



TECHNICAL INFORMATION

EXPANSION RATES FOR PIPING MATERIALS FROM 0°C (mm/m)

Temperature °C	Carbon and Carbon Molybdenum steel	4-6% Cr Alloy steel	12% Cr Stainless steel	18 Cr. 8 Ni. Stainless steel
-130	-1.27	-1.25	-1.17	-1.96
-120	-1.19	-1.17	-1.09	-1.82
-110	-1.11	-1.09	-1.01	-1.68
-100	-1.03	-0.98	-0.91	-1.55
-90	-0.94	-0.94	-0.87	-1.39
-80	-0.84	-0.82	-0.76	-1.23
-70	-0.74	-0.75	-0.70	-1.08
-60	-0.64	-0.64	-0.60	-0.93
-50	-0.54	-0.55	-0.52	-0.78
-40	-0.43	-0.44	-0.42	-0.62
-30	-0.32	-0.33	-0.31	-0.47
-20	-0.21	-0.22	-0.21	-0.31
-10	-0.10	-0.11	-0.10	-0.15
0	0	0	0	0
10	0.11	0.10	0.10	0.15
20	0.22	0.20	0.20	0.31
30	0.33	0.33	0.31	0.51
40	0.45	0.42	0.40	0.65
50	0.57	0.53	0.50	0.81
60	0.69	0.63	0.60	0.98
70	0.80	0.74	0.70	1.15
80	0.92	0.85	0.80	1.32
90	1.03	0.96	0.91	1.49
100	1.15	1.07	1.02	1.66
110	1.27	1.19	1.12	1.83
120	1.38	1.31	1.22	2.00
130	1.51	1.43	1.33	2.17
140	1.64	1.54	1.43	2.34
150	1.78	1.66	1.54	2.52
160	1.92	1.78	1.65	2.69
170	2.05	1.88	1.77	2.87
180	2.18	2.02	1.87	3.01
190	2.31	2.14	1.98	3.23
200	2.44	2.26	2.10	3.41
210	2.58	2.39	2.22	3.59
220	2.72	2.52	2.34	3.78
230	2.86	2.64	2.45	3.96
240	3.00	2.77	2.57	4.14
250	3.13	2.89	2.68	4.32
260	3.27	3.02	2.80	4.50
270	3.42	3.16	2.93	4.68
280	3.57	3.29	3.05	4.87
290	3.17	3.42	3.17	5.06
300	3.85	3.55	3.29	5.24
310	4.00	3.69	3.42	5.48
320	4.16	3.82	3.54	5.61
330	4.31	3.96	3.67	5.81
340	4.46	4.08	3.79	6.00
350	4.62	4.23	3.92	6.18
360	4.77	4.36	4.04	6.38
370	4.93	4.49	4.16	6.57
380	5.09	4.63	4.28	6.76
390	5.25	4.78	4.41	6.96
400	5.41	4.92	4.54	7.15
410	5.57	5.07	4.68	7.34
420	5.73	5.21	4.81	7.54
430	5.89	5.35	4.94	7.74
440	6.06	5.50	5.08	7.94



Temperature °C	Carbon and Carbon Molybdenum steel	4-6% Cr Alloy steel	12% Cr Stainless steel	18 Cr. 8 Ni. Stainless steel
450	6.22	5.65	5.22	8.13
460	6.39	5.79	5.35	8.33
470	6.56	5.94	5.48	8.53
480	6.73	6.08	5.61	8.73
490	6.89	6.22	5.74	8.93
500	7.05	6.39	5.89	9.14
510	7.21	6.52	6.01	9.34
520	7.38	6.67	6.15	9.54
530	7.54	6.82	6.29	9.75
540	7.71	6.97	6.43	9.95
550	7.84	7.11	6.56	10.16
560	8.05	7.26	6.70	10.36
570	8.22	7.41	6.84	10.56
580	8.40	7.56	6.97	10.77
590	8.57	7.71	7.11	10.97
600	8.73	7.85	7.24	11.13
610	8.89	7.99	7.37	11.38
620	9.04	8.14	7.50	11.58
630	9.20	8.28	7.63	11.79
640	9.36	8.43	7.77	11.99
650	9.53	8.58	7.91	12.20
660	9.70	8.74	8.05	12.40
670	9.87	8.90	8.19	12.60
680	10.03	9.06	8.33	12.81
690	10.20	9.21	8.46	13.01
700	10.37	9.35	8.59	13.22
710	10.54	9.52	8.74	13.42
720	10.71	9.67	8.87	13.62
730	10.87	9.82	9.01	13.83
740	11.04	9.97	9.15	14.03
750	11.21	10.12	9.28	14.24
760	11.38	10.27	9.41	14.44
770				14.67
780				14.90
790				15.14
800				15.37
810				15.60

TEMPERATURE CONVERSION TABLE

C	F	C	F	C	F	C	F	C	F	C	F	C	F	C	F								
-22.8	-9	15.8	-8.89	16	60.8	5.00	41	105.8	18.9	66	150.8	32.8	91	195.8	127	260	500	266	510	950	404	760	1400
-22.2	-8	17.6	-8.33	17	62.6	5.56	42	107.6	19.4	67	152.6	33.3	92	197.6	132	270	518	271	520	968	410	770	1418
-21.7	-7	19.4	-7.78	18	64.4	6.11	43	109.4	20.0	68	154.4	33.9	93	199.4	138	280	536	277	530	986	416	780	1436
-21.1	-6	21.2	-7.22	19	66.2	6.67	44	111.2	20.6	69	156.2	34.4	94	201.2	143	290	554	282	540	1004	421	790	1454
-20.6	-5	23.0	-6.67	20	68.0	7.22	45	113.0	21.1	70	158.0	35.0	95	203.0	149	300	572	288	550	1022	427	800	1472
-20.0	-4	24.8	-6.11	21	69.8	7.78	46	114.8	21.7	71	159.8	35.6	96	204.8	154	310	590	293	560	1040	432	810	1490
-19.4	-3	26.6	-5.56	22	71.6	8.33	47	116.6	22.2	72	161.6	36.1	97	206.6	160	320	608	299	570	1058	438	820	1508
-189	-2	28.4	-5.00	23	73.4	8.89	48	118.4	22.8	73	163.4	36.7	98	208.4	166	330	626	304	580	1076	443	830	1526
-18.3	-1	30.2	-4.44	24	75.2	9.44	49	120.2	23.3	74	165.2	37.2	99	210.2	171	340	644	310	590	1094	449	840	1544
-17.8	0	32.0	-3.89	25	77.0	10.0	50	122.0	23.9	75	167.0	38	100	212	177	350	662	316	600	1112	455	850	1562
-17.2	1	33.8	-3.33	26	78.8	10.6	51	123.8	24.4	76	168.8	43	110	230	182	360	680	321	610	1130	460	860	1580
-16.7	2	35.6	-2.78	27	80.6	11.1	52	125.6	25.0	77	170.6	49	120	248	188	370	698	327	620	1148	466	870	1598
-16.1	3	37.4	-2.22	28	82.4	11.7	53	127.4	25.6	78	172.4	54	130	266	193	380	716	332	630	1166	471	880	1616
-15.6	4	39.2	-1.67	29	84.2	12.2	54	129.2	26.1	79	174.2	60	140	284	199	390	734	338	640	1184	477	890	1634
-15.0	5	41.0	-1.11	30	86.0	12.8	55	131.0	26.7	80	176.0	66	150	302	204	400	752	343	650	1202	482	900	1652
-14.4	6	42.8	-0.56	31	87.8	13.3	56	132.8	27.2	81	177.8	71	160	320	210	410	770	349	660	1220	488	910	1670
-13.9	7	44.6	0	32	89.6	13.9	57	134.6	27.8	82	179.6	77	170	338	216	420	788	354	670	1238	493	920	1688
-13.3	8	46.4	0.56	33	91.4	14.4	58	136.4	28.3	83	181.4	82	180	356	221	430	806	360	680	1256	499	930	1706
-12.8	9	48.2	1.11	34	93.2	15.0	59	138.2	28.9	84	183.2	88	190	374	227	440	824	366	690	1274	504	940	1724
-12.2	10	50.0	1.67	35	95.0	15.6	60	140.0	29.4	85	185.0	93	200	392	232	450	842	371	700	1292	510	950	1742
-11.7	11	51.8	2.22	36	96.8	16.1	61	141.8	30.0	86	186.8	99	210	410	238	460	860	377	710	1310	516	960	1760
-11.1	12	53.6	2.78	37	98.6	16.7	62	143.6	30.6	87	188.6	104	220	428	243	470	878	382	720	1328	521	970	1778
-106	13	55.4	3.33	38	100.4	17.2	63	145.4	31.1	88	190.4	110	230	446	249	480	896	388	730	1346	527	980	1796
-10.0	14	57.2	3.89	39	102.2	17.8	64	147.2	31.7	89	192.2	116	240	464	254	490	914	393	740	1364	532	990	1814

Read known temperature in **BOLD TYPE**. Equivalent temperature in degrees Centigrade will be found in left hand column. Corresponding temperature in degrees Fahrenheit will be found in column to the right.