



Thermal Expansion Data

Temperature Deg. F	Carbon Steel, Carbon Moly, Low Chrome (thru 3 Cr Mo)	5 Cr Mo thru 9 Cr Mo 18	Stainless Steels 18 Cr 8 Ni	12 Cr 17 Cr 27 Cr	25 Cr 20 Ni	Monel 67 Ni 30 Cr	3-1/2 Nickel	Aluminum	Gray Cast Iron	Bronze	Brass	Wrought Iron	70 Cu 30 Ni
-325	-2.37	-2.22	-3.85	-2.04	-3.00	-2.62	-2.22	-4.68		-3.98	-3.88	-2.7	-3.15
-300	-2.24	-2.1	-3.63	-1.92	-2.83	-2.5	-2.1	-4.46		-3.74	-3.64	-2.55	-2.87
-275	-2.11	-1.98	-3.41	-1.8	-2.66	-2.38	-1.98	-4.21		-3.5	-3.4	-2.4	-2.7
-250	-1.98	-1.86	-3.19	-1.68	-2.49	-2.26	-1.86	-3.97		-3.26	-3.16	-2.25	-2.53
-225	-1.85	-1.74	-2.96	-1.57	-2.32	-2.14	-1.74	-3.71		-3.02	-2.93	-2.1	-2.36
-200	-1.71	-1.62	-2.73	-1.46	-2.15	-2.02	-1.62	-3.44		-2.78	-2.7	-1.95	-2.19
-175	-1.58	-1.5	-2.5	-1.35	-1.98	-1.9	-1.5	-3.16		-2.54	-2.47	-1.81	-2.12
-150	-1.45	-1.37	-2.27	-1.24	-1.81	-1.79	-1.38	-2.88		-2.31	-2.24	-1.67	-1.95
-125	-1.3	-1.23	-2.01	-1.11	-1.6	-1.59	-1.23	-2.57		-2.06	-2	-1.49	-1.74
-100	-1.15	-1.08	-1.75	-0.98	-1.39	-1.38	-1.08	-2.27		-1.81	-1.76	-1.31	-1.53
-75	-1	-0.94	-1.5	-0.85	-1.18	-1.18	-0.93	-1.97		-1.56	-1.52	-1.13	-1.33
-50	-0.84	-0.79	-1.24	-0.72	-0.98	-0.98	-0.078	-1.67		-1.32	-1.29	-0.96	-1.13
-25	-0.68	-0.63	-0.98	-0.57	-0.78	-0.77	-0.62	-1.32		-1.25	-1.02	-0.76	-0.089
0	-0.49	-0.46	-0.72	-0.42	-0.57	-0.57	-0.46	-0.97		-0.77	-0.75	-0.56	-0.66
25	-0.32	-0.3	-0.46	-0.27	-0.37	-0.3	-0.3	-0.63		-0.49	-0.48	-0.36	-0.42
50	-0.14	-0.13	-0.21	-0.12	-0.16	-0.2	-0.14	-0.28		-0.22	-0.21	-0.16	-0.19
70	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0.23	0.22	0.34	0.2	0.28	0.28	0.22	0.46	0.21	0.36	0.35	0.26	0.31
125	0.42	0.4	0.62	0.36	0.51	0.52	0.4	0.85	0.38	0.66	0.64	0.48	0.56
150	0.61	0.58	0.9	0.53	0.74	0.75	0.58	1.23	0.55	0.96	0.94	0.7	0.82
175	0.8	0.76	1.18	0.69	0.98	0.99	0.76	1.62	0.73	1.26	1.23	0.92	1.07
200	0.99	0.94	1.46	0.86	1.21	1.22	0.94	2	0.9	1.56	1.52	1.14	1.33
225	1.21	1.13	1.75	1.03	1.45	1.46	1.13	2.41	1.08	1.86	1.83	1.37	1.59
250	1.4	1.33	2.03	1.21	1.7	1.71	1.32	2.83	1.27	2.17	2.14	1.6	1.86
275	1.61	1.52	2.32	1.38	1.94	1.96	1.51	3.24	1.45	2.48	2.45	1.83	2.13
300	1.82	1.71	2.61	1.56	2.18	2.21	1.69	3.67	1.64	2.79	2.76	2.06	2.4
325	2.04	1.9	2.9	1.74	2.43	2.44	1.88	4.09	1.83	3.11	3.08	2.29	2.68
350	2.26	2.1	3.2	1.93	2.69	2.68	2.08	4.52	2.03	3.42	3.41	2.53	2.96
375	2.48	2.3	3.5	2.11	2.94	2.91	2.27	4.95	2.22	3.74	3.73	2.77	3.24
400	2.7	2.5	3.8	2.3	3.2	3.25	2.47	5.39	2.42	4.05	4.05	3.01	3.52
425	2.93	2.72	4.1	2.5	3.46	3.52	2.69	5.83	2.62	4.37	4.38	3.25	
450	3.16	2.93	4.41	2.69	3.72	3.79	2.91	6.28	2.83	4.69	4.72	3.5	
475	3.39	3.14	4.71	2.89	3.98	4.06	3.13	6.72	3.03	5.01	5.06	3.74	
500	3.62	3.35	5.01	3.08	4.24	4.33	3.34	7.17	3.24	5.33	5.4	3.99	
525	3.86	3.58	5.31	3.28	4.51	4.61	3.57	7.63	3.46	5.65	5.75	4.25	
550	4.11	3.8	5.62	3.49	4.79	4.9	3.8	8.1	3.67	5.98	6.1	4.5	
575	4.35	4.02	5.93	3.69	5.06	5.18	4.03	8.56	3.89	6.31	6.45	4.76	

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600	4.6	4.24	6.24	3.9	5.33	5.46	4.27	9.03	4.11	6.64	6.8	5.01	
625	4.86	4.47	6.55	4.1	5.6	5.75	4.51		4.34	6.96	7.16	5.27	
650	5.11	4.69	6.87	4.31	5.88	6.05	4.75		4.57	7.29	7.53	5.53	
675	5.37	4.92	7.18	4.73	6.16	6.34	4.99		4.8	7.62	7.89	5.8	
700	5.63	5.14	7.5	4.73	6.44	6.64	5.24		5.03	7.95	8.26	6.06	
725	5.9	5.38	7.82	5.16	6.73	6.94	5.5		5.26	8.28	8.64	6.32	
750	6.16	5.62	8.15	5.38	7.02	7.25	5.76		5.5	8.62	9.02	6.59	
775	6.43	5.86	8.47	5.6	7.31	7.55	6.02		5.74	8.96	9.4	6.85	
800	6.7	6.1	8.8	5.82	7.6	7.85	6.27		5.98	9.3	9.78	7.12	
825	6.97	6.34	9.13	6.05	7.89	8.16	6.54		6.22	9.64	10.17	7.4	
850	7.25	6.59	9.46	6.27	8.19	8.48	6.81		6.47	9.99	10.57	7.69	
875	7.53	6.83	9.79	6.49	8.48	8.8	7.08		6.72	10.33	10.96	7.97	
900	7.81	7.07	10.12	6.71	8.78	9.12	7.35		6.97	10.68	11.35	8.25	
925	8.08	7.31	10.46	6.71	9.07	9.44	7.72		7.23	11.02	11.75	8.53	
950	8.35	7.56	10.8	6.94	9.37	9.77	8.09		7.5	11.37	12.16	8.81	
975	8.62	7.81	11.14	7.17	9.66	10.09	8.46		7.76	11.71	12.57	9.08	
1000	8.89	8.06	11.48	7.4	9.95	10.42	8.83		8.02	12.05	12.98	9.36	
1025	9.17	8.3	11.82	7.62	10.24	10.75	8.98			12.4	12.39		
1050	9.46	8.55	12.16	7.95	10.54	11.09	9.14			12.76	13.81		
1075	9.75	8.8	12.5	8.18	10.83	11.43	9.29			13.11	14.23		
1100	10.04	9.05	12.84	8.31	11.12	11.77	9.45			13.47	14.65		
1125	10.31	9.28	13.18	8.53	11.41	12.11	9.78						
1150	10.57	9.52	13.52	8.76	11.71	12.47	10.11						
1175	10.83	9.76	13.86	8.98	12.01	12.81	10.44						
1200	11.1	10	14.2	9.2	12.31	13.15	10.78						
1225	11.38	10.26	14.54	9.42	12.59	13.5							
1250	11.66	10.53	14.88	9.65	12.88	13.86							
1275	11.94	10.79	15.22	9.88	13.17	14.22							
1300	12.22	11.06	15.56	10.11	13.46	14.58							
1325	12.5	11.3	15.9	10.33	13.75	14.94							
1350	12.78	11.55	16.24	10.56	14.05	15.3							
1375	13.34	11.8	16.58	10.78	14.35	15.66							
1400		12.05	16.92	11.01	14.65	16.02							
1425			17.3										
1450			17.69										
1475			18.08										
1500			18.47										

