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## PIPE, PIPE FITTINGS AND ACCESSORY WEIGHTS, AND THERMAL EXPANSION

# PIPE DATA

DATA SHEET DS-500-1.1

### BRITISH UNITS (see back page for Metric Units)

#### HANGER SELECTION

When selecting pipe hangers or supports, allowances must be made for Pipe Fittings or Accessories such as valves, strainers, etc. Larger capacities must be used in these locations. Approximate piping component weights are given in Pipe Fitting and Accessory Weight table.

#### WATER PIPE WEIGHTS (FIBERGLASS INSULATION)

Pipe Size (in)	Max Spacing (ft)	Pipe Schedule	Insul Thick-ness (in)	Weight per Foot (lbs)				WEIGHT per LENGTH (lbs)												
				Pipe Only	Water	Insulation	Total	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'
1	7	40	1	1.7	0.4	0.3	2.4	14	19	24										
1 1/4	7	40	1	2.3	0.7	0.3	3.3	20	26	33										
1 1/2	9	40	1	2.7	0.9	0.4	4.0	24	32	40										
2	10	40	1	3.7	1.5	0.4	5.6	34	45	56										
2 1/2	11	40	1	5.8	2.1	0.5	8.4	50	67	84	101									
3	12	40	1	7.6	3.2	0.6	11.4		91	114	137									
4	14	40	1	11.0	5.2	0.7	16.9		135	169	203	237								
5	16	40	1 1/2	15.0	8.7	1.4	25.1		201	251	301	351	402							
6	17	40	1 1/2	19.0	12.4	1.6	33.0		264	330	396	462	528	594						
8	19	40	1 1/2	29.0	22.0	2.0	53.0		424	530	636	742	848	954	1060					
10	22	40	1 1/2	41.0	34.0	2.4	77.4		619	774	929	1084	1238	1393	1548	1703				
12	23	40	1 1/2	54.0	49.0	3.0	106.0		848	1060	1272	1484	1696	1908	2120	2332	2544			
14	25	30	1 1/2	55.0	60.0	3.0	118.0			1180	1416	1652	1888	2124	2360	2596	2832	3068		
16	27	30	1 1/2	63.0	79.0	3.0	145.0			1450	1740	2030	2320	2610	2900	3190	3480	3770	4060	
18	28	30	1 1/2	82.0	100.0	4.0	186.0			1860	2232	2604	2976	3348	3720	4092	4464	4836	5208	
20	30	20	1 1/2	79.0	126.0	4.0	209.0			2090	2508	2926	3344	3762	4180	4598	5016	5434	5852	6270
24	32	20	1 1/2	95.0	184.0	5.0	284.0			2840	3408	3976	4544	5112	5680	6248	6816	7384	7952	8520 9088

#### STEAM PIPE WEIGHTS (FIBERGLASS INSULATION)

Pipe Size (in)	Max Spacing (ft)	Pipe Schedule	Insul Thick-ness (in)	Weight per Foot (lbs)				WEIGHT per LENGTH (lbs)												
				Pipe Only	Insulation	Total	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	32'
1	7	40	2 1/2	1.7	1.2	2.9	17	23	29											
1 1/4	7	40	2 1/2	2.3	1.3	3.6	22	29	36											
1 1/2	9	40	2 1/2	2.7	1.4	4.1	25	33	41											
2	10	40	2 1/2	3.7	1.6	5.3	32	42	53											
2 1/2	11	40	3	5.8	2.3	8.1	49	65	81	97										
3	12	40	3	7.6	2.5	10.1		81	101	121										
4	14	40	3	11.0	2.9	13.9		111	139	167	195									
5	16	40	3 1/2	15.0	4.1	19.1		153	191	229	267	306								
6	17	40	3 1/2	19.0	4.6	23.6		189	236	283	330	378	425							
8	19	40	3 1/2	29.0	5.5	34.5		276	345	414	483	552	621	690						
10	22	40	3 1/2	41.0	6.4	47.4		379	474	569	664	758	853	948	1043					
12	23	40	3 1/2	54.0	7.3	61.3		490	613	736	858	981	1103	1226	1349	1471				
14	25	30	3 1/2	55.0	7.9	62.9			629	755	881	1006	1132	1258	1384	1510	1635			
16	27	30	3 1/2	63.0	8.8	71.8			718	862	1005	1149	1292	1436	1580	1723	1867	2010		
18	28	30	3 1/2	82.0	9.7	91.7			917	1100	1284	1467	1651	1834	2017	2201	2384	2568		
20	30	20	3 1/2	79.0	10.6	89.6			896	1075	1254	1434	1613	1792	1971	2150	2330	2509	2688	
24	32	20	3 1/2	95.0	13.0	108.0			1080	1296	1512	1728	1944	2160	2376	2592	2808	3024	3240	3456

#### FLANGED 125lb CAST IRON PIPE FITTINGS AND ACCESSORY WEIGHTS (approximate)

Pipe Size (in)	ACCESSORIES			FITTINGS			
	Bonnet Check Strainer (lbs)	Bonnet Gate Valve (lbs)	Pipe Valve (lbs)	Size (in)	Elbows (lbs)	Tee (lbs)	Flange (lbs)
1 1/2	20	25	30	1 1/2	15	20	3.5
2	30	25	40	2	20	25	6
2 1/2	40	35	50	2 1/2	25	35	8
3	50	45	70	3	30	40	9
4	85	80	110	4	55	70	16
5	110	120	140	5	70	90	20
6	140	155	175	6	90	115	25
8	205	305	250	8	120	175	34
10	330	455	475	10	245	295	53
12	440	675	690	12	375	405	71
14	615	885	930	14	495	565	93
16	875	1170	1255	16	700	750	120
18	1075	1375	1650	18	890	925	140
20	1380	1780	1950	20	1140	1180	176
24	2150	2960	3065	24	1720	1850	255

250 lb. Fittings can be established at approximately 1.8 times weights shown.

#### THERMAL EXPANSION OF PIPE MATERIALS (inches per 100 ft. from 70°F)

Deg F	Carbon, Carbon-moly & Low Chrome Steel	Austenitic Stainless Steels (304, 316, 347)	Copper	PVC
-50	-0.87	-1.34	-1.32	-4.00
0	-0.51	-0.78	-0.79	-2.33
50	-0.15	-0.22	-0.22	-0.67
70	0.00	0.00	0.00	0.00
100	0.23	0.34	0.34	1.00
150	0.61	0.90	0.91	2.67
200	0.99	1.46	1.51	—
250	1.40	2.03	2.08	—
300	1.82	2.61	2.67	—
350	2.26	3.21	3.27	—
400	2.70	3.80	3.88	—
450	3.16	4.40	4.49	—
500	3.62	5.01	5.12	—
550	4.11	5.62	5.74	—
600	4.60	6.24	6.39	—

Inches per 100 Ft. per 100°F in Temperature Range 50-350°F:

Carbon, Carbon-moly, Low Chrome Steel: 0.80"  
Austenitic Stainless Steels (304, 316, 347): 1.14"  
Copper: 1.16"  
PVC (varies with type) 3.40"

#### SATURATED STEAM TEMP.

Pressure (psi)	Deg F
0	212
25	267
50	298
75	320
100	338
125	353
150	366
175	378
200	388
225	397
250	406
275	414
300	421

**METRIC UNITS** (see front page for British Units)

**HANGER SELECTION**

When selecting pipe hangers or supports, allowances must be made for Pipe Fittings or Accessories such as valves, strainers, etc. Larger capacities must be used in these locations. Approximate piping component weights are given in Pipe Fitting and Accessory Weight table.

**WATER PIPE WEIGHTS (FIBERGLASS INSULATION)**

Pipe Size (in)	Max Hanger Spacing (M)	Pipe Schedule	Insul Thick-ness (mm)	Weight per Meter (kgs)				WEIGHT per LENGTH (kgs)											
				Pipe Only	Water	Insu-lation	Total	2M	2.5M	3M	3.5M	4M	4.5M	5M	6M	7M	8M	9M	10M
1	2.1	40	25	2.5	0.6	0.5	3.6	7	7										
1 1/4	2.1	40	25	3.4	1.0	0.5	4.9	10	10										
1 1/2	2.7	40	25	4.0	1.3	0.7	6.0	12	15	18									
2	3.0	40	25	5.5	2.2	0.6	8.3	17	21	25	29								
2 1/2	3.4	40	25	8.6	3.1	0.8	12.5	25	31	38	44								
3	3.7	40	25	11.3	4.8	0.9	17.0	34	42	51	59	68							
4	4.3	40	25	16.4	7.7	1.1	25.2	50	63	75	88	101	113						
5	4.9	40	38	22.3	12.9	2.2	37.4	75	93	112	131	149	168	187					
6	5.2	40	38	28.3	18.4	2.4	49.1	98	123	147	172	196	221	246	295				
8	5.8	40	38	43.1	32.7	3.1	78.9	158	197	237	276	316	355	394	473				
10	6.7	40	38	61.0	50.6	3.6	115.2	230	288	346	403	461	518	576	691	806			
12	7.0	40	38	80.3	72.9	4.6	157.8	316	394	473	552	631	710	789	947	1104	1262		
14	7.6	30	38	81.8	89.3	4.5	175.6	351	439	527	615	702	790	878	1054	1229	1405		
16	8.2	30	38	93.7	117.5	4.6	215.8	432	539	647	755	863	971	1079	1295	1511	1726	1942	
18	8.5	30	38	122.0	148.8	6.0	276.8	554	692	830	969	1107	1246	1384	1661	1938	2215	2491	
20	9.1	20	38	117.5	187.5	6.0	311.0	622	778	933	1089	1244	1400	1555	1866	2177	2488	2799	3110
24	9.8	20	38	141.3	273.8	7.6	422.7	845	1057	1268	1479	1691	1902	2113	2536	2959	3381	3804	4227

**STEAM PIPE WEIGHTS (FIBERGLASS INSULATION)**

Pipe Size (in)	Max Hanger Spacing (M)	Pipe Sched-ule	Insul Thick-ness (mm)	Weight per Meter (kgs)			WEIGHT per LENGTH (kgs)												
				Pipe Only	Insu-lation	Total	2M	2.5M	3M	3.5M	4M	4.5M	5M	6M	7M	8M	9M	10M	
1	2.1	40	38	2.5	1.8	4.3	4	7	9	11									
1 1/4	2.1	40	38	3.4	2.2	5.4	6	9	11	13									
1 1/2	2.7	40	38	4.0	2.7	6.1	7	11	12	15	18								
2	3.0	40	38	5.5	3.0	7.9	9	13	16	20	24	28							
2 1/2	3.4	40	38	8.6	3.4	12.1	12	18	24	30	36	42							
3	3.7	40	38	11.3	3.1	15.0	22	30	38	45	53	60							
4	4.3	40	38	16.4	4.2	20.7	31	41	52	62	72	83	93						
5	4.9	40	38	22.3	4.5	28.4	40	57	71	85	99	114	128	142					
6	5.2	40	50	28.3	6.8	35.1	53	70	88	105	123	140	158	176	211				
8	5.8	40	50	43.1	8.3	51.3	77	103	128	154	180	205	231	257	308				
10	6.7	40	50	61.0	10.6	70.5	107	141	176	212	247	282	317	353	423	494			
12	7.0	40	50	80.3	12.1	91.2	139	182	228	274	319	365	411	456	547	639	730		
14	7.6	30	50	81.8	12.5	93.6		187	234	281	328	374	421	468	562	655	749		
16	8.2	30	50	93.7	13.8	106.9	214	267	321	374	427	481	534	641	748	855	962		
18	8.5	30	50	122.0	15.5	136.5	273	341	409	478	546	614	682	819	955	1092	1228		
20	9.1	20	50	117.5	17.3	133.3	267	333	400	467	533	600	667	800	933	1067	1200	1333	
24	9.8	20	50	141.3	19.9	160.7	321	402	482	563	643	723	804	964	1125	1286	1447	1607	

**FLANGED 125lb CAST IRON PIPE FITTINGS AND ACCESSORY WEIGHTS (approximate)**

ACCESSORIES				FITTINGS			
Pipe Size (in)	Bonnet Check Strainer (kgs)	Bonnet Gate Valve (kgs)	Pipe Valve (kgs)	Pipe Size (in)	Elbows (kgs)	Tee (kgs)	Flange (kgs)
1 1/2	9	11	14	1 1/2	7	9	2
2	14	11	18	2	9	11	3
2 1/2	18	16	23	2 1/2	11	16	4
3	23	20	32	3	14	18	4
4	39	36	50	4	25	32	7
5	50	54	63	5	32	41	9
6	63	70	79	6	41	52	11
8	93	138	113	8	54	79	15
10	149	206	215	10	111	134	24
12	199	306	312	12	170	183	32
14	278	401	421	14	224	256	42
16	396	530	568	16	317	339	54
18	487	622	747	18	403	419	63
20	625	806	883	20	516	534	80
24	973	1340	1387	24	779	837	115

250 lb. Fittings can be established at approximately 1.8 times weights shown.

**THERMAL EXPANSION OF PIPE MATERIALS (cm per 30m from 21°C)**

Deg C	Carbon, Carbon-moly & Low Chrome Steel	Austenitic Stainless Steels (304, 316, 347)	Copper	PVC
-46	-2.35	-3.58	-3.38	-10.13
-18	-1.37	-2.08	-1.97	-5.90
10	0.39	0.59	0.55	1.66
<b>21</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
38	0.60	0.91	0.86	2.57
66	1.58	2.40	2.27	6.80
93	2.53	3.84	3.63	—
121	3.51	5.34	5.04	—
149	4.49	6.84	6.45	—
177	5.48	8.33	7.86	—
204	6.42	9.77	9.22	—
232	7.41	11.27	10.63	—
260	8.39	12.76	12.05	—
288	9.37	14.26	13.46	—
316	10.35	15.75	14.87	—

cm per 30m per °C in Temperature Range 10 – 177°C:

Carbon, Carbon-moly, Low Chrome Steel: 0.0351  
 Austenitic Stainless Steels (304, 316, 347): 0.0534  
 Copper: 0.0504  
 PVC (varies with type) 0.1512

**SATURATED STEAM TEMP.**

Pressure (kg/cm <sup>2</sup> )	Deg C
0	100
1.7	131
3.4	148
5.2	160
6.9	170
8.6	178
10.3	186
12.1	192
13.8	198
15.5	203
17.2	208
19.0	212
20.7	216