BULLETINS \ REFERENCE DATA \ PRODUCT DATA \ INDEX

HEAT TRANSMISSION FROM SURFACES

BULLETIN 102-A

Carey
EST. 1873

THE PHILIP Carey MFG. COMPANY
General Offices — CINCINNATI 15, OHIO

530805

CALCIUM SILICATE HI-TEMP #19

PLAINTIFF'S
EXHIBIT
W-317

D-10

HEAT TRANSMISSION

FROM SURFACES

Bulletin No. 102 A

THE PHILIP CAREY MFG. COMPANY

CINCINNATI, OHIO

R. H. Heilman's paper "Surface Heat Transmission," Trans. Am. Soc. Mech. Engrs., Fuels Steam Power, 51, 257 (1929), gives a sound basis for determining losses, savings to be made by the use of heat insulation, and the per cent efficiency of such insulation. Many and conflicting claims of efficiency have been made for various commercial heat insulations. It is obvious that the efficiencies and savings cannot be compared unless the same heat losses from the bare surfaces are used as a basis. As mentioned in the paper above, several types of commercial shapes, such as pipes and flat plates, were tested. From the results of those tests a formula was developed for the transfer by free convection, and emissivity values were determined for various surfaces for use in the Stefan-Boltzmann radiation formula. The separation of heat transmission from a surface to the surrounding air into its two components radiation and convection greatly extends the range of usefulness of former tests on bare and insulated surfaces. By means of these two formulae and the emissivity of various surfaces, one is able to calculate the rate of heat transfer under still air conditions for practically any shape or type of surface and for any temperatures ordinarily met with in engineering practice:

The formulae are as follows:

$$q_c = C\left(\frac{1}{D}\right)^{0.2}\left(\frac{1}{T_{avg.}}\right)^{0.181}\Delta t^{1.266}$$

$$q_r = 17.4 \quad 10^{-10} \cdot e\,(T_1^4 - T_2^4)$$

where q_c heat transfer by free convection in Btu per sq. ft. per hr.

C a constant depending upon the shape of the surface.

(C 1.016 for horizontal cylinders, 1.235 for long vertical cylinders, 1.394 for vertical plates, 1.79 for horizontal plates facing upward, and 0.89 for horizontal plates facing downward. The constants for the horizontal plates facing upward and facing downward are reversed when the plates are cooler than the surrounding air.)

D cylinder diameter in inches or height of vertical plane in inches. The effect of diameter or height becomes constant at a value of approximately 24 inches.)

$T_{avg.}$ 460 plus the average of cylinder or plate surface and surrounding air temperature in deg. Fahr.

Δt=temperature difference (deg. Fahr.) between surface and air.

q_r =heat transfer by radiation in Btu per sq. ft. per hr.

e=emissivity of surface. (A value of 0.9 can be assumed as the emissivity of most industrial surfaces, such as brick, stone, glass, canvas, asphalt roofing and various colored flat paints at temperatures below 400 deg. Fahr. For highly polished metals "e" may be as low as 0.02.)

T_1=temperature of the hotter surface, deg. Fahr.+460.

T_2=temperature of surrounding objects, deg. Fahr.+460.

The bare pipe loss curves, the bare pipe loss tables, the surface loss curves for various outside diameters and the surface heat transmission from flat bare steel surfaces, contained in this bulletin, were all calculated with the above formula for free convection and radiation. The calculations were all based on an air temperature of 80 deg. Fahr. and with the surfaces at higher temperatures than the surrounding atmosphere.

Effect of Wind

The formula given above for free convection cannot be used for conditions where extraneous air currents are blowing over the surfaces. In this case the heat transfer takes place by forced convection and radiation. The forced convection for large bare plane surfaces greater than two feet on a side, can be obtained from the formula

$$q_{fc} = 1.+0.225V.$$

where q_{fc} heat transfer by forced convection in Btu per hr. per sq. ft. per deg. Fahr. temp. diff.

V: air velocity in feet per sec.

This formula is an approximate average of formula proposed by various investigators. The heat transmission curves shown on page 10 for large bare surfaces with various wind velocities were calculated from the above formula and the radiation formula. In this case an air temperature of 70 deg. Fahr. was assumed.

The data available on forced convection at present are not sufficient to enable one to differentiate to any degree of accuracy between the losses from plane surfaces in the various positions.

Considerable experimental work has been done on forced convection from wires and cylinders. The forced convection for air flowing at right angles to various sized single horizontal cylinders can be obtained from Reiher's equation which is as follows:

$$q_{fc} = .35\,\frac{k}{D}\left(\frac{DV\rho}{\mu}\right)^{.56}$$

where q_{fc}=surface conductance, Btu/sq. ft./hr./°F.

k -thermal conductivity of air, Btu/ft./hr./°F.

D -outside diameter of pipe, ft.

V=air velocity, ft./hr.

ρ density of air, lb./ft.^{3}

μ..viscosity of air, lb./ft.—hr.

The heat transmission curves shown on page 9 for various diameter bare steel pipes with various wind velocities were calculated from the above formula and the radiation formula. In this case also, an air temperature of 70° F. was assumed.

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BULLETINS REFERENCE DATA PRODUCT DATA INDEX

CALCIUM SILICATE HI-TEMP #19

Losses From Horizontal Bare Steel Steam Pipes

From 100 Linear Feet of Pipe per Month of 30 Days With Steam in Pipes 24 hours per Day.
Coal at $7.00 per Ton of 2000 Lbs.

Gage Press.	Hot Water			10 Lbs.			80 Lbs.			120 Lbs.			160 Lbs.			200 Lbs.			200 Lbs. and 100° F. Superheat			275 Lbs. and 250° F. Superheat		
Temp.	180° F.			239.4° F.			324.0° F.			350.0° F.			370.7° F.			387.9° F.			487.9° F.			464.3° F.		
	Dollars Lost	Pounds Coal	Btu Lateral Foot 1 Hr.	Dollars Lost	Pounds Coal	Btu Lateral Foot 1 Hr.	Dollars Lost	Pounds Coal	Btu Lateral Foot 1 Hr.	Dollars Lost	Pounds Coal	Btu Lateral Foot 1 Hr.	Dollars Lost	Pounds Coal	Btu Lateral Foot 1 Hr.	Dollars Lost	Pounds Coal	Btu Lateral Foot 1 Hr.	Dollars Lost	Pounds Coal	Btu Lateral Foot 1 Hr.	Dollars Lost	Pounds Coal	Btu Lateral Foot 1 Hr.
	[illegible]	[illegible]	[illegible]	3.17	772	.628	5.74	1435	.743	6.66	1666	.780	7.44	1861	.809	8.13	2031	.834	12.86	3216	.996	24.99	6142	1.440
	[illegible]	[illegible]	[illegible]	4.76	1191	.944	8.65	2164	1.121	10.06	2515	1.177	11.24	2811	1.222	12.28	3070	1.260	19.51	4878	1.531	37.62	9380	2.029
	[illegible]	[illegible]	[illegible]	6.67	1669	1.321	12.16	3039	1.574	14.14	3535	1.655	15.81	3954	1.719	17.28	4320	1.773	27.58	6888	2.133	53.20	13299	2.927
	[illegible]	[illegible]	[illegible]	8.21	2052	1.627	14.96	3740	1.938	17.41	4353	2.038	19.48	4871	2.118	21.30	5324	2.185	34.00	8499	2.641	65.96	16484	3.569
	[illegible]	[illegible]	[illegible]	9.79	2446	1.940	17.86	4466	2.313	20.79	5198	2.433	23.27	5818	2.530	25.44	6361	2.611	40.68	10170	3.151	78.94	19734	4.262
	[illegible]	[illegible]	[illegible]	11.71	2931	2.325	21.44	5359	2.776	24.96	6241	2.921	27.95	6988	3.038	30.56	7641	3.136	48.93	12232	3.790	95.23	23809	5.151
	[illegible]	[illegible]	[illegible]	13.27	3319	2.631	24.29	6069	3.144	28.28	7069	3.309	31.66	7916	3.442	34.61	8653	3.553	55.50	13875	4.299	108.24	27061	5.855
	[illegible]	[illegible]	[illegible]	14.81	3702	2.936	27.10	6774	3.509	31.57	7892	3.694	35.36	8839	3.845	38.67	9668	3.969	62.05	15512	4.806	121.02	30255	6.546
	[illegible]	[illegible]	[illegible]	16.34	4082	3.237	29.90	7475	3.872	34.84	8710	4.077	39.02	9756	4.242	42.69	10671	4.381	68.54	17136	5.310	133.92	33480	7.245
	[illegible]	[illegible]	[illegible]	17.81	4452	3.532	32.61	8256	4.226	38.00	9502	4.504	42.53	10632	4.656	47.18	11796	4.842	75.81	18951	5.872	146.75	36688	7.941
	52	2599	3.681	21.21	5303	4.205	38.89	9722	5.016	45.34	11334	5.306	50.81	12702	5.522	55.60	13900	5.706	89.45	22363	6.929	173.95	43488	9.416
	[illegible]	3292	4.748	24.18	6046	4.794	44.17	11042	5.745	51.74	12934	6.055	57.99	14498	6.303	63.47	15868	6.514	102.21	25554	7.918	200.71	49161	10.844
	[illegible]	3660	4.631	27.14	6782	5.377	49.61	12452	6.450	58.10	14524	6.799	65.15	16283	7.079	71.29	17823	7.316	114.93	28712	8.901	225.99	56492	12.462
	[illegible]	4027	5.156	30.06	7514	5.958	55.22	13805	7.151	64.42	16105	7.539	72.23	18057	7.851	79.07	19769	8.115	127.55	31887	9.880	251.35	62838	13.862
	[illegible]	4520	5.717	33.32	8330	6.605	61.25	15313	7.932	71.47	17867	8.364	80.14	20036	8.711	87.75	21937	9.004	141.67	35416	10.974	279.26	69814	15.401
	[illegible]	5291	6.699	39.10	9774	7.750	71.94	17985	9.318	83.97	20992	9.826	94.18	23545	10.236	103.14	25785	10.584	166.70	41674	12.911	329.12	82279	17.798
	[illegible]	5785	7.312	42.84	10670	8.460	78.56	19641	10.174	91.71	22928	10.733	102.87	25718	11.182	112.67	28167	11.562	182.22	45554	14.115	360.14	90034	19.475
	36.22	6556	8.286	48.16	12094	9.589	89.09	22273	11.537	104.04	26009	12.173	116.73	29184	12.688	127.67	31967	13.122	206.96	51744	16.033	409.64	102409	22.152
	39.27	7108	9.250	54.01	13503	10.707	99.57	24891	12.898	116.28	29071	13.608	130.49	32623	14.184	142.95	35738	14.670	231.59	57898	17.940	458.89	114723	24.815

In these Tables Coal has been figured at $7.00 per Ton of 2,000 Lbs. 13 000 Btu. per lb. of Coal - Labor, Boiler Room Expense, etc. Taken at $1.00 per Ton. Making Total Value of Coal Fired at $8.00 per Ton. Boiler Efficiency taken at 70 Per Cent. Air Temp. 60° F. Experimental Data Obtained at Mellon Institute.

CALCIUM SILICATE

Heat Losses From Horizontal Bare Steel Pipes and Flat Surfaces

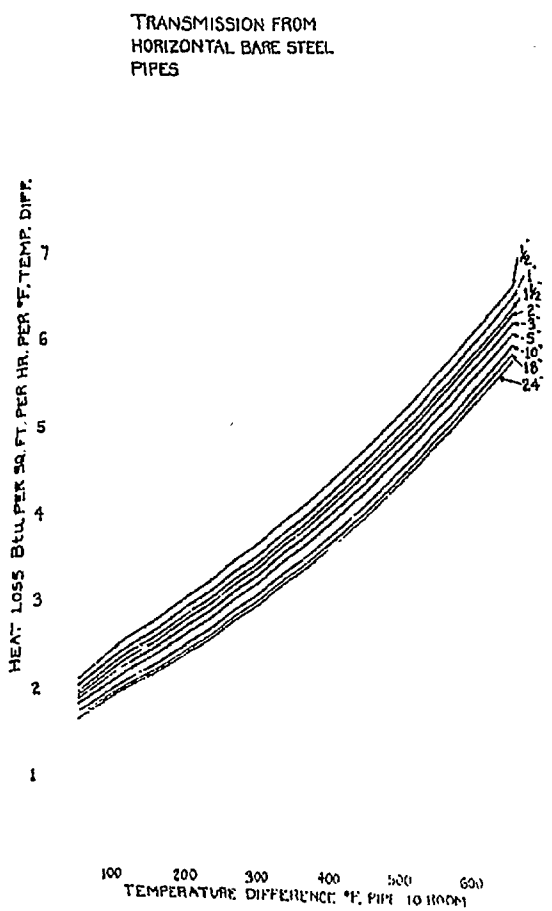
In Btu per Sq. Ft. of Pipe Surface per Hour per °F. Temperature Difference Between Pipe and Air

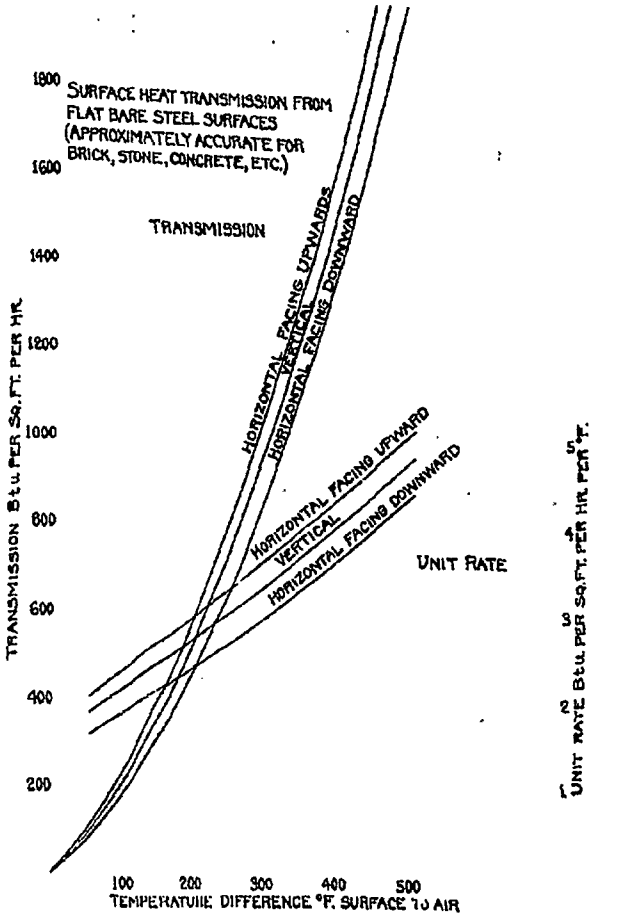
Pipe Size	Lineal Foot Factor*	Temperature Difference °F. Between Pipe Surface and Surrounding Air. Air at 80°F.																										
		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600
¼"	220	2.12	2.48	2.80	3.10	3.42	3.74	4.07	4.47	4.84	5.28	5.72	6.15	6.69	7.22	7.79	8.39	9.05	9.78	10.42	11.18	11.98	12.82	13.71	14.64	15.62	16.66	17.73	18.87	20.06	21.30	22.59	23.95
⅜"	275	2.06	2.41	2.74	3.04	3.35	3.62	4.00	4.45	4.79	5.21	5.65	6.12	6.64	7.15	7.71	8.31	8.93	9.62	10.34	11.20	11.99	12.79	13.62	14.56	15.49	16.57	17.65	18.78	19.97	21.21	22.51	23.86
1"	344	2.04	2.36	2.69	2.99	3.30	3.61	3.94	4.35	4.72	5.14	5.58	6.05	6.54	7.02	7.64	8.23	8.87	9.55	10.25	11.08	11.81	12.66	13.54	14.48	15.46	16.49	17.57	18.70	19.89	21.13	22.42	23.77
1¼"	435	2.00	2.34	2.64	2.93	3.26	3.55	3.86	4.23	4.66	5.07	5.51	5.91	6.42	7.00	7.56	8.16	8.79	9.47	10.18	10.94	11.73	12.56	13.46	14.39	15.38	16.41	17.49	18.62	19.80	21.04	22.34	23.69
1½"	492	1.98	2.31	2.61	2.90	3.20	3.52	3.84	4.23	4.62	5.01	5.47	5.93	6.43	6.96	7.52	8.12	8.75	9.43	10.14	10.89	11.69	12.53	13.42	14.35	15.33	16.36	17.44	18.57	19.76	20.99	22.29	23.64
2"	622	1.95	2.27	2.56	2.85	3.15	3.46	3.78	4.17	4.56	4.97	5.41	5.87	6.37	6.85	7.45	8.01	8.68	9.36	10.07	10.82	11.62	12.46	13.35	14.28	15.26	16.29	17.37	18.50	19.68	20.92	22.21	23.56
2½"	753	1.92	2.23	2.52	2.81	3.11	3.42	3.74	4.12	4.51	4.92	5.36	5.82	6.31	6.84	7.40	7.99	8.63	9.30	10.01	10.77	11.56	12.40	13.29	14.22	15.20	16.23	17.30	18.44	19.62	20.86	22.15	23.50
3"	.916	1.89	2.20	2.49	2.77	3.07	3.37	3.69	4.06	4.46	4.87	5.31	5.77	6.25	6.79	7.35	7.94	8.57	9.25	9.96	10.71	11.51	12.34	13.23	14.16	15.14	16.17	17.25	18.38	19.56	20.80	22.09	23.44
3½"	1 047	1.87	2.18	2.46	2.74	3.04	3.34	3.66	4.03	4.43	4.84	5.27	5.73	6.21	6.73	7.31	7.91	8.54	9.21	9.92	10.67	11.47	12.31	13.19	14.12	15.10	16.13	17.21	18.34	19.52	20.76	22.05	23.40
4"	1 178	1.85	2.16	2.44	2.72	3.01	3.32	3.64	4.02	4.40	4.81	5.25	5.71	6.20	6.72	7.28	7.87	8.51	9.18	9.89	10.64	11.44	12.27	13.16	14.08	15.07	16.09	17.17	18.30	19.49	20.72	22.02	23.37
4½"	1 309	1.84	2.14	2.42	2.70	2.99	3.30	3.61	4.00	4.38	4.79	5.22	5.68	6.17	6.69	7.25	7.83	8.46	9.13	9.84	10.61	11.41	12.25	13.15	14.06	15.04	16.07	17.14	18.27	19.44	20.69	21.99	23.34
5"	1 456	1.83	2.13	2.40	2.68	2.97	3.28	3.59	3.97	4.35	4.76	5.20	5.65	6.15	6.68	7.23	7.82	8.45	9.12	9.83	10.58	11.38	12.22	13.10	14.03	15.01	16.04	17.11	18.24	19.43	20.66	21.96	23.31
6"	1 734	1.80	2.10	2.37	2.65	2.94	3.24	3.55	3.94	4.32	4.72	5.16	5.61	6.10	6.63	7.19	7.78	8.41	9.08	9.79	10.54	11.34	12.17	13.06	13.99	14.96	15.99	17.07	18.20	19.38	20.62	21.91	23.26
7"	1 996	1.79	2.08	2.35	2.63	2.91	3.21	3.53	3.91	4.29	4.69	5.13	5.58	6.07	6.60	7.15	7.75	8.38	9.05	9.76	10.51	11.30	12.14	13.02	13.95	14.93	15.95	17.03	18.16	19.34	20.59	21.87	23.22
8"	2 258	1.77	2.06	2.33	2.60	2.89	3.18	3.50	3.88	4.26	4.65	5.10	5.56	6.05	6.58	7.12	7.72	8.35	9.02	9.73	10.48	11.27	12.11	12.99	13.92	14.90	15.92	17.00	18.13	19.31	20.55	21.84	23.19
9"	2 520	1.76	2.05	2.31	2.59	2.87	3.17	3.48	3.86	4.24	4.65	5.08	5.55	6.02	6.54	7.10	7.69	8.32	8.99	9.70	10.45	11.24	12.08	12.96	13.89	14.87	15.90	16.97	18.10	19.28	20.52	21.81	23.16
10"	2 814	1.75	2.03	2.30	2.57	2.85	3.15	3.46	3.84	4.22	4.62	5.05	5.51	6.00	6.52	7.08	7.67	8.30	8.97	9.68	10.43	11.22	12.06	12.94	13.87	14.84	15.87	16.95	18.08	19.26	20.49	21.79	23.13
12"	3 356	1.73	2.01	2.27	2.54	2.83	3.12	3.43	3.81	4.19	4.59	5.02	5.48	5.96	6.48	7.04	7.63	8.26	8.93	9.64	10.39	11.18	12.02	12.90	13.83	14.80	15.83	16.91	18.04	19.22	20.46	21.74	23.09
14"	3 665	1.72	2.00	2.26	2.53	2.81	3.11	3.41	3.79	4.17	4.57	5.00	5.46	5.94	6.47	7.02	7.61	8.24	8.91	9.62	10.37	11.16	12.00	12.88	13.81	14.78	15.81	16.89	18.01	19.20	20.43	21.72	23.07
16"	4 189	1.70	1.98	2.24	2.51	2.79	3.08	3.39	3.77	4.14	4.55	4.98	5.43	5.92	6.44	6.99	7.59	8.21	8.88	9.59	10.34	11.13	11.97	12.85	13.78	14.75	15.78	16.86	17.98	19.17	20.41	21.69	23.04
18"	4 717	1.69	1.96	2.22	2.49	2.77	3.07	3.37	3.75	4.12	4.53	4.96	5.41	5.90	6.42	6.97	7.56	8.19	8.86	9.57	10.32	11.11	11.94	12.83	13.75	14.73	15.75	16.83	17.96	19.14	20.36	21.65	23.00
20"	5 236	1.68	1.95	2.21	2.47	2.75	3.05	3.36	3.73	4.11	4.52	4.94	5.39	5.88	6.40	6.95	7.54	8.17	8.84	9.55	10.29	11.09	11.92	12.80	13.73	14.71	15.73	16.81	17.94	19.12	20.35	21.64	22.99
24"	6 283	1.66	1.93	2.19	2.45	2.73	3.02	3.33	3.70	4.09	4.48	4.90	5.36	5.84	6.36	6.92	7.51	8.14	8.80	9.51	10.26	11.05	11.89	12.77	13.69	14.67	15.70	16.77	17.90	19.08	20.31	21.64	22.95
Vertical Surface		1.84	2.16	2.42	2.70	3.00	3.30	3.62	4.00	4.38	4.79	5.22	5.68	6.17	6.70	7.25	7.85	8.48	9.15	9.86	10.62	11.43	12.25	13.13	14.06	15.04	16.08	17.15	18.28	19.46	20.70	21.99	23.34
Horizontal Surface Facing Upward		2.03	2.31	2.63	2.93	3.26	3.59	3.92	4.31	4.70	5.12	5.56	6.02	6.52	7.05	7.61	8.21	8.83	9.52	10.24	10.99	11.79	12.63	13.52	14.45	15.43	16.46	17.54	18.67	19.86	21.10	22.39	23.74
Horizontal Surface Facing Downward		1.64	1.86	2.11	2.36	2.64	2.93	3.23	3.60	3.97	4.37	4.80	5.25	5.73	6.25	6.80	7.39	8.02	8.68	9.39	10.14	10.93	11.76	12.64	13.53	14.55	15.52	16.62	17.77	18.93	20.19	21.48	22.83

Values are for Flat Surfaces feet square foot or more in area.

*To secure losses per Lineal foot, multiply sq. ft. losses in table by this factor. The losses per sq. ft. of pipe surface for pipes larger than 24" can be considered the same as the losses for the 24" pipe

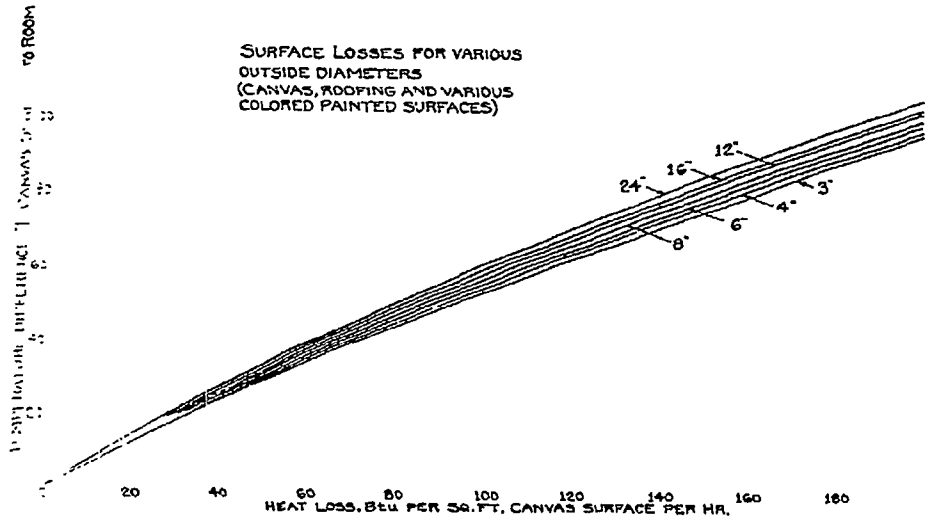
In these Tables Coal has been figured at $5.00 per Ton of 2000 Lbs. 13,000 Btu per lb. of Coal. Labor, Boiler Room Expense, etc., Taken at $1.00 per Ton. Method Used Values of Coal Used at $4.00 per Ton. Boiler Efficiency taken at 70 Per Cent. Air Temp. 80° F. Experimental Data Obtained at Various Institutes


TRANSMISSION FROM
HORIZONTAL BARE STEEL
PIPES
HEAT LOSS Btu. PER SQ. FT. PER HR. PER °F. TEMP. DIFF.
1
2
3
4
5
6
7
100
200
300
400
500
600
TEMPERATURE DIFFERENCE °F. PIPE TO ROOM
1/2"
1"
1 1/2"
2"
3"
5"
10"
18"
24"

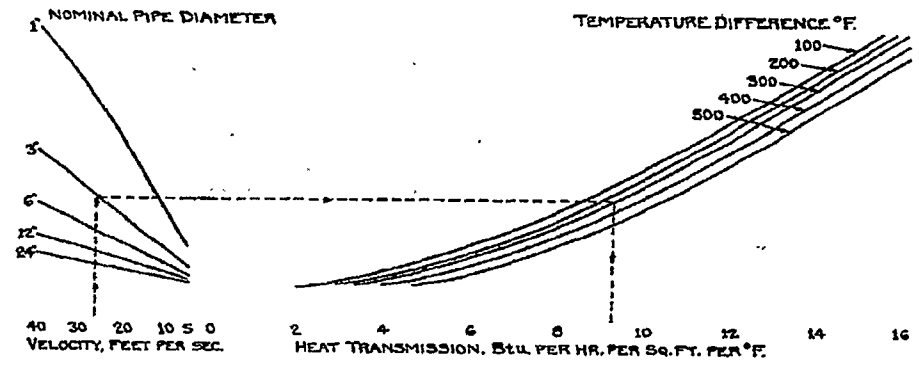

SURFACE HEAT TRANSMISSION FROM
FLAT BARE STEEL SURFACES
(APPROXIMATELY ACCURATE FOR
BRICK, STONE, CONCRETE, ETC.)
TRANSMISSION
TRANSMISSION Btu. PER SQ. FT. PER HR.
200
400
600
800
1000
1200
1400
1600
1800
HORIZONTAL FACING UPWARDS
VERTICAL
HORIZONTAL FACING DOWNWARD
HORIZONTAL FACING UPWARD
VERTICAL
HORIZONTAL FACING DOWNWARD
UNIT RATE
UNIT RATE Btu. PER SQ. FT. PER HR. PER °F.
1
2
3
4
5
100
200
300
400
500
TEMPERATURE DIFFERENCE °F. SURFACE TO AIR

530811

Surface Losses for Various Outside Diameters (Canvas, Roofing and Various Colored Painted Surfaces)



Heat Transmission for Various Wind Velocities (Cross Flow, Horizontal Bare Steel Pipes)



HEAT TRANSMISSION FOR
VARIOUS WIND VELOCITIES
(LARGE FLAT SURFACES)
AIR VELOCITY 30 FT. PER SEC.
25
20
15
10
5
TRANSMISSION, B.t.u. PER SQ. FT. PER HR.
3600
3200
2800
2400
2000
1600
1200
800
400
TEMPERATURE DIFFERENCE °F. SURFACE TO AIR
200
300
400
500

Where to buy

Carey Industrial Sales Engineers can be easily reached at the District Offices listed below. Call on them for any information you need, or for the name of a Carey-approved contract unit in a major trading area near you.

District Offices

Atlanta 9, Ga.
251 Armour Drive, N.E.
TRinity 4-5793

Boston, Mass. (Cambridge 38)
22 Moulton St.
TRowbridge 6-1700

California District
2350 Ingalls St.,
San Francisco 24, Calif.
MIssion 8-4400

Chicago District
25th and Warren, Bellwood, Ill.
AUstin 7-4083

Cincinnati 15, Ohio
316 S. Wayne Ave.
VAlley 1-3000

Cleveland 35, Ohio
4515 W. 100th St.
OHchard 1-6270

Detroit 38, Mich.
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TOwnsend 8-2600

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OVerland 6-3761

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Engineering service

Carey Engineering Service will help you determine which type of insulation is the best suited and most economical for your particular requirements, and will show you how it can be used to best advantage. Call on Carey any time.

Better products for industry since 1873

Cincinnati 15, Ohio

In Canada:

The Philip Carey Co., Ltd., Montreal 9, P.Q.

FORM 4351 Rev. 2 5m 10 60 HC

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530815

530316

CALCURI SILICATE

HI-TEMP #19

CALCIUM SILICATE
PIPE AND BLOCK INSULATION

Carey Calcium Silicate Pipe and Block Insulation is made by reacting lime and diatomaceous earth under suitable conditions of heat and water to form a hydrous calcium silicate. It is mechanically bonded together with asbestos fibers. No binder is necessary. Years of research and development have resulted in combining all the advantages Carey Calcium Silicate Pipe and Block Insulation should have to provide maximum efficiency for temperatures up to 1350° F.

*Physical and Thermal Properties

Temperature Limit	1350°F.
Density, lbs./cu.ft.	11.5
Hardness, mm penetration (½" ball, 1 kg load)	1.0
Thermal conductivity, Btu/hr./sq.ft./(°F./in.) at mean temperature of:	
100 F.	0.438
200 F.	0.375
300 F.	0.420
400 F.	0.465
500 F.	0.511
600 F.	0.560
700 F.	0.605
800 F.	0.650
Modulus of Rupture: lbs./sq.in.	65
Compressive Strength: lbs./sq.in.	
at 5% deformation	75
at 10% deformation	90
Abrasion Resistance	
Loss in 10 min.%	35
Loss in 20 min.%	60
Impact, ft lbs. on 1" thk. sample	25
Soaking Heating, 24 hrs. at 1200°F.	
Loss in weight,%	11.5
Linear shrinkage	1.0

*The data shown in the above table is average values of Carey Calcium Silicate Pipe and Block Insulation on a bone dry basis.

The following summarizes the important feature of Carey Calcium Silicate Insulation.

1. Low conductivity reveals it is one of the most efficient insulations up to 1350°F.
2. Low linear shrinkage of 1.0% for 24 hours at 1200° F. indicates good stability at high temperatures.
3. High impact test results show it has excellent handleability, meaning it has a good degree of toughness and resilience. It is not a brittle product as indicated by its high impact test. Because of this high impact the losses usually due to breakage during shipping, installation and in service are reduced.
4. The compressive strength indicates that Carey Calcium Silicate Insulation is not a hard brittle product and will readily conform to irregular shapes and bolt heads. It can be pressed around various type protrusions without snapping the insulation.
5. It can be easily cut, sawed and scored with ordinary tools of the trade.
6. Carey Calcium Silicate Insulation is incombustible, flame-resistant, and an excellent insulation for fireproofing piping and equipment due to its resistance to high temperatures.
7. Carey Calcium Silicate Pipe and Block Insulation is insoluble in water and soaking it in water will not permanently damage it. After drying, it will regain its low conductivity. Therefore, it is well suited for outdoor application.
8. It is easy to handle due to its light weight and can be speedily applied by insulation applicators.

530817

CALCIUM SILICATE
PIPE INSULATION

Carey Calcium Silicate Pipe Insulation performs efficiently at temperatures through the low pressure steam range and particularly through temperatures in the superheated steam range since it is effective up to 1350°F.

Carey Calcium Silicate Pipe Insulation is supplied in simplified thicknesses in both sectional and segmental form depending on the pipe size involved.

Nominal 1" thick is supplied in sectional form for pipe sizes 6" and less, nominal 1½" and 2" in sectional form for pipe sizes 10" and less with 11" pipe size being furnished in segmental layer. 12" pipe size can be supplied in sectional layers in nominal 1½" and 2" thicknesses when specified.

Nominal 2½", 3", 3½" and 4" thick Carey Calcium Silicate Pipe Insulation is furnished in double layer segmental or segmental and sectional form with the exception of nominal 2½" thick which is available in single layer, segmental form for pipe sizes 7" and up.

Factory-applied canvas jackets furnished on sectional pipe insulation up to and including 10" pipe size. No bands will be furnished unless ordered. Additional charge will be made for bands.

Recommended Thicknesses in Inches

Nominal Pipe Size Inches	Temperature of Pipe, °F. 150 to 199	200 to 299	300 to 399	400 to 499	500 to 599	600 to 699	700 to 799	800 to 899	900 to 999	1000 to 1099	1100 to 1199	1200 to 1350
	Nominal Thickness, Inches											
1¼ & under	1	1	1	1½	1½	2	2	2½	2½	2½	3	3½
2	1	1	1½	1½	2	2	2½	2½	2½	3	3	3½
2½	1	1	1½	2	2	2½	2½	3	3	3	3½	4
3	1	1	1½	2	2	2½	3	3	3	3½	4	4
3½	1	1½	1½	2	2	2½	3	3	3½	3½	4	4½
4	1	1½	1½	2	2½	3	3	3	3½	4	4	4½
5	1	1½	2	2	2½	3	3	3½	3½	4	4½	5
6	1	1½	2	2	2½	3	3	3½	4	4	4½	5
7	1	1½	2	2½	2½	3	3½	4	4	4½	5	5
8	1	1½	2	2½	3	3	3½	4	4	4½	5	5
9	1	1½	2	2½	3	3	3½	4	4	4½	5	5½
10	1	1½	2	2½	3	3	3½	4	4	4½	5	5½
11	1	1½	2	2½	3	3	3½	4	4	4½	5	5½
12	1	1½	2	3	3	3	3½	4	4	4½	5	5½
14 & over	1½	2	2½	3	3	3½	4	4½	4½	5	5	6

Note: No thickness recommendations can apply to all conditions. These recommendations have been found to be satisfactory and economical for most cases.

530818

CALCIUM SILICATE PIPE INSULATION
HEAT LOSSES

Expressed in B.T.U. per Linear Foot per Hour

Nominal Thickness Inches	Temperature of Pipe, °F. 150	200	300	400	500	600	700	800	900	1000	1100	1200
	Temperature Difference between pipe and air, °F. 30	130	230	330	430	530	630	730	830	930	1030	1130	1230
	Nominal Pipe Size ½"											
1	7.86	15.6	30.1	47.9	66.6	87.6	110					
1¼	7.01	13.9	26.9	39.6	53.1	70.4	88.7	108	131			
2	5.85	11.4	21.8	33.5	45.5	59.2	75.0	91.9	111			
2½	5.05	10.3	20.0	30.7	42.4	56.1	70.7	86.9	105	125	147	
3	4.53	9.4	18.9	29.2	40.3	52.3	66.2	80.7	97.0	116	136	160
3½	4.17	9.3	18.9	27.8	38.0	50.0	63.0	76.4	92.0	108	126	142
	Nominal Pipe Size ¾"											
1	7.91	15.8	30.4	54.6	78.5	105	131					
1¼	7.17	13.2	29.3	43.5	62.3	78	96.4	121	147			
2	5.11	12.5	25.9	40.0	55.1	72.5	91.0	110	134			
2½	4.83	11.6	22.6	36.4	49.7	65.5	78.5	98.3	114	134	155	179
3	4.72	10.9	21.9	32.1	44.2	58.4	73.3	89.3	107	126	145	167
3½	4.60	10.3	19.9	30.3	42.4	55.3	69.4	84.4	84.7	128	152	155
	Nominal Pipe Size 1"											
1	8.01	19.2	37.8	58.2	82.8	109	136					
1¼	7.39	16.3	31.7	49.8	66.8	88.0	111	133	167			
2	5.22	14.4	27.8	43.1	60.0	78.9	97.9	119	143	167	196	
2½	5.05	13.8	26.1	38.6	52.6	69.4	87.8	108	128	151	175	198
3	5.00	13.2	25.3	35.2	49.0	65.5	83.8	102	119	140	165	187
3½	4.79	11.4	22.8	34.8	47.4	62.0	77.9	91	113	133	152	176
	Nominal Pipe Size 1½"											
1	8.85	21.0	44.2	76.1	102	141	177					
1¼	7.99	18.4	35.6	55.1	76.1	100	126	151	182			
2	5.72	15.0	31.0	51.0	68.6	90.0	116	140	163	200	221	
2½	5.40	15.1	29.4	45.1	61.0	81.0	101	125	150	180	208	231
3	5.00	13.9	27.9	41.2	57.3	75.5	95.7	115	137	163	192	221
3½	5.01	13.0	25.3	41.4	53.1	70.1	88.9	107	126	150	174	200
	Nominal Pipe Size 1½"											
1	9.01	25.3	49.9	78.0	108	141	178					
1¼	8.22	21.0	40.4	62.3	85.6	111	142	167	211			
2	6.05	16.8	32.6	50.3	70.3	91.5	111	130	156	195	221	
2½	5.46	15.1	30.9	45.3	62.3	81.4	101	126	150	175	203	231
3	5.32	14.1	27.1	39.1	54.0	70.6	85.9	106	129	154	178	202
3½	5.01	13.0	25.7	39.9	54.0	71.5	89.4	109	130	153	177	201
	Nominal Pipe Size 2"											
1	6.57	20.9	37.1	59.3	124	165	206					
1¼	5.98	21.6	45.5	70.4	96.2	126	162	198	245			
2	5.16	19.9	38.5	60.2	85.0	109	136	167	201	233	272	
2½	5.02	19.2	36.6	57.3	78.5	103	127	154	178	208	240	270
3	5.19	18.4	31.9	49.8	67.4	88.1	111	134	155	181	209	235
3½	5.32	15.4	29.3	45.1	62.0	82.2	103	125	150	177	204	231
4	5.21	14.1	27.5	42.8	58.7	76.9	95.3	117	139	165	191	220

530819

BE-1 CLEAR #19

Expressed in B.T.U. per Linear Foot per Hour

Nominal Thickness Inches	Temperature of Pipe, F. 100	200	300	400	500	600	700	800	900	1000	1100	1200	1300
	Temperature Difference between pipe and air, F. 20	120	220	320	420	520	620	720	820	920	1020	1120	1220
Nominal Pipe Size 2½"													
1	5 26	33 3	63 8	102 5	151	198	255						
1½	3 52	28 3	46 8	75 6	91 2	131	167	203	246				
2	3 36	25 5	41 5	66 2	86 5	116	145	177	215	256	295		
2½	3 02	19 2	36 8	57 1	74 9	101	129	157	189	222	253	291	
3	2 76	17 6	33 0	52 4	72 2	94 8	119	145	173	204	234	273	329
3½	2 53	16 5	31 3	48 2	64 9	87 7	109	134	161	188	217	250	303
4	2 40	15 4	29 7	45 8	61 6	83 0	104	126	151	179	205	235	284
Nominal Pipe Size 3"													
1	6 23	39 6	78 2	122 0	170	226	281						
1½	4 87	30 5	60 1	93 1	130	170	214	260	314				
2	4 51	26 1	50 8	68 0	109	142	179	218	267	301	360		
2½	3 04	23 0	44 5	69.4	95 4	124	157	190	230	270	312	359	
3	3 31	20 7	40 5	63 5	85 5	112	140	172	205	242	283	323	391
3½	3 09	19 1	36 5	56 7	78 0	103	129	157	193	221	254	293	353
4	2 92	17 4	34 2	53 0	72 3	95 9	120	146	175	206	237	271	330
Nominal Pipe Size 3½"													
1	6 83	38 6	75 3	118	162	215	269						
1½	4 88	30 1	60 2	95	129	170	211	256	301				
2	4 22	26 8	52.2	80 4	101	145	184	223	274	312			
2½	3 59	24 3	46 5	71 6	95 0	129	162	197	238	281	321	372	
3	3 38	21 3	41 5	64 7	84 0	116	143	178	211	250	292	330	398
3½	3 22	19 9	38 4	59 8	78 1	103	134	165	196	230	266	305	378
4	3 05	18 4	35 4	55 5	73 9	99	125	153	184	214	248	286	356
Nominal Pipe Size 4"													
1	7 41	47 4	93 3	145	201	269	336						
1½	5 81	37 0	72 1	112	155	206	255	310	372				
2	5 36	32 1	62 3	97 7	129	168	213	258	311	362			
2½	4 85	27 3	52 8	81 5	111	150	182	212	251	315	362	441	
3	3 87	25 7	47 8	73 8	102	133	168	204	245	287	335	381	461
3½	3 58	23 2	42 7	66 0	91 8	119	150	183	218	257	293	344	435
4	3 36	20 6	39 6	61 7	84 8	112	140	171	203	240	272	316	383
4½	3 09	18 9	36 5	56 4	78 8	101	127	155	182	219	252	291	352
Nominal Pipe Size 4½"													
1	7 76	48 5	89 2	148	203	275	322						
1½	7 23	36 8	71 0	111	152	200	251	303	358				
2	6 82	31 3	60 1	91 4	130	170	211	250	315	365			
2½	4 31	29 3	53 3	82 6	115	150	188	228	276	320	374	430	
3	4 02	23 6	47 7	73 5	103	134	168	205	244	289	340	390	474
3½	3 54	22 6	44 0	67 7	93 0	123	154	188	225	265	308	354	435
4	3 95	21 3	41 6	64 5	89 0	118	146	178	213	251	298	341	407
4½	3 78	20 6	40 2	61 5	85 1	112	140	171	203	239	277	319	385
Nominal Pipe Size 5"													
1	8 96	57 6	114 9	117	248	327							
1½	6 96	44 1	84 4	131	181	246	310	374					
2	6 26	36 9	70 7	109	151	199	245	295	351				
2½	6 95	34 4	61 2	93 5	131	171	215	261	314	370	429	493	
3	4 46	28 8	55 2	85 7	117	154	195	241	290	344	397	458	564
3½	4 03	25 6	49 1	76 6	105	138	174	215	259	306	354	408	502
4	3 46	22 9	44 7	68 6	94 6	126	156	195	235	278	320	370	455
4½	3 60	23 6	45 6	69 7	96 2	127	160	199	241	285	329	381	469
5	3 20	20 9	40 4	61 8	85 5	111	140	174	211	251	291	337	415

CS-6

530890

Expressed in B.T.U. per Linear Foot per Hour

Nominal Thickness Inches	Temperature of Pipe, °F. 100	200	300	400	500	600	700	800	900	1000	1100	1200	1300
	Temperature Difference between pipe and air, °F. 20	120	220	320	420	520	620	720	820	920	1020	1120	1220
Nominal Pipe Size 6"													
1	10 65	6.78	133.6	210	290	382	358						
1½	8.08	51.1	100.0	154	217	288	358						
2	6 56	41.9	81.0	126	168	229	288	347	426				
2½	6 08	36.3	78 0	109	151	196	246	298	365	423	491	566	
3	5 61	34.0	66.8	96.6	138	178	217	265	321	376	429	497	601
3½	4 46	28 2	57 3	83.9	116	153	188	232	277	328	378	433	524
4	4.16	26.1	50.8	71.6	106	143	178	217	259	305	352	405	490
4½	3.86	24 5	46 9	72.5	97.9	132	165	201	240	284	327	376	454
5	3 52	22.7	44 9	66.0	93.6	121	153	188	224	265	305	350	423
Nominal Pipe Size 7"													
1½	8.96	53.0	112	171	242	319	399						
2	7 35	46.8	90.8	141	196	256	321	400	473				
2½	6.38	40.2	77.6	121	165	217	275	332	399	467	544	638	
3	5.67	34.6	67.2	102	144	188	238	287	347	407	466	539	652
3½	4.96	31.4	61.0	94.7	131	171	223	261	311	367	421	484	585
4	4.56	28 9	52.0	86.1	119	155	196	239	285	335	382	445	538
4½	4 20	26.9	51.4	79.7	110	143	182	221	265	312	358	413	499
5	3.93	25 1	49.2	74 4	103	134	170	207	247	292	335	387	468
5½	3.74	23 9	47.2	71 4	98.3	129	162	197	232	279	321	369	446
Nominal Pipe Size 8"													
1½	9.92	62 8	123	188	265	356	441						
2	8.16	52 2	101	155	215	284	360	420	526				
2½	6.66	42 6	82 4	125	179	229	275	332	409	462	546	630	
3	6 08	35.6	76 6	118	161	208	261	318	385	448	522	602	727
3½	5.42	33.9	66.8	101	141	186	232	284	350	420	487	552	665
4	4.91	31.2	60.2	91.5	126	170	212	259	307	364	418	481	581
4½	4.56	28.9	55.5	84.8	118	156	197	238	286	336	390	446	540
5	4.27	26.9	53.7	80.3	111	146	184	222	267	316	365	417	506
5½	4.46	25 7	50 5	76 8	106	139	174	212	255	299	346	398	479
Nominal Pipe Size 9"													
1½	10.9	69 3	134	211	294	392	486						
2	8.96	54.1	106	161	225	296	372	449	539				
2½	7.32	45 8	90.8	141	196	254	320	384	459	514	619	714	
3	6.56	41.7	80 5	123	172	226	283	344	415	483	563	656	791
3½	5 83	37 0	69.0	112	155	206	250	306	368	432	497	573	692
4	5.37	33.9	63.4	102	140	184	231	281	333	395	455	530	634
4½	4 92	31.1	60.4	92.8	128	170	213	260	308	365	421	485	586
5	4.63	29.2	53.3	88.0	120	158	198	241	285	341	392	452	547
5½	5.36	27.6	54 5	82 7	114	150	187	228	274	322	371	426	515
Nominal Pipe Size 10"													
1½	11 6	73.8	146	224	314	413	517						
2	9 52	61 2	118	180	252	333	419	502	612				
2½	8.68	51.9	100	155	217	281	354	430	515	606	705		
3	7.18	45.9	88.3	135	190	248	311	377	457	529	614	705	
3½	6.47	40 9	74.5	123	172	221	277	337	406	480	556	631	765
4	5 88	37 1	72 7	112	156	202	251	305	369	433	503	572	691
4½	5 40	34.6	68.1	103	142	182	232	283	340	400	463	535	645
5	5 01	32 2	63 2	95 4	133	172	217	265	317	373	430	496	597
5½	4 69	30 0	59 2	88 9	123	162	202	246	294	347	401	462	556

IGM NO. 7067—1m—12/49CL

Litho in U. S. A.

CS-5

USE

530891

Expressed in B.T.U. per Linear Foot per Hour

Nominal Thickness, Inches	Temperature of Pipe, °F: 100	200	300	400	500	600	700	800	900	1000	1100	1200	1300
	Temperature Difference between pipe and air, °F: 28	128	228	328	428	528	628	728	828	928	1028	1128	1228
Nominal Pipe Size 1/8"													
1½	11.6	55.8	166.	358.	668.	1141.	1806.						
2	11.0	50.2	149.4	321.	598.	1022.	1617.	2417.					
2½	9.38	44.7	133.6	287.	535.	914.	1446.	2161.	3078.	4228.			
3	8.15	39.0	116.	250.	466.	796.	1259.	1882.	2680.	3681.	4914.		
3½	7.49	36.5	108.6	234.	436.	745.	1178.	1761.	2508.	3444.	4598.	5977.	7619.
4	6.89	33.1	98.6	212.	395.	675.	1068.	1596.	2273.	3122.	4168.	5418.	6905.
4½	6.13	29.7	88.6	191.	356.	608.	962.	1438.	2048.	2813.	3755.	4882.	6222.
5	5.68	27.5	82.0	176.	329.	562.	889.	1329.	1893.	2600.	3471.	4512.	5750.
5½	5.36	25.8	76.8	165.	308.	526.	832.	1244.	1772.	2434.	3249.	4224.	5382.
6	5.20	25.0	74.6	160.	299.	511.	808.	1208.	1720.	2363.	3154.	4100.	5225.
Nominal Pipe Size 1/4"													
1½	15.4	68.0	216.	469.	878.	1504.	2385.						
2	12.4	58.8	181.	388.	724.	1236.	1955.	2922.					
2½	10.4	49.6	152.	325.	605.	1032.	1631.	2437.	3471.	4768.			
3	9.12	44.0	133.	285.	530.	904.	1428.	2133.	3037.	4171.	5567.	7289.	
3½	8.08	38.8	118.	252.	468.	798.	1260.	1882.	2679.	3680.	4911.	6429.	8268.
4	7.32	34.5	103.0	221.	410.	699.	1103.	1647.	2345.	3220.	4298.	5626.	7235.
4½	6.70	32.2	97.0	207.	385.	656.	1035.	1545.	2199.	3020.	4030.	5275.	6781.
5	6.15	29.4	88.6	189.	351.	598.	943.	1408.	2004.	2752.	3672.	4807.	6180.
5½	5.81	27.8	82.9	177.	329.	560.	883.	1318.	1876.	2576.	3438.	4500.	5784.
6	5.55	26.5	78.5	167.	309.	526.	829.	1237.	1760.	2417.	3224.	4220.	5424.
Nominal Pipe Size 1/2"													
1½	17.3	110.	245.	531.	985.	1685.	2674.						
2	13.9	84.3	192.	420.	778.	1327.	2102.	3140.					
2½	11.7	74.3	161.	354.	656.	1120.	1774.	2650.	3775.	5188.			
3	10.2	64.6	135.	298.	549.	937.	1484.	2217.	3158.	4339.	5791.	7584.	
3½	9.10	58.1	117.	258.	477.	814.	1289.	1926.	2743.	3769.	5029.	6584.	8466.
4	8.20	51.2	103.	225.	416.	710.	1125.	1680.	2393.	3287.	4386.	5742.	7383.
4½	7.52	47.0	91.8	202.	374.	638.	1010.	1509.	2148.	2951.	3937.	5153.	6625.
5	6.91	43.2	85.6	188.	348.	593.	939.	1402.	1996.	2741.	3657.	4787.	6154.
5½	6.49	40.7	80.4	177.	327.	558.	883.	1318.	1876.	2576.	3438.	4500.	5784.
6	6.08	38.3	75.7	167.	309.	526.	833.	1243.	1769.	2429.	3240.	4240.	5450.
Nominal Pipe Size 10"													
1½	19.4	118.	265.	573.	1062.	1817.	2883.						
2	15.9	96.3	222.	480.	889.	1516.	2402.	3588.					
2½	13.5	84.3	186.	403.	748.	1277.	2024.	3023.	4305.	5917.			
3	11.9	74.3	161.	348.	644.	1098.	1741.	2600.	3703.	5088.	6789.	8892.	
3½	10.7	68.3	138.	298.	552.	941.	1492.	2228.	3174.	4361.	5820.	7622.	9797.
4	9.62	60.6	122.	264.	489.	834.	1322.	1974.	2812.	3864.	5156.	6752.	8678.
4½	8.82	55.3	111.	240.	444.	757.	1200.	1792.	2552.	3506.	4678.	6125.	7872.
5	8.11	50.7	100.	217.	402.	685.	1085.	1620.	2307.	3169.	4227.	5534.	7113.
5½	7.61	47.8	94.3	204.	377.	643.	1018.	1520.	2165.	2974.	3967.	5194.	6676.
6	7.13	44.9	88.8	192.	356.	606.	960.	1433.	2041.	2804.	3740.	4895.	6293.
Nominal Pipe Size 12"													
1½	20.4	128.	285.	616.	1139.	1948.	3091.						
2	16.7	104.	231.	498.	921.	1574.	2496.	3727.					
2½	13.9	86.8	193.	416.	770.	1316.	2087.	3116.	4436.	6096.			
3	12.3	76.8	166.	358.	662.	1131.	1794.	2678.	3813.	5240.	6992.	9159.	
3½	11.0	70.3	142.	307.	568.	970.	1538.	2295.	3268.	4491.	5994.	7850.	10091.
4	9.91	62.4	126.	272.	503.	859.	1362.	2033.	2895.	3978.	5309.	6954.	8938.
4½	9.09	57.0	114.	247.	458.	780.	1237.	1846.	2629.	3612.	4820.	6312.	8113.
5	8.36	52.2	103.	224.	414.	706.	1118.	1669.	2376.	3265.	4356.	5703.	7330.
5½	7.84	49.3	97.2	210.	388.	663.	1049.	1566.	2230.	3064.	4088.	5353.	6879.
6	7.35	46.3	91.5	198.	367.	625.	989.	1476.	2102.	2889.	3853.	5045.	6484.

530823

CALCIUM SILICATE PIPE INSULATION
PACKAGING DATA

CARTON CONTENTS

TABLE ONE—NOMINAL 1 INCH THICK

Nominal Pipe Size Inches	Nominal Weight Per Section Lbs.	Sections Per Carton	Carton No.	Nominal Net Weight Per Carton Lbs.	Nominal Gross Weight Per Carton Lbs.
3/8	1.82	45	[illegible]	81	87
1/2	1.78	45	[illegible]	79	85
3/4	1.72	45	[illegible]	77	83
1	2.45	36	[illegible]	75	81
1 1/4	2.15	31	[illegible]	67	73
1 1/2	2.04	31	[illegible]	63	74
2	3.33	18	[illegible]	60	68
2 1/2	3.91	15	[illegible]	58	65
3	4.36	14	[illegible]	61	68
3 1/2	5.01	6	[illegible]	58	65
4	5.84	6	[illegible]	64	69
4 1/2	7.14	6	[illegible]	68	63
5	8.35	6	[illegible]	58	64
6	7.30	6	[illegible]	56	63

TABLE TWO—NOMINAL 1½ INCH THICK

Nominal Pipe Size Inches	Nominal Weight Per Section Lbs.	Sections Per Carton	Carton No.	Nominal Net Weight Per Carton Lbs.	Nominal Gross Weight Per Carton Lbs.
3/8	3.71	30	[illegible]	106	113
1/2	3.68	30	[illegible]	104	111
3/4	3.64	30	[illegible]	101	108
1	4.40	25	[illegible]	110	118
1 1/4	5.34	15	[illegible]	80	86
1 1/2	5.15	15	[illegible]	77	83
2	6.03	12	[illegible]	72	78
2 1/2	8.60	8	[illegible]	69	74
3	7.66	8	[illegible]	61	66
3 1/2	10.03	8	[illegible]	80	87
4	9.72	8	[illegible]	78	84
4 1/2	10.58	4	[illegible]	42	46
5	10.37	4	[illegible]	41	46
6	10.60	4	[illegible]	42	46
8	13.83	4	[illegible]	54	59
10	16.99	2	[illegible]	34	38
12	16.44	2	[illegible]	33	36
10	12.86	2	[illegible]	26	29
12	21.60	1	[illegible]	22	24

FORM NO. PSP—24—12/6051

[illegible] U.S.A.

530823

INDEX REFERENCE DATA \ PRODUCT DATA BULLETINS

CARTON CONTENTS

TABLE THREE—NOMINAL 2 INCH THICK

Nominal Pipe Size Inches	Nominal Weight Per Section Lbs.	Sections Per Carton	Carton No.	Nominal Net Weight Per Carton Lbs.	Nominal Gross Weight Per Carton Lbs.
3/8	5.92	12	321	71	75
1/2	5.85	12	321	70	75
3/4	5.75	12	324	70	75
1	7.80	10	324	78	75
1 1/4	6.75	10	326	68	73
1 1/2	9.61	8	326	77	83
2	9.11	8	326	73	80
2 1/2	11.67	6	328	71	77
3	11.84	6	328	66	72
3 1/2	14.00	4	328	56	61
4	12.87	4	328	52	57
4 1/2	16.16	4	327	64	70
5	14.89	4	327	59	65
6	17.02	4	328	68	76
7	15.85	2	328	30	43
8	20.70	2	324	41	47
9	21.32	2	325	43	55
10	25.69	2	328	51	58
12	29.35	1	326	29	33

TABLE FOUR—MINIMUM DOUBLE LAYER THICK

Nominal Pipe Size Inches	Nominal Weight Per Section Lbs.	Sections Per Carton	Carton No.	Nominal Net Weight Per Carton Lbs.	Nominal Gross Weight Per Carton Lbs.
3/8	5.85	12	324	70	75
1/2	5.77	12	324	69	74
3/4	5.68	12	324	77	82
1	6.91	10	324	69	74
1 1/4	6.84	10	326	68	73
1 1/2	9.50	8	326	76	82
2	9.00	8	326	72	78
2 1/2	11.71	6	328	70	76
3	10.81	6	328	65	72
3 1/2	13.78	4	328	55	60
4	12.79	4	328	51	56
4 1/2	21.28	4	328	85	92
5	19.91	4	328	80	87
6	22.48	2	327	44	49
7	32.36	2	325	64	70

The 1st and 2nd courses of pipe sizes 3/8" to 3" inclusive are packed assembled in the same carton.

530824

CALCIUM SILICATE PIPE INSULATION
PACKAGING DATA

CARTON CONTENTS

PACKAGING MINIMUM DOUBLE LAYER

Nominal Pipe Size Inches	Carton No.	Sections Per Carton	Nominal Net Weight Per Carton Lbs.	Nominal Gross Weight Per Carton Lbs.
1st Course Sectional				
8	322	2	80	85
9	324	2	88	88
10	328	2	88	88
11"	325	3-5/7	88	94
12"	325	3	88	78
Segmental				
2nd Course Segmental				
8	323	2-5/7	68	74
9	325	2	88	78
10	325	2	84	88
11	325	2-3/5	81	88
12	328	2-3/5	88	78

TABLE FIVE—NOMINAL 3½" THICK

Nominal Pipe Size Inches	Nominal Weight Lbs. 1st & 2nd Course	Sections Per Carton	Carton No.	Nominal Net Weight Per Carton Lbs.	Nominal Gross Weight Per Carton Lbs.
3/8	10.81	2	320	22	28
1/2	10.25	2	320	28	28
3/4	10.18	2	320	21	27
1	9.22	2	320	28	28
1 1/4	9.72	2	320	19	25
1 1/2	10.06	2	320	78	24
2	10.47	2	320	76	21
2 1/2	15.69	4	321	62	68
3	16.72	4	321	69	64
3 1/2	14.19	4	321	76	78
4	17.15	4	322	69	76
4 1/2	21.28	4	320	25	92
5	19.91	4	320	80	87
6	22.48	2	320	44	49
7	--	-	--	--	--

Note: The 1st and 2nd course of 2½" thick pipe sizes from 2½" to 6" inclusive are packed assembled in the same carton.

530825

CARTON CONTENTS

TABLE SIX—NOMINAL 3" THICK

Nominal Pipe Size Inches	Nominal Weight Lbs. 1st & 2nd Course	Sections Per Carton	Carton No.	Nominal Net Weight Per Carton Lbs.	Nominal Gross Weight Per Carton Lbs.
3/8	13.75	6	320	83	89
1/2	13.49	6	320	82	88
3/4	13.53	6	320	82	88
1	13.55	6	320	82	88
1 1/4	13.20	6	320	79	85
1 1/2	16.80	4	321	67	72
2	16.30	4	321	65	70
2 1/2	19.88	4	321	80	86
3	19.04	4	321	76	82
3 1/2	23.31	2	322	47	52
4	22.52	2	322	45	50
4 1/2	25.50	2	322	53	58
5	25.20	2	322	50	55
6	27.46	2	324	58	61
7	32.18	2	324	64	70

The first and second course of 3" thick pipe sizes 3/4" to 7" inclusive, are assembled and packed in the same carton.

PACKAGING 3" THICK

Nominal Pipe Size Inches	Carton No.	Sections Per Carton	Nominal Net Weight Per Carton Lbs.	Nominal Gross Weight Per Carton Lbs.
1st Course Sectional				
8	322	2	30	35
9	324	2	33	38
10	324	2	38	44
11*	323	3-3/7	69	74
12* (Sectional when specified)	323	3	65	70
2nd Course Segmental				
8*	323	3-3/7	69	74
9*	323	3	65	70
10*	323	3	64	69
11*	323	2-2/3	61	66
12*	323	2-2/3	65	70
*Segmental				

CALCIUM SILICATE PIPE INSULATION
PACKAGING DATA

CARTON CONTENTS

TABLE SEVEN—NOMINAL 3½" THICK

Nominal Pipe Size Inches	Nominal Weight Lbs. 1st & 2nd Course	Sections Per Carton	Carton No.	Nominal Net Weight Per Carton Lbs.	Nominal Gross Weight Per Carton Lbs.
3/8	17.63	4	321	71	78
1/2	17.57	4	321	70	75
3/4	17.47	4	321	70	75
1	17.27	4	321	69	74
1 1/4	17.02	4	321	68	74
1 1/2	21.12	4	321	85	91
2	20.61	4	321	86	91
2 1/2	25.38	4	323	102	102
3	24.44	4	323	99	105
3 1/2	28.61	2	322	58	63
4	27.81	2	323	56	61
4 1/2	32.38	2	324	65	69
5	30.95	2	324	62	69
6	35.74	2	324	71	77
7	39.62	2	324	78	84

Note: The 1st and 2nd courses of 3½" thick pipe sizes 3/4" to 7" inclusive are packed assembled in the same carton.

PACKAGING 3½" THICK

Nominal Pipe Size Inches	Carton No.	Sections Per Carton	Nominal Net Weight Per Carton Lbs.	Nominal Gross Weight Per Carton Lbs.
1st Course Sectional				
8	324	2	42	47
9	324	2	33	38
10	325	2	33	44
11*	323	3-3/7	66	74
12*	323	3	65	70
*Segmental				
2nd Course Segmental				
8	323	3	68	70
9	323	3-1/4	68	71
10	323	2-1/4	67	73
11	323	2	66	72
12	323	3	67	73

530827

CARTON CONTENTS

TABLE EIGHT—NOMINAL 6" THICK

Nominal Pipe Size Inches	Nominal Weight Lbs. 1st & 2nd Courses	Sections Per Carton	Carton No.	Nominal Net Weight Per Carton Lbs.	Nominal Gross Weight Per Carton Lbs.
3/8	21.81	4	327	88	96
1/2	21.85	4	327	87	95
3/4	21.74	4	327	87	95
1	21.68	4	327	87	95
1 1/4	21.51	4	327	86	93
1 1/2	25.45	4	327	86	93
2	25.69	4	328	106	91
2 1/2	30.66	4	328	108	113
3	29.72	4	328	81	116
3 1/2	34.56	3	327	88	96
4	33.35	3	324	69	85
4 1/2	48.28	3	324	67	74
5	38.60	3	325	90	72
6	42.49	3	325	78	86
		3	326	85	98

Note: The 1st and 2nd courses of 6" thick pipe sizes 1/2" to 6" inclusive are packed and assembled in the same cartons.

PACKAGING 6" THICK

Nominal Pipe Size Inches	Carton No.	Sections Per Carton	Nominal Net Weight Per Carton Lbs.	Nominal Gross Weight Per Carton Lbs.
1st Course Sectional				
7"	323	2	36	43
8"	324	2	42	47
10"	326	2	49	55
12"	325	2	49	55
	325	2-1/2	51	58
	325	2-1/4	70	78
2nd Course Segmental				
7"	323	2-1/2	70	78
8"	325	2-1/4	66	76
10"	325	2-1/2	66	74
12"	323	2	67	71
*Segmental	323	2	63	78
		1-4/5	67	88
			63	78
				68

CALCIUM SILICATE PIPE INSULATION
PACKAGING DATA

CARTON CONTENTS

TABLE ONE - NOMINAL 1-1/2" THICK SEGMENTAL - CARTON 323

NOMINAL PIPE SIZE INCHES	SEGMENTS PER CARTON	SEGMENTS PER SECTION	SECTIONS PER CARTON	NOMINAL NET WEIGHT PER CARTON LBS.	NOMINAL GROSS WEIGHT PER CARTON LBS.
11	24	7	3.429	78	78
12	24	8	3.000	69	74
14	24	8	3.000	68	73
15	24	9	2.667	64	69
16	24	9	2.667	68	73
17	24	10	2.400	66	70
18	24	10	2.400	69	74
19	24	11	2.182	65	70
20	24	11	2.182	69	74
21	24	12	2.000	66	70
22	24	12	2.000	69	74
23	24	13	1.846	66	70
24	24	13	1.846	69	74
26	24	14	1.714	69	74
28	24	15	1.600	69	74
30	24	16	1.500	69	74

TABLE TWO - NOMINAL 2" THICK SEGMENTAL - CARTON 323

NOMINAL PIPE SIZE INCHES	SEGMENTS PER CARTON	SEGMENTS PER SECTION	SECTIONS PER CARTON	NOMINAL NET WEIGHT PER CARTON LBS.	NOMINAL GROSS WEIGHT PER CARTON LBS.
11	18	7	2.571	75	80
12	18	8	2.250	70	75
14	18	8	2.250	71	76
15	18	9	2.000	67	72
16	18	9	2.000	71	76
17	18	10	1.800	67	72
18	18	10	1.800	71	76
19	18	11	1.636	67	72
20	18	11	1.636	71	76
21	18	12	1.500	68	73
22	18	12	1.500	71	76
23	18	13	1.385	69	74
24	18	13	1.385	71	76
26	18	14	1.286	71	76
28	18	15	1.200	70	75
30	18	16	1.125	71	76

530829

CARTON CONTENTS

TABLE THREE - NOMINAL 2-1/2" THICK SEGMENTAL - CARTON 323

NOMINAL PIPE SIZE INCHES	SEGMENTS PER CARTON	SEGMENTS PER SECTION	SECTIONS PER CARTON	NOMINAL NET WEIGHT PER CARTON LBS.	NOMINAL GROSS WEIGHT PER CARTON LBS.
8	15	6	2,500	76	80
9	15	6-1/2	2,308	75	80
10	15	7	2,143	74	79
11	15	7	2,143	80	85
12	15	8	1,875	75	80
14	15	8	1,875	76	81
15	15	9	1,667	72	77
16	15	9	1,667	76	81
17	15	10	1,500	72	77
18	15	10	1,500	76	81
19	15	11	1,364	72	77
20	15	11	1,364	76	80
21	15	12	1,250	72	77
22	15	12	1,250	76	80
23	15	13	1,154	77	77
24	15	13	1,154	76	80
26	15	14	1,071	76	80
28	15	15	1,000	76	80
30	15	16	.938	76	80

SIZES — DESCRIPTIONS OF CONTAINERS

Carton No.	Inside Diameter Inches	Weight Empty Lbs.
No. 320 Pipe Carton	22¾ x 14½ x 36	6
No. 321 " "	17¾ x 17¾ x 36	5
No. 322 " "	11¾ x 23¾ x 36	5
No. 323 Segmental Pipe Carton	13½ x 20 x 36	5
No. 324 Pipe Carton	11½ x 26 x 36	5
No. 325 " "	11 x 28 x 36	6
No. 326 " "	15 x 30½ x 36	7
No. 327 " "	19¾ x 19¾ x 36	6
No. 328 " "	22 x 22 x 36	7
No. 376 " " (Plain Carton)	16½ x 16½ x 36	4

530830 CS-14

CALCIUM SILICATE BLOCK INSULATION

Carey Calcium Silicate Block Insulation is used to insulate flat, curved or irregular surfaces such as ovens, vessels, boilers, oil stills, tanks, and other types of equipment where the temperature does not exceed 1350° F.

Carey Calcium Silicate Block Insulation is 36" long. It can be supplied in widths of 6" and 12" and in thicknesses of 1", 1½", 2", 2½", 3", 3½" and 4".

Curved blocks are generally furnished 6" wide and 36" long, the thickness being 1½" or greater.

Recommended Thicknesses in Inches

Note: No thickness recommendations can apply to all conditions. These recommendations have been found to be satisfactory and economical for most cases.

Carey Calcium Silicate Block Insulation

Temperature of Pipe F.	Thickness Inches	Temperature of Pipe F.	Thickness Inches
100° to 199°	1½	700° to 799°	4
200° to 299°	2	800° to 899°	4½
300° to 399°	2½	900° to 999°	4½
400° to 499°	3	1000° to 1099°	5
500° to 599°	3½	1100° to 1199°	5½
600° to 699°	3½	1200° to 1350°	6

Carey Calcium Silicate Block Insulation
Packaging Data

	Carton No.	Weight Lbs. per Block	Blocks per Carton	Net Weight Lbs. per Carton	Gross Weight Lbs. per Carton
6" x 36" x 1"	289	1.58	36	54	59
1¼	289	1.87	29	53	58
1½	289	2.25	24	54	59
1¾	289	2.62	21	54	60
2	289	3.00	18	54	59
2¼	289	3.37	16	54	60
2½	289	3.75	15	56	61
3	289	4.50	12	54	59
3½	289	5.25	10	53	58
4	289	6.00	9	54	59
12" x 36" x 1"	289	3.00	18	54	59
1¼	289	3.75	11	53	58
1½	289	4.50	12	54	59
1¾	289	5.25	10	53	58
2	289	6.00	9	54	59
2¼	289	6.75	8	52	57
2½	289	7.50	7	53	58
3	289	9.00	6	54	59
3½	289	10.50	5	53	58
4	289	12.00	4	48	53

FORM NO. 7107—2M—12/49 CL

Litho in U.S.A. CS-15

530831

530933

CAREY CALCIUM SILICATE AND HITEMP #19 PIPE INSULATION

Pipe Size	SINGLE LAYER SECTIONAL Thickness 1"	1½"	2"	DOUBLE LAYER SECTIONAL Thickness 2½"	2"	3"	4"
½							
¾							
1							
1¼							
1½							
2							
2½							
3							
3½							
4							
4½							
5							
6							
7							
8							
9							
10							
11 *							
12	**	**	**	Single Segment			
13							
14				Double Segment			
15							
16							
17							
18							
20							
25							
30							
31							

NUMBER OF SEGMENTS PER COURSE							
Thickness	1½"	2"	2½"	3"	3½" – 1½"	4" – 2"	
1½"							
2"							
2½"							
3"							
3½" – 1½"							
4" – 2"							
4½" – 2½"							
5" – 3"							
6" – 3"							
7" – 3½"							
8" – 4"							
9" – 4½"							
10" – 5"							
11" – 5½"							
12" – 6"							
13" – 6½"							
14" – 7"							
15" – 7½"							
16" – 8"							
17" – 8½"							
18" – 9"							
19" – 9½"							
20" – 10"							
21" – 10½"							
22" – 11"							
23" – 11½"							
24" – 12"							

* Sectional
** Sectional when specified
• Segmental

530932

Ch.16

CALCIUM SILICATE BLOCK INSULATION
HEAT LOSSES

Expressed in B.T.U. per Square Foot per Hour

Thickness Inches	Temperature of Surface, °F. Temperature Difference Between Surface and Air, °F. 100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500
1	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500
1	36.0	54.0	72.0	90.0	108	126	144	162	180	198	216	234	252	270	288	306	324	342	360	378	396	414	432	450	468	486	504	522	540
1½	34.6	51.9	69.2	86.5	104	121	138	156	173	190	208	225	242	260	277	294	312	329	346	363	381	398	415	433	450	467	485	502	519
2	33.3	50.0	66.7	83.3	100	117	133	150	167	183	200	217	233	250	267	283	300	317	333	350	367	383	400	417	433	450	467	483	500
2½	32.4	48.6	64.8	81.0	97.2	113	130	146	162	178	194	211	227	243	259	275	292	308	324	340	356	373	389	405	421	437	454	470	486
3	31.6	47.4	63.2	79.0	94.8	111	127	142	158	174	190	206	221	237	253	269	285	301	316	332	348	364	380	396	411	427	443	459	475
3½	31.0	46.5	62.0	77.5	93.0	108	124	139	155	170	186	202	217	232	248	263	279	294	310	325	341	356	372	387	403	418	434	449	465
4	30.4	45.6	60.8	76.0	91.2	106	122	137	152	167	182	198	213	228	243	258	274	289	304	319	334	350	365	380	395	410	426	441	456
4½	29.9	44.8	59.7	74.6	89.5	104	119	134	149	164	179	194	209	224	239	254	269	284	299	314	328	343	358	373	388	403	418	433	448
5	29.4	44.1	58.8	73.5	88.2	103	118	132	147	162	176	191	206	221	235	250	265	279	294	309	324	338	353	368	382	397	412	426	441
6	28.6	43.0	57.3	71.6	85.9	100	114	129	143	157	172	186	200	215	229	243	258	272	286	301	315	329	344	358	372	387	401	415	430
7	28.0	42.0	56.0	70.0	84.0	97.9	112	126	140	154	168	182	196	210	224	238	252	266	280	294	308	322	336	350	364	378	392	406	420
8	27.5	41.3	55.0	68.8	82.5	96.3	110	124	138	151	165	179	193	206	220	234	248	261	275	289	303	316	330	344	358	371	385	399	413
9	27.1	40.7	54.2	67.8	81.3	94.9	108	122	136	149	163	176	190	203	217	231	244	258	271	285	298	312	325	339	352	366	379	393	406
10	26.8	40.2	53.6	67.0	80.4	93.8	107	121	134	148	161	174	188	201	214	228	241	254	268	281	294	308	321	334	348	361	374	387	401
11	26.4	39.6	52.8	66.0	79.2	92.4	106	119	132	145	158	171	185	198	211	224	237	250	263	276	289	302	316	329	342	355	368	381	394
12	26.1	39.1	52.2	65.2	78.3	91.3	104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351	364	377	390
13	25.8	38.7	51.6	64.5	77.4	90.3	103	116	129	142	155	168	180	193	206	219	232	245	258	271	284	296	309	322	335	348	361	374	387
14	25.5	38.3	51.1	63.8	76.6	89.4	102	115	128	140	153	166	179	192	204	217	230	243	256	268	281	294	307	319	332	345	358	370	383
15	25.3	37.9	50.6	63.2	75.9	88.5	101	114	126	139	152	164	177	190	202	215	228	240	253	266	278	291	304	316	329	342	354	367	379
16	25.0	37.5	50.0	62.6	75.1	87.6	100	113	125	138	150	163	175	188	200	213	225	238	250	263	275	288	300	313	325	338	350	363	375
17	24.8	37.2	49.6	62.0	74.4	86.8	99.2	112	124	136	149	161	173	186	198	210	223	235	247	260	272	284	297	309	321	334	346	358	371
18	24.6	36.9	49.2	61.5	73.8	86.1	98.4	111	123	135	147	160	172	184	196	209	221	233	245	257	270	282	294	306	318	331	343	355	367
20	24.3	36.5	48.7	60.8	73.0	85.2	97.3	109	122	134	146	158	170	182	194	206	218	230	242	254	266	278	290	302	314	326	338	350	362
25	23.8	35.7	47.6	59.5	71.4	83.3	95.2	107	119	131	143	154	166	178	190	202	213	225	237	249	261	273	284	296	308	320	332	344	356
30	23.4	35.1	46.8	58.5	70.2	81.9	93.6	105	117	129	140	152	164	175	187	199	210	222	234	245	257	269	280	292	304	315	327	339	350
31	23.2	34.8	46.4	58.0	69.6	81.2	92.8	104	116	127	139	151	162	174	185	197	208	220	232	243	255	266	278	289	301	312	324	335	347

530831

CIP-TEMP #10

[redacted] HI-TEMP NO. 19 BLOCK INSULATION [redacted]

Carey Hi-Temp No. 19 Block Insulation is an efficient insulation with high heat resisting qualities making it effective to a temperature of 1900°F. It consists of diatomaceous silica with heat-resistant mineral fillers and asbestos fiber.

Hi-Temp Blocks are furnished in standard width of 6". However, widths of 3", 9" and 12" are also available. The standard length of all blocks is 36". The thicknesses range from 1" to 4". Curved blocks are available in 6" wide and 36" long in thicknesses of 1½" and 2".

Physical Characteristics

(All properties are on a bone dry basis with the exception of shipping density)

Shipping density, lbs./cu. ft., average plus or minus 10%	23.6
Thermal Conductivity (k) BTU/hr./ft.²/(°F./in.), average	
Mean Temperature 550°F	0.72
Mean Temperature 800°F	0.80
Modulus of rupture, psi, average	70.0
Heat tests (6 hrs. at 1500°F.)	
% linear shrinkage	1.0
% loss in weight	9.0

HI-TEMP CARTON CONTENTS

Size in Inches	Thickness in Inches								
	1	1¼	1½	1¾	2	2¼	2½	3	4
3 x 36									
Blocks per Carton	48	38	32	28	24	20	20	16	12
Sq. Ft. per Carton	36	28½	24	21	18	15	15	12	9
6 x 36									
Blocks per Carton	24	19	16	14	12	10	10	8	6
Sq. Ft. per Carton	36	28½	24	21	18	15	15	12	9
12 x 36									
Blocks per Carton	12	9	8	7	6	5	5	4	3
Sq. Ft. per Carton	36	27	24	21	18	15	15	12	9

Empty carton weight—4 lbs.
Approximate gross weight—75 lbs. for Hi-Temp Blocks.
Outside dimensions of carton 13" x 12-15/16" x 36½"

530935

HI-TEMP NO. 19 PIPE INSULATION

Carey Hi-Temp Pipe Insulation is an efficient insulation with high heat-resisting qualities making it effective up to temperatures of 1900°F. It consists of diatomaceous silica combined with heat resistant mineral fillers and asbestos fiber.

Hi-Temp Pipe Insulation is available in simplified thickness 1" for pipe sizes 6" and less, 1½" and 2" for pipe sizes 10" and less, and 1½", 2", 3", 3½" and 4" (double layer) thicknesses for pipe sizes ½" to 33". Furnished in sectional form for sizes up to outer layer of 11" size. Sizes 11" - ' above are furnished in segmental form.

Physical Characteristics

(All properties are on a bone dry basis with the exception of shipping density)

Density, lbs./cu. ft., au. 10%	23.6
Thermal Cond. (k) BTU/hr/ft²/(°F/in.)	
Average	
Mean Temperature 550°F	0.63
Mean Temperature 800°F	0.71
Modulus of Rupture, psi, average	80.0
Heat Tests (6 hrs. at 1500°F)	
% Linear Shrinkage	1.0
% Loss in Weight	9.0
Hardness	
Before Heat	0.75
6 hrs. + 1500°	1.14
Compressive Strength, psi	
5% deformation	78.0
10% deformation	110.0
Resistance to Abrasion	
% loss after 10 min.	37.0
% loss after 20 min.	65.0

HI-TEMP PIPE INSULATION
PACKAGING DATA

CARTON CONTENTS

NOMINAL 1 INCH THICKNESS (SECTIONAL)

NOMINAL PIPE SIZE INCHES	NOMINAL WEIGHT PER SECTION-LBS.	SECTIONS PER CARTON	CARTON NO.	NOMINAL NET WEIGHT PER CARTON LBS.	NOMINAL GROSS WEIGHT PER CARTON LBS.
2	5.63	12	251	68	71
2-1/2	6.45	9	251	58	69
3	7.19	7	251	50	55
3-1/2	10.75	6	251	65	70
4	9.01	6	251	55	60
4-1/2	12.77	4	251	51	56
5	10.49	4	251	42	47
6	11.72	4	252	47	52

NOMINAL 1-1/2 INCH THICK (SECTIONAL)

NOMINAL PIPE SIZE INCHES	NOMINAL WEIGHT PER SECTION-LBS.	SECTIONS PER CARTON	CARTON NO.	NOMINAL NET WEIGHT PER CARTON LBS.	NOMINAL GROSS WEIGHT PER CARTON LBS.
1/2	6.93	10	277	80	84
3/4	5.81	10	277	58	62
1	7.20	8	277	58	62
1-1/4	8.75	7	277	61	65
1-1/2	8.39	7	277	59	63
2	9.79	5	253	49	53
2-1/2	13.79	4	253	55	59
3	12.26	4	253	49	53
3-1/2	16.44	4	276	66	70
4	14.80	4	276	59	63
4-1/2	18.14	4	202	77	82
5	18.82	4	202	67	72
6	18.84	2	277	38	42
7	22.01	2	248	44	49
8	24.34	2	248	49	54
9	26.70	2	256	54	59
10	30.63	2	257	61	67

CARTON CONTENTS

NOMINAL 2 INCH (SECTIONAL)

NOMINAL PIPE SIZE INCHES	NOMINAL WEIGHT PER SECTION-LBS.	SECTIONS PER CARTON	CARTON NO.	NOMINAL NET WEIGHT PER CARTON	NOMINAL GROSS WEIGHT PER CARTON LBS.
1/2	9.59	7	277	67	71
3/4	9.42	7	277	66	70
1	11.43	6	277	69	73
1-1/4	11.06	6	277	66	70
1-1/2	15.77	4	253	63	67
2	14.80	4	253	59	63
2-1/2	19.50	4	297	78	83
3	17.95	4	297	72	77
3-1/2	22.81	4	302	91	96
4	21.13	4	292	85	89
4-1/2	26.25	2	277	53	57
5	23.90	2	277	48	52
6	27.76	2	248	56	61
7	30.71	2	248	61	66
8	35.84	2	258	72	78
9	39.68	1	253	40	44
10	41.89	1	291	42	47

2-1/2 INCH THICK (SEGMENTAL)—CARTON 253

NOMINAL PIPE SIZE INCHES	SEGMENTS PER CARTON	SEGMENTS PER SECTION	SECTIONS PER CARTON	NOMINAL NET WEIGHT PER CARTON	NOMINAL GROSS WEIGHT PER CARTON LBS.
8	10	5	1.666	75	82
9	10	6-1/2	1.538	75	82
10	10	7	1.429	77	81
11	10	7	1.429	83	87
12	10	8	1.250	75	82
14	10	8	1.250	78	83
15	10	9	1.111	75	79
16	10	9	1.111	75	83
17	10	10	1.000	75	79
18	10	10	1.000	79	83
19	10	11	.909	75	79
20	10	11	.909	78	82
21	10	12	.833	75	79
22	10	12	.833	78	82
23	10	13	.769	75	79
24	10	13	.769	78	82
25	10	14	.714	75	79
26	10	14	.714	78	82
27	10	14	.714	81	84
28	10	15	.667	78	82
29	10	15	.666	80	84
30	10	16	.625	78	82
31	10	16	.625	80	84
32	10	16	.625	82	86

530838

HI-TEMP PIPE INSULATION
PACKAGING DATA

CARTON CONTENTS

TABLE ONE - NOMINAL 1-1/2" THICK SEGMENTAL - CARTON 253

NOMINAL PIPE SIZE INCHES	SEGMENTS PER CARTON	SEGMENTS PER SECTION	SECTIONS PER CARTON	NOMINAL NET WEIGHT PER CARTON LBS.	NOMINAL GROSS WEIGHT PER CARTON LBS.
11	18	7	2.285	76	80
12	18	8	2.000	71	75
14	18	8	2.000	71	75
15	18	9	1.778	67	71
16	18	9	1.778	71	75
17	18	10	1.600	68	72
18	18	10	1.600	71	75
19	18	11	1.455	68	72
20	18	11	1.455	71	75
21	18	12	1.333	68	72
22	18	12	1.333	71	75
23	18	13	1.231	68	72
24	18	13	1.231	72	76
25	18	14	1.143	72	76
26	18	15	1.067	72	76
28	18	16	1.000	72	76

TABLE TWO - NOMINAL 2" THICK SEGMENTAL - CARTON 253

NOMINAL PIPE SIZE INCHES	SEGMENTS PER CARTON	SEGMENTS PER SECTION	SECTIONS PER CARTON	NOMINAL NET WEIGHT PER CARTON LBS.	NOMINAL GROSS WEIGHT PER CARTON LBS.
11	12	7	1.714	78	82
12	12	8	1.500	73	77
14	12	8	1.500	73	77
15	12	9	1.333	69	73
16	12	9	1.333	73	77
17	12	10	1.200	70	74
18	12	10	1.200	73	77
19	12	11	1.091	70	74
20	12	11	1.091	73	77
21	12	12	1.000	70	74
22	12	12	1.000	73	77
23	12	13	.923	71	75
24	12	13	.923	73	77
26	12	14	.857	73	77
28	12	15	.800	73	77
30	12	16	.750	73	77

FORM NO. 7507—2M—12/60 CI

Made in U.S.A.

530839

WEATHERPROOF JACKETS

FOR CAREY CALCIUM SILICATE AND HI-TEMP NO. 19 PIPE INSULATION

Weatherproof jackets applied to sectional pipe insulations give the most practical and least expensive form of weather protection. In exceptional cases, where the jacket or pipe insulation would be subjected to mechanical injury from excessive rough usage, a suitable metal jacket should be substituted for the Weatherproof Jacket.

STANDARD WEATHERPROOF JACKET: This is a rag felt base saturated with a good grade asphalt; weighing 30 pounds per 108 square feet.

45-POUND ASBESTOS WEATHERPROOF JACKET: This is the highest grade asbestos felt base, saturated with the highest grade asphalt. There is a final coat of fine sand on both sides. This jacket weighs approximately 45 pounds per 108 square feet.

Standard or 45-Pound Asbestos Weatherproof Jackets are satisfactory for pipes running in closed conduits or tunnels.

Unless specified otherwise, all orders for pipe insulations calling for "roofing jackets" or "weatherproof jackets" without detailed specifications as to weight or quality, will be made up using Standard Weatherproof Jackets.

Where the specification mentions "roofing jackets" or "weatherproof jackets" weighin in excess of 30 pounds per 108 square feet, order will be filled by furnishing 45-Pound Asbestos Weatherproof Jackets.

Both types of Weatherproof Jackets include 6" wide strips or collars for covering the circumferential joints at the ends of the sectional insulation. The Weatherproof Jackets are lapped at the joint, but with the lap loose so that the pipe insulation can be applied in the regular manner.

A waterproof coating should be applied to the cement surfaces of exposed fittings.

Where accessories are ordered, we furnish the quantity of Lap Cement per 100 lineal feet of pipe insulation as indicated on the opposite table. In addition sufficient No. 16 gauge copperweld wire is furnished for application on 6" centers.

Jackets are cut at the factory to fit pipe size involved, but are not pasted to the sections of the pipe insulation.

LAP CEMENT PER 100 LINEAL FEET OF INSULATION

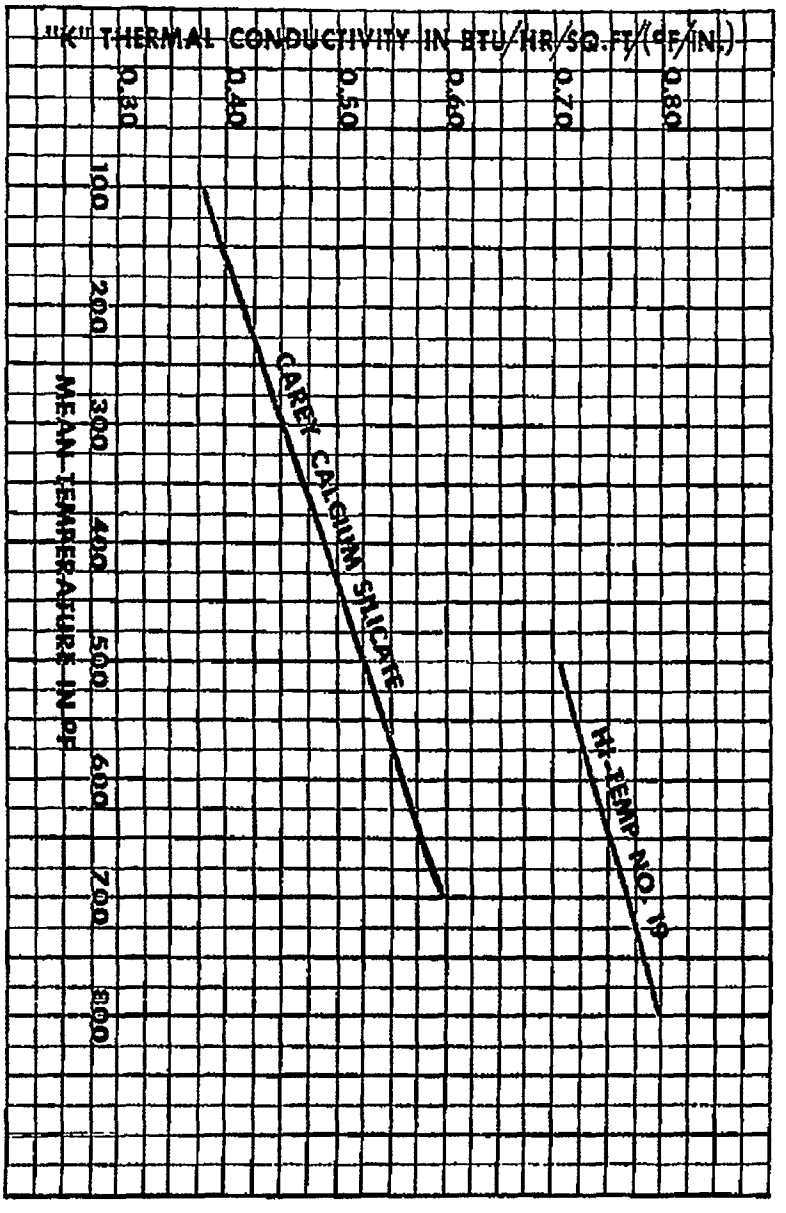
Pipe Size, Inches	Insulation Thickness	
	Less than 2"	2" or more
½-3	1 gal.*	1½ gal.*
3½-7	1½ gal.	2 gal.
8-14	2 gal.	2½ gal.

*Lap Cement, a liquid asphalt cement, furnished in 1, 5, 25 and 50 gal. containers.

533910

[redacted] **THERMAL CONDUCTIVITY** [redacted]

CAREY CALCIUM SILICATE AND HI-TEMP NO. 19



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