

TABLE 1. DEGREE-DAYS FOR CITIES IN THE UNITED STATES AND CANADA^a

Col. A	Col. B	Col. C	Col. A	Col. B	Col. C
State	City	Degree-Days	State	City	Degree-Days
Ala.	Birmingham	2,408	Nev.	Reno	5,891
	Mobile	1,471	N. H.	Concord	6,852
Ariz.	Flagstaff	7,145	N. J.	Atlantic City	5,175
	Tucson	1,845		Trenton	4,934
Ark.	Hot Springs	2,665	N. M.	Santa Fe	6,063
	Little Rock	2,811	N. Y.	Albany	6,889
Calif.	Los Angeles	1,504		Buffalo	6,821
	San Francisco	3,264		New York	5,348
Colo.	Colorado Springs	6,553	N. C.	Raleigh	3,234
	Denver	5,873		Wilmington	2,302
Conn.	New Haven	5,895	N. Dak.	Bismarck	8,498
D. C.	Washington	4,626	Ohio	Cincinnati	4,702
Fla.	Jacksonville	890		Cleveland	6,154
Ga.	Atlanta	2,891		Columbus	5,323
	Savannah	1,490	Okla.	Oklahoma City	3,613
Idaho	Boise	4,558	Ore.	Portland	4,468
	Lewiston	4,924		Salem	4,629
Ill.	Chicago	6,315	Pa.	Philadelphia	4,855
	Springfield	5,370		Pittsburgh	5,235
Ind.	Evansville	4,164	R. I.	Providence	6,014
	Indianapolis	5,297	S. C.	Charleston	1,769
Iowa	Des Moines	6,373		Spartanburg	3,257
	Sioux City	7,023	S. Dak.	Sioux Falls	7,683
Kans.	Dodge City	5,034	Tenn.	Memphis	2,950
	Topeka	5,301		Nashville	3,578
Ky.	Lexington	4,616	Texas	Austin	1,578
	Louisville	4,180		Dallas	2,455
La.	New Orleans	1,023		Houston	1,157
Me.	Eastport	8,531		San Antonio	1,202
	Portland	7,012	Utah	Logan	6,735
Md.	Baltimore	4,333		Salt Lake City	5,553
Mass.	Springfield	6,464	Vt.	Burlington	7,620
	Boston	6,145	Va.	Fredericksburg	4,243
Mich.	Detroit	6,494		Norfolk	3,349
	Marquette	8,692		Richmond	3,725
Minn.	Duluth	9,480	Wash.	Seattle	4,868
	Minneapolis	7,851		Spokane	6,353
Miss.	Vicksburg	1,822	W. Va.	Morgantown	5,016
Mo.	Kansas City	5,202		Parkersburg	4,884
	St. Louis	4,585	Wis.	Fond du Lac	7,612
Mont.	Billings	7,115		Green Bay	7,823
	Havre	8,699		La Crosse	6,690
Nebr.	Lincoln	6,231		Milwaukee	7,372
	Omaha	6,128	Wyo.	Cheyenne	7,462

Province	City	Degree-Days	Province	City	Degree-Days
B. C.	Victoria	5,777	Ont.	Toronto	7,732
	Vancouver	5,976	Que.	Montreal	8,705
	Kamloops	6,724		Quebec	8,628
Alb.	Medicine Hat	8,152	N. B.	Fredericton	9,099
Sask.	Qu'Appelle	11,261	N. S.	Yarmouth	7,694
Man.	Winnipeg	11,166	P. E. I.	Charlottetown	8,485
Ont.	Port Arthur	10,803			

^aFrom *Industrial Gas Series, House Heating* (third edition) published by the American Gas Association. These degree-days are based on daily mean temperatures. Base, 65°F.

building is to be heated with oil fuel having a calorific value of 141,000 Btu per gallon. The heating efficiency is assumed to be 70 per cent. Thermostatic control is to be used and a temperature of 55 F is to be maintained from 11 p.m. to 7 a.m. How many gallons of oil will be required during a normal heating season if the loss of heat through open windows is neglected?

Solution. The maximum hourly heat loss will be $127,000 - \frac{28,000}{2} = 113,000$ Btu = H . Substituting the proper values in Equation 1:

$$F = \frac{113,000 \times (70 - 36.4) \times 5040}{141,000 \times 0.70 \times [70 - (-8)]} = 2486 \text{ gal of oil.}$$

$$\text{The average inside temperature will be } \frac{70 \times 16 + 55 \times 8}{24} = 65 \text{ F}$$

$$\text{and the fuel saving due to this fact will be } \frac{70 - 65}{70 - 36.4} = 0.149 \text{ or } 14.9 \text{ per cent.}$$

Hence, the net fuel consumption will be $2486 - 0.149 \times 2486 = 2116$ gal.

The normal number of degree-days for Chicago is 6315. Substituting in Equation 3 and solving by the degree-day method:

$$F = \frac{113,000 \times 6315 \times 24}{78 \times 141,000 \times 0.70} = 2225 \text{ gal of oil}$$

No allowance need be made for the average temperature of 65 F since this is taken care of by the selection of a base of 65 F for the degree-day, as already explained. It will be noted that the two methods check within 5 per cent in this case. If the average daily inside temperature in the first solution had been 66.4 F instead of 65 F, the two methods would have checked exactly.

INDUSTRIAL DEGREE-DAY

Since the standard degree-day is intended for an inside temperature of 70 F, it is particularly convenient for solving residence problems. Where the design temperature differs greatly from 70 F, the standard degree-day cannot be accurately applied. Consequently, the industrial degree-day^a has been developed and values have been derived for two bases, namely 55 F and 45 F, intended for inside temperatures of 60 F and 50 F, respectively.

There is a considerable spread, however, among these three bases, and consequently there would be an appreciable error if the actual basis to be used in a certain case would be approximately midway between any two of the three bases for which degree-day values are at present available. Since the correction cannot be made on a proportionate basis, it would be more accurate in the majority of cases involving inside temperatures other than 70 F, 60 F, or 50 F to apply Equation 1.

APPROXIMATING FUEL REQUIREMENTS

It is sometimes desirable to obtain a rough approximation of the annual fuel consumption. Such approximations may be obtained by using unit factors based on the fuel requirements per square foot (or per 100 sq ft) of radiation or per 1000 cu ft of space.

Fig. 1 may be used for rough approximations of coal and oil require-

^aSee *Heating and Ventilating Degree-Day Handbook*.