

TABLE VI. EXPERIMENTAL DATA FOR 80 F HYDROSTATIC EXTRUSION OF 7075-O ALUMINUM ROUNDS AT A RATIO OF 20:1 AND STEM SPEED OF 20 IPM

Die angle - 45 degrees  
Exit speed - 61.5 ft/min

Fluid - Castor oil  
Billet diameter - 1.75 inches

Objective or Variable	Trial	Billet Surface Finish <sup>(a)</sup> , microinches, rms	Billet Lubricant (Details in Table 3)	Extrusion Pressure, 1000 psi				Type of Curve (Fig. 26)	Length of Extrusion, inches	Comments
				Breakthrough		Runout				
				Stem	Fluid	Stem	Fluid			
Billet finish	251	50	L11	195	175 <sup>(h)</sup>	128	120	D2	61	
	250	110-130	L11	180	160 <sup>(h)</sup>	125	117	D2	30	
	249	270	L11	149	135	142	125	B2	87	
	297	300	L11	172	157 <sup>(h)</sup>	140	115	D2	49	
	298	350	L11	164	153 <sup>(h)</sup>	141	118	D2	40	
	299	400	L11	168	153 <sup>(h)</sup>	137	118	D2	44	
	256	Grit	L11	192	173 <sup>(h)</sup>	--	--	D1	22	
	273	Grit	L11	178	180 <sup>(h)</sup>	136	135	D1	26	
	283	Grit	L11	179	167 <sup>(h)</sup>	147	126	D1	30	
Billet finish	255 <sup>(b)</sup>	300	L17	162	159	--	--	--	0	P <sub>b</sub> not reached
	271 <sup>(b)</sup>	350	L17	239	225	--	--	--	0	Ditto
	272 <sup>(b)</sup>	400	L17	274	248	--	--	--	0	"
Billet finish	308	35-50	L17	199	189	--	--	D2	17	
	309	100-250	L17	167	156	139	118	D2	50	
	329	350	L17	179	162 <sup>(h)</sup>	143	116	D1	41	
	330	500	L17	154	153 <sup>(h)</sup>	147	120	D1	51	
	281	Grit	L17	(c)	150	(c)	121	D2	43	
	282	Grit	L17	(c)	153	(c)	117	D2	46	
Billet lubricant and fluid	347	60-120	L17	162	152	144	130	C1	65	
	380	60-120	L8	180	172	--	--	--	--	P <sub>b</sub> not reached
	343 <sup>(d)</sup>	60-120	L22	234	215	--	--	--	--	Ditto
	344 <sup>(d)</sup>	60-120	L46	195	186	--	--	--	--	"
	346	60-120	L46	168	144	--	--	--	--	Stopped prematurely due to false instrument reading
	345	60-120	L47	165	158	141	130	D1	44	
	365 <sup>(e)</sup>	60-120	L47	165	154	143	136	C3	62	
	356	60-120	L51	202	187	--	--	--	--	P <sub>b</sub> not reached
	424	60-120	L52	219	191	160	137	D1	75	
Billet lubricant, fluid, die material, and billet nose design	447	60-120	L31	168	148	136	125	C2	65	
	449 <sup>(f)</sup>	60-120	L31	176	153	141	128	C2	65	
	440	60-120	L33	169	150	159	138	B3	40	
	436	60-120	L38	156	140	140	122	B2	39	
	444	60-120	L48 + L17	156	150	135	127	D1	80	
	431	60-120	L52	188	169	142	119	D2	74	
	432	60-120	L53	164	150	144	123	C2	79	Insufficient lubricant on nose
	433	60-120	L54	169	154	143	127	C2	57	Ditto
	463	60-120	L53	152	137	138	123	B2	66	Stepped billet nose
	464 <sup>(g)</sup>	60-120	L53	149	135	133	119	B2	68	
	453	60-120	L53	155	138	142	122	B2	108	
	454 <sup>(f)</sup>	60-120	L53	150	134	136	122	B2	108	
472	60-120	L53	156	135	138	121	B2	65		

(a) The finish quoted was obtained by the turning operation except for the grit finish, which was obtained by vapor blasting.

(b) Trials 255, 271, and 272 were attempted with the 7075 billets in the T6 condition.

(c) Stem load-cell recorder did not function.

(d) Fluid was water.

(e) Fluid was polyethylene glycol.

(f) Flame coated die used.

(g) Fluid was silicate ester (SE).

(h) A small breakthrough pressure peak occurred at about 135,000 psi followed by seizure and stick-slip. For comparison purposes, the first large stick-slip peak is taken as the breakthrough pressure.

TABLE VII. ADDITIONAL EXPERIMENTAL DATA FOR 80 F HYDROSTATIC EXTRUSION OF 7075-O ROUNDS

Die angle - 45 degrees

Billet diameter - 1.75 inches

Fluid - Castor oil

Surface Finish, inches, rms	Extrusion Ratio	Stem Speed, ipm	Exit Speed, fpm	Billet Lubricant (Details in Table 3)	Extrusion Pressure, 1000 psi				Type of Curve (Fig. 26)	Length of Extrusion, inches	Comments
					Breakthrough		Runout				
					Stem	Fluid	Stem	Fluid			
5-65	40	20	123.0	L17	197	183	157	140	D1	90	
crit	40	20	123.0	L17	195	186	161	145	D1	80	
0-120	40	20	123.0	L53	254	221	165	142	D2	58	
0-120	40	20	123.0	L53	204	164	144	135	D3	137	
0-120	40	20	123.0	L38	204	179	146	135	D1	119	
0-120	40	20	123.0	L52	177	157	149	143	B2	120	Compound angle billet nose, A = 0
0-120	40	20	123.0	L53	168	150	154	137	B2	140	Compound angle billet nose, A = 0
0-120	60	6	55.4	L17	239	216	173	156	D1	60	
0-120	60	20	184.5	L17	217	204	171	153	D1	81	
0-120	60	20	184.5	L17	222	204	147	147	D1	90	
0-120	60	20	184.5	L52	192	178	175	153	B2	200	Compound angle billet nose, A = 0
0-120	200	6	282.5	L53	210	189	--	--	C4	49	Compound angle billet nose, A = 0
0-120	20	80	246.0	L17	167	155	139	129	B1	79	
crit	20	80	246.0	L17	167	154	141	130	B2	80	
on nose	20	80	246.0	L17	160	150	144	130	B1	64	
on rest											
0-120	20	80	246.0	L53	170	148	144	126	B2	88	
0-120	20	80	246.0	L54	168	150	144	126	B2	50	
0-120	20	80	246.0	L31	174	158	144	133	B2	44	
0-120	25	20	7.7	L17	48	46	48	46	A1	8	
0-120	7	20	21.4	L17	99	94	96	89	A2	18	

silicate ester.  
meter was 1.414 inches.