

TABLE 5. EXPERIMENTAL DATA FOR COLD HYDROSTATIC EXTRUSION OF AISI 4340 STEEL AND 7075 ALUMINUM T-SECTIONS

Billet lubricant ---L17      Fluid--- Castor oil

Item	Trial	Material	Die Design	Die Angle, degrees	Extrusion Ratio	Stem Speed	Billet Surface Finish, microinches, rms	Extrusion Pressure, 1000 psi				Length of Extrusion, inches	Comments
								Breakthrough		Runout			
								Stem	Fluid	Stem	Fluid		
1	316	4340	Single angle	45	3.0	6	50-100	232.0	210.0	--	--	2-1/4	Slight $P_b$ peak; severe stick-slip. Die broken on extrusion removal.
2	341	4340	Compound angle	45, 160	3.0	6	Grit <sup>(a)</sup>	256.0	236.0	--	--	1/8	Stopped at indicated pressure.
	342	4340	Compound angle	45, 160	3.0	6	Grit	274.0	245.5	--	--	1/8	Stopped at indicated pressure.
3	321	7075	Compound angle	45, 160	7.3	6	Grit	133.0	122.0	120.0	110.0	17	High $P_b$ peak; severe stick-slip.
	320	7075	Compound angle	45, 160	7.3	6	30-200	133.0	118.0	119.0	106.0	12-1/2	High $P_b$ peak; severe stick-slip.
	325	7075	Compound angle	45, 160	7.3	20	Grit	123.0	115.0	118.5	109.0	15	Moderate $P_b$ peak; moderate stick-slip.
	326	7075	Compound angle		7.3	80	40-130	130.0	119.0	112.0	103.5	22-1/2	High $P_b$ peak; $P_r$ uniform.

(a) Grit billet surface finish obtained by grit blasting followed by vapor blasting.

TABLE 6. EXPERIMENTAL DATA FOR COLD HYDROSTATIC EXTRUSION OF AISI 4340 STEEL AND 7075 ALUMINUM TUBING<sup>(a)</sup>

Die angle -----45 degrees      Billet size -----1.750 OD x 0.750 ID  
 Fluid -----Castor oil      Mandrel -----0.7485 dia at top  
 Billet lubricant ---L17      0.7460 dia at bottom  
 Billet surface ---25 to 100 microinches, rms

Item	Trial	Material	Die Orifice, inches	Extrusion Ratio	Stem Speed, ipm	Extrusion Pressure, 1000 psi				Length of Extrusion, inches	Comments
						Breakthrough		Runout			
						Stem	Fluid	Stem	Fluid		
1	336	4340	1.107	3.77	6	174.0	158.5	179.0	154.5	9-1/2	No $P_b$ peak; uniform $P_r$ followed by pressure rise.
2	331	7075	1.107	3.77	6	49.6	47.0	48.0	47.0	9-1/2	No $P_b$ peak; very slight stick-slip.
	333	7075	1.107		20	48.0	48.0	48.0	48.0	14-1/4	No $P_b$ peak; $P_r$ uniform.
3	335	7075	0.875	12.2	1	135.0	126.0	98.7	92.0	48	High $P_b$ peak; severe stick-slip.
	332	7075	0.875	12.2	6	121.0	110.5	98.0	86.8	42	High $P_b$ peak; severe stick-slip.
	334	7075	0.875	12.2	20	118.0	106.0	100.0	89.2	36	Moderate $P_b$ peak; severe stick-slip.

(a)  $P_b$  = breakthrough pressure;  $P_r$  = runout pressure.

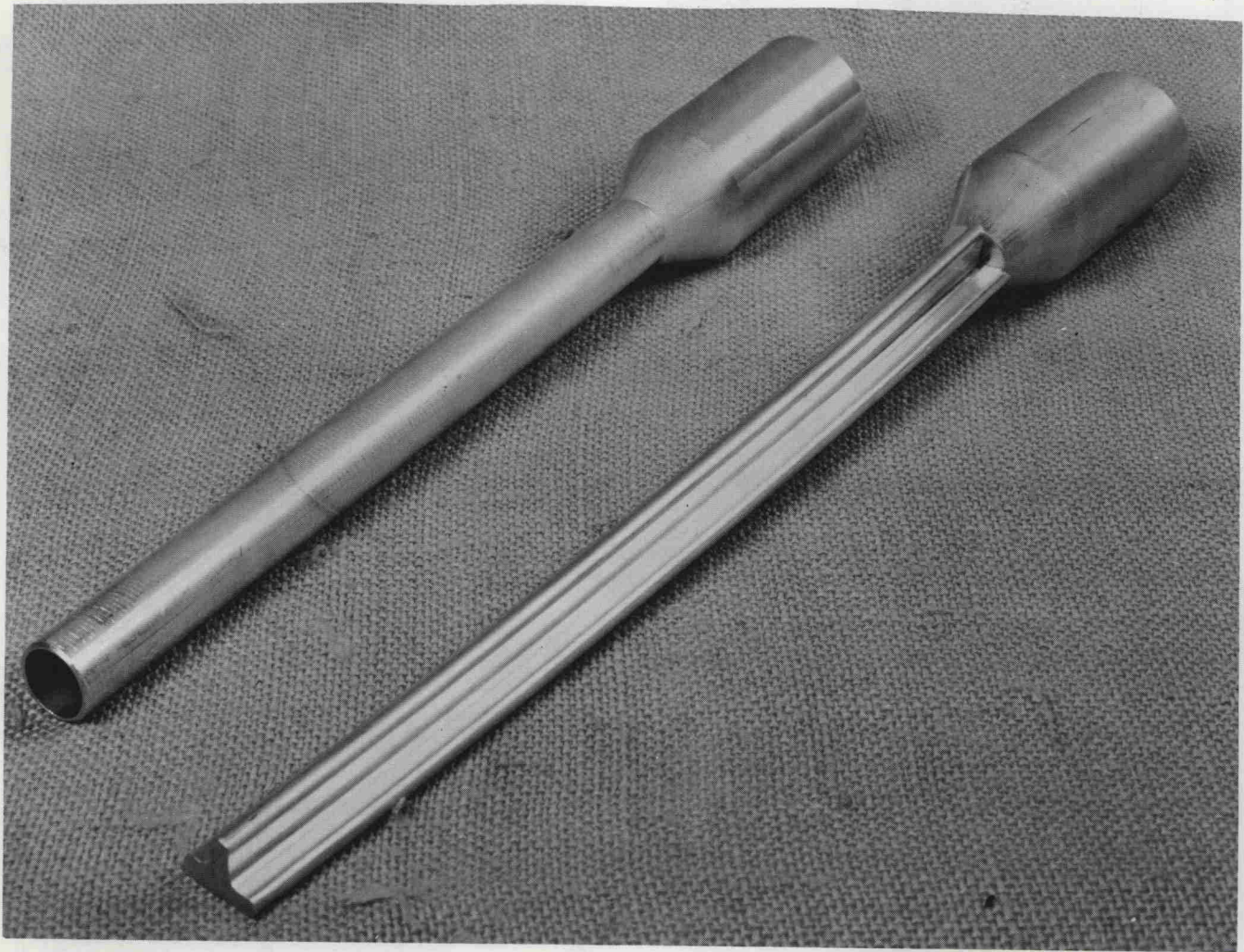


FIGURE 5. HYDROSTATIC EXTRUSIONS OF TUBING AND T-SECTION PRODUCED FROM 7075 ALUMINUM AT ROOM TEMPERATURE.

	<u>Extrusion Ratio</u>	<u>Section Size, inch</u>
Tubing	12. 2:1	0. 875 OD x 0. 750 ID x 0. 063 wall
T-Section	7. 3:1	0. 938 x 0. 688 x 1/4-inch thick