deg below 65 F. For any one day, when the mean temperature is less than 65 F, there are as many degree-days as there are degrees difference in temperature between the mean temperature for the day and 65 F. Degree-days may be calculated on other than the 65 F base for use mainly for warehouse and other industrial spaces in which temperatures to be maintained are considerably below the 68 to 72 F range. They are listed in a later section of this chapter.

Studies made by the *National District Heating Association*[11] of the metered steam consumption of 163 buildings located in 22 different cities and served with steam from a district heating company, substantiate the approximate correctness of the 65 F base chosen by the gas industry.

Table 2 lists the average number of degree-days which have occurred over a long period of years, by months, and the yearly totals for various cities in the United States and Canada. The number of degree-days for United States cities were calculated by taking the difference between 65 F and the daily mean temperature computed as half the total of the daily maximum and the daily minimum temperatures. The monthly averages were obtained by adding daily degree-days for each month each year and dividing by the number of days in the month; then totaling the respective calendar monthly averages for the number of years indicated and dividing by the number of years. The total or long term yearly average degree-day value is the summation of the 12 monthly averages. Degree days for Canadian cities were supplied by the *Canadian Meteorological Division* of the *Department of Transport*, and were computed from the mean temperature normals on record for the various stations.

Any attempt to apply the degree-day method of estimating fuel consumption for less than one month would be of very little value. It should be noted that this method of calculation is based on a long term average and cannot be expected to coincide with any single year in calculating fuel requirement. Individual yearly degree-day calculations may vary as much as 20 percent above and below the long term average.

If the degree-days occurring each day are totaled for a reasonably long period, the fuel consumption during that period as compared with another period will be in direct proportion to the number of degree-days in the two periods. Consequently, for a given installation, the fuel consumption can be calculated in terms of fuel used per degree-day for any sufficiently long period, and compared with similar ratios for other periods to determine the relative operating efficiencies with the outside temperature variable eliminated.

Computation and Application

The general equation for calculating the probable fuel consumption by the degree-day method is:

$$F = U \times N \times D \times C_t \qquad (4)$$

where

F = fuel consumption for the estimate period.

U = unit fuel consumption, or quantity of fuel used per (degree-day) (*building load unit*).

N = number of *building load units* (when available use calculated hourly heat loss instead of actual amount of radiation installed).

D = number of degree-days for the estimate period.

C_t = temperature-correction factor from Table 3.

Values of N depend on the particular building for which the estimate is

TABLE 2. AVERAGE MONTHLY AND YEARLY DEGREE-DAYS FOR CITIES IN THE UNITED STATES AND CANADA[a, b] (BASE 65F)

State	Station	Years	No. of Seasons	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Yearly Total
Ala.	Anniston	05/06–40/41	35	0	0	10	135	388	600	609	513	361	152	37	1	2806
	Birmingham A	98/99–45/46	48	0	1	10	111	348	586	591	497	313	130	23	1	2611
	Mobile	98/99–45/46	48	0	0	1	44	203	377	397	314	175	52	3	0	1566
	Montgomery	98/99–45/46	48	0	0	4	71	279	484	494	405	239	85	10	0	2071
Ariz.	Flagstaff	98/99–40/41	43	43	70	244	573	847	1111	1167	970	889	668	469	190	7241
	Phoenix	98/99–45/46	48	0	0	0	18	166	384	402	263	154	47	7	0	1441
	Yuma	98/99–40/41 45/46	44	0	0	0	9	113	306	318	182	85	22	1	0	1036
Ark.	Bentonville	06/07–40/41	35	1	1	33	216	516	810	879	716	519	247	86	7	4036
	Fort Smith A	98/99–45/46	48	0	0	12	128	410	717	763	615	390	154	36	1	3226
	Little Rock A	98/99–45/46	48	0	0	11	120	383	668	704	579	367	145	31	1	3009
Calif.	Eureka	98/99–45/46	48	281	269	274	344	411	518	541	478	504	440	391	307	4758
	Fresno A	98/99–45/46	48	0	0	5	77	309	562	573	380	289	152	52	4	2403
	Independence	98/99–40/41	43	0	0	28	216	512	778	799	619	477	267	120	18	3834
	Los Angeles	98/99–45/46	48	1	0	5	43	110	225	272	235	212	158	103	27	1391
	Needles	17/18–38/39	22	0	0	0	19	217	416	447	243	124	26	3	0	1495
	Point Reyes	98/99–40/41	43	350	336	263	282	317	425	467	406	437	413	415	363	4474
	Red Bluff A	98/99–33/34 38/39–40/41 44/45–45/46	41	0	0	12	97	345	592	601	419	328	178	72	9	2653
	Sacramento	98/99–45/46	48	2	1	15	98	332	582	595	405	326	202	101	21	2680
	San Diego A	98/99–45/46	48	5	1	9	60	143	252	300	257	230	172	118	49	1596
	San Francisco	98/99–45/46	48	196	179	121	139	241	420	460	340	317	272	255	197	3137
	San Jose	06/07–40/41	35	21	21	52	151	329	512	527	383	339	249	167	72	2823
Colo.	Denver	98/99–45/46	48	8	8	126	411	716	1005	1023	897	790	516	275	64	5839
	Durango	04/05–40/41	37	25	37	201	535	861	1204	1271	1002	859	615	394	139	7143
	Grand Junction	98/99–45/46	48	1	1	59	347	743	1138	1218	883	671	377	152	23	5613
	Leadville	07/08–40/41	34	280	332	509	841	1139	1413	1470	1285	1245	990	740	434	10678
	Pueblo A	98/99–45/46	48	3	4	91	377	730	1042	1042	875	724	446	195	29	5558
Conn.	Hartford A	04/05–45/46	42	3	16	105	370	692	1065	1157	1062	859	524	213	47	6113
	New Haven A	98/99–45/46	48	3	11	88	341	658	1017	1109	1023	840	522	221	47	5880
D. C.	Washington	98/99–45/46	48	0	2	42	251	553	872	928	834	624	340	101	14	4561
Fla.	Apalachicola	13/14–45/46	33	0	0	1	23	154	300	323	252	159	38	2	0	1252
	Jacksonville	98/99–45/46	48	0	0	0	25	144	294	302	244	131	42	3	0	1185
	Key West	98/99–45/46	48	0	0	0	0	2	14	21	15	7	0	0	0	59
	Miami	11/12–45/46	35	0	0	0	0	15	41	53	45	28	3	0	0	185
	Pensacola	13/14–45/46	33	0	0	0	25	159	305	332	255	162	39	4	0	1281
	Tampa A	98/99–45/46	48	0	0	0	6	60	149	157	126	62	11	0	0	571
Ga.	Atlanta	98/99–45/46	48	0	0	12	128	392	644	660	563	382	169	33	2	2985
	Augusta	98/99–45/46	48	0	0	4	85	312	529	533	448	274	107	13	1	2306
	Macon	99/00–45/46	47	0	0	5	91	322	532	538	449	278	108	14	1	2338
	Savannah A	98/99–45/46	48	0	0	1	45	206	390	395	332	194	66	6	0	1635
	Thomasville	05/06–40/41	36	0	0	2	48	208	361	359	299	178	52	5	1	1513
Idaho	Boise A	98/99–45/46	48	9	17	136	385	717	1025	1077	840	688	440	252	92	5678
	Lewistown	00/01–32/33	33	5	9	107	378	688	932	992	779	603	371	193	52	5109
	Pocatello	98/99–45/46	48	12	21	176	475	821	1159	1224	1004	845	550	330	124	6741
Ill.	Cairo	98/99–45/46	48	0	0	26	181	493	823	878	748	512	232	60	4	3957
	Chicago	98/99–45/46	48	6	7	88	337	712	1116	1218	1080	861	531	259	67	6282
	Peoria A	05/06–45/46	41	4	8	88	350	730	1126	1231	1035	790	436	178	28	6004
	Springfield	98/99–45/46	48	0	3	65	286	664	1056	1151	977	719	377	132	16	5446
Ind.	Evansville A	98/99–45/46	48	0	1	35	211	544	888	948	822	582	288	85	6	4410
	Fort Wayne A	11/12–45/46	35	6	13	106	374	737	1107	1211	1052	864	504	217	41	6232
	Indianapolis	98/99–45/46	48	1	4	66	297	660	1032	1102	973	737	410	154	22	5458
	Royal Center	18/19–31/32	14	11	19	116	373	740	1104	1239	976	860	502	245	54	6239
	Terre Haute	12/13–45/46	34	0	3	62	270	627	993	1072	897	687	358	133	15	5117
Iowa	Charles City	04/05–45/46	42	8	24	164	480	906	1362	1535	1281	995	552	255	62	7624
	Davenport	98/99–45/46	48	2	6	91	344	748	1176	1291	1111	835	448	171	29	6252
	Des Moines	98/99–45/46	48	1	6	102	354	767	1204	1320	1132	843	446	171	29	6375
	Dubuque	98/99–45/46	48	3	12	123	402	808	1249	1380	1190	915	493	204	41	6820
	Keokuk	98/99–41/42	44	1	3	71	303	680	1077	1191	1025	761	397	136	18	5663
	Sioux City A	98/99–45/46	48	3	11	128	402	844	1273	1402	1206	909	485	202	40	6905
Kan.	Concordia	98/99–45/46	48	1	3	68	288	670	1060	1144	954	712	365	142	18	5425
	Dodge City A	98/99–45/46	48	1	3	69	275	641	998	1046	868	668	351	139	20	5069
	Iola	05/06–40/41	36	0	1	40	236	579	930	1026	817	599	282	98	8	4616
	Topeka	98/99–45/46	48	0	2	56	254	623	1013	1096	917	659	326	116	13	5075
	Wichita A	98/99–45/46	48	0	1	41	221	576	947	1016	836	604	290	103	9	4644
Ky.	Louisville	98/99–45/46	48	0	1	35	217	549	881	931	816	588	298	93	8	4417
	Lexington	98/99–40/41	43	1	3	48	258	601	916	964	862	650	352	123	14	4792
La.	New Orleans	98/99–45/46	48	0	0	0	23	145	304	323	247	129	31	1	0	1203
	Shreveport A	98/99–45/46	48	0	0	4	71	275	506	531	415	241	79	10	0	2132
Me.	Eastport	98/99–45/46	48	158	146	271	528	827	1224	1364	1238	1080	778	530	301	8445
	Greenville	07/08–40/41 42/43–45/46	38	69	113	315	643	1012	1464	1625	1443	1251	842	468	194	9439
	Portland A	98/99–45/46	48	28	48	182	466	794	1182	1309	1188	997	671	376	136	7377
Md.	Baltimore	98/99–45/46	48	0	1	33	227	526	855	921	837	637	343	95	12	4487

[a] Computed from daily temperatures recorded by *United States Weather Bureau* stations over a varied number of seasons as indicated in the 3rd and 4th column of the table. Degree-day data for airport stations are not included in this table. The data for United States cities were computed by the *United States Weather Bureau* in 1946 and 1947 in accordance with the requirements of the *National Joint Committee on Weather Statistics*. The data for a number of the cities listed are based on readings taken at more than one official city weather station during the periods of analysis, but the slight difference in the readings would not appreciably affect the resultant. [b] Letter A indicates city office and airport records combined.