

RESULT

Table 1. Tensile Test Parameters, Properties, and Hardness Test Parameters

Alloy Name	do	Lo	ΔP	$\Delta \epsilon$	Pys	Pts	df	Lf	RB	BHN	Ao	E	σ_{ys}	σ_{ts}	Af	%RA	%EL
	[in]	[in]	[lbf]		[lbf]	[lbf]	[in]	[in]			(in ²)	lbf	lbf/in ²	lbf/in ²	(in ²)		
AISI/SAE 1018 Steel Normalized	0.253	1.8413	180	0.0001	2600	3760	0.1442	2.38	79.62	124.14	0.050	35822988	51744.32	74830.24	0.016	67.51	29.25
	0.25	1.95	1000	0.00074	2550	3680	0.17	2.444	76.64	137.54	0.049	27543467	51974.52	75006.37	0.022	53.76	25.33
	0.252	1.64	1000	0.0083	2605	3780	0.1545	2.19	77.24	113.66	0.049	2416858	52256.1	75826.51	0.018	62.41	33.53
AISI/SAE 1018 Steel Cold Drawn	0.255	1.783	840	0.00062	4500	5220	0.174	1.998	98.6	195	0.051	26542240	88158.16	102263.5	0.023	53.43	12.05
	0.253	3.5	500	0.0004	5000	5250	0.182	3.71875	100.24	784.4	0.05	24877075	99508.3	104483.7	0.026	48.25	6.25
AISI/SAE 1045 Steel Normalized	0.256	1.28125	280	0.0002	3300	5000	0.22405	1.28125	73.28	141.38	0.05	27213127	64145.23	97189.74	0.039	23.40	0
	0.25155	1.8631	300	0.0002	3400	5100	0.1754	2.25	91.22	146.99	0.05	30197637	68447.98	102672	0.024	51.38	20.76
	0.2498	1.766	272	0.0001	3900	6090	0.185	1.987	102.2	247	0.048	55528300	79617.78	124326.2	0.026	45.15	12.51
AISI/SAE 1045 Steel Cold Drawn	0.255	1.857	840	0.0005	4400	6400	0.2077	2.0259	101.94	206.27	0.05	32912378	86199.09	125380.5	0.033	33.65	9.09
	0.254	1.761	210	0.00015	5450	6400	0.183	1.986	99.8	262	0.05	27643367	107611.7	126369.7	0.026	48.09	12.78
2024 Aluminum T6	0.254	1.75	380	0.0007	2570	3310	0.213	1.97	77.8	114.56	0.05	10718857	50745.32	65356.82	0.035	29.67	12.57
	0.2527	2.05	1000	0.00178	2800	3341	0.2046	2.1715	77.5	141.383	0.05	11207271	55857.04	66649.41	0.032	34.44	5.92
2024 Aluminum T4	0.2537	1.702	700	0.00133	2525	3475	0.205	2.05	74.5	119	0.2537	1.702	700	0.00133	2525	3475	0.205
	0.254	2.033	200	0.0005	2000	3300	0.208	2.213	20.33	91.11	0.05	7898105	39490.52	65159.37	0.033	32.94	8.85
6061 Aluminum T6	0.258	1.8	285	0.00076	1655	2010	0.216	2.07	37.48	79.003	0.05	7176657	31672.98	38466.88	0.036	29.90	15
	0.2546	3.5	1000	0.0006	1642	1947	0.207	3.707	25.8	270	0.05	32753845	32269.09	38263.04	0.033	33.89	5.91
	0.2479	1.861	1000	0.0022	1725	1900	0.225	2.05	38.06	122.6	0.048	9422250	35757.44	39385	0.039	17.62	10.15
360 Brass Cold Drawn	0.255	1.94	500	0.00106	2760	2960	0.165	2.154	74.44	114.355	0.05	9240897	54070.34	57988.48	0.021	58.13	11.03
	0.2497	1.78	1000	0.00092	3150	3400	0.188	2.265	67.64	500	0.049	22207795	64358.19	69465.98	0.027	43.31	27.24
	0.2474	3.5	600	0.0013	2620	2890	0.156	3.704	74.9	433.31	0.048	9605917	54529.59	60149.05	0.019	60.23	5.82

Table 2. Hardness Test Parameters and Properties

Alloy Name	Treatment	Brinell Hardness			Rb	1/(130-Rb)
		d(mm)	P(kg)	BHN		
AISI/SAE 1018 Steel Normalized	Normalized	± .002	500	N/A	± .606	±0.02
AISI/SAE 1018 Steel	Normalized	± .002	500	N/A	±1.69794	±0.02
AISI/SAE 1018 Steel	Normalized	± .002	500	N/A	± 3.34	±0.02
AISI/SAE 1018 Steel Cold Drawn		± .002	500	N/A	± .703	±0.02
AISI/SAE 1018 Steel	Cold Drawn	± .002	500	N/A	± .404	±0.02
AISI/SAE 1045 Steel Normalized	Normalized	± .002	500	N/A	± 4.2163	±0.02
AISI/SAE 1045 Steel	Normalized	± .002	500	N/A	± 1.665	±0.02
AISI/SAE 1045 Steel	Normalized	± .002	500	N/A	± 1.	±0.02
AISI/SAE 1045 Steel Cold Drawn	Cold Drawn	± .002	500	N/A	± .4	±0.02
AISI/SAE 1045 Steel	Cold Drawn	± .002	500	N/A	± 2.122	±0.02
2024 Aluminum T6	T6	± .002	500	N/A	± 1.38	±0.02
2024 Aluminum	T6	± .002	500	N/A	± .3536	±0.02
2024 Aluminum T4	T4	± .002	500	N/A	± 1.2	±0.02
2024 Aluminum	T4	± .002	500	N/A	± .0925	±0.02
6061 Aluminum T6	T6	± .002	500	N/A	± .0925	±0.02
6061 Aluminum	T6	± .002	500	N/A	± 1.8059	±0.02
6061 Aluminum	T6	± .002	500	N/A	± 2.01	±0.02
360 Brass Cold Drawn	Cold Drawn	± .002	500	N/A	±1.6881	±0.02
360 Brass	Cold Drawn	± .002	500	N/A	± 1.392	±0.02
360 Brass	Cold Drawn	± .002	500	N/A	± 4.459	±0.02
AISI/SAE 1018 Steel Normalized	Normalized	± .002	500	N/A	± .8497	±0.02