TABLE 2. UNIT FUEL CONSUMPTION CONSTANTS (U) FOR GAS[a]
Based on 0 F Outside Temperature, 70 F Inside Temperature, and 8-Hour Reduction to 60 F.

Heating Value of Gas Btu per Cu Ft	Hot Water: Cu Ft Gas per Degree-Day per Sq Ft Radiator			Steam: Cu Ft Gas per Degree-Day per Sq Ft Radiator			Warm Air: Cu Ft Gas per Degree-Day per 1000 Btu Hourly Design Heat Loss	
	Up to 500 Sq Ft	500 to 1200 Sq Ft	Over 1200 Sq Ft	Up to 300 Sq Ft	300 to 700 Sq Ft	Over 700 Sq Ft	Gravity	Fan Systems
500	0.142	0.135	0.128	0.242	0.231	0.220	0.855	0.820
535	0.132	0.126	0.120	0.226	0.215	0.206	0.800	0.766
800	0.089	0.085	0.081	0.151	0.144	0.137	0.534	0.513
1000	0.071	0.068	0.065	0.121	0.115	0.110	0.428	0.410
1 Therm = 100,000 Btu	Gas Consumption in Therms per Degree-Day							
	0.000708	0.000675	0.000642	0.00121	0.00115	0.00110	0.00428	0.00409

[a] Abstracted from Comfort Heating, *American Gas Association*, 1938.

tions. For other outside design conditions corrections must be made as given in Table 5.

The factors in Table 2, as corrected if necessary, are satisfactory for regions having 3500 to 6500 degree-days per heating season. In regions with less than 3500 degree-days the unit gas consumption is higher than given; where over 6500, the unit is less than given. Ten per cent addition or deduction in these cases is recommended by *A.G.A.* publications. Estimates for industrial buildings where low inside temperatures are maintained cannot be made from this table.

For gas heating values other than those given in Table 2, simply interpolate or extrapolate. It will also be noted that Table 2 applies only to small installations. In general the larger the installation the smaller the unit gas consumption becomes and the values in the table should be used with care, if at all, in large gas-burning installations.

Example 5. Estimate the gas required to heat a building located in Chicago, Ill., which has 6282 degree-days and a gas heating value of 800 Btu per cu ft. The calculated heating surface requirements are 1000 sq ft of hot water radiation based on design temperature of −10 F and 70 F.

Solution. From Table 2, the fuel consumption for a design temperature of 0 F with 800 Btu gas is found to be 0.085 cu ft of gas per (degree-day) (square foot of hot water radiation). From Table 5, the correction factor is 0.875 for −10 F outside design temperature, hence $0.875 \times 0.085 = 0.07438$. By Equation 4,

$$F = 0.07438 \times 1000 \times 6282 = 467{,}255 \text{ cu ft.}$$

TABLE 3. UNIT FUEL CONSUMPTION[a] CONSTANTS (U) FOR OIL[b]
Based on 0 F Outside Temperature, 70 F Inside Temperature, and 8-Hour Reduction to 55 F

Units	Efficiency in Per Cent				
	40	50	60	70	80
Gal Oil per Sq Ft Steam Radiator	0.00172	0.00137	0.00114	0.00098	0.00086
Gal Oil per Sq Ft Hot Water Radiator	0.00108	0.00086	0.00072	0.00062	0.00054
Gal Oil per 1000 Btu per Hour Heat Loss	0.00715	0.00571	0.00476	0.00409	0.00358

[a] Based on a heating value of 140,000 Btu per gallon.
[b] Abstracted by permission from *Degree-Day Handbook* (Second Edition, 1937), by C. Strock and C. H. B. Hotchkiss.
[c] Per degree-day.

TABLE 4. UNIT FUEL CONSUMPTION[a] CONSTANTS (U) FOR COAL[b]
Based on 0 F Outside Temperature, 70 F Inside Temperature, and 8-Hour Reduction to 55 F.

Units	Efficiency in Per Cent				
	40	50	60	70	80
Lb Coal per Sq Ft Steam Radiator	0.0200	0.0160	0.0133	0.0114	0.0100
Lb Coal per Sq Ft Hot Water Radiator	0.0125	0.0100	0.0084	0.0072	0.0063
Lb Coal per 1000 Btu per Hour Heat Loss	0.0825	0.0666	0.0550	0.0471	0.0412

[a] Based on a heating value of 12,000 Btu per pound.
[b] Abstracted by permission from *Degree-Day Handbook* (Second Edition, 1937), by C. Strock and C. H. B Hotchkiss.
[c] Per degree-day.

Estimating Oil Consumption

Unit fuel consumption factors for oil, similar to those for gas in Table 2, are given in Table 3. The factors in Table 3 apply only to an inside design temperature of 70 F and an outside design temperature of 0 F. For other outside design temperatures, the constants in Table 3 must be multiplied by the values in Table 5 as explained under Estimating Gas Consumption.

Values given in Table 3 assume the use of oil with a heating value of 140,000 Btu per gallon. For other heating values, multiply the values in Table 3 by the ratio of 140,000 divided by the heating value per gallon of fuel being used.

Example 6. Estimate the seasonal oil consumption of an oil-fired boiler in a building located in Minneapolis having a calculated heat loss of 192,000 Btu per hr, burning 144,000 Btu per gal oil and operating at a seasonal efficiency of 60 per cent. The outside design temperature for Minneapolis is −20 F, and the inside design temperature is 70 F.

Solution. From Table 3, under 60 per cent efficiency and opposite the bottom column, the value of U is found to be 0.00476 gal per 1000 Btu hourly heat loss for 0 F outside temperature.

TABLE 5. CORRECTION FACTORS FOR OUTSIDE DESIGN TEMPERATURES[a]

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

[a] The multipliers in Table 5, which are high for mild climates and low for cold regions, are not in error as might appear. The unit figures in Tables 2, 3, and 4 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.