

HEAT LOSSES FROM HORIZONTAL BARE STEEL PIPE

(BTU per hour per linear foot at 70°F room temperature)

PIPE Nom. Pipe Size	HOT WATER (180°F)	STEAM 5 PSIG (20 PSIA)
1/2	60	96
3/4	73	118
1	90	144
1 1/4	112	179
1 1/2	126	202
2	155	248
2 1/2	185	296
3	221	355
3 1/2	244	401
4	279	448

COLORS & APPROXIMATE TEMPERATURE FOR CARBON STEEL

Black Red	990°F
Dark Blood Red	1,050°F
Dark Cherry Red	1,175°F
Medium Cherry Red	1,250°F
Full Cherry Red	1,375°F
Light Cherry, Scalding	1,550°
Salmon, Free Scalding	1,650°F
Light Salmon	1,725°F
Yellow	1,825°F
Light Yellow	1,975°F
White	2,220°F

TOTAL THERMAL EXPANSION OF PIPING MATERIAL

(Inches Per 100 Ft. Above 32°F)

Temp °F	Carbon & Molly Cast		Brass & Wrought		
	Carbon Steel	Iron	Copper	Bronze	Iron
32	0.0	0.0	0.0	0.0	0.0
100	0.5	0.5	0.8	0.8	0.5
150	0.8	0.8	1.4	1.4	0.9
200	1.2	1.2	2.0	2.0	1.3
250	1.7	1.5	2.7	2.6	1.7
300	2.0	1.9	3.3	3.2	2.2
350	2.5	2.3	4.0	3.9	2.6
400	2.9	2.7	4.7	4.6	3.1
450	3.4	3.1	5.3	5.2	3.6
500	3.8	3.5	6.0	5.9	4.1
550	4.3	3.9	6.7	6.5	4.6
600	4.8	4.4	7.4	7.2	5.2
650	5.3	4.8	8.2	7.9	5.6
700	5.9	5.3	9.0	8.5	6.1
750	6.4	5.8	-	-	6.7
800	7.0	6.3	-	-	7.2
850	7.4	-	-	-	-
900	8.0	-	-	-	-
950	8.5	-	-	-	-
1000	9.1	-	-	-	-

WEIGHTS OF METALS

Material	Chemical Symbol	Wt.in Lbs. Per Cubic In.	Wt. in Lbs. Per Cubic Ft.
Aluminum	Al	0.093	160
Antimony	Sb	0.2422	418
Brass	-	0.303	524
Bronze	-	0.32	552
Chromium	Cr	0.2348	406
Copper	Cu	0.323	558
Gold	Au	0.6975	1,205
Iron (cast)	Fe	0.26	450
Iron (wrought)	Fe	0.2834	490
Lead	Pb	0.4105	710
Maganese	Mn	0.2679	463
Mercury	Hg	0.491	849
Molybdenum	Mo	0.309	534
Monel	-	0.318	550
Platinum	Pt	0.818	1,413
Steel (mild)	-	0.2816	490
Steel (stainless)	-	0.277	484
Tin	Sn	0.265	459
Titanium	Ti	0.1278	221
Zinc	Zn	0.258	446