



PIPE EXPANSION TABLE LINEAR THERMAL EXPANSION BETWEEN 21°C

Pressure of Steam			Temperature		Pipe Expansion Movements (mm /meter)				
kPa (a)	mmHg	kPa (g)	°C	°F	Carbon Steel, Carbon-Mo < 3% Cr	Alloy Steel 5 Cr-Mo to 9 Cr-Mo	Austenitic St. Steel 18 Cr-8 Ni	Ferritic St. Steel 12 to 27 Cr	Monel 400
			-129	-200	-1.42	-1.34	-2.26	-1.22	-1.69
			-155	-175	-1.31	-1.24	-2.07	-1.12	-1.59
			-101	-150	-1.20	-1.14	-1.89	-1.03	-1.49
			-87	-125	-1.08	-1.02	-1.67	-0.93	-1.32
			-73	-100	-0.95	-0.90	-1.45	-0.82	-1.15
			-59	-75	-0.83	-0.78	-1.25	-0.71	-0.98
			-46	-50	-0.70	-0.65	-1.03	-0.60	-0.81
			-32	-25	-0.55	-0.52	-0.81	-0.48	-0.64
			-18	0	-0.41	-0.39	-0.60	-0.35	-0.47
			-4	25	-0.26	-0.25	-0.38	-0.22	-0.33
1.23	9.21		10	50	-0.11	-0.11	-0.17	-0.10	-0.13
2.50	18.77		21	70	0.00	0.00	0.00	0.00	0.00
6.52	48.92		38	100	0.18	0.17	0.27	0.15	0.22
13.36	100.28		52	125	0.34	0.32	0.50	0.29	0.41
25.61	192.28		66	150	0.50	0.47	0.74	0.43	0.61
46.29	347.22		79	175	0.66	0.62	0.97	0.57	0.81
79.43	596.14		93	200	0.83	0.78	1.21	0.71	1.01
130.38		29.06	107	225	1.00	0.94	1.45	0.85	1.22
205.63		104.28	121	250	1.16	1.10	1.69	1.00	1.42
313.02		211.70	135	275	1.34	1.25	1.93	1.15	1.66
461.95		360.63	149	300	1.51	1.42	2.17	1.30	1.84
662.90		561.60	163	325	1.70	1.59	2.42	1.45	2.05
928.00		826.70	177	350	1.87	1.75	2.66	1.60	2.26
1270.0		1169.0	191	375	2.06	1.92	2.91	1.75	2.45
1704.0		1603.0	204	400	2.25	2.08	3.16	1.91	2.70
			218	425	2.44	2.26	3.41	2.07	2.92
2910.0		2808.0	232	450	2.63	2.44	3.66	2.23	3.15
			236	475	2.82	2.61	3.91	2.40	3.38
4682.0		4581.0	260	500	3.01	2.79	4.17	2.56	3.60
			274	525	3.21	2.91	4.42	2.73	3.84

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kPa (a)	mmHg	kPa (g)	°C	°F	Carbon Steel, Carbon-Mo < 3% Cr	Alloy Steel 5 Cr-Mo to 9 Cr-Mo	Austenitic St. Steel 18 Cr-8 Ni	Ferritic St. Steel 12 to 27 Cr	Monel 400
7191.0		7099.0	288	550	3.41	3.15	4.68	2.90	4.07
			302	575	3.62	3.34	4.94	3.07	4.30
10618		10517	316	600	3.83	3.53	5.20	3.25	4.55
			329	625	4.04	3.71	5.46	3.41	4.79
15196		15095	343	650	4.25	3.90	5.72	3.59	5.03
			357	675	4.46	4.09	5.98	3.76	5.28
			371	700	4.68	4.28	6.25	3.94	5.53
			385	725	4.90	4.48	6.51	4.12	5.78
			399	750	5.13	4.68	6.79	4.30	6.03
			413	775	5.35	4.88	7.05	4.48	6.28
			427	800	5.58	5.08	7.33	4.66	6.54
			441	825	5.80	5.28	7.60	4.85	6.80
			454	850	6.04	5.48	7.88	5.03	7.04
			468	875	6.27	5.68	8.15	5.22	7.33
			482	900	6.50	5.89	8.43	5.40	7.60
			496	925	6.73	6.10	8.71	5.60	7.86
			510	950	6.95	6.30	9.00	5.78	8.14
			524	975	7.18	6.50	9.28	5.97	8.40
			538	1000	7.40	6.71	9.56	6.16	8.68
			551	1025	7.65	6.91	9.85	6.35	
			566	1050	7.88	7.12	10.13	6.54	
			580	1075	8.12	7.33	10.41	6.73	
			593	1100	8.36	7.54	10.70	6.92	
			607	1125	8.58	7.74	10.98	7.10	
			621	1150	8.80	7.93	11.26	7.29	