incline
109				2F	NA	NA	160	23	NA	5	NA	5.5	139.7	40.1	1.58	6.0	acceptable bead profile and penetration	10 deg drag
110			19.1	3F dwn	NA	NA	160	25	NA	5	NA	10	254	24.0	0.94	6.0	acceptable bead profile and penetration	10 deg incline
111				5F incl dwn	NA	NA	160	24	NA	5	NA	8.5	215.9	27.1	1.07	6.0	acceptable bead profile and penetration	10 deg incline
112				5F oh dwn	NA	NA	160	24	NA	5	NA	9.5	241.3	24.3	0.95	6.0	acceptable bead profile and penetration	10 deg incline
113				2F	NA	NA	160	23.5	NA	5	NA	7.5	190.5	30.1	1.18	6.0	acceptable bead profile and	10 deg drag

penetration																		
114	1.0	Thyssen K-Nova	3.2	3F up 5F incl up	C10	145	75	17.5	55	30	13	8	203.2	9.8	0.39	4.0	acceptable bead profile and penetration	5 deg incline
115		ER70S-6			C10	145	75	17.5	55	30	13	8.5	215.9	9.3	0.36	4.0	acceptable bead profile and penetration	10 deg incline
116		Accu-pulse Mode		5F oh up	C10	145	80	18	57	30	13	7.5	190.5	11.5	0.45	4.0	acceptable bead profile and penetration	10 deg incline
117				2F	C10	145	80	18.5	57	30	13	8.5	215.9	10.4	0.41	4.0	acceptable bead profile and penetration	0 deg
118			6.4	3F up 5F incl up	C10	170	85	18.5	49	40	13	4.5	114.3	21.0	0.83	5.0	acceptable bead profile and penetration	5 deg incline
119					C10	170	80	18.5	48	40	13	5	127	17.8	0.70	5.0	acceptable bead profile and penetration	10 deg incline
120				5F oh up	C10	170	85	18.5	48	40	13	4	101.6	23.6	0.93	5.0	acceptable bead profile and penetration	10 deg incline
121				2F	C10	170	80	18.5	48	40	13	6.5	165.1	13.7	0.54	5.0	acceptable bead profile and penetration	0 deg
122			8	3F up 5F incl up	C10	170	85	18.5	49	40	13	4.5	114.3	21.0	0.83	6.0	acceptable bead profile and penetration	5 deg incline
123					C10	170	80	18.5	48	40	13	5	127	17.8	0.70	6.0	acceptable bead profile and penetration	10 deg incline
124				5F oh up	C10	170	85	18.5	48	40	13	4	101.6	23.6	0.93	6.0	acceptable bead profile and penetration	10 deg incline
125				2F	C10	170	80	18.5	48	40	13	6.5	165.1	13.7	0.54	6.0	acceptable bead profile and penetration	0 deg
126			10	3F up 5F incl up	C10	170	85	18.5	49	40	13	4.5	114.3	21.0	0.83	6.0	acceptable bead profile and penetration	5 deg incline
127					C10	170	80	18.5	48	40	13	5	127	17.8	0.70	6.0	acceptable bead profile and penetration	10 deg incline
128				5F oh up	C10	170	85	18.5	48	40	13	4	101.6	23.6	0.93	6.0	acceptable bead profile and penetration	10 deg incline
129				2F	C10	170	80	18.5	48	40	13	6.5	165.1	13.7	0.54	6.0	acceptable bead profile and penetration	0 deg
130	1.0	Thyssen K-Nova	3.2	3F dwn 5F incl dwn	C10	300	155	18	68	45	13	14	355.6	12.0	0.47	4.0	acceptable bead profile and penetration	5 deg incline
131		ER70S-6			C10	300	155	18	68	45	13	14	355.6	12.0	0.47	4.0	acceptable bead profile and penetration	5 deg incline
132		RMD Mode		5F oh dwn	C10	300	155	18	68	45	13	14	355.6	12.0	0.47	4.0	acceptable bead profile and penetration	5 deg incline
133				2F	C10	300	155	18	68	45	13	14	355.6	12.0	0.47	4.0	acceptable bead profile and penetration	5 deg drag
134	1.0	ESAB 70XTi	15	3F up 5F incl up	C10	170	85	18.5	49	40	13	4.5	114.3	21.0	0.83	6.0	acceptable bead profile and penetration	5 deg incline
135		ER70S-G			C10	170	80	18.5	48	40	13	5	127	17.8	0.70	6.0	acceptable bead profile and penetration	10 deg incline
136		Accu-pulse Mode		5F oh up	C10	170	85	18.5	48	40	13	4	101.6	23.6	0.93	6.0	acceptable bead profile and penetration	10 deg incline
137				2F	C10	170	80	18.5	48	40	13	6.5	165.1	13.7	0.54	6.0	acceptable bead profile and penetration	0 deg
138			19.1	3F up 5F incl up	C10	170	85	18.5	49	40	13	4.5	114.3	21.0	0.83	6.0	acceptable bead profile and penetration	5 deg incline
139					C10	170	80	18.5	48	40	13	5	127	17.8	0.70	6.0	acceptable bead profile and penetration	10 deg incline
140				5F oh up	C10	170	85	18.5	48	40	13	4	101.6	23.6	0.93	6.0	acceptable bead profile and penetration	10 deg incline
141				2F	C10	170	80	18.5	48	40	13	6.5	165.1	13.7	0.54	6.0	acceptable bead profile and penetration	0 deg
142	2.0	Fabshield 71K6	6.4	3F dwn	NA	75	200	17.5	NA	NA	19	7.5	190.5	28.0	1.10	6.0	acceptable bead profile and penetration	10 deg drag

143		E71T8-K6		5F incl dwn	NA	75	205	17.5	NA	NA	19	7.5	190.5	28.7	1.13	6.0	acceptable bead profile and penetration	10 deg drag
144		DCEN Polarity		5F oh dwn	NA	75	205	17.5	NA	NA	19	8	203.2	26.9	1.06	6.0	acceptable bead profile and penetration	10 deg drag
145				2F	NA	125	270	20	NA	NA	19	8.5	215.9	38.1	1.50	6.0	acceptable bead profile and penetration	5 deg drag
146			8	3F dwn	NA	75	200	17.5	NA	NA	19	7.5	190.5	28.0	1.10	6.0	acceptable bead profile and penetration	10 deg drag
147				5F incl dwn	NA	75	205	17.5	NA	NA	19	7.5	190.5	28.7	1.13	6.0	acceptable bead profile and penetration	10 deg drag
148				5F oh dwn	NA	75	205	17.5	NA	NA	19	8	203.2	26.9	1.06	6.0	acceptable bead profile and penetration	10 deg drag
149				2F	NA	125	270	20	NA	NA	19	8.5	215.9	38.1	1.50	6.0	acceptable bead profile and penetration	5 deg drag
150			10	3F dwn	NA	90	230	17.5	NA	NA	19	10.5	266.7	23.0	0.91	6.0	acceptable bead profile and penetration	10 deg drag
151				5F incl dwn	NA	75	200	17.5	NA	NA	19	6.5	165.1	32.3	1.27	6.0	acceptable bead profile and penetration	10 deg drag
152				5F oh	NA	75	200	17.5	NA	NA	19	6.5	165.1	32.3	1.27	6.0	acceptable bead profile and penetration	10 deg drag
153				2F	NA	125	260	20	NA	NA	19	10	254	31.2	1.23	6.0	acceptable bead profile and penetration	5 deg drag
154	2.0	Fabshield 81N2	10	3F dwn	NA	90	220	17.5	NA	NA	22	8.5	215.9	27.2	1.07	6.0	acceptable bead profile and penetration	10 deg drag
155		E71T8-Ni1J		5F incl dwn	NA	95	240	17.5	NA	NA	22	9	228.6	28.0	1.10	6.0	acceptable bead profile and penetration	10 deg drag
156		DCEN Polarity		5F oh dwn	NA	95	240	17.5	NA	NA	22	7.5	190.5	33.6	1.32	6.0	acceptable bead profile and penetration	10 deg drag
157				2F	NA	125	275	20	NA	NA	22	7.5	190.5	44.0	1.73	6.0	acceptable bead profile and penetration	5 deg drag
158			15	3F dwn	NA	90	220	17.5	NA	NA	22	8.5	215.9	27.2	1.07	6.0	acceptable bead profile and penetration	10 deg drag
159				5F incl dwn	NA	95	240	17.5	NA	NA	22	9	228.6	28.0	1.10	6.0	acceptable bead profile and penetration	10 deg drag
160				5F oh dwn	NA	95	240	17.5	NA	NA	22	7.5	190.5	33.6	1.32	6.0	acceptable bead profile and penetration	10 deg drag
161				2F	NA	125	275	20	NA	NA	22	7.5	190.5	44.0	1.73	6.0	acceptable bead profile and penetration	5 deg drag
162			19.1	3F dwn	NA	90	220	17.5	NA	NA	22	8.5	215.9	27.2	1.07	6.0	acceptable bead profile and penetration	10 deg drag
163				5F incl dwn	NA	95	240	17.5	NA	NA	22	9	228.6	28.0	1.10	6.0	acceptable bead profile and penetration	10 deg drag
164				5F oh dwn	NA	95	240	17.5	NA	NA	22	7.5	190.5	33.6	1.32	6.0	acceptable bead profile and penetration	10 deg drag
165				2F	NA	125	275	20	NA	NA	22	7.5	190.5	44.0	1.73	6.0	acceptable bead profile and penetration	5 deg drag

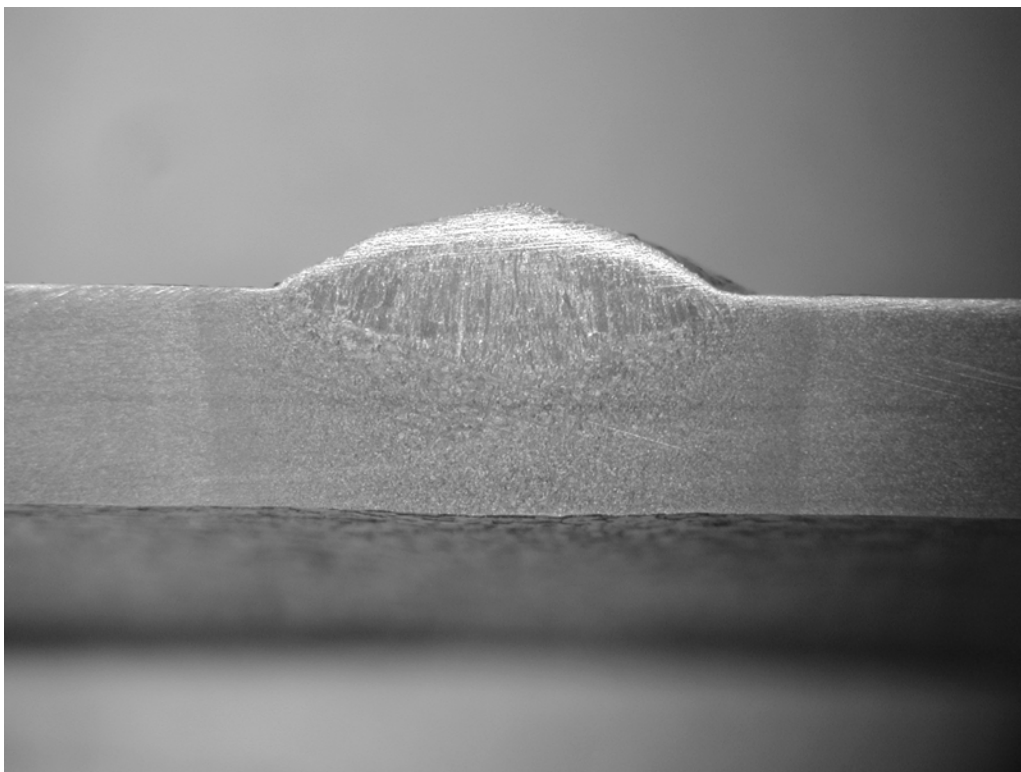


Figure 1: Weld 1

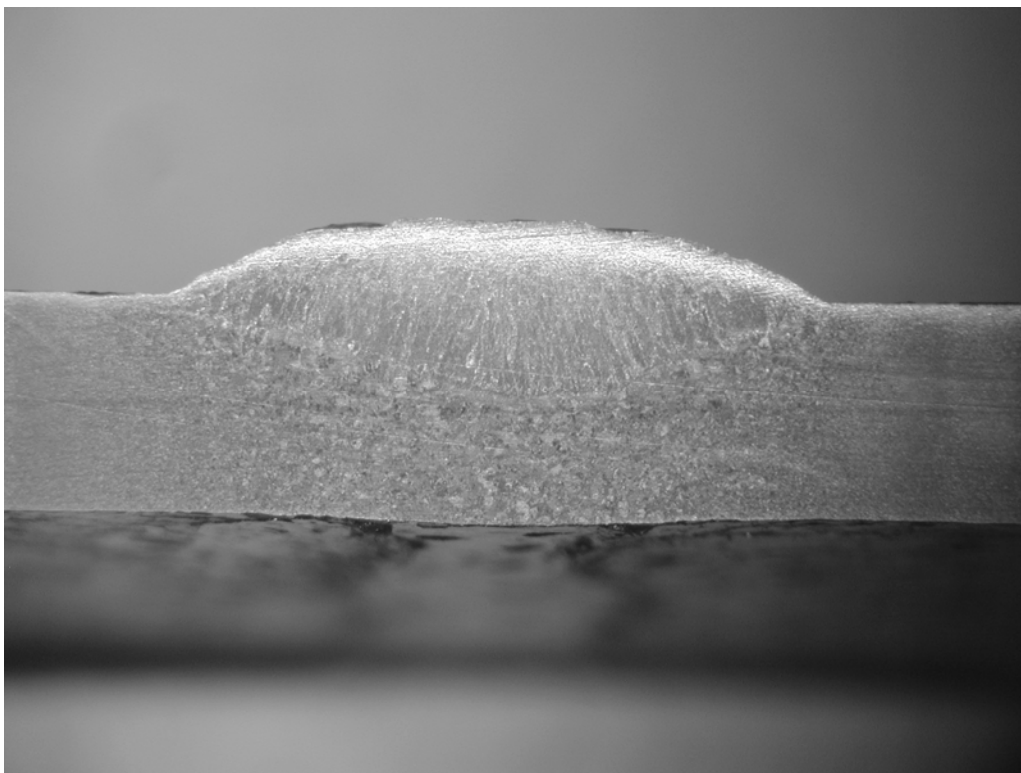


Figure 2: Weld 2

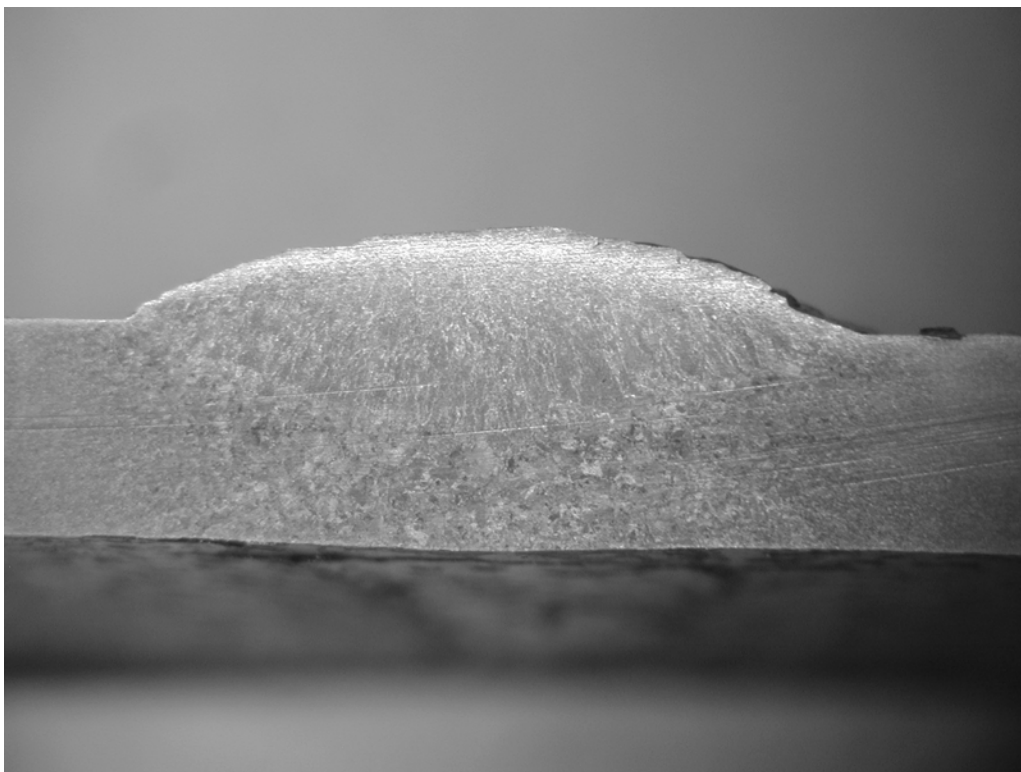


Figure 3: Weld 3

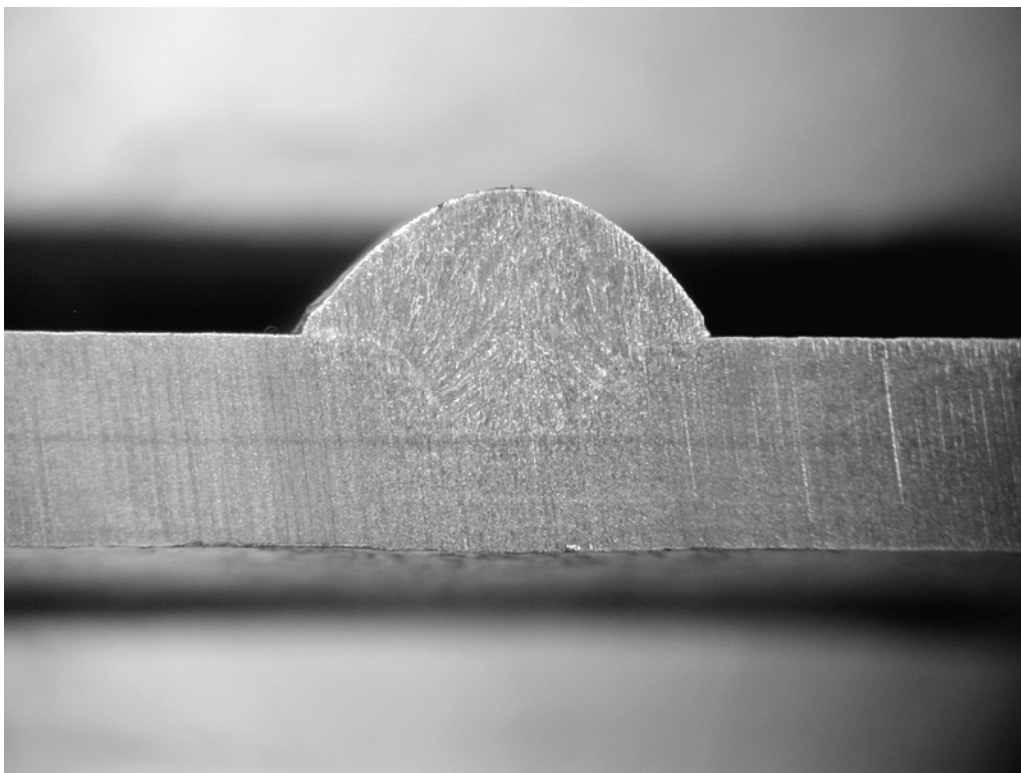


Figure 4: Weld 28

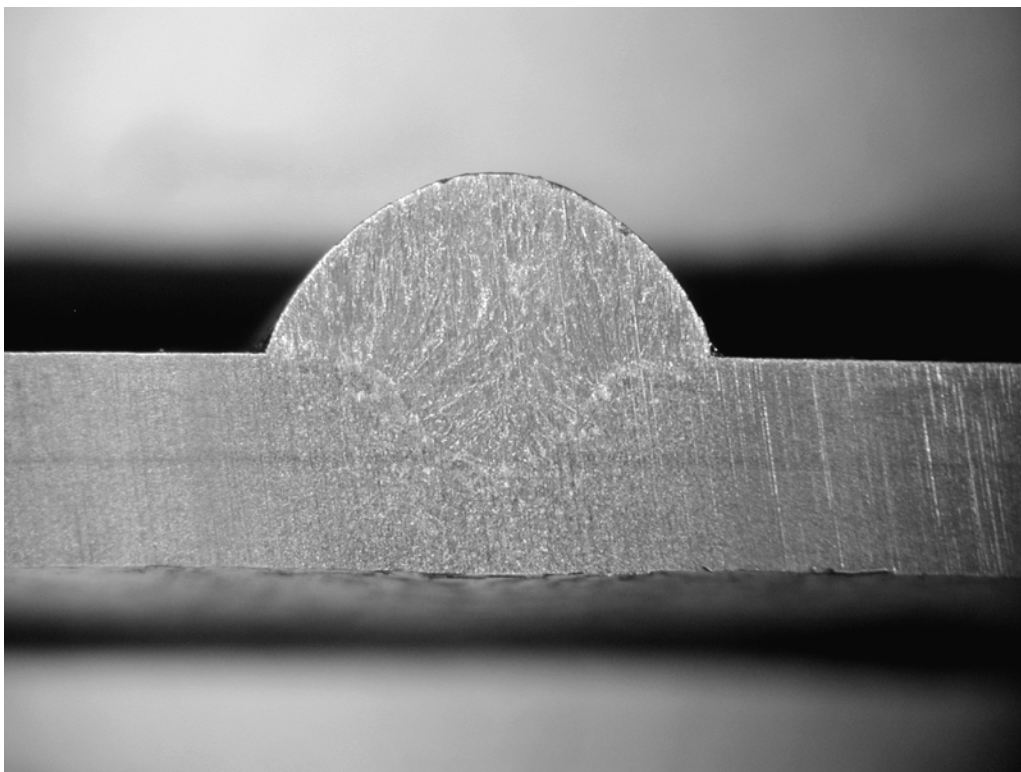


Figure 5: Weld 29

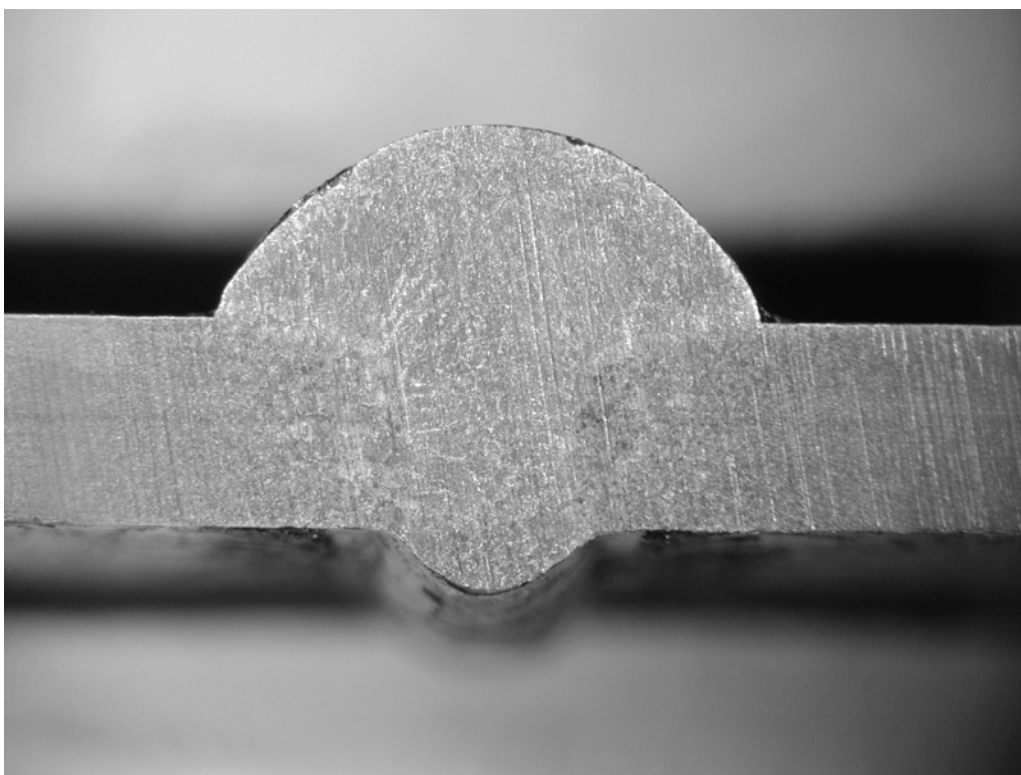


Figure 6: Weld 30

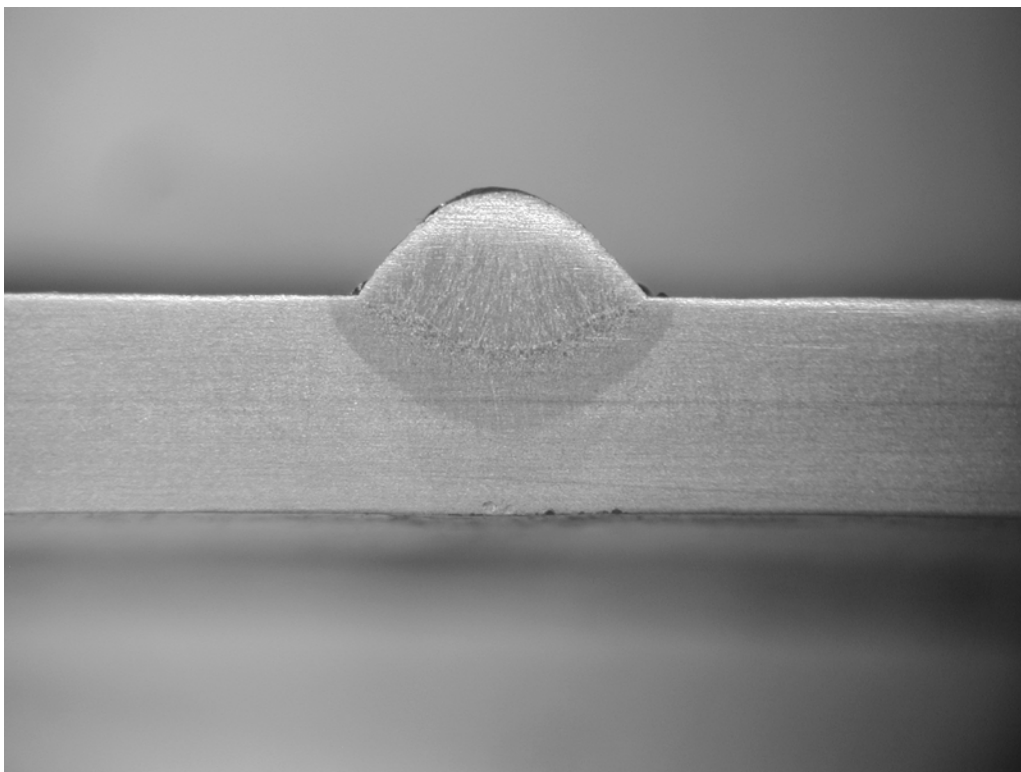


Figure 7: Weld 34

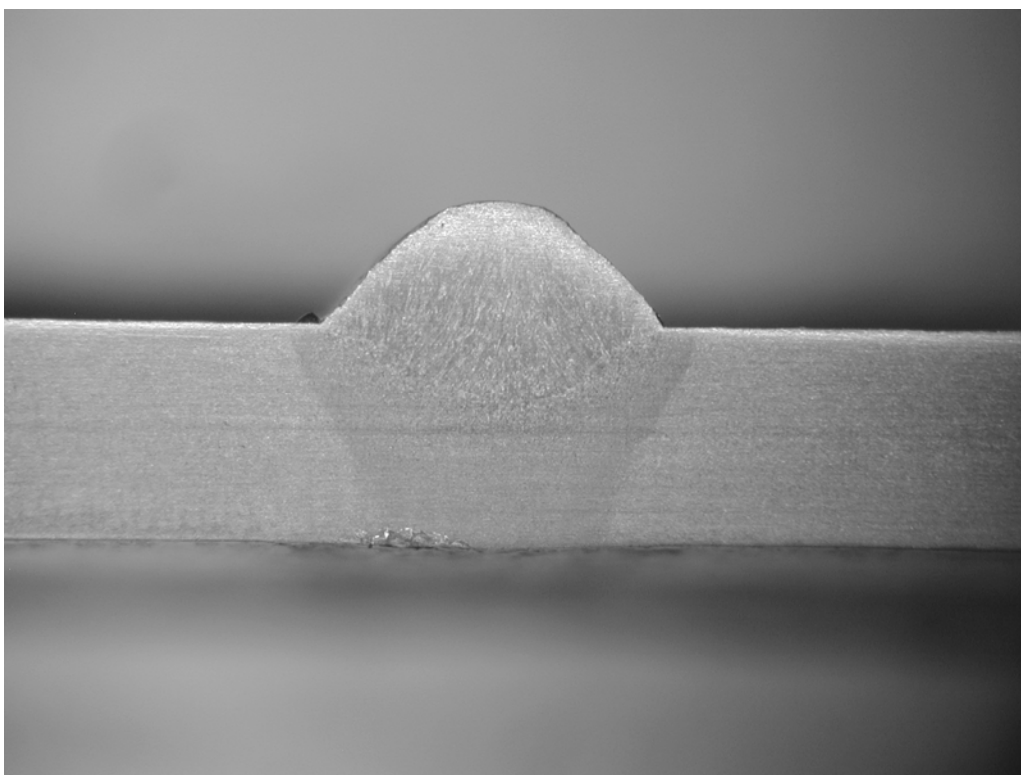


Figure 8: Weld 35

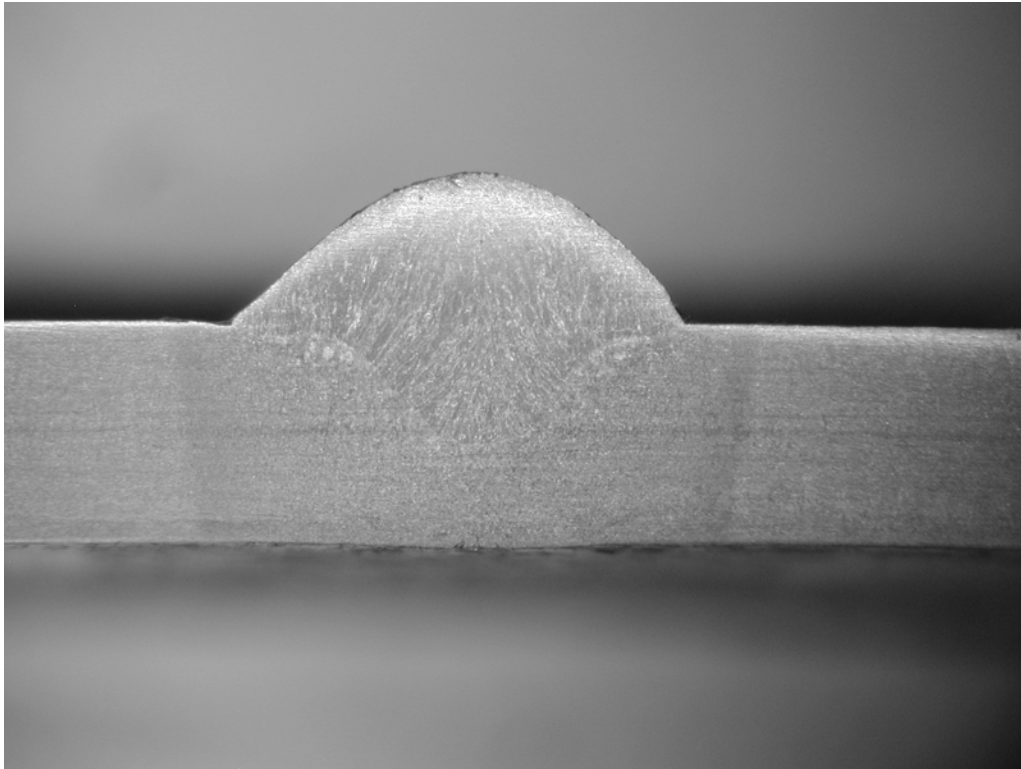


Figure 9: Weld 36

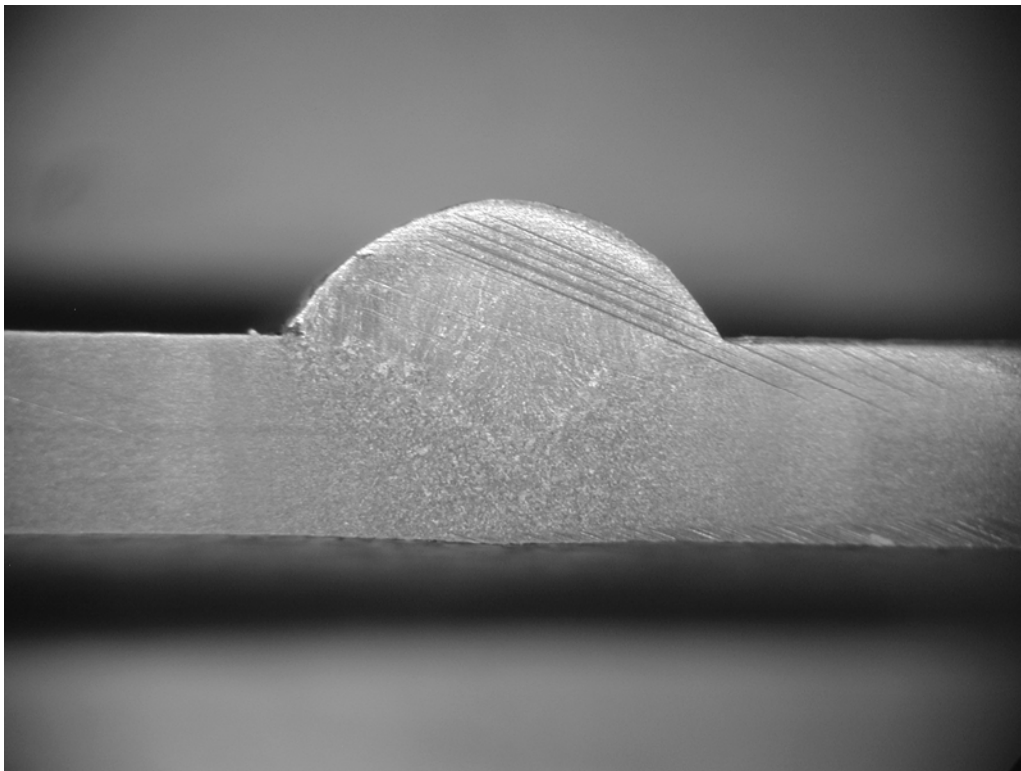


Figure 10: Weld 40

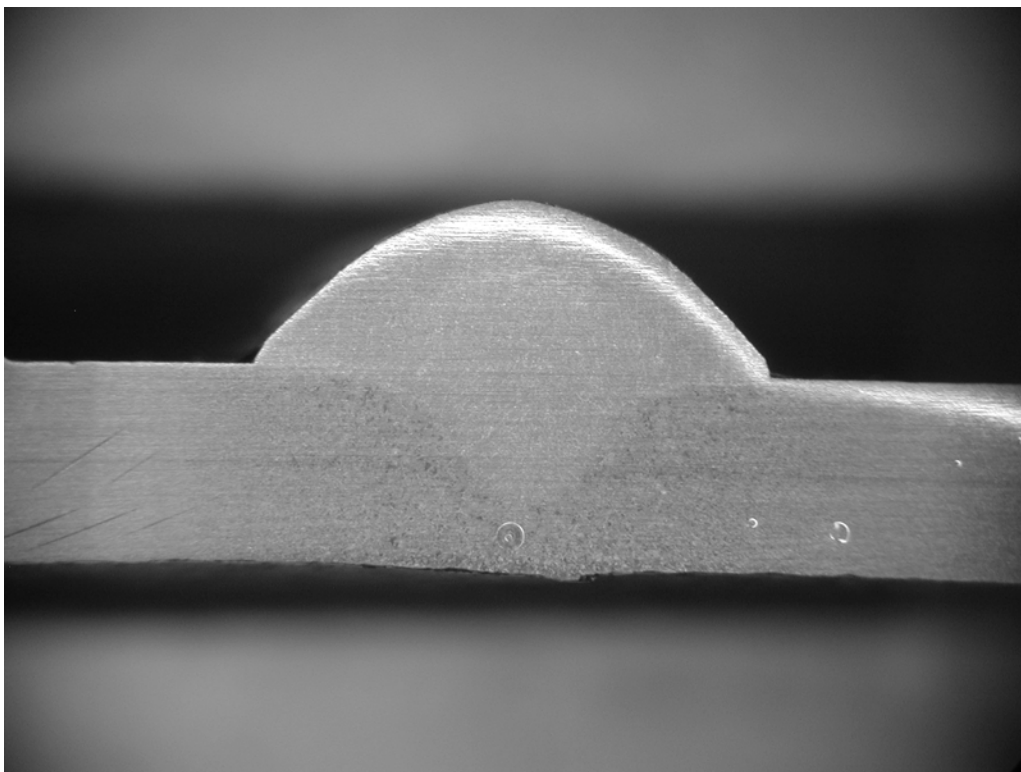


Figure 11: Weld 41

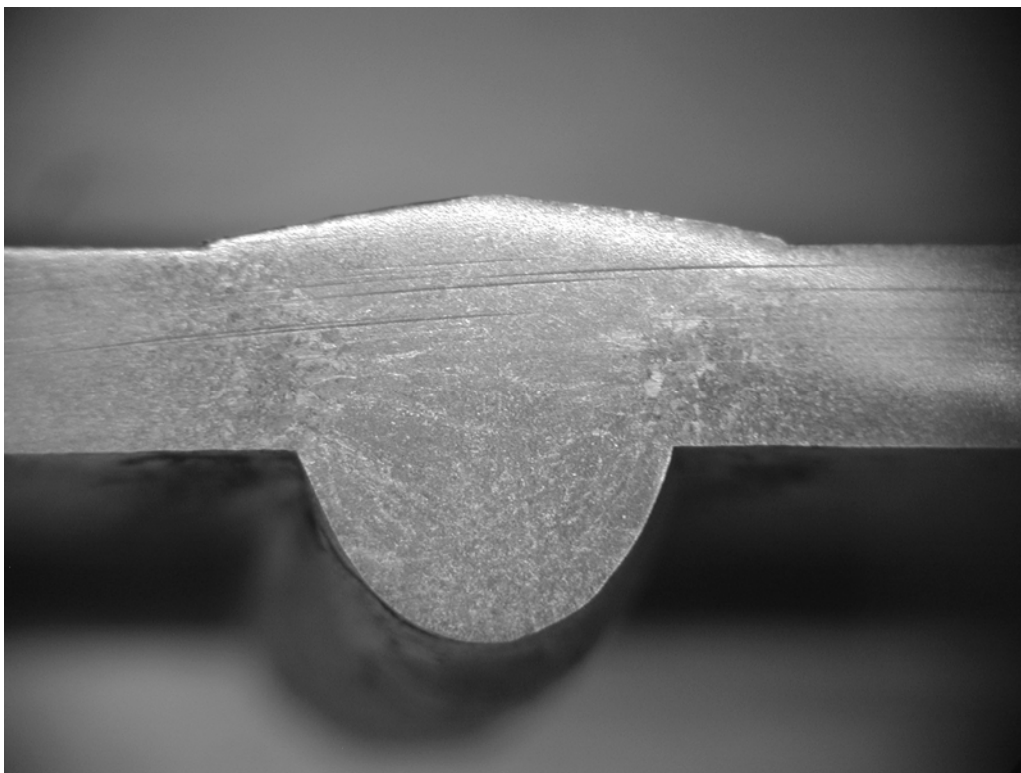


Figure 12: Weld 42

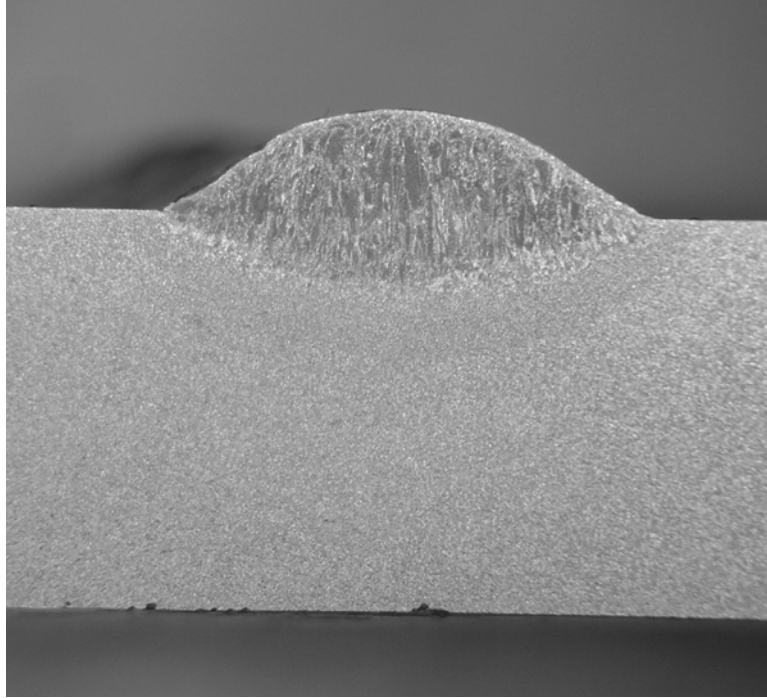


Figure 13: Weld 13

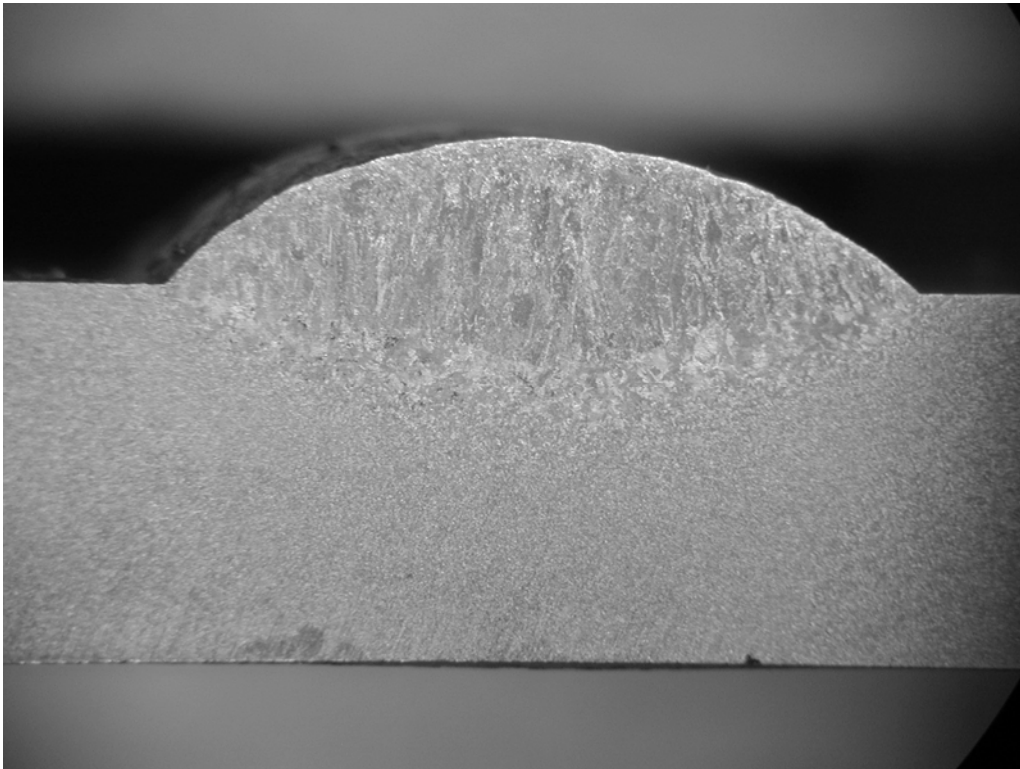


Figure 14: Weld 14

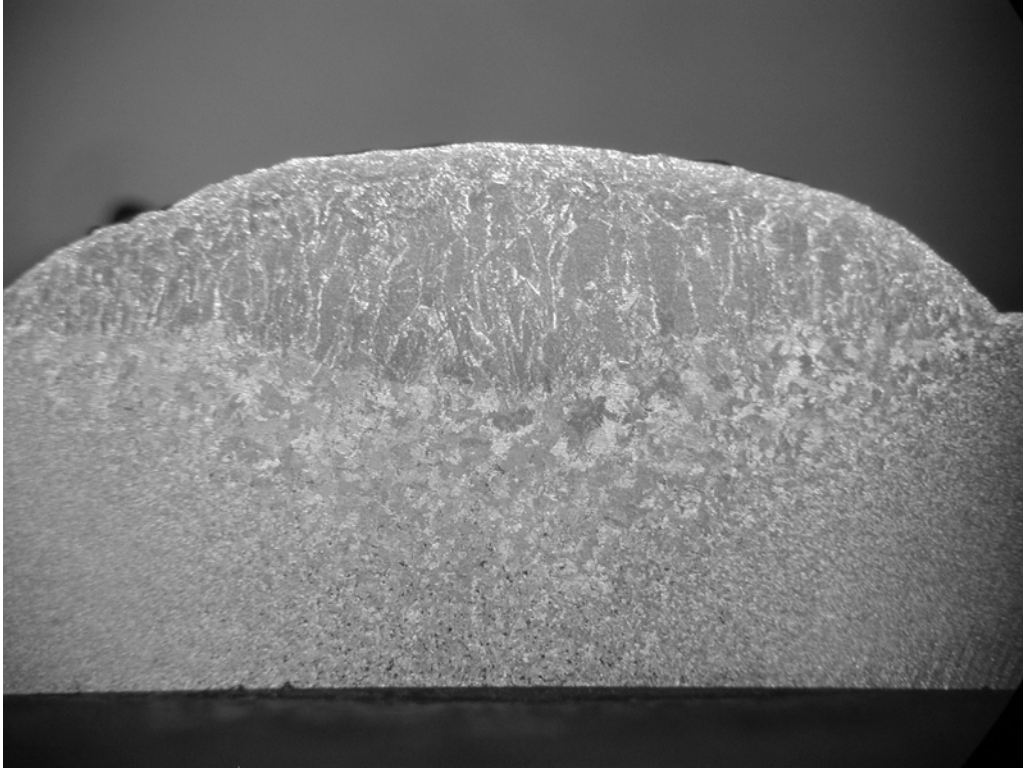


Figure 15: Weld 15



Figure 16: Weld 60

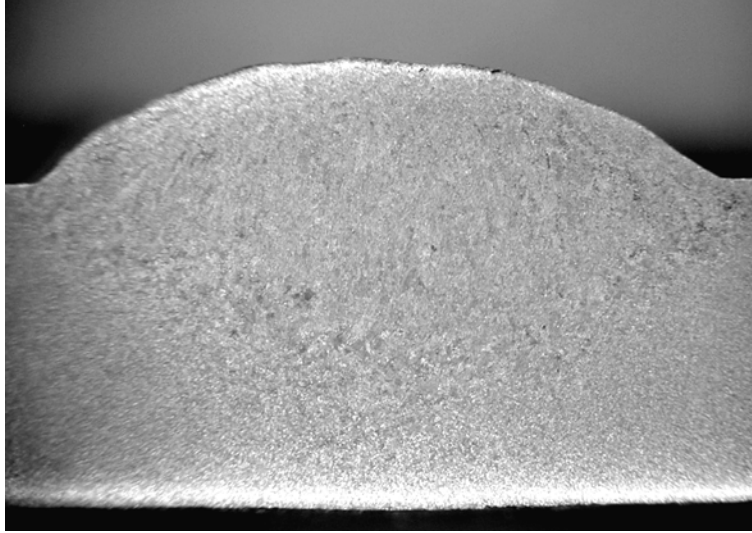


Figure 17: Weld 58

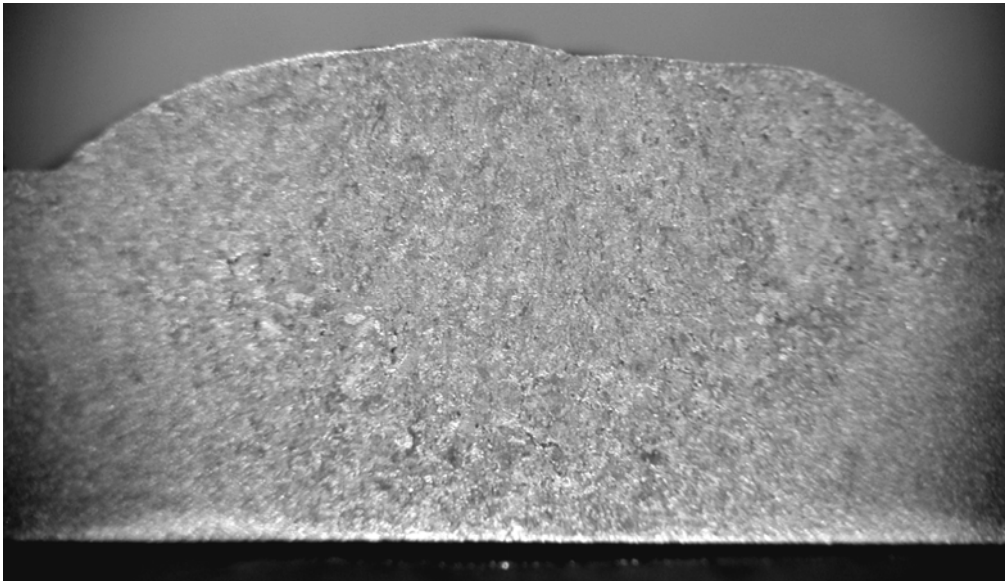


Figure 18: Weld 59

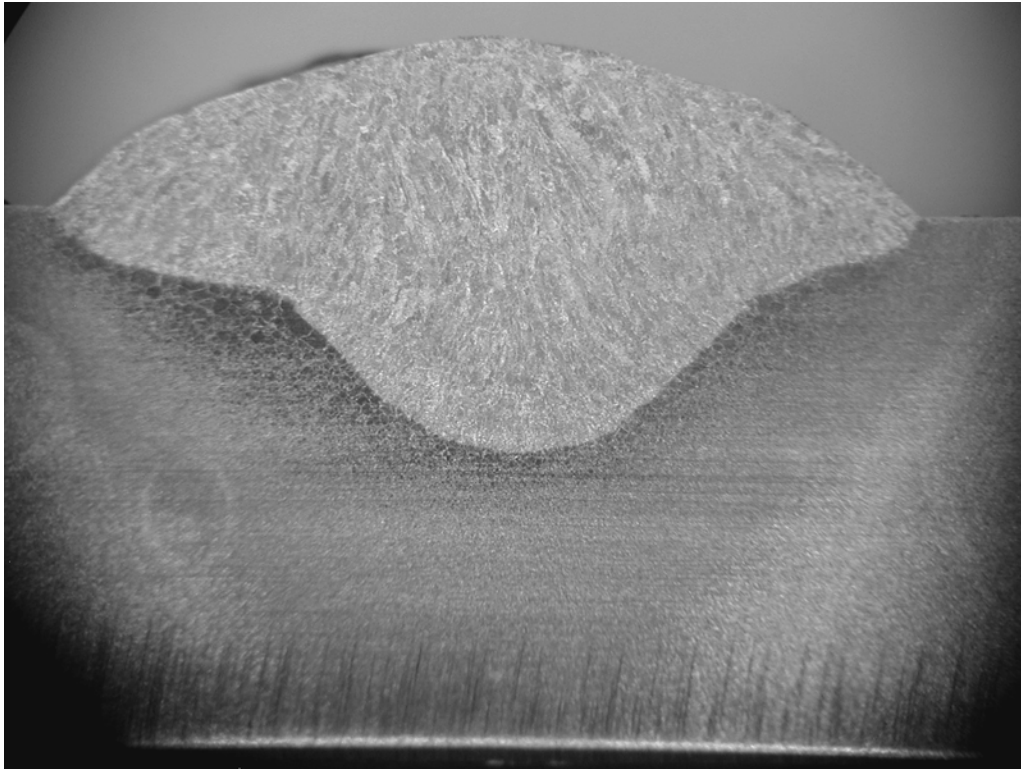


Figure 19: Weld 65

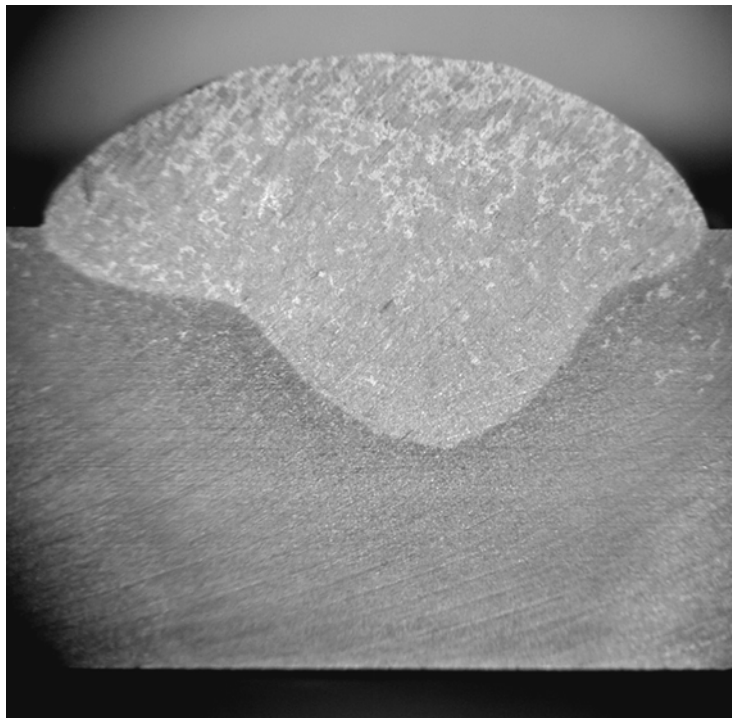


Figure 20: Weld 66

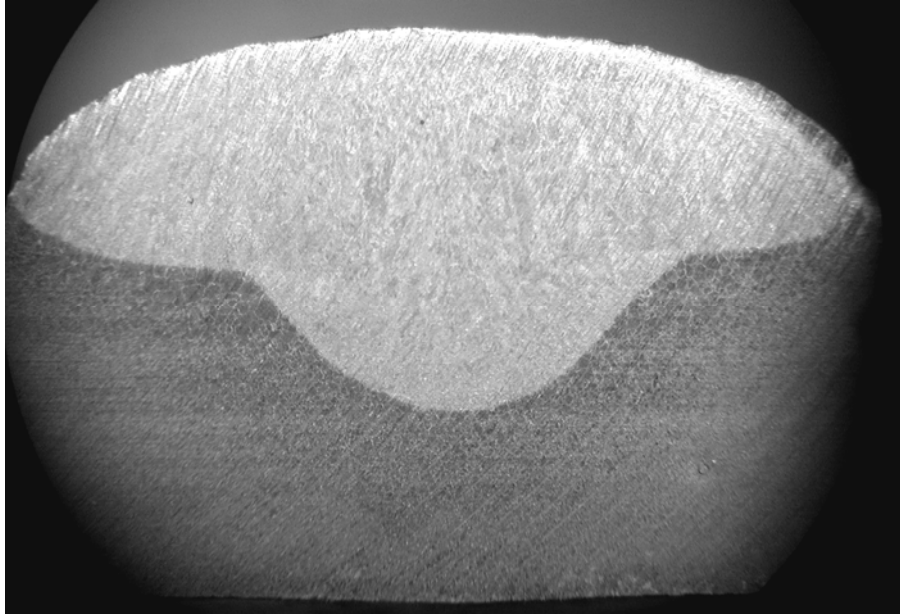


Figure 21: Weld 67

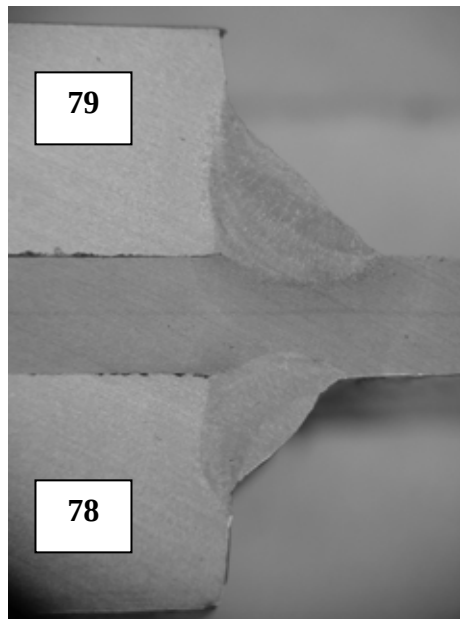


Figure 22: Welds 78 and 79

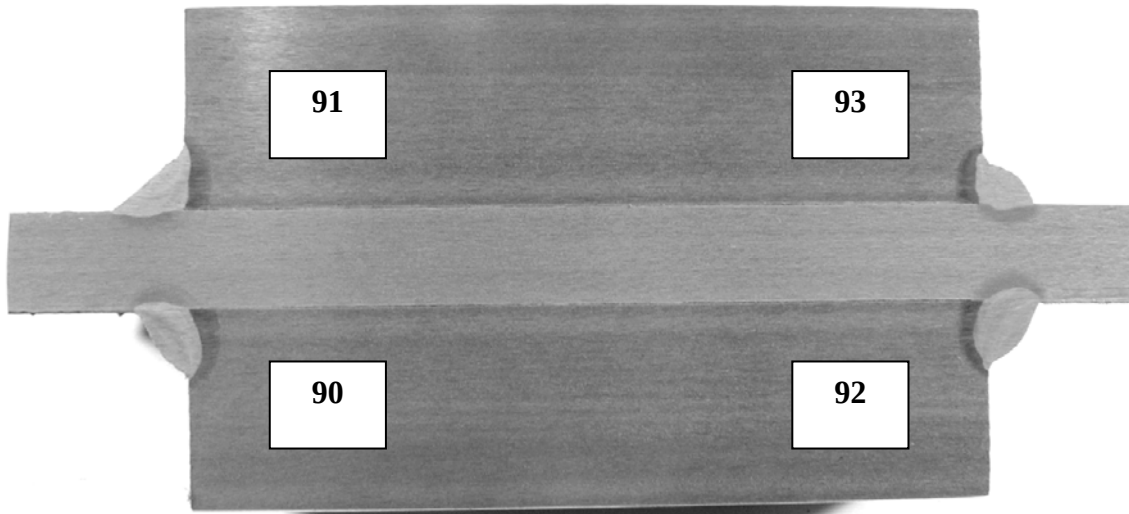


Figure 23: Welds 90, 91, 92, and 93

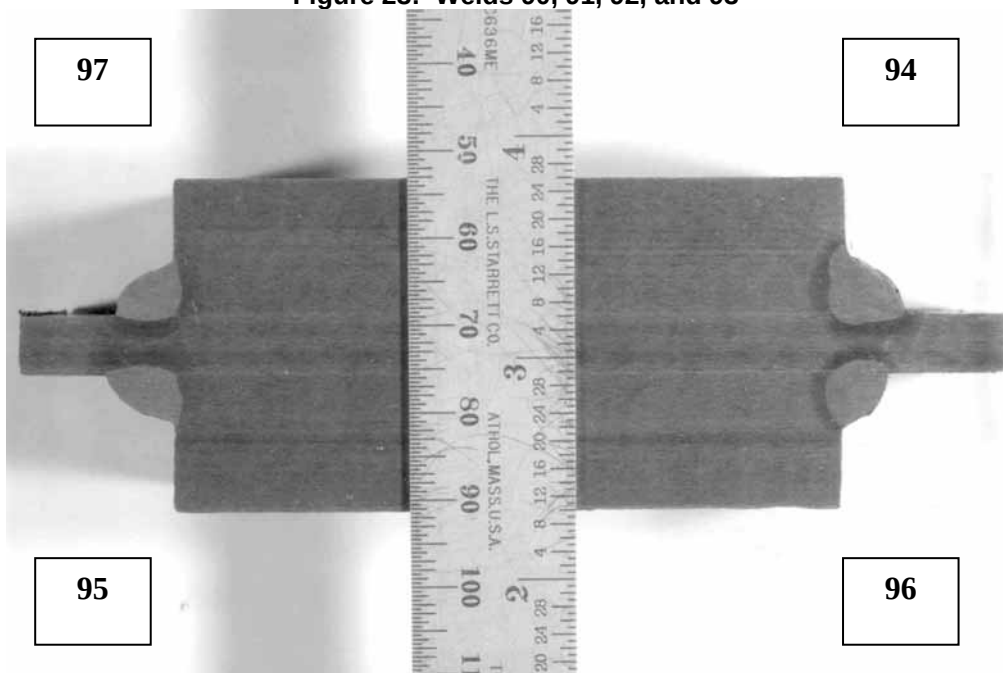


Figure 24: Welds 94, 95, 96, and 97

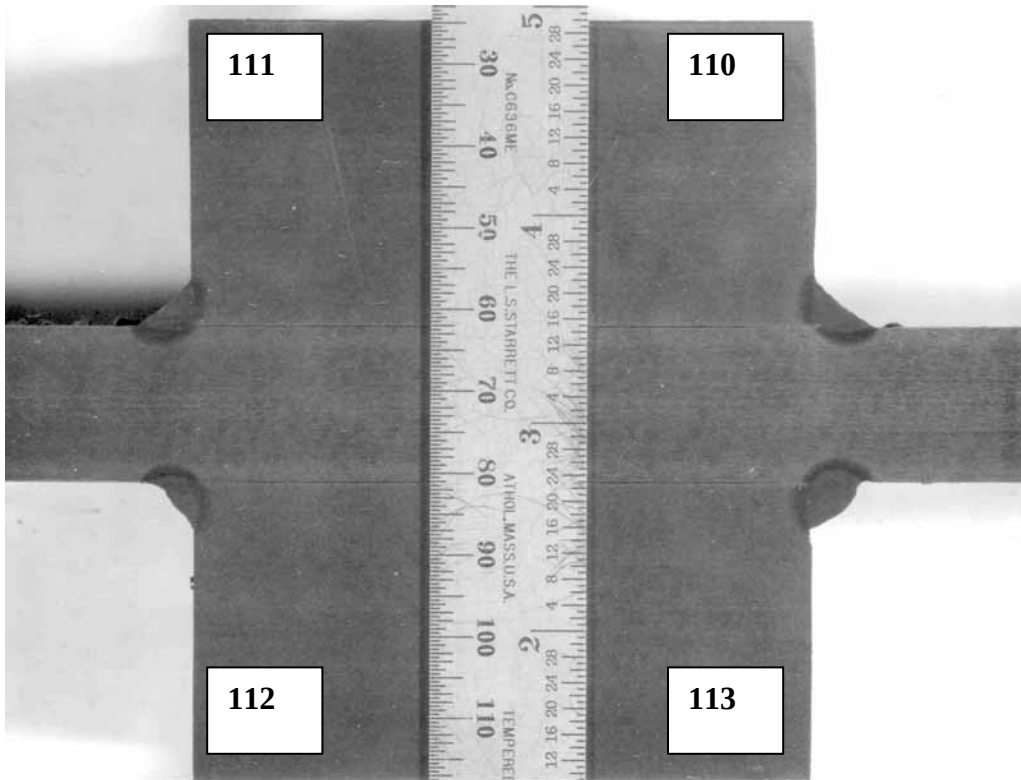


Figure 25: Welds 110, 111, 112, and 113

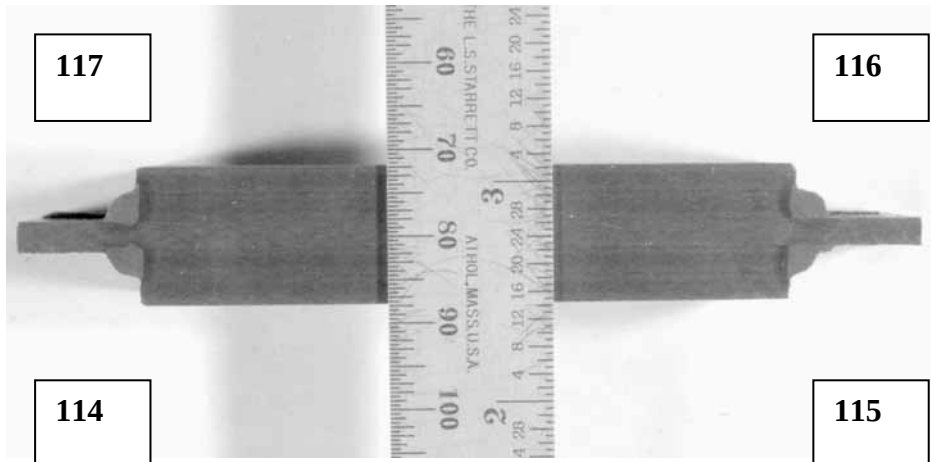


Figure 26: Welds 114, 115, 116, and 117

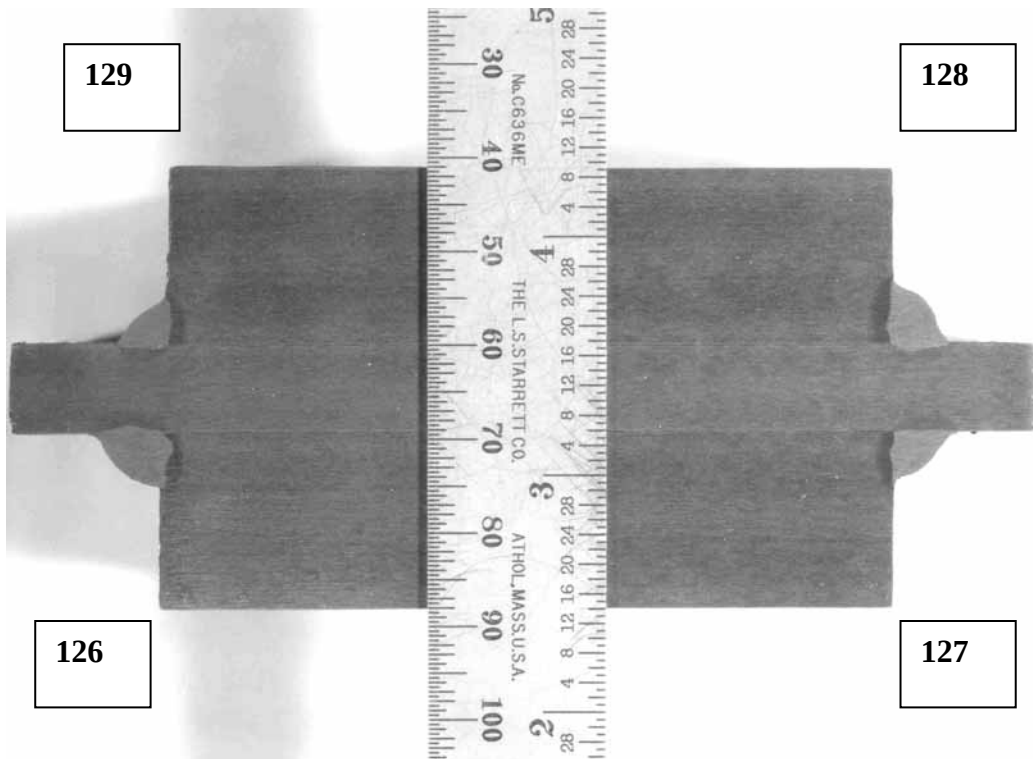


Figure 27: Welds 126, 127, 128, and 129

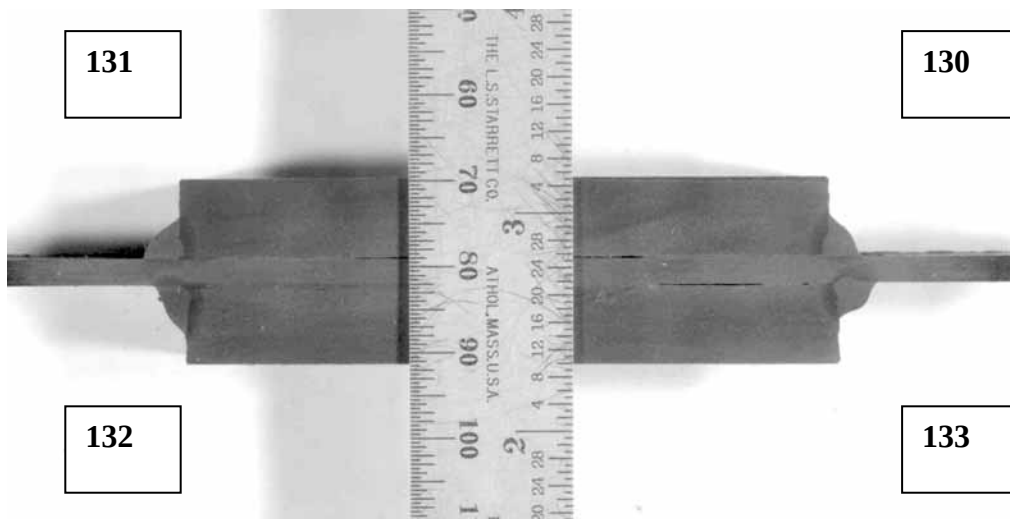


Figure 28: Welds 130, 131, 132, and 133

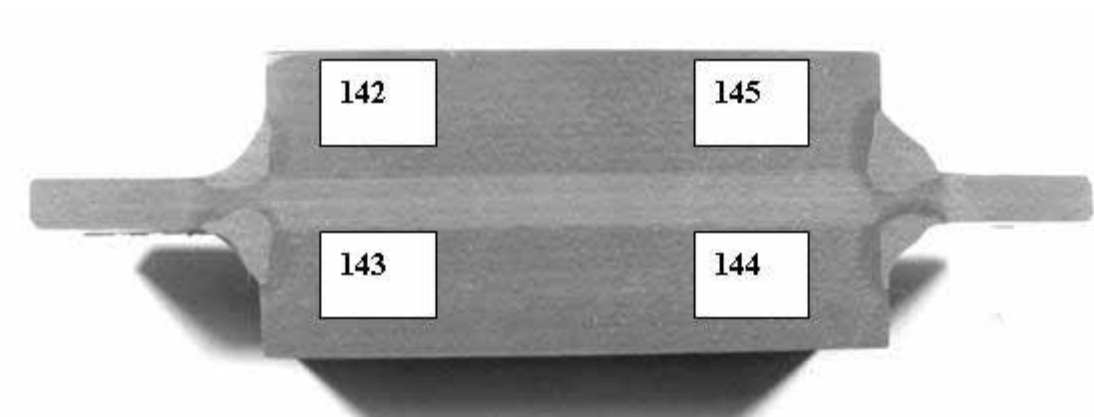


Figure 29: Welds 142, 143, 144, and 145

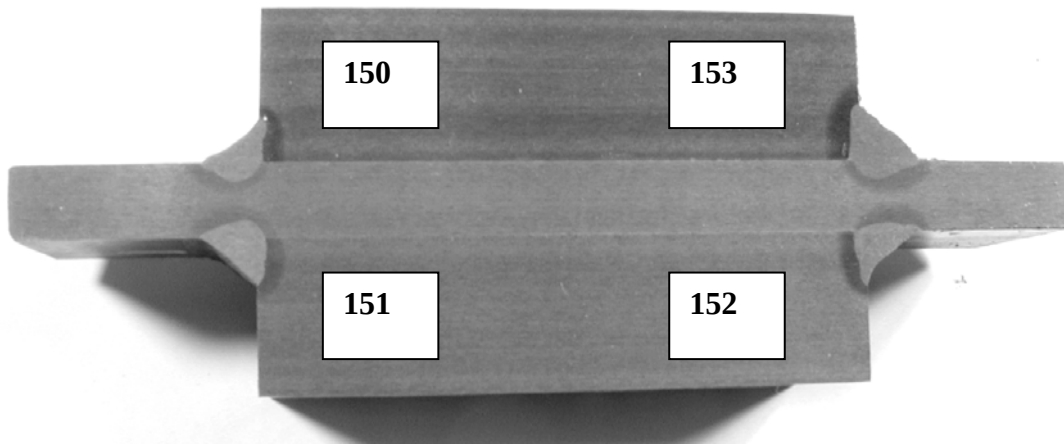


Figure 30: Welds 150, 151, 152, and 153

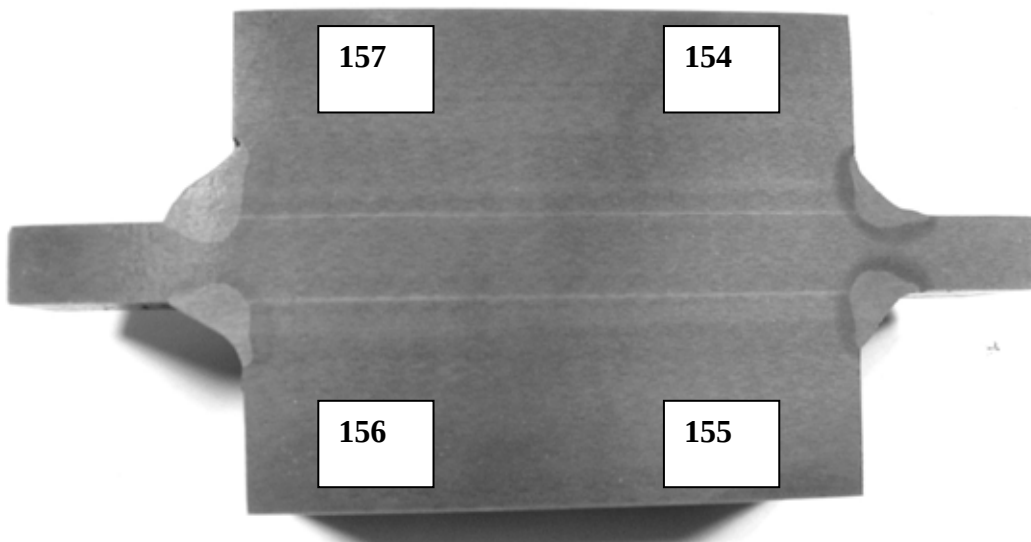


Figure 31: Welds 154, 155, 156, and 157