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Mechanical Properties of Various Alloys

material	*alloy*	density (lb/cu.in.)	0.2% yield strength (ksi)	ultimate tensile strength (ksi)	elongation in 2" (%)	elastic modulus (10^6 psi)	hardness (HV)	specific strength (kNm/kg)	specific stiffness (MNm/kg)	thermal conductivity (btu/hr/ft/degF) @ 68F	coefficient of thermal expansion (microin/in/deg F) @	specific heat (Btu/lb/deg. F)	melting point (deg. F)
Martensitic stainless	*type 410 - hardened*	0.281	160	205	9	29.0	413	182	25.7	14.4	5.5	0.11	2750
Martensitic stainless	*type 410 - annealed*	0.281	45	80	30	29.0	148	71	25.7	14.4	5.5	0.11	2750
steel	*HSLA grade SAE 945A*	0.284	45	65	24	29.0	134	57	25.4	28	5.8	0.12	2800
Boron-treated steel	*22MnB5 - hardened*	0.284	160	215	8	29.0	447	189	25.4	-	-	-	2750
Boron-treated steel	*22MnB5 - as delivered*	0.284	45	72	28	29.0	148	63	25.4	-	-	-	2750
Aluminum	*6061-T6*	0.098	40	45	12	10.0	107	115	25.5	96.4	13.1	0.22	1210
Stainless steel	*type 304L*	0.290	35	85	55	28.0	148	73	24.1	9.4	9.6	0.12	2600
Stainless steel	*type 316L*	0.290	42	84	50	28.0	145	72	24.1	9.4	8.8	0.12	2550
Magnesium	*AZ31B -H24*	0.064	32	42	15	6.5	73	163	25.4	44.4	14.4	0.25	1160
Titanium	*CP GR-2*	0.163	50	63	25	15.0	200	96	22.9	9.5	4.8	0.124	3020
Titanium	*Ti 6Al-4V solution+aged*	0.160	160	170	10	16.5	370	265	25.7	3.8	5.0	0.14	3010

Relative Mechanical Properties Compared to Martensitic Stainless Steel - *Type 410 - Hardened*

material	*alloy*	relative density	relative yield strength	relative ultimate tensile strength	relative elongation in 2"	relative elastic modulus	relative hardness	relative specific strength	relative specific stiffness	relative thermal conductivity	relative coef. of thermal expansion	relative specific heat	relative melting point
Martensitic stainless	*type 410 - hardened*	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Martensitic stainless	*type 410 - annealed*	1.00	0.28	0.39	3.33	1.00	0.36	0.39	1.00	1.00	1.00	1.00	1.00
steel	*HSLA grade SAE 945A*	1.01	0.28	0.32	2.67	1.00	0.32	0.31	0.99	1.94	1.05	1.09	1.02
Boron-treated steel	*22MnB5 - hardened*	1.01	1.00	1.05	0.89	1.00	1.08	1.04	0.99	-	-	-	1.00
Boron-treated steel	*22MnB5 - as delivered*	1.01	0.28	0.35	3.11	1.00	0.36	0.35	0.99	-	-	-	1.00
Aluminum	*6061-T6*	0.35	0.25	0.22	1.33	0.34	0.26	0.63	0.99	6.69	2.38	2.00	0.44
Stainless steel	*type 304L*	1.03	0.22	0.41	6.11	0.97	0.36	0.40	0.94	0.65	1.75	1.09	0.95
Stainless steel	*type 316L*	1.03	0.26	0.41	5.56	0.97	0.35	0.40	0.94	0.65	1.60	1.09	0.93
Magnesium	*AZ31B -H24*	0.23	0.20	0.20	1.67	0.23	0.18	0.90	0.99	3.08	2.62	2.27	0.42
Titanium	*CP GR-2*	0.58	0.31	0.31	2.78	0.52	0.48	0.53	0.89	0.66	0.87	1.13	1.10
Titanium	*Ti 6Al-4V solution+aged*	0.57	1.00	0.83	1.11	0.57	0.90	1.46	1.00	0.26	0.91	1.27	1.09