South Dakota Natural Gas Residential Furnaces - Energy Savings Table

Retrofit **Choose New or Retrofit from Drop-Down Menu to the left**

Calculator

Furnace Size (BTU)	75,000
Heating Efficiency	95%
Savings (MMBTU)	**14.2**

Burner Btu/yr = Unit Dth Savings per Year = Btuh_input x HDD65 x 24 x LF x CF x [1/(T_indoor - T_design)] x (1/Eff_Base - 1/Eff_high) x Eff_Base / 1,000,000

Where:

Btuh_input =	The nominal rating of the input capacity of the new furnace or boiler in Btu/h
LF =	The load factor, assumed to be 0.77 (implies 30% oversizing)
CF =	Correction Factor, assumed to be 0.7
HDD65 =	The heating degree-days of the climate zone, see notes
T_indoor =	The temperature of the indoor conditioned space, assumed to be 65 degrees Fahrenheit
T_design =	The equipment design temperature of the climate zone, see notes
Eff_base =	Efficiency of the baseline equipment
Eff_high =	Efficiency (AFUE) of the new furnace or boiler

Source: MN Technical Reference Manual Version 1.2 adjusted for South Dakota weather

Furnace Size (BTU)	Energy Factor 0.95	Energy Factor 0.96	Energy Factor 0.97
30,000	5.7	6.0	6.3
35,000	6.6	7.0	7.4
40,000	7.6	8.0	8.4
45,000	8.5	9.0	9.5
50,000	9.5	10.0	10.5
55,000	10.4	11.0	11.6
60,000	11.4	12.0	12.7
65,000	12.3	13.0	13.7
70,000	13.3	14.0	14.8

Furnace Size (BTU)	Energy Factor 0.95	Energy Factor 0.96	Energy Factor 0.97
75,000	14.2	15.0	15.8
80,000	15.2	16.0	16.9
85,000	16.1	17.0	17.9
90,000	17.1	18.0	19.0
95,000	18.0	19.0	20.0
100,000	19.0	20.1	21.1
105,000	19.9	21.1	22.1
110,000	20.9	22.1	23.2
115,000	21.8	23.1	24.2
120,000	22.8	24.1	25.3
125,000	23.7	25.1	26.4
130,000	24.7	26.1	27.4
135,000	25.6	27.1	28.5
140,000	26.6	28.1	29.5
145,000	27.5	29.1	30.6
150,000	28.5	30.1	31.6
155,000	29.4	31.1	32.7
160,000	30.4	32.1	33.7
165,000	31.3	33.1	34.8
170,000	32.3	34.1	35.8
175,000	33.2	35.1	36.9
180,000	34.2	36.1	38.0
185,000	35.1	37.1	39.0
190,000	36.1	38.1	40.1
195,000	37.0	39.1	41.1
200,000	38.0	40.1	42.2
205,000	38.9	41.1	43.2
210,000	39.9	42.1	44.3
215,000	40.8	43.1	45.3
220,000	41.8	44.1	46.4
225,000	42.7	45.1	47.4

South Dakota Natural Gas Programmable Thermostats - Energy Savings Table

Single-Family — **Choose Housing Type from Drop-Down Menu to the left**

Other Install — **Choose Install Type from Drop-Down Menu to the left**

Savings in dk per Programmable Thermostat = 2.1

Savings (Dth/Year) = HHCgas x HSF x HF x ISR

Where:

HHCgas =	Household heating consumption for natural gas heated single family homes
HSF =	Heating Savings Factor, assumed fraction reduction in heating energy consumption due to programmable thermostat, HSF = 0.062
HF =	Household factor, to adjust consumption for non-single family households, assumed to be 1.0 for single family homes or 0.65 for duplexes/townhomes/multi-family
ISR =	In-Service Rate, the percentage of units installed and programmed effectively (1.0 for direct install, 0.56 otherwise)

South Dakota Natural Gas Commercial Furnaces - Energy Savings Table

Retrofit **Choose Replacement or New from Drop-Down Menu to the left**

Calculator

Furnace Size (BTU)	75,000
Heating Efficiency	95%
Savings (MMBTU)	**14.2**

Burner Btu/yr = Unit Dth Savings per Year = Btuh_input x HDD65 x 24 x LF x CF x [1/(T_indoor - T_design)] x (1/Eff_Base - 1/Eff_high) x Eff_Base / 1,000,000

Where:

Btuh_input =	The nominal rating of the input capacity of the new furnace or boiler in Btu/h
LF =	The load factor, assumed to be 0.77 (implies 30% oversizing)
CF =	Correction Factor, assumed to be 0.7
HDD65 =	The heating degree-days of the climate zone, see notes
T_indoor =	The temperature of the indoor conditioned space, assumed to be 65 degrees Fahrenheit
T_design =	The equipment design temperature of the climate zone, see notes
Eff_base =	Efficiency of the baseline equipment
Eff_high =	Efficiency (AFUE) of the new furnace or boiler

Source: MN Technical Reference Manual Version 1.2 adjusted for South Dakota weather

Furnace Size (BTU)	Energy Factor 0.95	Energy Factor 0.96	Energy Factor 0.97
30,000	5.7	6.0	6.3
35,000	6.6	7.0	7.4
40,000	7.6	8.0	8.4
45,000	8.5	9.0	9.5
50,000	9.5	10.0	10.5
55,000	10.4	11.0	11.6
60,000	11.4	12.0	12.7
65,000	12.3	13.0	13.7
70,000	13.3	14.0	14.8

Furnace Size (BTU)	Energy Factor 0.95	Energy Factor 0.96	Energy Factor 0.97
75,000	14.2	15.0	15.8
80,000	15.2	16.0	16.9
85,000	16.1	17.0	17.9
90,000	17.1	18.0	19.0
95,000	18.0	19.0	20.0
100,000	19.0	20.1	21.1
105,000	19.9	21.1	22.1
110,000	20.9	22.1	23.2
115,000	21.8	23.1	24.2
120,000	22.8	24.1	25.3
125,000	23.7	25.1	26.4
130,000	24.7	26.1	27.4
135,000	25.6	27.1	28.5
140,000	26.6	28.1	29.5
145,000	27.5	29.1	30.6
150,000	28.5	30.1	31.6
155,000	29.4	31.1	32.7
160,000	30.4	32.1	33.7
165,000	31.3	33.1	34.8
170,000	32.3	34.1	35.8
175,000	33.2	35.1	36.9
180,000	34.2	36.1	38.0
185,000	35.1	37.1	39.0
190,000	36.1	38.1	40.1
195,000	37.0	39.1	41.1
200,000	38.0	40.1	42.2