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

State or Province	Station	Years	No. of Seasons	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Yearly Total
Texas	Palestine C			0	0	0	45	260	440	531	368	265	71	0	0	1980
	Port Arthur A			0	0	0	20	218	349	406	274	211	39	0	0	1517
	Port Arthur C			0	0	0	8	170	315	381	258	181	27	0	0	1340
	San Antonio A			0	0	0	25	201	374	462	293	190	34	0	0	1579
	Taylor	01/02–40/41	40	0	0	2	56	234	462	494	375	214	64	8	0	1909
Utah	Modena	00/01–45/46	46	6	11	156	499	832	1142	1190	944	816	567	338	97	6598
	Salt Lake City A			0	0	88	381	771	1039	1194	885	741	453	233	81	5866
	Salt Lake City C			0	0	61	330	714	995	1119	857	701	414	208	64	5463
Vt.	Burlington A			19	47	172	521	858	1308	1460	1313	1107	681	307	72	7885
	Northfield	98/99–42/43	45	62	112	283	602	947	1389	1524	1384	1176	754	405	166	8804
Va.	Cape Henry C			0	0	0	120	366	648	698	636	512	267	60	0	3307
	Lynchburg A			0	0	49	236	531	809	846	722	584	289	82	5	4153
	Norfolk A			0	0	9	152	408	688	729	644	500	265	59	0	3454
	Norfolk C			0	0	5	118	354	636	679	602	464	220	41	0	3119
	Richmond A			0	0	33	210	498	791	828	708	550	271	66	0	3955
	Richmond C			0	0	31	181	456	750	787	675	529	254	57	0	3720
	Wytheville	02/03–40/41	39	7	13	82	352	662	916	945	836	677	410	168	35	5103
Wash.	North Head L.H. Reservation			239	205	234	341	486	636	704	585	598	492	406	285	5211
	Seattle C			49	45	134	329	540	679	753	602	558	396	246	107	4438
	Seattle-Tacoma A			75	70	192	412	633	781	862	675	636	477	307	155	5275
	Spokane A			17	28	205	508	879	1113	1243	988	834	561	330	146	6852
	Tacoma C			66	62	177	375	579	719	797	636	595	435	282	143	4866
	Tatoosh Island C			295	288	315	406	528	648	713	610	629	525	437	330	5724
	Walla Walla C			0	0	93	308	675	890	1023	748	564	338	171	38	4848
	Yakima A			0	7	150	446	807	1066	1181	862	660	408	205	53	5845
W. Va.	Elkins A			9	31	122	412	726	995	1017	910	797	477	224	53	5773
	Parkersburg C			0	0	56	272	600	896	949	826	672	347	119	13	4750
Wis.	Green Bay A			32	58	183	515	945	1392	1516	1336	1132	696	347	107	8259
	La Crosse A			11	20	152	447	921	1380	1528	1280	1035	552	250	74	7650
	Madison A			13	31	150	459	891	1302	1423	1207	1008	579	272	82	7417
	Madison C			10	30	137	419	864	1287	1417	1207	1011	573	266	79	7300
	Milwaukee A			20	32	134	428	831	1218	1336	1142	983	621	351	109	7205
	Milwaukee C			11	24	112	397	795	1184	1302	1117	961	606	335	100	6944
	Wausau	15/16–40/41	26	26	58	216	568	982	1427	1594	1381	1147	680	315	100	8494
Wyo.	Cheyenne A			33	39	241	577	897	1125	1225	1044	1029	717	462	173	7562
	Lander A			7	23	244	632	1050	1383	1494	1179	1045	687	396	163	8303
	Yellowstone Park	04/05–40/41	37	125	173	424	759	1079	1386	1464	1252	1165	841	603	334	9605
Alta.	Calgary	1921–50	30	110	170	410	710	1110	1430	1530	1350	1200	770	460	270	9520
	Edmonton	1921–50	30	90	180	440	750	1220	1660	1780	1520	1290	760	410	220	10320
	Lethbridge	1921–50	30	60	100	350	620	1030	1330	1450	1290	1120	690	400	210	8650
	Medicine Hat	1921–50	30	20	50	300	600	1070	1440	1590	1380	1130	620	320	130	8650
B.C.	Prince George	1921–50	30	180	220	440	730	1100	1450	1560	1290	1070	730	470	260	9500
	Prince Rupert	1921–50	30	270	240	340	510	680	860	910	810	790	650	500	350	6910
	Vancouver	1921–45	25	60	60	200	410	620	790	850	710	650	460	290	130	5230
	Victoria	1921–50	30	160	150	230	410	600	730	800	660	620	470	350	230	5410
Man.	Brandon	1921–50	30	60	100	350	730	1290	1810	2010	1730	1440	820	420	170	10930
	Churchill	1926–50	25	310	370	650	1110	1750	2300	2520	2270	2150	1590	1100	690	16810
	Winnipeg	1921–50	30	40	70	300	690	1250	1770	2000	1710	1440	810	400	150	10630
N.B.	Fredericton	1921–50	30	50	70	250	600	940	1410	1570	1410	1180	780	420	150	8830
	Moncton	1939–50	12	40	80	240	580	890	1340	1510	1340	1180	830	460	210	8700
	Saint John	1921–50	30	110	110	250	530	830	1250	1400	1270	1100	780	500	250	8380
Nfld.	Corner Brook	1933–50	18	90	140	320	640	890	1230	1410	1360	1240	900	640	350	9210
	Gander	1937–50	14	130	160	320	660	920	1230	1430	1320	1270	970	650	380	9440
	Goose Bay	1941–51	10	130	220	440	840	1220	1740	2020	1710	1530	1110	770	410	12140
	St. John's		19	170	160	320	580	820	1100	1270	1230	1160	910	680	380	8780
NWT.	Aklavik	1926–50	25	280	460	800	1400	2040	2500	2580	2310	2280	1690	1050	480	17870
	Fort Norman		25	170	350	700	1220	1940	2460	2550	2190	2040	1390	730	280	16020
N.S.	Halifax	1921–50	30	50	70	180	470	740	1120	1260	1180	1050	760	480	210	7570
	Sydney	1921–50	30	60	80	220	510	780	1130	1310	1280	1160	850	570	270	8220
	Yarmouth	1921–50	30	110	120	230	480	720	1040	1180	1100	1010	750	510	270	7520
Ont.	Fort William	1921–50	30	90	120	350	690	1140	1590	1780	1550	1360	890	550	240	10350
	Hamilton		21	10	10	120	430	760	1130	1270	1160	1000	620	320	60	6890
	Kapuskasing	1921–50	30	110	170	410	780	1270	1780	2060	1770	1570	1030	600	240	11790
	Kingston	1921–50	30	30	40	160	500	820	1250	1420	1290	1110	710	380	100	7810
	London	1921–50	30	20	40	150	490	840	1200	1320	1210	1040	650	330	90	7380
	Ottawa	1921–50	30	30	60	210	590	960	1480	1640	1480	1230	730	340	80	8830
	Toronto	1921–50	30	20	30	140	460	770	1130	1260	1160	1020	640	320	70	7020
P.E.I.	Charlottetown	1921–50	30	40	60	200	510	820	1230	1430	1340	1180	840	510	220	8380
Que.	Arvida	1931–50	20	60	110	330	690	1100	1670	1880	1660	1410	880	480	170	10440
	Montreal	1921–50	30	10	40	180	530	890	1370	1540	1370	1150	700	300	50	8130
	Quebec City	1921–50	30	20	70	250	610	990	1470	1640	1460	1250	810	400	100	9070
	Sherbrooke	1921–50	30	20	70	240	590	920	1400	1560	1410	1190	750	370	90	8610
Saska.	Prince Albert	1921–50	30	70	140	410	780	1350	1870	2060	1750	1500	850	440	210	11430
	Regina	1921–50	30	70	110	370	750	1290	1740	1940	1680	1420	790	420	190	10770
	Saskatoon	1921–50	30	60	110	380	760	1320	1790	1990	1710	1440	800	420	180	10960
	Swift Current	1921–50	30	50	90	340	680	1170	1550	1710	1490	1260	730	400	190	9660
Y.T.	Dawson	1921–50	30	170	320	660	1170	1890	2410	2510	2160	1830	1100	570	250	15040

being prepared and must be found by surveying plans, by observation, or by measurement of the building. Values of U for use in this equation are the unit fuel consumptions per degree-day, obtained as a result of the collection of operating information and listed in Tables 4, 5 and 6. Attention is directed to the nature of these units in the next following sections.

Unit Fuel Consumptions per Degree-Day

The quantity of fuel used per degree-day in a given heating plant can be reduced to a unit basis in terms of quantity of fuel or steam per degree-day per thousand Btu hourly heat loss at design conditions. A less frequently used basis is quantity of fuel per (degree-day) (square foot of floor area). In fact any convenient unit can be used to relate the consumption to the degree-day and to the building.

The choice of these units requires explanation, and some discrimination and judgment. If the volume basis is used, the net heated space is preferable to the gross building cubage, since gross cubage includes outer walls and certain portions of attic and basement space which are usually unheated. In the absence of data on net heated volume, a figure of 80 per-

TABLE 3. CORRECTION FACTORS FOR OUTSIDE DESIGN TEMPERATURES[a]

Outside Design Temp F	−20	−10	0	+10	20
Correction Factor	0.778	0.875	1.000	1.167	1.400

[a] The multipliers in Table 3, which are high for mild climates and low for cold regions, are not in error as might appear. The unit figures in Tables 4, 5, and 6 are per square foot of radiator or thousand Btu heat loss per degree-day. For equivalent buildings and heating seasons, those in warm climates have lower design heat losses and smaller radiator quantities than those in cold cities. Consequently, the *unit* figure in quantity of fuel per (square foot of radiator) (degree-day), is larger for warm localities than for colder regions. Since the northern cities have more radiator surface per given building and a higher seasonal degree-day total than cities in the south, the total fuel per season will be larger for the northern city.

cent of the gross volume may be used to obtain the estimated net heated volume. The volume basis has been rather widely used primarily because it is simple to apply. In industrial buildings it is usually easier to obtain the correct volume of a given building than to measure and evaluate the heating capacity of its heating system, or calculate its maximum hourly Btu loss. The comparison of buildings on a straight volume basis does not allow for variation in exposure, type of construction, ratio of exposed area to cubical contents, and type of occupancy. It is inaccurate for estimating purposes unless the buildings are of very similar nature.

The calculated heat loss or the heating capacity of the installed radiation may be used as the unit. The use of the heating capacity of the installed radiation is of questionable value when referring to heat transfer surfaces used in warm air furnace or central air conditioning systems. Where steam or hot water radiation is already installed, care should be exercised in using the installed radiation as the basis for estimating, since actual installed radiation may differ considerably from the exact radiation requirements. In view of all these considerations, it is believed that the unit based on *thousands of Btu of hourly calculated heat loss for the design hour* is probably the most desirable.

Estimating Gas Consumption

Values of the Unit Fuel Consumption Constant (U) for gas are given in Table 4 for various gas heating values, and different types and sizes of