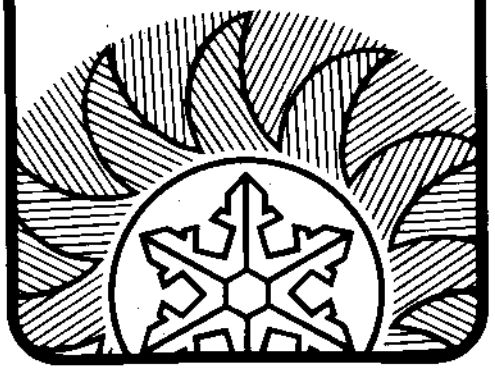
MANUAL 2100-073

# DUAL FUEL ADD-ON HEAT PUMP GUIDE FOR OPERATIONAL COST SAVINGS

# REGION 5

Bard®

DUAL ENERGY SYSTEMS



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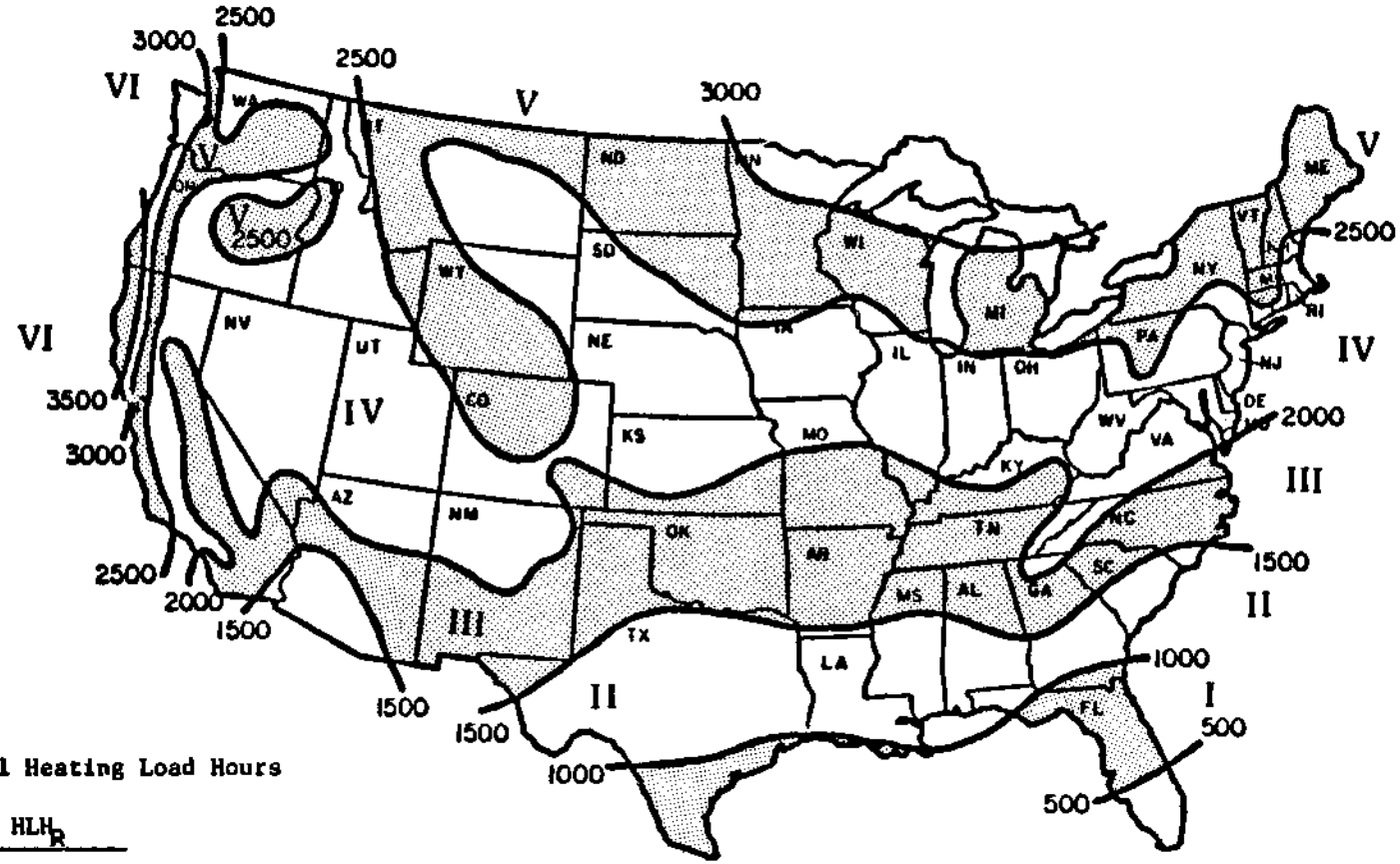


**Regional Heating Load Hours**

| Region | $HLH_R$ |
|---|---|
| I | 750 |
| II | 1250 |
| III | 1750 |
| IV | 2250 |
| V | 2750 |
| VI | 2750 |

This map is reasonably accurate for most parts of the United States but is necessarily highly generalized and consequently not too accurate in mountainous regions, particularly in the Rockies.

# TABLE OF CONTENTS

# GENERAL DESCRIPTION

## WHAT DOES THIS GUIDE SHOW?

This operational cost savings guide has been prepared to show theoretical cost savings for Bard dual fuel "add-on" heat pumps when used with either existing or new furnaces. It covers add-on applications for electric, oil, propane gas and natural gas type forced air furnaces. It includes both air source heat pumps and ground water source heat pumps at many combinations of gas, oil and electrical rates. It enables the user not only to make a theoretical operating cost comparison at today's fuel costs but also at future estimated higher energy costs.

It is important to understand that this is a theoretical comparison between fuels. Actual operation costs can vary depending on many difficult to predict variables such as the actual design heating or cooling load, air infiltration, and wind effects, solar effect, efficiency of existing furnace, severity of weather for a given heating or cooling season and also individual usage pattern.

## SPECIAL FEATURE - FSM-1 FUEL SAVER MODULE

These estimates utilize the Bard FSM-1 Fuel Saver Module which permit the heat pump to operate below the balance point to maximize the energy savings. For each application an analysis should be made to determine the economic balance point which is the outdoor temperature at which it becomes more cost effective to shut the heat pump down with an outdoor thermostat. This temperature varies with each combination of fuel cost and furnace and heat pump efficiency level. Refer to tables included in the instructions with the FSM-1 module.

## FURNACE EFFICIENCY

For purposes of these cost estimates, furnace efficiency levels of 100% AFUE for electric, 65% AFUE for natural and propane gas and 65% AFUE for oil was chosen. We recognize that any variation in efficiency from these values will change the operating cost somewhat. These values were chosen to best represent typical efficiency levels of most equipment in the field today. Bard standing pilot gas furnaces without flue dampers range from 60.6% to 67.9% AFUE with a 65.1% average. New Bard oil furnaces which utilize high speed flame retention head power burners range from 72% to 83.5% AFUE with the average at 78.5%. In order to represent the typical efficiency level of oil-fired furnaces currently installed in the field, it is necessary to recognize the fact that many older less efficient designs are still in use and that the efficiency level of any oil heating system will be reduced by improper adjustment or a lack of adequate maintenance and servicing on a regular basis. An oil-fired system typically requires more frequent and complex msintenance to prevent degradation of its efficiency level, hence, a 65% AFUE was chosen for these calculations. The AFUE efficiency varies, depending on the design of the specific piece of equipment and its maintenance and condition.

# HOW TO USE DUAL FUEL ADD-ON
# HEAT PUMP GUIDE TO ENERGY COST SAVINGS

1. Determine the heating Btuh loss and cooling Btuh gain for structure using a Bard "Whole-House Heat Loss and Gain Work Sheet," Form B008, or ACCA "Load Calculation," Manual J.

   a. Heating house Btuh loss is _____.

   b. Cooling house Btuh gain is _____.

2. Determine the type of fuel available at structure (what type of [fuel] heating system is already there).

   a. Electricity
   b. Natural Gas
   c. Propane Gas
   d. Fuel Oil
   e. Good water supply and disposal

3. Call local utilities and determine area energy costs.

   a. Electricity _____ $/Kilowatt-hour
   b. Natural Gas _____ $/Therm
   c. Propane Gas _____ $/Gallon
   d. Fuel Oil _____ $/Gallon

4. Tentatively select an add-on heat pump system using Bard Manual 2100-057, "Heat Pump Sizing" as a guide, and a Bard equipment catalog.

   a. Air to air heat pump

      Model _____ Indoor Coil _____

      Btuh _____ Heat Btuh _____ Cool

   b. Water to air

      Model _____ Indoor Coil _____

      Btuh _____ Heat Btuh _____ Cool

5. Determine heating region where the structure is located. To do this, find the geographic location of house on regional heating load hours map. A map is located inside the front cover of this guide.

   a. Region structure is located _____.

**YOU ARE NOW READY TO USE THE "DUAL FUEL ADD-ON HEAT PUMP GUIDE"**

6. Select the "Dual Fuel Add-On Heat Pump Guide" for the region the structure is located. ( See step 5 above)

7. Locate the add-on heat pump model or models you tentatively selected (Step 4) in the "Guide." Refer to Table of Contents.

EXAMPLE: 36HPQ4 w/H3AQ Indoor Coil

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 4

HEAT PUMP MODEL: OUTDOOR 36HPQ4 INDOOR H3AQ/H3AQ1

ARI RATED COOLING CAP.: BTUH (95 ) 36600, SEER 7.50

ARI RATED HEATING CAP.: BTUH (47 ) 40500, COP(47 ) 2.65, HSPF 6.40 MIN.OHR

BTUH (17 ) 24800, COP(17 ) 1.95

8. Now locate the furnace type by fuel used (Step 2).

EXAMPLE: A fuel oil furnace with AFUE of 65%.

FURNACE TYPE FUEL OIL FURNACE EFFICIENCY 65.00% AFUE

9. You now have located the page or pages that will help you determine annual operating cost. See example - Figure 1.

   a. Locate the closest structure loss in Btuh column on left side of page (step 1).

      EXAMPLE: 70,000 Btuh Heat Loss

   b. Locate the heating cost per unit at top of page (step 3).

      EXAMPLE: $1.40 per gallon fuel oil.

   c. Now read down the fuel cost column until directly across from structure heat loss in Btuh. This will be the theoretical annual heating cost using only the furnace.

      EXAMPLE: 70,000 Btuh heat loss @ $1.40 per gallon fuel oil, the annual cost will be $1,878.

   d. Next locate the electric cost $/Kw under Heat Loss Btuh for structure (step 3).

      EXAMPLE: $.06 Kw rate

   e. Now once again read down the fuel cost column until directly across from electric cost $/Kw. You now have located the annual heating cost for the house using an add-on heat pump with the furnace.

      EXAMPLE: 70,000 Btuh structure heat loss, with $.06 Kw cost and $1.40 per gallon fuel oil. The annual cost using a 36HPQ4 Bard heat pump with the oil furnace would be $1173 for an annual savings of $705 ($1878 minus $1173).

Now repeat steps 8 through 9 for each type fuel and/or heat pump selected. This will enable you to select the best combination of furnace and heat pump to use for a structure.

10. The balance point (the outdoor temperature at which the heat pump is running 100% of the time and just meeting structure heat loss requirements) is located on right side of page.

EXAMPLE: For a structure with a 70,000 Btuh with a 36HPQ4 heat pump has a balance point of 31 Deg. F. Below this theoretical balance point, the heating load is automatically transferred between the heat pump and the furnace by the wall thermostat to maintain the desired temperature. This is accomplished with the FSM-1 Fuel Saver Module.

| 70,000 | | | | | | | | | | | | | <--THEORETICAL HEATING COST @ FURNACE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $ | 1342 | 1478 | 1613 | 1743 | 1878 | 2014 | 2149 | 2285 | 2423 | 2685 | 2956 | 3227 | |
| .03 | $ | 660 | 688 | 716 | 739 | 767 | 795 | 818 | 846 | 868 | 925 | 976 | 1026 | THEORETICAL HEATING COST @ FURN.+ HEAT PUMP $ PER YEAR |
| .04 | $ | 795 | 823 | 852 | 874 | 902 | 931 | 953 | 981 | 1004 | 1060 | 1111 | 1162 | |
| .05 | $ | 931 | 959 | 987 | 1010 | 1038 | 1066 | 1089 | 1117 | 1139 | 1196 | 1247 | 1297 | |
| .06 | $ | 1066 | 1094 | 1122 | 1145 | 1173 | 1201 | 1224 | 1252 | 1275 | 1331 | 1382 | 1433 | |
| .07 | $ | 1201 | 1230 | 1258 | 1280 | 1309 | 1337 | 1359 | 1388 | 1410 | 1467 | 1517 | 1568 | |
| .08 | $ | 1337 | 1365 | 1393 | 1416 | 1444 | 1472 | 1495 | 1523 | 1546 | 1602 | 1653 | 1704 | |
| .09 | $ | 1467 | 1495 | 1523 | 1546 | 1574 | 1602 | 1625 | 1653 | 1675 | 1732 | 1783 | 1833 | |
| .10 | $ | 1602 | 1630 | 1658 | 1681 | 1709 | 1737 | 1760 | 1788 | 1811 | 1867 | 1918 | 1969 | |
| .12 | $ | 1873 | 1901 | 1929 | 1952 | 1980 | 2009 | 2031 | 2059 | 2092 | 2138 | 2189 | 2240 | |

BALANCE POINT 31 DEG.F. 10

11. To find annual cooling cost of heat pump, look at the bottom of page under annual air conditioning cost. Directly under the electric rate $/Kw (step 3) line, is located the annual cooling cost.

EXAMPLE: At .06 $/Kw rate for electricity, the cooling cost would be $234.00 annually.

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | <--ELECTRIC RATE $/KWH |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 117 | 156 | 195 | 234 | 273 | 312 | 351 | 390 | 468 | <--THEORETICAL AIR CONDITIONING COST |

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

NOTE. The accuracy of the "Dual Fuel-Add-On Heat Pump Guide to Energy Cost Savings," is directly affected by how accurately you estimate the structure's heat loss and heat gain in step 1. Because of uncontrollable variables, Bard Manufacturing Company is not responsible for any variation in actual operating costs from these theoretical estimates.

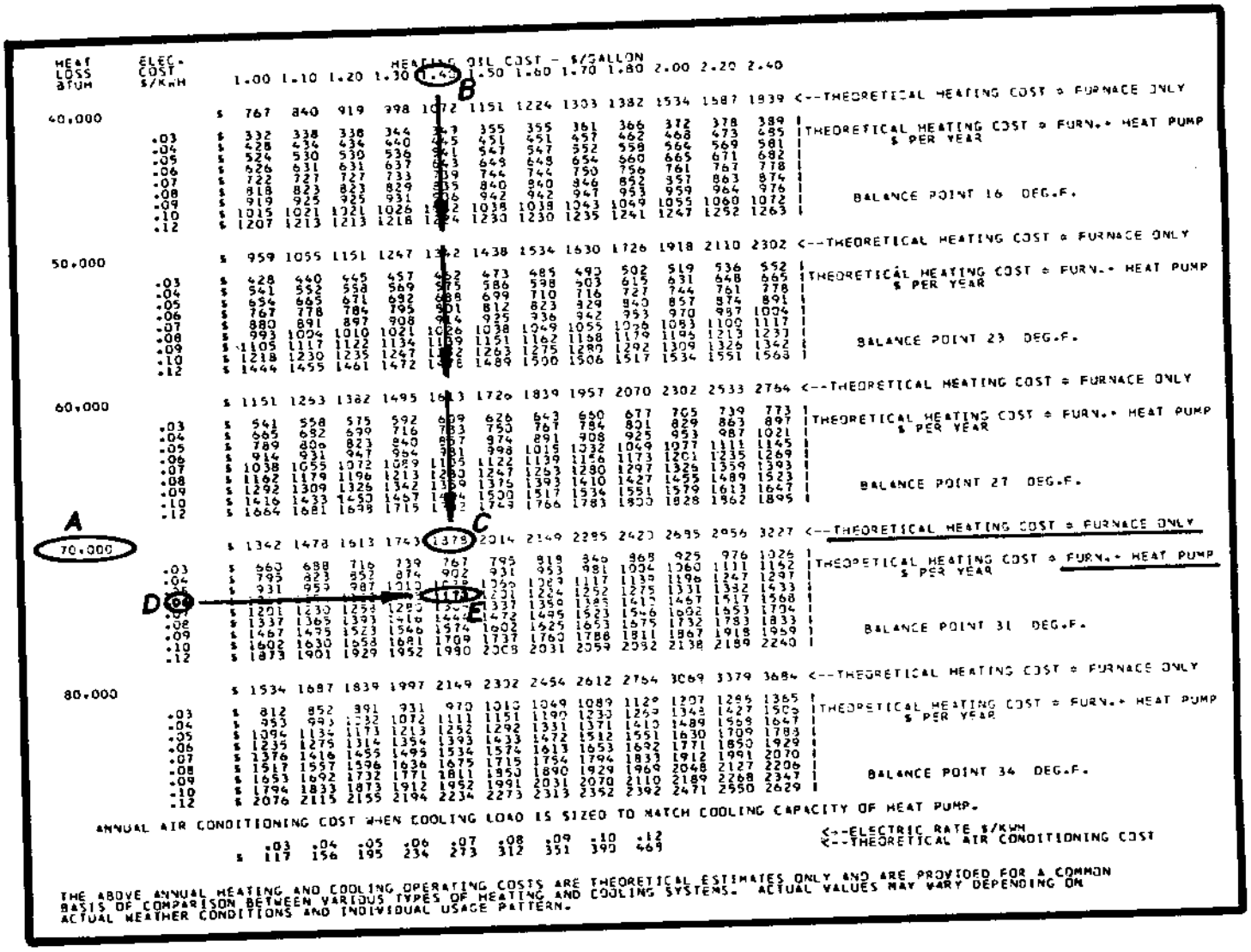
HEAT LOSS BTUH
ELEC. COST $/KWH
HEATING OIL COST - $/GALLON
1.00 1.10 1.20 1.30 1.40 1.50 1.60 1.70 1.80 2.00 2.20 2.40
<--THEORETICAL HEATING COST @ FURNACE ONLY
THEORETICAL HEATING COST @ FURN.+ HEAT PUMP $ PER YEAR
BALANCE POINT 16 DEG.F.
BALANCE POINT 23 DEG.F.
BALANCE POINT 27 DEG.F.
BALANCE POINT 31 DEG.F.
BALANCE POINT 34 DEG.F.
40,000
50,000
60,000
70,000
80,000
A
B
C
D
E
ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.
<--ELECTRIC RATE $/KWH
<--THEORETICAL AIR CONDITIONING COST
.03 .04 .05 .06 .07 .08 .09 .10 .12
$ 117 156 195 234 273 312 351 390 469
THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

Figure 1.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: COMPRESSOR SECTION W2530/W05D30 INDOOR W3AC/W3AS
COOLING CAPACITY AT -45 DEG.F.ENTERING WATER TEMP.: 31700 BTUH. 15.50 EER
HEATING CAPACITY AT 45 DEG.F.ENTERING WATER TEMP.: 26300 BTUH. 4.20 COP
FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | --- THEORETICAL ANNUAL HEATING COST --- HEAT PUMP WITH ELECTRIC HEAT | ELECTRIC HEAT ONLY | |
|---|---|---|---|---|
| 25,000 | .03 | $ 194 | 459 | |
| | .04 | $ 257 | 619 | |
| | .05 | $ 319 | 772 | |
| | .06 | $ 382 | 925 | |
| | .07 | $ 452 | 1085 | |
| | .08 | $ 514 | 1238 | |
| | .09 | $ 577 | 1391 | |
| | .10 | $ 639 | 1544 | |
| | .12 | $ 772 | 1857 | |
| 30,000 | .03 | $ 229 | 556 | |
| | .04 | $ 306 | 744 | |
| | .05 | $ 382 | 925 | |
| | .06 | $ 452 | 1112 | |
| | .07 | $ 528 | 1300 | |
| | .08 | $ 605 | 1488 | |
| | .09 | $ 688 | 1669 | |
| | .10 | $ 758 | 1857 | BALANCE POINT -20 DEG.F. |
| | .12 | $ 911 | 2232 | |
| 35,000 | .03 | $ 264 | 646 | |
| | .04 | $ 354 | 862 | |
| | .05 | $ 438 | 1085 | |
| | .06 | $ 528 | 1300 | |
| | .07 | $ 612 | 1516 | |
| | .08 | $ 702 | 1732 | |
| | .09 | $ 793 | 1947 | |
| | .10 | $ 876 | 2170 | BALANCE POINT -8 DEG.F. |
| | .12 | $ 1057 | 2601 | |
| 40,000 | .03 | $ 306 | 744 | |
| | .04 | $ 396 | 987 | |
| | .05 | $ 500 | 1238 | |
| | .06 | $ 605 | 1488 | |
| | .07 | $ 702 | 1732 | |
| | .08 | $ 806 | 1982 | |
| | .09 | $ 904 | 2232 | |
| | .10 | $ 1008 | 2476 | BALANCE POINT 1 DEG.F. |
| | .12 | $ 1203 | 2977 | |
| 50,000 | .03 | $ 396 | 925 | |
| | .04 | $ 528 | 1238 | |
| | .05 | $ 667 | 1544 | |
| | .06 | $ 793 | 1857 | |
| | .07 | $ 925 | 2170 | |
| | .08 | $ 1064 | 2476 | |
| | .09 | $ 1196 | 2789 | |
| | .10 | $ 1321 | 3095 | BALANCE POINT 13 DEG.F. |
| | .12 | $ 1592 | 3721 | |
| 60,000 | .03 | $ 521 | 1112 | |
| | .04 | $ 688 | 1488 | |
| | .05 | $ 869 | 1857 | |
| | .06 | $ 1036 | 2232 | |
| | .07 | $ 1210 | 2601 | |
| | .08 | $ 1377 | 2977 | |
| | .09 | $ 1558 | 3345 | |
| | .10 | $ 1725 | 3721 | BALANCE POINT 22 DEG.F. |
| | .12 | $ 2079 | 4465 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | <--ELECTRIC RATE $/KWH |
|---|---|---|---|---|---|---|---|---|---|
| $ 28 | 37 | 46 | 56 | 65 | 75 | 84 | 93 | 112 | <--THEORETICAL AIR CONDITIONING COST |

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5-
HEAT PUMP MODEL: COMPRESSOR SECTION W*S30/*0S030 INDOOR W3A0/W3A01----
COOLING CAPACITY AT 95 DEG.F.ENTERING WATER TEMP.: 31700 BTUH, 15.5% EER
HEATING CAPACITY AT 45 DEG.F.ENTERING WATER TEMP.: 25300 BTUH, 3.4% COP
FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY 65.0% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | | NATURAL GAS COST - $/THERM .35 | .40 | .45 | .50 | .55 | .60 | .65 | .70 | .75 | .80 | .90 | 1.00 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25,000 | | $ | 278 | 319 | 361 | 403 | 445 | 486 | 528 | 563 | 605 | 646 | 730 | 813 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 187 | 187 | 187 | 194 | 194 | 194 | 194 | 201 | 201 | 201 | 208 | 208 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 243 | 243 | 243 | 250 | 250 | 250 | 250 | 257 | 257 | 257 | 264 | 264 | |
| | .05 | $ | 299 | 299 | 299 | 306 | 306 | 306 | 306 | 313 | 313 | 313 | 319 | 319 | |
| | .06 | $ | 354 | 354 | 354 | 361 | 361 | 361 | 361 | 368 | 369 | 368 | 375 | 375 | |
| | .07 | $ | 417 | 417 | 417 | 424 | 424 | 424 | 424 | 431 | 431 | 431 | 438 | 438 | |
| | .08 | $ | 473 | 473 | 473 | 479 | 479 | 479 | 479 | 486 | 486 | 486 | 493 | 493 | |
| | .09 | $ | 528 | 528 | 528 | 535 | 535 | 535 | 535 | 542 | 542 | 542 | 549 | 549 | |
| | .10 | $ | 584 | 584 | 584 | 591 | 591 | 591 | 591 | 598 | 598 | 598 | 605 | 605 | |
| | .12 | $ | 702 | 702 | 702 | 709 | 709 | 709 | 709 | 716 | 716 | 716 | 723 | 723 | |
| 30,000 | | $ | 340 | 389 | 438 | 486 | 535 | 584 | 633 | 681 | 730 | 779 | 876 | 973 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 215 | 215 | 222 | 222 | 222 | 229 | 229 | 229 | 236 | 236 | 243 | 243 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 285 | 285 | 292 | 292 | 292 | 299 | 299 | 299 | 306 | 306 | 313 | 313 | |
| | .05 | $ | 354 | 354 | 361 | 361 | 361 | 368 | 368 | 368 | 375 | 375 | 382 | 382 | |
| | .06 | $ | 417 | 417 | 424 | 424 | 424 | 431 | 431 | 431 | 438 | 438 | 445 | 445 | |
| | .07 | $ | 486 | 486 | 493 | 493 | 493 | 500 | 500 | 500 | 507 | 507 | 514 | 514 | |
| | .08 | $ | 556 | 556 | 563 | 563 | 563 | 570 | 570 | 570 | 577 | 577 | 584 | 594 | |
| | .09 | $ | 626 | 626 | 633 | 633 | 633 | 639 | 639 | 639 | 646 | 646 | 653 | 653 | |
| | .10 | $ | 688 | 688 | 695 | 695 | 695 | 702 | 702 | 702 | 709 | 709 | 716 | 716 | BALANCE POINT -20 DEG.F. |
| | .12 | $ | 827 | 827 | 834 | 834 | 834 | 841 | 841 | 841 | 848 | 848 | 855 | 855 | |
| 35,000 | | $ | 396 | 452 | 507 | 563 | 626 | 681 | 737 | 793 | 848 | 911 | 1022 | 1133 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 257 | 257 | 257 | 264 | 264 | 271 | 271 | 271 | 278 | 278 | 285 | 292 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 333 | 333 | 333 | 340 | 340 | 347 | 347 | 347 | 354 | 354 | 361 | 368 | |
| | .05 | $ | 410 | 410 | 410 | 417 | 417 | 424 | 424 | 424 | 431 | 431 | 438 | 445 | |
| | .06 | $ | 486 | 486 | 486 | 493 | 493 | 500 | 500 | 500 | 507 | 507 | 514 | 521 | |
| | .07 | $ | 563 | 563 | 563 | 570 | 570 | 577 | 577 | 577 | 584 | 584 | 591 | 598 | |
| | .08 | $ | 646 | 646 | 646 | 653 | 653 | 660 | 660 | 660 | 667 | 667 | 674 | 681 | |
| | .09 | $ | 723 | 723 | 723 | 730 | 730 | 737 | 737 | 737 | 744 | 744 | 751 | 758 | |
| | .10 | $ | 799 | 799 | 799 | 806 | 806 | 813 | 813 | 813 | 820 | 820 | 827 | 834 | BALANCE POINT -9 DEG.F. |
| | .12 | $ | 959 | 959 | 959 | 966 | 966 | 973 | 973 | 973 | 980 | 980 | 987 | 994 | |
| 40,000 | | $ | 452 | 514 | 584 | 646 | 716 | 779 | 841 | 911 | 973 | 1036 | 1168 | 1300 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 285 | 292 | 292 | 299 | 299 | 306 | 306 | 313 | 313 | 319 | 326 | 333 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 368 | 375 | 375 | 382 | 382 | 389 | 389 | 396 | 396 | 403 | 410 | 417 | |
| | .05 | $ | 459 | 466 | 466 | 473 | 473 | 479 | 479 | 486 | 486 | 493 | 500 | 507 | |
| | .06 | $ | 549 | 556 | 556 | 563 | 563 | 570 | 570 | 577 | 577 | 584 | 591 | 598 | |
| | .07 | $ | 633 | 639 | 639 | 646 | 646 | 653 | 653 | 660 | 660 | 667 | 674 | 681 | |
| | .08 | $ | 723 | 730 | 730 | 737 | 737 | 744 | 744 | 751 | 751 | 758 | 765 | 772 | |
| | .09 | $ | 806 | 813 | 813 | 820 | 820 | 827 | 827 | 834 | 834 | 841 | 848 | 855 | |
| | .10 | $ | 897 | 904 | 904 | 911 | 911 | 918 | 918 | 925 | 925 | 932 | 939 | 946 | BALANCE POINT 1 DEG.F. |
| | .12 | $ | 1071 | 1078 | 1078 | 1085 | 1085 | 1092 | 1092 | 1099 | 1099 | 1106 | 1112 | 1119 | |
| 50,000 | | $ | 563 | 646 | 730 | 813 | 890 | 973 | 1057 | 1133 | 1217 | 1300 | 1460 | 1627 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 361 | 368 | 375 | 382 | 396 | 403 | 410 | 417 | 424 | 431 | 452 | 466 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 466 | 473 | 479 | 486 | 500 | 507 | 514 | 521 | 528 | 535 | 556 | 570 | |
| | .05 | $ | 570 | 577 | 584 | 591 | 605 | 612 | 619 | 626 | 633 | 639 | 660 | 674 | |
| | .06 | $ | 667 | 674 | 681 | 688 | 702 | 709 | 716 | 723 | 730 | 737 | 758 | 772 | |
| | .07 | $ | 772 | 779 | 786 | 793 | 806 | 813 | 820 | 827 | 834 | 841 | 862 | 876 | |
| | .08 | $ | 876 | 883 | 890 | 897 | 911 | 918 | 925 | 932 | 939 | 946 | 966 | 980 | |
| | .09 | $ | 980 | 987 | 994 | 1001 | 1015 | 1022 | 1029 | 1036 | 1043 | 1050 | 1071 | 1085 | |
| | .10 | $ | 1078 | 1085 | 1092 | 1099 | 1112 | 1119 | 1126 | 1133 | 1140 | 1147 | 1168 | 1182 | BALANCE POINT 13 DEG.F. |
| | .12 | $ | 1286 | 1293 | 1300 | 1307 | 1321 | 1328 | 1335 | 1342 | 1349 | 1356 | 1377 | 1391 | |
| 60,000 | | $ | 681 | 779 | 876 | 973 | 1071 | 1168 | 1266 | 1363 | 1460 | 1558 | 1752 | 1947 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 452 | 466 | 479 | 493 | 514 | 528 | 542 | 556 | 577 | 591 | 619 | 653 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 563 | 577 | 591 | 605 | 626 | 639 | 653 | 667 | 688 | 702 | 730 | 765 | |
| | .05 | $ | 681 | 695 | 709 | 723 | 744 | 758 | 772 | 786 | 806 | 820 | 848 | 883 | |
| | .06 | $ | 793 | 806 | 820 | 834 | 855 | 869 | 883 | 897 | 918 | 932 | 959 | 994 | |
| | .07 | $ | 904 | 918 | 932 | 946 | 966 | 980 | 994 | 1008 | 1029 | 1043 | 1071 | 1106 | |
| | .08 | $ | 1015 | 1029 | 1043 | 1057 | 1078 | 1092 | 1106 | 1119 | 1140 | 1154 | 1182 | 1217 | |
| | .09 | $ | 1133 | 1147 | 1161 | 1175 | 1196 | 1210 | 1224 | 1238 | 1259 | 1272 | 1300 | 1335 | |
| | .10 | $ | 1245 | 1259 | 1272 | 1286 | 1307 | 1321 | 1335 | 1349 | 1370 | 1384 | 1412 | 1446 | BALANCE POINT 22 DEG.F. |
| | .12 | $ | 1474 | 1488 | 1502 | 1516 | 1537 | 1551 | 1565 | 1579 | 1599 | 1613 | 1641 | 1676 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 28 | 37 | 46 | 56 | 65 | 75 | 84 | 93 | 112 | <--THEORETICAL AIR CONDITIONING COST |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: COMPRESSOR SECTION W0S30/W0SD30 INDOOR H340/H342
COOLING CAPACITY AT -45 DEG.F.ENTERING WATER TEMP.: 31700 BTUH, 12.50 EER
HEATING CAPACITY AT -45 DEG.F.ENTERING WATER TEMP.: 27300 BTUH, 4.60 COP
FURNACE TYPE FUEL OIL FURNACE EFFICIENCY 82.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | | HEATING OIL COST - $/GALLON 1.00 | 1.10 | 1.20 | 1.30 | 1.40 | 1.50 | 1.60 | 1.70 | 1.80 | 2.00 | 2.20 | 2.40 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25,000 | | $ | 584 | 639 | 702 | 758 | 820 | 876 | 939 | 994 | 1050 | 1168 | 1286 | 1405 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 201 | 201 | 201 | 208 | 208 | 215 | 215 | 215 | 222 | 222 | 229 | 236 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 257 | 257 | 257 | 264 | 264 | 271 | 271 | 271 | 278 | 278 | 285 | 292 | |
| | .05 | $ | 313 | 313 | 313 | 319 | 319 | 326 | 326 | 326 | 333 | 333 | 340 | 347 | |
| | .06 | $ | 368 | 368 | 368 | 375 | 375 | 382 | 382 | 382 | 389 | 389 | 396 | 403 | |
| | .07 | $ | 431 | 431 | 431 | 438 | 438 | 445 | 445 | 445 | 452 | 452 | 459 | 466 | |
| | .08 | $ | 486 | 486 | 486 | 493 | 493 | 500 | 500 | 500 | 507 | 507 | 514 | 521 | |
| | .09 | $ | 542 | 542 | 542 | 549 | 549 | 556 | 556 | 556 | 563 | 563 | 570 | 577 | |
| | .10 | $ | 598 | 598 | 598 | 605 | 605 | 612 | 612 | 612 | 619 | 619 | 626 | 633 | |
| | .12 | $ | 716 | 716 | 716 | 723 | 723 | 730 | 730 | 730 | 737 | 737 | 744 | 751 | |
| 30,000 | | $ | 702 | 772 | 841 | 911 | 980 | 1050 | 1126 | 1196 | 1266 | 1405 | 1544 | 1690 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 229 | 236 | 236 | 243 | 243 | 250 | 250 | 257 | 257 | 264 | 271 | 278 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 299 | 306 | 306 | 313 | 313 | 319 | 319 | 326 | 326 | 333 | 340 | 347 | |
| | .05 | $ | 368 | 375 | 375 | 382 | 382 | 389 | 389 | 396 | 396 | 403 | 410 | 417 | |
| | .06 | $ | 431 | 438 | 438 | 445 | 445 | 452 | 452 | 459 | 459 | 466 | 473 | 479 | |
| | .07 | $ | 500 | 507 | 507 | 514 | 514 | 521 | 521 | 528 | 528 | 535 | 542 | 549 | |
| | .08 | $ | 570 | 577 | 577 | 584 | 584 | 591 | 591 | 598 | 598 | 605 | 612 | 619 | |
| | .09 | $ | 639 | 646 | 646 | 653 | 653 | 660 | 660 | 667 | 667 | 674 | 681 | 688 | |
| | .10 | $ | 702 | 709 | 709 | 716 | 716 | 723 | 723 | 730 | 730 | 737 | 744 | 751 | BALANCE POINT -20 DEG.F. |
| | .12 | $ | 841 | 848 | 849 | 855 | 855 | 862 | 862 | 869 | 869 | 876 | 883 | 890 | |
| 35,000 | | $ | 820 | 897 | 980 | 1064 | 1147 | 1231 | 1314 | 1391 | 1474 | 1641 | 1801 | 1968 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 271 | 278 | 285 | 285 | 292 | 292 | 299 | 299 | 306 | 313 | 319 | 326 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 347 | 354 | 361 | 361 | 368 | 368 | 375 | 375 | 382 | 389 | 396 | 403 | |
| | .05 | $ | 424 | 431 | 438 | 438 | 445 | 445 | 452 | 452 | 459 | 466 | 473 | 479 | |
| | .06 | $ | 500 | 507 | 514 | 514 | 521 | 521 | 528 | 528 | 535 | 542 | 549 | 556 | |
| | .07 | $ | 577 | 584 | 591 | 591 | 598 | 598 | 605 | 605 | 612 | 619 | 626 | 633 | |
| | .08 | $ | 660 | 667 | 674 | 674 | 681 | 681 | 688 | 688 | 695 | 702 | 709 | 716 | |
| | .09 | $ | 737 | 744 | 751 | 751 | 758 | 758 | 765 | 765 | 772 | 779 | 786 | 793 | |
| | .10 | $ | 813 | 820 | 827 | 827 | 834 | 834 | 841 | 841 | 848 | 855 | 862 | 869 | BALANCE POINT -8 DEG.F. |
| | .12 | $ | 973 | 980 | 987 | 987 | 994 | 994 | 1001 | 1001 | 1008 | 1015 | 1022 | 1029 | |
| 40,000 | | $ | 939 | 1029 | 1126 | 1217 | 1314 | 1405 | 1502 | 1592 | 1690 | 1878 | 2065 | 2253 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 313 | 319 | 319 | 326 | 333 | 340 | 340 | 347 | 354 | 361 | 375 | 382 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 396 | 403 | 403 | 410 | 417 | 424 | 424 | 431 | 438 | 445 | 459 | 466 | |
| | .05 | $ | 486 | 493 | 493 | 500 | 507 | 514 | 514 | 521 | 528 | 535 | 549 | 556 | |
| | .06 | $ | 577 | 584 | 584 | 591 | 598 | 605 | 605 | 612 | 619 | 626 | 639 | 646 | |
| | .07 | $ | 660 | 667 | 667 | 674 | 681 | 688 | 688 | 695 | 702 | 709 | 723 | 730 | |
| | .08 | $ | 751 | 758 | 758 | 765 | 772 | 779 | 779 | 786 | 793 | 799 | 813 | 820 | |
| | .09 | $ | 834 | 841 | 841 | 848 | 855 | 862 | 862 | 869 | 876 | 883 | 897 | 904 | |
| | .10 | $ | 925 | 932 | 932 | 939 | 946 | 952 | 952 | 959 | 966 | 973 | 987 | 994 | BALANCE POINT 1 DEG.F. |
| | .12 | $ | 1099 | 1106 | 1106 | 1112 | 1119 | 1126 | 1126 | 1133 | 1140 | 1147 | 1161 | 1168 | |
| 50,000 | | $ | 1168 | 1286 | 1405 | 1523 | 1641 | 1759 | 1878 | 1996 | 2107 | 2344 | 2580 | 2817 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 417 | 431 | 445 | 452 | 466 | 479 | 486 | 500 | 514 | 535 | 556 | 584 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 521 | 535 | 549 | 556 | 570 | 584 | 591 | 605 | 619 | 639 | 660 | 688 | |
| | .05 | $ | 626 | 639 | 653 | 660 | 674 | 688 | 695 | 709 | 723 | 744 | 765 | 793 | |
| | .06 | $ | 723 | 737 | 751 | 758 | 772 | 786 | 793 | 806 | 820 | 841 | 862 | 890 | |
| | .07 | $ | 827 | 841 | 855 | 862 | 876 | 890 | 897 | 911 | 925 | 946 | 966 | 994 | |
| | .08 | $ | 932 | 946 | 959 | 966 | 980 | 994 | 1001 | 1015 | 1029 | 1050 | 1071 | 1099 | |
| | .09 | $ | 1036 | 1050 | 1064 | 1071 | 1085 | 1099 | 1106 | 1119 | 1133 | 1154 | 1175 | 1203 | |
| | .10 | $ | 1133 | 1147 | 1161 | 1168 | 1182 | 1196 | 1203 | 1217 | 1231 | 1252 | 1272 | 1300 | BALANCE POINT 13 DEG.F. |
| | .12 | $ | 1342 | 1356 | 1370 | 1377 | 1391 | 1405 | 1412 | 1426 | 1439 | 1460 | 1481 | 1509 | |
| 60,000 | | $ | 1405 | 1544 | 1690 | 1829 | 1968 | 2107 | 2253 | 2392 | 2532 | 2817 | 3095 | 3380 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 563 | 591 | 612 | 633 | 653 | 681 | 702 | 723 | 744 | 793 | 834 | 883 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 674 | 702 | 723 | 744 | 765 | 793 | 813 | 834 | 855 | 904 | 946 | 994 | |
| | .05 | $ | 793 | 820 | 841 | 862 | 883 | 911 | 932 | 952 | 973 | 1022 | 1064 | 1112 | |
| | .06 | $ | 904 | 932 | 952 | 973 | 994 | 1022 | 1043 | 1064 | 1085 | 1133 | 1175 | 1224 | |
| | .07 | $ | 1015 | 1043 | 1064 | 1085 | 1106 | 1133 | 1154 | 1175 | 1196 | 1245 | 1286 | 1335 | |
| | .08 | $ | 1126 | 1154 | 1175 | 1196 | 1217 | 1245 | 1266 | 1286 | 1307 | 1356 | 1398 | 1446 | |
| | .09 | $ | 1245 | 1272 | 1293 | 1314 | 1335 | 1363 | 1384 | 1405 | 1426 | 1474 | 1516 | 1565 | |
| | .10 | $ | 1356 | 1384 | 1405 | 1426 | 1446 | 1474 | 1495 | 1516 | 1537 | 1586 | 1627 | 1676 | BALANCE POINT 22 DEG.F. |
| | .12 | $ | 1586 | 1613 | 1634 | 1655 | 1676 | 1704 | 1725 | 1745 | 1766 | 1815 | 1857 | 1905 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 28 | 37 | 46 | 56 | 65 | 75 | 84 | 93 | 112 | <--THEORETICAL AIR CONDITIONING COST |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5

HEAT PUMP MODEL: COMPRESSOR SECTION W0S30/W0S030 INDOOR W3A2/W3A21

COOLING CAPACITY AT 95 DEG.F. ENTERING WATER TEMP.: 31700 BTUH. 15.50 EER

HEATING CAPACITY AT 47 DEG.F. ENTERING WATER TEMP.: 29300 BTUH. 2.60 COP

FURNACE TYPE PROPANE GAS FURNACE EFFICIENCY 65.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | | PROPANE GAS COST - $/GALLON .60 | .65 | .70 | .75 | .80 | .85 | .90 | .95 | 1.00 | 1.10 | 1.20 | 1.20 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25,000 | | $ | 535 | 577 | 626 | 667 | 709 | 758 | 799 | 848 | 890 | 980 | 1071 | 1071 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 194 | 201 | 201 | 201 | 208 | 208 | 208 | 208 | 215 | 215 | 222 | 222 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 250 | 257 | 257 | 257 | 264 | 264 | 264 | 264 | 271 | 271 | 278 | 278 | |
| | .05 | $ | 306 | 313 | 313 | 313 | 319 | 319 | 319 | 319 | 326 | 326 | 333 | 333 | |
| | .06 | $ | 361 | 368 | 368 | 368 | 375 | 375 | 375 | 375 | 382 | 382 | 389 | 389 | |
| | .07 | $ | 424 | 431 | 431 | 431 | 438 | 438 | 438 | 438 | 445 | 445 | 452 | 452 | |
| | .08 | $ | 479 | 486 | 486 | 486 | 493 | 493 | 493 | 493 | 500 | 500 | 507 | 507 | |
| | .09 | $ | 535 | 542 | 542 | 542 | 549 | 549 | 549 | 549 | 556 | 556 | 563 | 563 | |
| | .10 | $ | 591 | 598 | 598 | 598 | 605 | 605 | 605 | 605 | 612 | 612 | 619 | 619 | |
| | .12 | $ | 709 | 716 | 716 | 716 | 723 | 723 | 723 | 723 | 730 | 730 | 737 | 737 | |
| 30,000 | | $ | 639 | 695 | 751 | 799 | 855 | 911 | 959 | 1015 | 1071 | 1175 | 1286 | 1286 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 229 | 229 | 236 | 236 | 236 | 243 | 243 | 243 | 250 | 250 | 257 | 257 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 299 | 299 | 306 | 306 | 306 | 313 | 313 | 313 | 319 | 319 | 326 | 326 | |
| | .05 | $ | 368 | 368 | 375 | 375 | 375 | 382 | 382 | 382 | 389 | 389 | 396 | 396 | |
| | .06 | $ | 431 | 431 | 438 | 438 | 438 | 445 | 445 | 445 | 452 | 452 | 459 | 459 | |
| | .07 | $ | 500 | 500 | 507 | 507 | 507 | 514 | 514 | 514 | 521 | 521 | 528 | 528 | |
| | .08 | $ | 570 | 570 | 577 | 577 | 577 | 584 | 584 | 584 | 591 | 591 | 598 | 598 | |
| | .09 | $ | 639 | 639 | 646 | 646 | 646 | 653 | 653 | 653 | 660 | 660 | 667 | 667 | |
| | .10 | $ | 702 | 702 | 709 | 709 | 709 | 716 | 716 | 716 | 723 | 723 | 730 | 730 | BALANCE POINT-20 DEG.F. |
| | .12 | $ | 841 | 841 | 848 | 848 | 848 | 855 | 855 | 855 | 862 | 862 | 869 | 869 | |
| 35,000 | | $ | 751 | 813 | 876 | 939 | 1001 | 1064 | 1126 | 1189 | 1252 | 1377 | 1502 | 1502 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 271 | 271 | 278 | 278 | 285 | 285 | 285 | 292 | 292 | 299 | 306 | 306 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 347 | 347 | 354 | 354 | 361 | 361 | 361 | 368 | 368 | 375 | 382 | 382 | |
| | .05 | $ | 424 | 424 | 431 | 431 | 438 | 438 | 438 | 445 | 445 | 452 | 459 | 459 | |
| | .06 | $ | 500 | 500 | 507 | 507 | 514 | 514 | 514 | 521 | 521 | 528 | 535 | 535 | |
| | .07 | $ | 577 | 577 | 584 | 584 | 591 | 591 | 591 | 598 | 598 | 605 | 612 | 612 | |
| | .08 | $ | 660 | 660 | 667 | 667 | 674 | 674 | 674 | 681 | 681 | 688 | 695 | 695 | |
| | .09 | $ | 737 | 737 | 744 | 744 | 751 | 751 | 751 | 758 | 758 | 765 | 772 | 772 | |
| | .10 | $ | 813 | 813 | 820 | 820 | 827 | 827 | 827 | 834 | 834 | 841 | 848 | 848 | BALANCE POINT -8 DEG.F. |
| | .12 | $ | 973 | 973 | 980 | 980 | 987 | 987 | 987 | 994 | 994 | 1001 | 1008 | 1008 | |
| 40,000 | | $ | 855 | 925 | 1001 | 1071 | 1140 | 1210 | 1286 | 1356 | 1426 | 1572 | 1718 | 1718 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 306 | 313 | 319 | 319 | 326 | 326 | 333 | 333 | 340 | 347 | 354 | 354 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 389 | 396 | 403 | 403 | 410 | 410 | 417 | 417 | 424 | 431 | 438 | 438 | |
| | .05 | $ | 479 | 486 | 493 | 493 | 500 | 500 | 507 | 507 | 514 | 521 | 528 | 528 | |
| | .06 | $ | 570 | 577 | 584 | 584 | 591 | 591 | 598 | 598 | 605 | 612 | 619 | 619 | |
| | .07 | $ | 653 | 660 | 667 | 667 | 674 | 674 | 681 | 681 | 688 | 695 | 702 | 702 | |
| | .08 | $ | 744 | 751 | 758 | 758 | 765 | 765 | 772 | 772 | 779 | 786 | 793 | 793 | |
| | .09 | $ | 827 | 834 | 841 | 841 | 848 | 848 | 855 | 855 | 862 | 869 | 876 | 876 | |
| | .10 | $ | 918 | 925 | 932 | 932 | 939 | 939 | 946 | 946 | 952 | 959 | 966 | 966 | BALANCE POINT 1 DEG.F. |
| | .12 | $ | 1092 | 1099 | 1106 | 1106 | 1112 | 1112 | 1119 | 1119 | 1126 | 1133 | 1140 | 1140 | |
| 50,000 | | $ | 1071 | 1161 | 1252 | 1335 | 1426 | 1516 | 1606 | 1697 | 1787 | 1968 | 2142 | 2142 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 410 | 417 | 431 | 438 | 445 | 452 | 466 | 473 | 479 | 500 | 514 | 514 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 514 | 521 | 535 | 542 | 549 | 556 | 570 | 577 | 584 | 605 | 619 | 619 | |
| | .05 | $ | 619 | 626 | 639 | 646 | 653 | 660 | 674 | 681 | 688 | 709 | 723 | 723 | |
| | .06 | $ | 716 | 723 | 737 | 744 | 751 | 758 | 772 | 779 | 786 | 806 | 820 | 820 | |
| | .07 | $ | 820 | 827 | 841 | 848 | 855 | 862 | 876 | 883 | 890 | 911 | 925 | 925 | |
| | .08 | $ | 925 | 932 | 946 | 952 | 959 | 966 | 980 | 987 | 994 | 1015 | 1029 | 1029 | |
| | .09 | $ | 1029 | 1036 | 1050 | 1057 | 1064 | 1071 | 1085 | 1092 | 1099 | 1119 | 1133 | 1133 | |
| | .10 | $ | 1126 | 1133 | 1147 | 1154 | 1161 | 1168 | 1182 | 1189 | 1196 | 1217 | 1231 | 1231 | BALANCE POINT 13 DEG.F. |
| | .12 | $ | 1335 | 1342 | 1356 | 1363 | 1370 | 1377 | 1391 | 1398 | 1405 | 1426 | 1439 | 1439 | |
| 60,000 | | $ | 1286 | 1391 | 1502 | 1606 | 1718 | 1822 | 1926 | 2038 | 2142 | 2358 | 2573 | 2573 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 549 | 563 | 584 | 598 | 612 | 633 | 646 | 667 | 681 | 716 | 751 | 751 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 660 | 674 | 695 | 709 | 723 | 744 | 758 | 779 | 793 | 827 | 862 | 862 | |
| | .05 | $ | 779 | 793 | 813 | 827 | 841 | 862 | 876 | 897 | 911 | 946 | 980 | 980 | |
| | .06 | $ | 890 | 904 | 925 | 939 | 952 | 973 | 987 | 1008 | 1022 | 1057 | 1092 | 1092 | |
| | .07 | $ | 1001 | 1015 | 1036 | 1050 | 1064 | 1085 | 1099 | 1119 | 1133 | 1168 | 1203 | 1203 | |
| | .08 | $ | 1112 | 1126 | 1147 | 1161 | 1175 | 1196 | 1210 | 1231 | 1245 | 1279 | 1314 | 1314 | |
| | .09 | $ | 1231 | 1245 | 1266 | 1279 | 1293 | 1314 | 1328 | 1349 | 1363 | 1398 | 1432 | 1432 | |
| | .10 | $ | 1362 | 1356 | 1377 | 1391 | 1405 | 1426 | 1439 | 1460 | 1474 | 1509 | 1544 | 1544 | BALANCE POINT 22 DEG.F. |
| | .12 | $ | 1572 | 1586 | 1606 | 1620 | 1634 | 1655 | 1669 | 1690 | 1704 | 1739 | 1773 | 1773 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 28 | 37 | 46 | 56 | 65 | 75 | 84 | 93 | 112 | <--THEORETICAL AIR CONDITIONING COST |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: COMPRESSOR SECTION W0S30/W0S036 INDOOR W3A0/W3A01
COOLING CAPACITY AT -45 DEG.F.ENTERING WATER TEMP.:--35500 BTUH.--13.20 EER
HEATING CAPACITY AT -42 DEG.F.ENTERING WATER TEMP.:--32300 BTUH.--3.00 COP
FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | | --- THEORETICAL ANNUAL HEATING COST --- HEAT PUMP WITH ELECTRIC HEAT | ELECTRIC HEAT ONLY | |
|---|---|---|---|---|---|
| 30,000 | | | | | |
| | .03 | $ | 243 | 556 | |
| | .04 | $ | 319 | 744 | |
| | .05 | $ | 396 | 925 | |
| | .06 | $ | 479 | 1112 | |
| | .07 | $ | 556 | 1300 | |
| | .08 | $ | 633 | 1488 | |
| | .09 | $ | 723 | 1669 | |
| | .10 | $ | 799 | 1857 | |
| | .12 | $ | 952 | 2232 | |
| 35,000 | | | | | |
| | .03 | $ | 278 | 646 | |
| | .04 | $ | 368 | 862 | |
| | .05 | $ | 459 | 1085 | |
| | .06 | $ | 549 | 1300 | |
| | .07 | $ | 646 | 1516 | |
| | .08 | $ | 737 | 1732 | |
| | .09 | $ | 827 | 1947 | |
| | .10 | $ | 925 | 2170 | |
| | .12 | $ | 1106 | 2601 | |
| 40,000 | | | | | |
| | .03 | $ | 313 | 744 | |
| | .04 | $ | 417 | 987 | |
| | .05 | $ | 521 | 1238 | |
| | .06 | $ | 633 | 1488 | |
| | .07 | $ | 730 | 1732 | |
| | .08 | $ | 834 | 1982 | |
| | .09 | $ | 939 | 2232 | |
| | .10 | $ | 1043 | 2476 | BALANCE POINT-13 DEG.F. |
| | .12 | $ | 1252 | 2977 | |
| 50,000 | | | | | |
| | .03 | $ | 389 | 925 | |
| | .04 | $ | 521 | 1238 | |
| | .05 | $ | 653 | 1544 | |
| | .06 | $ | 779 | 1857 | |
| | .07 | $ | 911 | 2170 | |
| | .08 | $ | 1043 | 2476 | |
| | .09 | $ | 1175 | 2789 | |
| | .10 | $ | 1300 | 3095 | BALANCE POINT 2 DEG.F. |
| | .12 | $ | 1565 | 3721 | |
| 60,000 | | | | | |
| | .03 | $ | 486 | 1112 | |
| | .04 | $ | 646 | 1488 | |
| | .05 | $ | 813 | 1857 | |
| | .06 | $ | 980 | 2232 | |
| | .07 | $ | 1140 | 2601 | |
| | .08 | $ | 1300 | 2977 | |
| | .09 | $ | 1460 | 3345 | |
| | .10 | $ | 1627 | 3721 | BALANCE POINT 12 DEG.F. |
| | .12 | $ | 1954 | 4465 | |
| 70,000 | | | | | |
| | .03 | $ | 605 | 1300 | |
| | .04 | $ | 806 | 1732 | |
| | .05 | $ | 1008 | 2170 | |
| | .06 | $ | 1217 | 2601 | |
| | .07 | $ | 1412 | 3039 | |
| | .08 | $ | 1613 | 3471 | |
| | .09 | $ | 1822 | 3902 | |
| | .10 | $ | 2024 | 4340 | BALANCE POINT 20 DEG.F. |
| | .12 | $ | 2427 | 5210 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | <--ELECTRIC RATE $/KWH |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 144 | <--THEORETICAL AIR CONDITIONING COST |

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: COMPRESSOR SECTION HS536/HS536 INDOOR H3A2/H3A2
COOLING CAPACITY AT 95 DEG.F. ENTERING WATER TEMP.: 35500 BTUH, 13.20 EER
HEATING CAPACITY AT 55 DEG.F. ENTERING WATER TEMP.: 42500 BTUH, 4.00 COP
FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY 65.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | | NATURAL GAS COST - $/THERM .35 | .40 | .45 | .50 | .55 | .60 | .65 | .70 | .75 | .80 | .90 | 1.00 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30,000 | | $ | 340 | 389 | 438 | 486 | 535 | 584 | 633 | 681 | 730 | 779 | 876 | 973 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 229 | 229 | 236 | 236 | 236 | 243 | 243 | 243 | 250 | 250 | 257 | 257 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 299 | 299 | 306 | 306 | 306 | 313 | 313 | 313 | 319 | 319 | 326 | 326 | |
| | .05 | $ | 368 | 368 | 375 | 375 | 375 | 382 | 382 | 382 | 389 | 389 | 396 | 396 | |
| | .06 | $ | 445 | 445 | 452 | 452 | 452 | 459 | 459 | 459 | 466 | 466 | 473 | 473 | |
| | .07 | $ | 514 | 514 | 521 | 521 | 521 | 528 | 528 | 528 | 535 | 535 | 542 | 542 | |
| | .08 | $ | 584 | 584 | 591 | 591 | 591 | 598 | 598 | 598 | 605 | 605 | 612 | 612 | |
| | .09 | $ | 660 | 660 | 667 | 667 | 667 | 674 | 674 | 674 | 681 | 681 | 688 | 688 | |
| | .10 | $ | 730 | 730 | 737 | 737 | 737 | 744 | 744 | 744 | 751 | 751 | 758 | 758 | |
| | .12 | $ | 869 | 869 | 876 | 876 | 876 | 883 | 883 | 883 | 890 | 890 | 897 | 897 | |
| 35,000 | | $ | 396 | 452 | 507 | 563 | 626 | 681 | 737 | 793 | 848 | 911 | 1022 | 1133 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 271 | 271 | 271 | 278 | 278 | 278 | 285 | 285 | 285 | 292 | 292 | 299 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 354 | 354 | 354 | 361 | 361 | 361 | 368 | 368 | 368 | 375 | 375 | 382 | |
| | .05 | $ | 431 | 431 | 431 | 438 | 438 | 438 | 445 | 445 | 445 | 452 | 452 | 459 | |
| | .06 | $ | 514 | 514 | 514 | 521 | 521 | 521 | 528 | 528 | 528 | 535 | 535 | 542 | |
| | .07 | $ | 598 | 598 | 598 | 605 | 605 | 605 | 612 | 612 | 612 | 619 | 619 | 626 | |
| | .08 | $ | 681 | 681 | 681 | 688 | 688 | 688 | 695 | 695 | 695 | 702 | 702 | 709 | |
| | .09 | $ | 765 | 765 | 765 | 772 | 772 | 772 | 779 | 779 | 779 | 786 | 786 | 793 | |
| | .10 | $ | 848 | 848 | 848 | 855 | 855 | 855 | 862 | 862 | 862 | 869 | 869 | 876 | |
| | .12 | $ | 1015 | 1015 | 1015 | 1022 | 1022 | 1022 | 1029 | 1029 | 1029 | 1036 | 1036 | 1043 | |
| 40,000 | | $ | 452 | 514 | 584 | 646 | 716 | 779 | 841 | 911 | 973 | 1036 | 1168 | 1300 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 299 | 299 | 306 | 306 | 313 | 313 | 313 | 319 | 319 | 326 | 326 | 333 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 396 | 396 | 403 | 403 | 410 | 410 | 410 | 417 | 417 | 424 | 424 | 431 | |
| | .05 | $ | 486 | 486 | 493 | 493 | 500 | 500 | 500 | 507 | 507 | 514 | 514 | 521 | |
| | .06 | $ | 584 | 584 | 591 | 591 | 598 | 598 | 598 | 605 | 605 | 612 | 612 | 619 | |
| | .07 | $ | 674 | 674 | 681 | 681 | 688 | 688 | 688 | 695 | 695 | 702 | 702 | 709 | |
| | .08 | $ | 765 | 765 | 772 | 772 | 779 | 779 | 779 | 786 | 786 | 793 | 793 | 799 | |
| | .09 | $ | 862 | 862 | 869 | 869 | 876 | 876 | 876 | 883 | 883 | 890 | 890 | 897 | |
| | .10 | $ | 952 | 952 | 959 | 959 | 966 | 966 | 966 | 973 | 973 | 980 | 980 | 987 | BALANCE POINT -13 DEG.F. |
| | .12 | $ | 1140 | 1140 | 1147 | 1147 | 1154 | 1154 | 1154 | 1161 | 1161 | 1168 | 1168 | 1175 | |
| 50,000 | | $ | 563 | 646 | 730 | 813 | 890 | 973 | 1057 | 1133 | 1217 | 1300 | 1460 | 1627 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 368 | 375 | 382 | 382 | 389 | 396 | 396 | 403 | 403 | 410 | 417 | 431 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 479 | 486 | 493 | 493 | 500 | 507 | 507 | 514 | 514 | 521 | 528 | 542 | |
| | .05 | $ | 598 | 605 | 612 | 612 | 619 | 626 | 626 | 633 | 633 | 639 | 646 | 660 | |
| | .06 | $ | 709 | 716 | 723 | 723 | 730 | 737 | 737 | 744 | 744 | 751 | 758 | 772 | |
| | .07 | $ | 820 | 827 | 834 | 834 | 841 | 848 | 848 | 855 | 855 | 862 | 869 | 883 | |
| | .08 | $ | 939 | 946 | 952 | 952 | 959 | 966 | 966 | 973 | 973 | 980 | 987 | 1001 | |
| | .09 | $ | 1050 | 1057 | 1064 | 1064 | 1071 | 1078 | 1078 | 1085 | 1085 | 1092 | 1099 | 1112 | |
| | .10 | $ | 1161 | 1168 | 1175 | 1175 | 1182 | 1189 | 1189 | 1196 | 1196 | 1203 | 1210 | 1224 | BALANCE POINT 2 DEG.F. |
| | .12 | $ | 1391 | 1398 | 1405 | 1405 | 1412 | 1419 | 1419 | 1426 | 1426 | 1432 | 1439 | 1453 | |
| 60,000 | | $ | 681 | 779 | 876 | 973 | 1071 | 1168 | 1266 | 1363 | 1460 | 1558 | 1752 | 1947 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 452 | 459 | 466 | 479 | 486 | 493 | 500 | 514 | 521 | 528 | 549 | 563 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 577 | 584 | 591 | 605 | 612 | 619 | 626 | 639 | 646 | 653 | 674 | 688 | |
| | .05 | $ | 709 | 716 | 723 | 737 | 744 | 751 | 758 | 772 | 779 | 786 | 806 | 820 | |
| | .06 | $ | 841 | 848 | 855 | 869 | 876 | 883 | 890 | 904 | 911 | 918 | 939 | 952 | |
| | .07 | $ | 966 | 973 | 980 | 994 | 1001 | 1008 | 1015 | 1029 | 1036 | 1043 | 1064 | 1078 | |
| | .08 | $ | 1099 | 1106 | 1112 | 1126 | 1133 | 1140 | 1147 | 1161 | 1168 | 1175 | 1196 | 1210 | |
| | .09 | $ | 1224 | 1231 | 1238 | 1252 | 1259 | 1266 | 1272 | 1286 | 1293 | 1300 | 1321 | 1335 | |
| | .10 | $ | 1356 | 1363 | 1370 | 1384 | 1391 | 1398 | 1405 | 1419 | 1426 | 1432 | 1453 | 1467 | BALANCE POINT 12 DEG.F. |
| | .12 | $ | 1613 | 1620 | 1627 | 1641 | 1648 | 1655 | 1662 | 1676 | 1683 | 1690 | 1711 | 1725 | |
| 70,000 | | $ | 793 | 911 | 1022 | 1133 | 1252 | 1363 | 1481 | 1592 | 1704 | 1822 | 2052 | 2274 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 535 | 549 | 570 | 584 | 598 | 619 | 633 | 646 | 667 | 681 | 709 | 744 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 674 | 688 | 709 | 723 | 737 | 758 | 772 | 786 | 806 | 820 | 848 | 883 | |
| | .05 | $ | 813 | 827 | 848 | 862 | 876 | 897 | 911 | 925 | 946 | 959 | 987 | 1022 | |
| | .06 | $ | 959 | 973 | 994 | 1008 | 1022 | 1043 | 1057 | 1071 | 1092 | 1106 | 1133 | 1168 | |
| | .07 | $ | 1099 | 1112 | 1133 | 1147 | 1161 | 1182 | 1196 | 1210 | 1231 | 1245 | 1272 | 1307 | |
| | .08 | $ | 1238 | 1252 | 1272 | 1286 | 1300 | 1321 | 1335 | 1349 | 1370 | 1384 | 1412 | 1446 | |
| | .09 | $ | 1384 | 1398 | 1419 | 1432 | 1446 | 1467 | 1481 | 1495 | 1516 | 1530 | 1558 | 1592 | |
| | .10 | $ | 1523 | 1537 | 1558 | 1572 | 1586 | 1606 | 1620 | 1634 | 1655 | 1669 | 1697 | 1732 | BALANCE POINT 20 DEG.F. |
| | .12 | $ | 1808 | 1822 | 1843 | 1857 | 1871 | 1892 | 1905 | 1919 | 1940 | 1954 | 1982 | 2017 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | <--ELECTRIC RATE $/KWH |
| $ | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 144 | <--THEORETICAL AIR CONDITIONING COST |

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 2
HEAT PUMP MODEL: COMPRESSOR SECTION W0536/W0S036 INDOOR W3A2/W3A0[illegible]
COOLING CAPACITY AT -5 DEG.F.ENTERING WATER TEMP.: 35500 BTUH; 14.0 EER
HEATING CAPACITY AT -5 DEG.F.ENTERING WATER TEMP.: 43300 BTUH; 4.0 COP
FURNACE TYPE FUEL OIL FURNACE EFFICIENCY 55.0% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | HEATING OIL COST - $/GALLON 1.00 | 1.10 | 1.20 | 1.30 | 1.40 | 1.50 | 1.60 | 1.70 | 1.80 | 2.00 | 2.20 | 2.40 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30,000 | | $ 702 | 772 | 841 | 911 | 980 | 1050 | 1126 | 1196 | 1265 | 1405 | 1544 | 1690 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 243 | 250 | 250 | 257 | 257 | 264 | 264 | 271 | 271 | 278 | 285 | 292 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 313 | 319 | 319 | 326 | 326 | 333 | 333 | 340 | 340 | 347 | 354 | 361 | |
| | .05 | $ 382 | 389 | 389 | 396 | 396 | 403 | 403 | 410 | 410 | 417 | 424 | 431 | |
| | .06 | $ 459 | 466 | 466 | 473 | 473 | 479 | 479 | 486 | 486 | 493 | 500 | 507 | |
| | .07 | $ 528 | 535 | 535 | 542 | 542 | 549 | 549 | 556 | 556 | 563 | 570 | 577 | |
| | .08 | $ 598 | 605 | 605 | 612 | 612 | 619 | 619 | 626 | 626 | 633 | 639 | 646 | |
| | .09 | $ 674 | 681 | 681 | 688 | 688 | 695 | 695 | 702 | 702 | 709 | 716 | 723 | |
| | .10 | $ 744 | 751 | 751 | 758 | 758 | 765 | 765 | 772 | 772 | 779 | 786 | 793 | |
| | .12 | $ 883 | 890 | 890 | 897 | 897 | 904 | 904 | 911 | 911 | 918 | 925 | 932 | |
| 35,000 | | $ 820 | 897 | 980 | 1064 | 1147 | 1231 | 1314 | 1391 | 1474 | 1641 | 1801 | 1968 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 285 | 292 | 292 | 299 | 299 | 306 | 306 | 313 | 313 | 319 | 326 | 333 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 368 | 375 | 375 | 382 | 382 | 389 | 389 | 396 | 396 | 403 | 410 | 417 | |
| | .05 | $ 445 | 452 | 452 | 459 | 459 | 466 | 466 | 473 | 473 | 479 | 486 | 493 | |
| | .06 | $ 528 | 535 | 535 | 542 | 542 | 549 | 549 | 556 | 556 | 563 | 570 | 577 | |
| | .07 | $ 612 | 619 | 619 | 626 | 626 | 633 | 633 | 639 | 639 | 646 | 653 | 660 | |
| | .08 | $ 695 | 702 | 702 | 709 | 709 | 716 | 716 | 723 | 723 | 730 | 737 | 744 | |
| | .09 | $ 779 | 786 | 786 | 793 | 793 | 799 | 799 | 806 | 806 | 813 | 820 | 827 | |
| | .10 | $ 862 | 869 | 869 | 876 | 876 | 883 | 883 | 890 | 890 | 897 | 904 | 911 | |
| | .12 | $ 1029 | 1036 | 1036 | 1043 | 1043 | 1050 | 1050 | 1057 | 1057 | 1064 | 1071 | 1078 | |
| 40,000 | | $ 939 | 1029 | 1126 | 1217 | 1314 | 1405 | 1502 | 1592 | 1690 | 1878 | 2065 | 2253 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 319 | 326 | 326 | 333 | 333 | 340 | 347 | 347 | 354 | 361 | 368 | 375 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 417 | 424 | 424 | 431 | 431 | 438 | 445 | 445 | 452 | 459 | 466 | 473 | |
| | .05 | $ 507 | 514 | 514 | 521 | 521 | 528 | 535 | 535 | 542 | 549 | 556 | 563 | |
| | .06 | $ 605 | 612 | 612 | 619 | 619 | 626 | 633 | 633 | 639 | 646 | 653 | 660 | |
| | .07 | $ 695 | 702 | 702 | 709 | 709 | 716 | 723 | 723 | 730 | 737 | 744 | 751 | |
| | .08 | $ 786 | 793 | 793 | 799 | 799 | 806 | 813 | 813 | 820 | 827 | 834 | 841 | |
| | .09 | $ 883 | 890 | 890 | 897 | 897 | 904 | 911 | 911 | 918 | 925 | 932 | 939 | |
| | .10 | $ 973 | 980 | 980 | 987 | 987 | 994 | 1001 | 1001 | 1008 | 1015 | 1022 | 1029 | BALANCE POINT -13 DEG.F. |
| | .12 | $ 1161 | 1168 | 1168 | 1175 | 1175 | 1182 | 1189 | 1189 | 1196 | 1203 | 1210 | 1217 | |
| 50,000 | | $ 1168 | 1286 | 1405 | 1523 | 1641 | 1759 | 1878 | 1996 | 2107 | 2344 | 2580 | 2817 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 403 | 410 | 417 | 424 | 431 | 438 | 445 | 452 | 452 | 466 | 479 | 493 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 514 | 521 | 528 | 535 | 542 | 549 | 556 | 563 | 563 | 577 | 591 | 605 | |
| | .05 | $ 633 | 639 | 646 | 653 | 660 | 667 | 674 | 681 | 681 | 695 | 709 | 723 | |
| | .06 | $ 744 | 751 | 758 | 765 | 772 | 779 | 786 | 793 | 793 | 806 | 820 | 834 | |
| | .07 | $ 855 | 862 | 869 | 876 | 883 | 890 | 897 | 904 | 904 | 918 | 932 | 946 | |
| | .08 | $ 973 | 980 | 987 | 994 | 1001 | 1008 | 1015 | 1022 | 1022 | 1036 | 1050 | 1064 | |
| | .09 | $ 1085 | 1092 | 1099 | 1106 | 1112 | 1119 | 1126 | 1133 | 1133 | 1147 | 1161 | 1175 | |
| | .10 | $ 1196 | 1203 | 1210 | 1217 | 1224 | 1231 | 1238 | 1245 | 1245 | 1259 | 1272 | 1286 | BALANCE POINT 2 DEG.F. |
| | .12 | $ 1426 | 1432 | 1439 | 1446 | 1453 | 1460 | 1467 | 1474 | 1474 | 1488 | 1502 | 1516 | |
| 60,000 | | $ 1405 | 1544 | 1690 | 1829 | 1968 | 2107 | 2253 | 2392 | 2532 | 2817 | 3095 | 3380 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 514 | 528 | 542 | 556 | 570 | 577 | 591 | 605 | 619 | 639 | 667 | 695 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 639 | 653 | 667 | 681 | 695 | 702 | 716 | 730 | 744 | 765 | 793 | 820 | |
| | .05 | $ 772 | 786 | 799 | 813 | 827 | 834 | 848 | 862 | 876 | 897 | 925 | 952 | |
| | .06 | $ 904 | 918 | 932 | 946 | 959 | 966 | 980 | 994 | 1008 | 1029 | 1057 | 1085 | |
| | .07 | $ 1029 | 1043 | 1057 | 1071 | 1085 | 1092 | 1106 | 1119 | 1133 | 1154 | 1182 | 1210 | |
| | .08 | $ 1161 | 1175 | 1189 | 1203 | 1217 | 1224 | 1238 | 1252 | 1266 | 1286 | 1314 | 1342 | |
| | .09 | $ 1286 | 1300 | 1314 | 1328 | 1342 | 1349 | 1363 | 1377 | 1391 | 1412 | 1439 | 1467 | |
| | .10 | $ 1419 | 1432 | 1446 | 1460 | 1474 | 1481 | 1495 | 1509 | 1523 | 1544 | 1572 | 1599 | BALANCE POINT 12 DEG.F. |
| | .12 | $ 1676 | 1690 | 1704 | 1718 | 1732 | 1739 | 1752 | 1766 | 1780 | 1801 | 1829 | 1857 | |
| 70,000 | | $ 1641 | 1801 | 1968 | 2135 | 2295 | 2462 | 2629 | 2789 | 2956 | 3283 | 3610 | 3944 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 653 | 681 | 702 | 723 | 751 | 772 | 793 | 820 | 841 | 883 | 932 | 980 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 793 | 820 | 841 | 862 | 890 | 911 | 932 | 959 | 980 | 1022 | 1071 | 1119 | |
| | .05 | $ 932 | 959 | 980 | 1001 | 1029 | 1050 | 1071 | 1099 | 1119 | 1161 | 1210 | 1259 | |
| | .06 | $ 1078 | 1106 | 1126 | 1147 | 1175 | 1196 | 1217 | 1245 | 1266 | 1307 | 1356 | 1405 | |
| | .07 | $ 1217 | 1245 | 1266 | 1286 | 1314 | 1335 | 1356 | 1384 | 1405 | 1446 | 1495 | 1544 | |
| | .08 | $ 1356 | 1384 | 1405 | 1426 | 1453 | 1474 | 1495 | 1523 | 1544 | 1586 | 1634 | 1683 | |
| | .09 | $ 1502 | 1530 | 1551 | 1572 | 1599 | 1620 | 1641 | 1669 | 1690 | 1732 | 1780 | 1829 | |
| | .10 | $ 1641 | 1669 | 1690 | 1711 | 1739 | 1759 | 1780 | 1808 | 1829 | 1871 | 1919 | 1968 | BALANCE POINT 20 DEG.F. |
| | .12 | $ 1926 | 1954 | 1975 | 1996 | 2024 | 2045 | 2065 | 2093 | 2114 | 2156 | 2205 | 2253 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 144 | <--THEORETICAL AIR CONDITIONING COST |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: COMPRESSOR SECTION W0536/W0S036 INDOOR H3A0/H3A0
COOLING CAPACITY AT 45 DEG.F.ENTERING WATER TEMP.: 35500 BTUH, 13.0 EER
HEATING CAPACITY AT 45 DEG.F.ENTERING WATER TEMP.: 42500 BTUH, 3.00 COP
FURNACE TYPE PROPANE GAS FURNACE EFFICIENCY 65.0% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | PROPANE GAS COST - $/GALLON .60 | .65 | .70 | .75 | .80 | .85 | .90 | .95 | 1.00 | 1.10 | 1.20 | 1.20 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30,000 | | $ 639 | 695 | 751 | 799 | 855 | 911 | 959 | 1015 | 1071 | 1175 | 1286 | 1286 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 243 | 243 | 250 | 250 | 250 | 257 | 257 | 257 | 264 | 264 | 271 | 271 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ 313 | 313 | 319 | 319 | 319 | 326 | 326 | 326 | 333 | 333 | 340 | 340 | |
| | .05 | $ 382 | 382 | 389 | 389 | 389 | 396 | 396 | 396 | 403 | 403 | 410 | 410 | |
| | .06 | $ 459 | 459 | 466 | 466 | 466 | 473 | 473 | 473 | 479 | 479 | 486 | 486 | |
| | .07 | $ 528 | 528 | 535 | 535 | 535 | 542 | 542 | 542 | 549 | 549 | 556 | 556 | |
| | .08 | $ 598 | 598 | 605 | 605 | 605 | 612 | 612 | 612 | 619 | 619 | 626 | 626 | |
| | .09 | $ 674 | 674 | 681 | 681 | 681 | 688 | 688 | 688 | 695 | 695 | 702 | 702 | |
| | .10 | $ 744 | 744 | 751 | 751 | 751 | 758 | 758 | 758 | 765 | 765 | 772 | 772 | |
| | .12 | $ 883 | 883 | 890 | 890 | 890 | 897 | 897 | 897 | 904 | 904 | 911 | 911 | |
| 35,000 | | $ 751 | 813 | 876 | 939 | 1001 | 1064 | 1126 | 1189 | 1252 | 1377 | 1502 | 1502 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 285 | 285 | 292 | 292 | 292 | 299 | 299 | 299 | 306 | 313 | 313 | 313 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ 368 | 368 | 375 | 375 | 375 | 382 | 382 | 382 | 389 | 396 | 396 | 396 | |
| | .05 | $ 445 | 445 | 452 | 452 | 452 | 459 | 459 | 459 | 466 | 473 | 473 | 473 | |
| | .06 | $ 528 | 528 | 535 | 535 | 535 | 542 | 542 | 542 | 549 | 556 | 556 | 556 | |
| | .07 | $ 612 | 612 | 619 | 619 | 619 | 626 | 626 | 626 | 633 | 639 | 639 | 639 | |
| | .08 | $ 695 | 695 | 702 | 702 | 702 | 709 | 709 | 709 | 716 | 723 | 723 | 723 | |
| | .09 | $ 779 | 779 | 786 | 786 | 786 | 793 | 793 | 793 | 799 | 806 | 806 | 806 | |
| | .10 | $ 862 | 862 | 869 | 869 | 869 | 876 | 876 | 876 | 883 | 890 | 890 | 890 | |
| | .12 | $ 1029 | 1029 | 1036 | 1036 | 1036 | 1043 | 1043 | 1043 | 1050 | 1057 | 1057 | 1057 | |
| 40,000 | | $ 855 | 925 | 1001 | 1071 | 1140 | 1210 | 1286 | 1356 | 1426 | 1572 | 1718 | 1718 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 313 | 319 | 319 | 326 | 326 | 333 | 333 | 340 | 340 | 347 | 354 | 354 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ 410 | 417 | 417 | 424 | 424 | 431 | 431 | 438 | 438 | 445 | 452 | 452 | |
| | .05 | $ 500 | 507 | 507 | 514 | 514 | 521 | 521 | 528 | 528 | 535 | 542 | 542 | |
| | .06 | $ 598 | 605 | 605 | 612 | 612 | 619 | 619 | 626 | 626 | 633 | 639 | 639 | |
| | .07 | $ 688 | 695 | 695 | 702 | 702 | 709 | 709 | 716 | 716 | 723 | 730 | 730 | |
| | .08 | $ 779 | 786 | 786 | 793 | 793 | 799 | 799 | 806 | 806 | 813 | 820 | 820 | |
| | .09 | $ 876 | 883 | 883 | 890 | 890 | 897 | 897 | 904 | 904 | 911 | 918 | 918 | BALANCE POINT -13 DEG.F. |
| | .10 | $ 966 | 973 | 973 | 980 | 980 | 987 | 987 | 994 | 994 | 1001 | 1008 | 1008 | |
| | .12 | $ 1154 | 1161 | 1161 | 1168 | 1168 | 1175 | 1175 | 1182 | 1182 | 1189 | 1196 | 1196 | |
| 50,000 | | $ 1071 | 1161 | 1252 | 1335 | 1426 | 1516 | 1606 | 1697 | 1787 | 1968 | 2142 | 2142 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 396 | 403 | 410 | 410 | 417 | 424 | 431 | 431 | 438 | 445 | 459 | 459 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ 507 | 514 | 521 | 521 | 528 | 535 | 542 | 542 | 549 | 556 | 570 | 570 | |
| | .05 | $ 626 | 633 | 639 | 639 | 646 | 653 | 660 | 660 | 667 | 674 | 688 | 688 | |
| | .06 | $ 737 | 744 | 751 | 751 | 758 | 765 | 772 | 772 | 779 | 786 | 799 | 799 | |
| | .07 | $ 848 | 855 | 862 | 862 | 869 | 876 | 883 | 883 | 890 | 897 | 911 | 911 | |
| | .08 | $ 966 | 973 | 980 | 980 | 987 | 994 | 1001 | 1001 | 1008 | 1015 | 1029 | 1029 | |
| | .09 | $ 1078 | 1085 | 1092 | 1092 | 1099 | 1106 | 1112 | 1112 | 1119 | 1126 | 1140 | 1140 | BALANCE POINT 2 DEG.F. |
| | .10 | $ 1189 | 1196 | 1203 | 1203 | 1210 | 1217 | 1224 | 1224 | 1231 | 1238 | 1252 | 1252 | |
| | .12 | $ 1419 | 1426 | 1432 | 1432 | 1439 | 1446 | 1453 | 1453 | 1460 | 1467 | 1481 | 1481 | |
| 60,000 | | $ 1286 | 1391 | 1502 | 1606 | 1718 | 1822 | 1926 | 2038 | 2142 | 2358 | 2573 | 2573 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 507 | 514 | 521 | 535 | 542 | 556 | 563 | 570 | 584 | 605 | 619 | 619 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ 633 | 639 | 646 | 660 | 667 | 681 | 688 | 695 | 709 | 730 | 744 | 744 | |
| | .05 | $ 765 | 772 | 779 | 793 | 799 | 813 | 820 | 827 | 841 | 862 | 876 | 876 | |
| | .06 | $ 897 | 904 | 911 | 925 | 932 | 946 | 952 | 959 | 973 | 994 | 1008 | 1008 | |
| | .07 | $ 1022 | 1029 | 1036 | 1050 | 1057 | 1071 | 1078 | 1085 | 1099 | 1119 | 1133 | 1133 | |
| | .08 | $ 1154 | 1161 | 1168 | 1182 | 1189 | 1203 | 1210 | 1217 | 1231 | 1252 | 1266 | 1266 | |
| | .09 | $ 1279 | 1286 | 1293 | 1307 | 1314 | 1328 | 1335 | 1342 | 1356 | 1377 | 1391 | 1391 | BALANCE POINT 12 DEG.F. |
| | .10 | $ 1412 | 1419 | 1426 | 1439 | 1446 | 1460 | 1467 | 1474 | 1488 | 1509 | 1523 | 1523 | |
| | .12 | $ 1669 | 1676 | 1683 | 1697 | 1704 | 1718 | 1725 | 1732 | 1745 | 1766 | 1780 | 1780 | |
| 70,000 | | $ 1502 | 1627 | 1752 | 1878 | 2003 | 2128 | 2253 | 2379 | 2504 | 2754 | 3005 | 3005 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 633 | 653 | 667 | 688 | 709 | 723 | 744 | 758 | 779 | 813 | 848 | 848 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ 772 | 793 | 806 | 827 | 848 | 862 | 883 | 897 | 918 | 952 | 987 | 987 | |
| | .05 | $ 911 | 932 | 946 | 966 | 987 | 1001 | 1022 | 1036 | 1057 | 1092 | 1126 | 1126 | |
| | .06 | $ 1057 | 1078 | 1092 | 1112 | 1133 | 1147 | 1168 | 1182 | 1203 | 1238 | 1272 | 1272 | |
| | .07 | $ 1196 | 1217 | 1231 | 1252 | 1272 | 1286 | 1307 | 1321 | 1342 | 1377 | 1412 | 1412 | |
| | .08 | $ 1335 | 1356 | 1370 | 1391 | 1412 | 1426 | 1446 | 1460 | 1481 | 1516 | 1551 | 1551 | |
| | .09 | $ 1481 | 1502 | 1516 | 1537 | 1558 | 1572 | 1592 | 1606 | 1627 | 1662 | 1697 | 1697 | BALANCE POINT 20 DEG.F. |
| | .10 | $ 1620 | 1641 | 1655 | 1676 | 1697 | 1711 | 1732 | 1745 | 1766 | 1801 | 1836 | 1836 | |
| | .12 | $ 1905 | 1926 | 1940 | 1961 | 1982 | 1996 | 2017 | 2031 | 2052 | 2086 | 2121 | 2121 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 144 | <--THEORETICAL AIR CONDITIONING COST |

<-- ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: OUTDOOR 24HPQ2 INDOOR H24251
ARI RATED COOLING CAP.: BTUH (95 ) 22000, SEER 7.89
ARI RATED HEATING CAP.: BTUH (47 ) 25000, COP(47 ) 2.70, HSPF 6.35 MIN.OHR REG IV
BTUH (17 ) 14200, COP(17 ) 1.92
FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | | --- THEORETICAL ANNUAL HEATING COST --- HEAT PUMP WITH ELECTRIC HEAT | ELECTRIC HEAT ONLY | |
|---|---|---|---|---|---|
| 25,000 | | | | | |
| | .03 | $ | 285 | 459 | |
| | .04 | $ | 375 | 619 | |
| | .05 | $ | 473 | 772 | |
| | .06 | $ | 563 | 925 | |
| | .07 | $ | 660 | 1085 | |
| | .08 | $ | 758 | 1238 | |
| | .09 | $ | 848 | 1391 | |
| | .10 | $ | 939 | 1544 | BALANCE POINT 13 DEG.F. |
| | .12 | $ | 1133 | 1857 | |
| 30,000 | | | | | |
| | .03 | $ | 340 | 556 | |
| | .04 | $ | 452 | 744 | |
| | .05 | $ | 563 | 925 | |
| | .06 | $ | 681 | 1112 | |
| | .07 | $ | 793 | 1300 | |
| | .08 | $ | 911 | 1488 | |
| | .09 | $ | 1022 | 1669 | |
| | .10 | $ | 1133 | 1857 | BALANCE POINT 18 DEG.F. |
| | .12 | $ | 1356 | 2232 | |
| 35,000 | | | | | |
| | .03 | $ | 403 | 646 | |
| | .04 | $ | 535 | 862 | |
| | .05 | $ | 674 | 1085 | |
| | .06 | $ | 799 | 1300 | |
| | .07 | $ | 939 | 1516 | |
| | .08 | $ | 1071 | 1732 | |
| | .09 | $ | 1210 | 1947 | |
| | .10 | $ | 1335 | 2170 | BALANCE POINT 22 DEG.F. |
| | .12 | $ | 1606 | 2601 | |
| 40,000 | | | | | |
| | .03 | $ | 466 | 744 | |
| | .04 | $ | 626 | 997 | |
| | .05 | $ | 779 | 1238 | |
| | .06 | $ | 932 | 1488 | |
| | .07 | $ | 1085 | 1732 | |
| | .08 | $ | 1245 | 1982 | |
| | .09 | $ | 1405 | 2232 | |
| | .10 | $ | 1551 | 2476 | BALANCE POINT 25 DEG.F. |
| | .12 | $ | 1871 | 2977 | |
| 50,000 | | | | | |
| | .03 | $ | 605 | 925 | |
| | .04 | $ | 806 | 1238 | |
| | .05 | $ | 1015 | 1544 | |
| | .06 | $ | 1217 | 1857 | |
| | .07 | $ | 1419 | 2170 | |
| | .08 | $ | 1620 | 2476 | |
| | .09 | $ | 1822 | 2789 | |
| | .10 | $ | 2024 | 3095 | BALANCE POINT 31 DEG.F. |
| | .12 | $ | 2434 | 3721 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 35 | 47 | 59 | 71 | 83 | 94 | 106 | 118 | 142 | <--THEORETICAL AIR CONDITIONING CO |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

RARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: OUTDOOR 24HPD2 INDOOR H2492S1
ARI RATED COOLING CAP.: BTUH (95 ) 23500. SEER 12.89
ARI RATED HEATING CAP.: BTUH (47 ) 25000. COP(47 ) 2.70. HSPF 8.35 MIN.DHR REG IV
BTUH (17 ) 14200. COP(17 ) 1.92
FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY 65.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | | NATURAL GAS COST - $/THERM .35 | .40 | .45 | .50 | .55 | .60 | .65 | .70 | .75 | .80 | .90 | 1.00 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25,000 | | $ | 278 | 319 | 361 | 403 | 445 | 486 | 528 | 563 | 605 | 646 | 730 | 813 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 257 | 264 | 278 | 292 | 306 | 319 | 326 | 340 | 354 | 368 | 389 | 417 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 313 | 319 | 333 | 347 | 361 | 375 | 382 | 396 | 410 | 424 | 445 | 473 | |
| | .05 | $ | 368 | 375 | 389 | 403 | 417 | 431 | 438 | 452 | 466 | 479 | 500 | 528 | |
| | .06 | $ | 424 | 431 | 445 | 459 | 473 | 486 | 493 | 507 | 521 | 535 | 556 | 584 | |
| | .07 | $ | 479 | 486 | 500 | 514 | 528 | 542 | 549 | 563 | 577 | 591 | 612 | 639 | |
| | .08 | $ | 535 | 542 | 556 | 570 | 584 | 598 | 605 | 619 | 633 | 646 | 667 | 695 | |
| | .09 | $ | 591 | 598 | 612 | 626 | 639 | 653 | 660 | 674 | 688 | 702 | 723 | 751 | |
| | .10 | $ | 646 | 653 | 667 | 681 | 695 | 709 | 716 | 730 | 744 | 758 | 779 | 806 | BALANCE POINT 13 DEG.F. |
| | .12 | $ | 765 | 772 | 786 | 799 | 813 | 827 | 834 | 848 | 862 | 876 | 897 | 925 | |
| 30,000 | | $ | 340 | 389 | 438 | 486 | 535 | 584 | 633 | 681 | 730 | 779 | 876 | 973 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 313 | 326 | 347 | 368 | 389 | 403 | 424 | 445 | 466 | 486 | 521 | 563 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 368 | 382 | 403 | 424 | 445 | 459 | 479 | 500 | 521 | 542 | 577 | 619 | |
| | .05 | $ | 424 | 438 | 459 | 479 | 500 | 514 | 535 | 556 | 577 | 598 | 633 | 674 | |
| | .06 | $ | 479 | 493 | 514 | 535 | 556 | 570 | 591 | 612 | 633 | 653 | 688 | 730 | |
| | .07 | $ | 535 | 549 | 570 | 591 | 612 | 626 | 646 | 667 | 688 | 709 | 744 | 786 | |
| | .08 | $ | 591 | 605 | 626 | 646 | 667 | 681 | 702 | 723 | 744 | 765 | 799 | 841 | |
| | .09 | $ | 653 | 667 | 688 | 709 | 730 | 744 | 765 | 786 | 806 | 827 | 862 | 904 | |
| | .10 | $ | 709 | 723 | 744 | 765 | 786 | 799 | 820 | 841 | 862 | 883 | 918 | 959 | BALANCE POINT 18 DEG.F. |
| | .12 | $ | 820 | 834 | 855 | 876 | 897 | 911 | 932 | 952 | 973 | 994 | 1029 | 1071 | |
| 35,000 | | $ | 396 | 452 | 507 | 563 | 626 | 681 | 737 | 793 | 848 | 911 | 1022 | 1133 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 361 | 389 | 417 | 445 | 473 | 507 | 535 | 563 | 591 | 619 | 674 | 737 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 417 | 445 | 473 | 500 | 528 | 563 | 591 | 619 | 646 | 674 | 730 | 793 | |
| | .05 | $ | 466 | 493 | 521 | 549 | 577 | 612 | 639 | 667 | 695 | 723 | 779 | 841 | |
| | .06 | $ | 521 | 549 | 577 | 605 | 633 | 667 | 695 | 723 | 751 | 779 | 834 | 897 | |
| | .07 | $ | 570 | 598 | 626 | 653 | 681 | 716 | 744 | 772 | 799 | 827 | 883 | 946 | |
| | .08 | $ | 626 | 653 | 681 | 709 | 737 | 772 | 799 | 827 | 855 | 883 | 939 | 1001 | |
| | .09 | $ | 681 | 709 | 737 | 765 | 793 | 827 | 855 | 883 | 911 | 939 | 994 | 1057 | |
| | .10 | $ | 730 | 758 | 786 | 813 | 841 | 876 | 904 | 932 | 959 | 987 | 1043 | 1106 | BALANCE POINT 22 DEG.F. |
| | .12 | $ | 841 | 869 | 897 | 925 | 952 | 987 | 1015 | 1043 | 1071 | 1099 | 1154 | 1217 | |
| 40,000 | | $ | 452 | 514 | 584 | 646 | 716 | 779 | 841 | 911 | 973 | 1036 | 1168 | 1300 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 410 | 445 | 473 | 507 | 542 | 577 | 605 | 639 | 674 | 709 | 772 | 834 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 466 | 500 | 528 | 563 | 598 | 633 | 660 | 695 | 730 | 765 | 827 | 890 | |
| | .05 | $ | 528 | 563 | 591 | 626 | 660 | 695 | 723 | 758 | 793 | 827 | 890 | 952 | |
| | .06 | $ | 584 | 619 | 646 | 681 | 716 | 751 | 779 | 813 | 848 | 883 | 946 | 1008 | |
| | .07 | $ | 646 | 681 | 709 | 744 | 779 | 813 | 841 | 876 | 911 | 946 | 1008 | 1071 | |
| | .08 | $ | 702 | 737 | 765 | 799 | 834 | 869 | 897 | 932 | 966 | 1001 | 1064 | 1126 | |
| | .09 | $ | 765 | 799 | 827 | 862 | 897 | 932 | 959 | 994 | 1029 | 1064 | 1126 | 1189 | |
| | .10 | $ | 820 | 855 | 883 | 918 | 952 | 987 | 1015 | 1050 | 1085 | 1119 | 1182 | 1245 | BALANCE POINT 25 DEG.F. |
| | .12 | $ | 939 | 973 | 1001 | 1036 | 1071 | 1106 | 1133 | 1168 | 1203 | 1238 | 1300 | 1363 | |
| 50,000 | | $ | 563 | 646 | 730 | 813 | 890 | 973 | 1057 | 1133 | 1217 | 1300 | 1460 | 1627 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 514 | 563 | 619 | 667 | 716 | 772 | 820 | 869 | 925 | 973 | 1078 | 1175 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 570 | 619 | 674 | 723 | 772 | 827 | 876 | 925 | 980 | 1029 | 1133 | 1231 | |
| | .05 | $ | 626 | 674 | 730 | 779 | 827 | 883 | 932 | 980 | 1036 | 1085 | 1189 | 1286 | |
| | .06 | $ | 681 | 730 | 786 | 834 | 883 | 939 | 987 | 1036 | 1092 | 1140 | 1245 | 1342 | |
| | .07 | $ | 730 | 779 | 834 | 883 | 932 | 987 | 1036 | 1085 | 1140 | 1189 | 1293 | 1391 | |
| | .08 | $ | 786 | 834 | 890 | 939 | 987 | 1043 | 1092 | 1140 | 1196 | 1245 | 1349 | 1446 | |
| | .09 | $ | 841 | 890 | 946 | 994 | 1043 | 1099 | 1147 | 1196 | 1252 | 1300 | 1405 | 1502 | |
| | .10 | $ | 897 | 946 | 1001 | 1050 | 1099 | 1154 | 1203 | 1252 | 1307 | 1356 | 1460 | 1558 | BALANCE POINT 31 DEG.F. |
| | .12 | $ | 1001 | 1050 | 1106 | 1154 | 1203 | 1259 | 1307 | 1356 | 1412 | 1460 | 1565 | 1662 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 35 | 47 | 59 | 71 | 83 | 94 | 106 | 118 | 142 | <--THEORETICAL AIR CONDITIONING COST |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: OUTDOOR 24HPQ2 INDOOR H2491
ARI RATED COOLING CAP.: BTUH (95 ) 23600, SEER 7.89
ARI RATED HEATING CAP.: BTUH (47 ) 25000, COP(47 ) 2.10, HSPF 6.35 MIN.DHR REG IV
BTUH (17 ) 14200, COP(17 ) 1.93
FURNACE TYPE FUEL OIL FURNACE EFFICIENCY 65.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | | HEATING OIL COST - $/GALLON 1.00 | 1.10 | 1.20 | 1.30 | 1.40 | 1.50 | 1.60 | 1.70 | 1.80 | 2.00 | 2.20 | 2.40 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25,000 | | $ | 584 | 639 | 702 | 758 | 820 | 876 | 939 | 994 | 1050 | 1168 | 1286 | 1405 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 306 | 313 | 319 | 333 | 340 | 347 | 361 | 368 | 382 | 396 | 417 | 438 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 375 | 382 | 389 | 403 | 410 | 417 | 431 | 438 | 452 | 466 | 486 | 507 | |
| | .05 | $ | 445 | 452 | 459 | 473 | 479 | 486 | 500 | 507 | 521 | 535 | 556 | 577 | |
| | .06 | $ | 514 | 521 | 528 | 542 | 549 | 556 | 570 | 577 | 591 | 605 | 626 | 646 | |
| | .07 | $ | 584 | 591 | 598 | 612 | 619 | 626 | 639 | 646 | 660 | 674 | 695 | 716 | |
| | .08 | $ | 653 | 660 | 667 | 681 | 688 | 695 | 709 | 716 | 730 | 744 | 765 | 786 | |
| | .09 | $ | 723 | 730 | 737 | 751 | 758 | 765 | 779 | 786 | 799 | 813 | 834 | 855 | |
| | .10 | $ | 799 | 806 | 813 | 827 | 834 | 841 | 855 | 862 | 876 | 890 | 911 | 932 | BALANCE POINT 13 DEG.F. |
| | .12 | $ | 939 | 946 | 952 | 966 | 973 | 980 | 994 | 1001 | 1015 | 1029 | 1050 | 1071 | |
| 30,000 | | $ | 702 | 772 | 841 | 911 | 980 | 1050 | 1126 | 1196 | 1266 | 1405 | 1544 | 1690 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 375 | 389 | 403 | 417 | 431 | 445 | 459 | 473 | 486 | 514 | 542 | 570 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 452 | 466 | 479 | 493 | 507 | 521 | 535 | 549 | 563 | 591 | 619 | 646 | |
| | .05 | $ | 528 | 542 | 556 | 570 | 584 | 598 | 612 | 626 | 639 | 667 | 695 | 723 | |
| | .06 | $ | 605 | 619 | 633 | 646 | 660 | 674 | 688 | 702 | 716 | 744 | 772 | 799 | |
| | .07 | $ | 688 | 702 | 716 | 730 | 744 | 758 | 772 | 786 | 799 | 827 | 855 | 883 | |
| | .08 | $ | 765 | 779 | 793 | 806 | 820 | 834 | 848 | 862 | 876 | 904 | 932 | 959 | |
| | .09 | $ | 841 | 855 | 869 | 883 | 897 | 911 | 925 | 939 | 952 | 980 | 1008 | 1036 | |
| | .10 | $ | 913 | 932 | 946 | 959 | 973 | 987 | 1001 | 1015 | 1029 | 1057 | 1085 | 1112 | BALANCE POINT 18 DEG.F. |
| | .12 | $ | 1078 | 1092 | 1106 | 1119 | 1133 | 1147 | 1161 | 1175 | 1189 | 1217 | 1245 | 1272 | |
| 35,000 | | $ | 820 | 897 | 980 | 1064 | 1147 | 1231 | 1314 | 1391 | 1474 | 1641 | 1801 | 1968 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 452 | 473 | 486 | 507 | 528 | 549 | 570 | 584 | 605 | 646 | 681 | 723 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 535 | 556 | 570 | 591 | 612 | 633 | 653 | 667 | 688 | 730 | 765 | 806 | |
| | .05 | $ | 619 | 639 | 653 | 674 | 695 | 716 | 737 | 751 | 772 | 813 | 848 | 890 | |
| | .06 | $ | 702 | 723 | 737 | 758 | 779 | 799 | 820 | 834 | 855 | 897 | 932 | 973 | |
| | .07 | $ | 786 | 806 | 820 | 841 | 862 | 883 | 904 | 918 | 939 | 980 | 1015 | 1057 | |
| | .08 | $ | 876 | 897 | 911 | 932 | 952 | 973 | 994 | 1008 | 1029 | 1071 | 1106 | 1147 | |
| | .09 | $ | 959 | 980 | 994 | 1015 | 1036 | 1057 | 1078 | 1092 | 1112 | 1154 | 1189 | 1231 | |
| | .10 | $ | 1043 | 1064 | 1078 | 1099 | 1119 | 1140 | 1161 | 1175 | 1196 | 1238 | 1272 | 1314 | BALANCE POINT 22 DEG.F. |
| | .12 | $ | 1210 | 1231 | 1245 | 1266 | 1286 | 1307 | 1328 | 1342 | 1363 | 1405 | 1439 | 1481 | |
| 40,000 | | $ | 939 | 1029 | 1126 | 1217 | 1314 | 1405 | 1502 | 1592 | 1690 | 1878 | 2065 | 2253 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 535 | 556 | 584 | 612 | 639 | 660 | 688 | 716 | 744 | 793 | 848 | 897 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 626 | 646 | 674 | 702 | 730 | 751 | 779 | 806 | 834 | 883 | 939 | 987 | |
| | .05 | $ | 716 | 737 | 765 | 793 | 820 | 841 | 869 | 897 | 925 | 973 | 1029 | 1078 | |
| | .06 | $ | 806 | 827 | 855 | 883 | 911 | 932 | 959 | 987 | 1015 | 1064 | 1119 | 1168 | |
| | .07 | $ | 897 | 918 | 946 | 973 | 1001 | 1022 | 1050 | 1078 | 1106 | 1154 | 1210 | 1259 | |
| | .08 | $ | 987 | 1008 | 1036 | 1064 | 1092 | 1112 | 1140 | 1168 | 1196 | 1245 | 1300 | 1349 | |
| | .09 | $ | 1071 | 1092 | 1119 | 1147 | 1175 | 1196 | 1224 | 1252 | 1279 | 1328 | 1384 | 1432 | |
| | .10 | $ | 1161 | 1182 | 1210 | 1238 | 1266 | 1286 | 1314 | 1342 | 1370 | 1419 | 1474 | 1523 | BALANCE POINT 25 DEG.F. |
| | .12 | $ | 1342 | 1363 | 1391 | 1419 | 1446 | 1467 | 1495 | 1523 | 1551 | 1599 | 1655 | 1704 | |
| 50,000 | | $ | 1168 | 1286 | 1405 | 1523 | 1641 | 1759 | 1878 | 1996 | 2107 | 2344 | 2580 | 2817 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 709 | 751 | 793 | 834 | 876 | 918 | 959 | 1001 | 1043 | 1126 | 1210 | 1293 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ | 806 | 848 | 890 | 932 | 973 | 1015 | 1057 | 1099 | 1140 | 1224 | 1307 | 1391 | |
| | .05 | $ | 904 | 946 | 987 | 1029 | 1071 | 1112 | 1154 | 1196 | 1238 | 1321 | 1405 | 1488 | |
| | .06 | $ | 1001 | 1043 | 1085 | 1126 | 1168 | 1210 | 1252 | 1293 | 1335 | 1419 | 1502 | 1586 | |
| | .07 | $ | 1099 | 1140 | 1182 | 1224 | 1266 | 1307 | 1349 | 1391 | 1432 | 1516 | 1599 | 1683 | |
| | .08 | $ | 1196 | 1238 | 1279 | 1321 | 1363 | 1405 | 1446 | 1488 | 1530 | 1613 | 1697 | 1780 | |
| | .09 | $ | 1293 | 1335 | 1377 | 1419 | 1460 | 1502 | 1544 | 1586 | 1627 | 1711 | 1794 | 1878 | |
| | .10 | $ | 1391 | 1432 | 1474 | 1516 | 1558 | 1599 | 1641 | 1683 | 1725 | 1808 | 1892 | 1975 | BALANCE POINT 31 DEG.F. |
| | .12 | $ | 1586 | 1627 | 1669 | 1711 | 1752 | 1794 | 1836 | 1878 | 1919 | 2003 | 2086 | 2170 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | <--ELECTRIC RATE $/KWH |
| $ | 35 | 47 | 59 | 71 | 83 | 94 | 106 | 118 | 142 | <--THEORETICAL AIR CONDITIONING COST |

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: OUTDOOR 24HP02 INDOOR H2405I
ARI RATED COOLING CAP.: BTUH (95 ) 24500, SEER 7.09
ARI RATED HEATING CAP.: BTUH (47 ) 25000, COP(47 ) 2.70, HSPF 6.35 MIN.DHR REG IV
BTUH (17 ) 14200, COP(17 ) 1.93
FURNACE TYPE PROPANE GAS FURNACE EFFICIENCY 65.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | | PROPANE GAS COST - $/GALLON .60 | .65 | .70 | .75 | .80 | .85 | .90 | .95 | 1.00 | 1.10 | 1.20 | 1.20 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25,000 | | $ | 535 | 577 | 626 | 667 | 709 | 758 | 799 | 848 | 890 | 980 | 1071 | 1071 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 292 | 306 | 313 | 319 | 326 | 333 | 340 | 347 | 354 | 368 | 382 | 382 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 361 | 375 | 382 | 389 | 396 | 403 | 410 | 417 | 424 | 438 | 452 | 452 | |
| | .05 | $ | 431 | 445 | 452 | 459 | 466 | 473 | 479 | 486 | 493 | 507 | 521 | 521 | |
| | .06 | $ | 500 | 514 | 521 | 528 | 535 | 542 | 549 | 556 | 563 | 577 | 591 | 591 | |
| | .07 | $ | 570 | 584 | 591 | 598 | 605 | 612 | 619 | 626 | 633 | 646 | 660 | 660 | |
| | .08 | $ | 639 | 653 | 660 | 667 | 674 | 681 | 688 | 695 | 702 | 716 | 730 | 730 | |
| | .09 | $ | 709 | 723 | 730 | 737 | 744 | 751 | 758 | 765 | 772 | 786 | 799 | 799 | BALANCE POINT 13 DEG.F. |
| | .10 | $ | 786 | 799 | 806 | 813 | 820 | 827 | 834 | 841 | 848 | 862 | 876 | 876 | |
| | .12 | $ | 925 | 939 | 946 | 952 | 959 | 966 | 973 | 980 | 987 | 1001 | 1015 | 1015 | |
| 30,000 | | $ | 639 | 695 | 751 | 799 | 855 | 911 | 959 | 1015 | 1071 | 1175 | 1286 | 1286 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 361 | 375 | 382 | 396 | 403 | 417 | 431 | 438 | 452 | 473 | 493 | 493 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 438 | 452 | 459 | 473 | 479 | 493 | 507 | 514 | 528 | 549 | 570 | 570 | |
| | .05 | $ | 514 | 528 | 535 | 549 | 556 | 570 | 584 | 591 | 605 | 626 | 646 | 646 | |
| | .06 | $ | 591 | 605 | 612 | 626 | 633 | 646 | 660 | 667 | 681 | 702 | 723 | 723 | |
| | .07 | $ | 674 | 688 | 695 | 709 | 716 | 730 | 744 | 751 | 765 | 786 | 806 | 806 | |
| | .08 | $ | 751 | 765 | 772 | 786 | 793 | 806 | 820 | 827 | 841 | 862 | 883 | 883 | |
| | .09 | $ | 827 | 841 | 848 | 862 | 869 | 883 | 897 | 904 | 918 | 939 | 959 | 959 | BALANCE POINT 18 DEG.F. |
| | .10 | $ | 904 | 918 | 925 | 939 | 946 | 959 | 973 | 980 | 994 | 1015 | 1036 | 1036 | |
| | .12 | $ | 1064 | 1078 | 1085 | 1099 | 1106 | 1119 | 1133 | 1140 | 1154 | 1175 | 1196 | 1196 | |
| 35,000 | | $ | 751 | 813 | 876 | 939 | 1001 | 1064 | 1126 | 1189 | 1252 | 1377 | 1502 | 1502 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 431 | 452 | 466 | 479 | 493 | 507 | 521 | 535 | 549 | 584 | 612 | 612 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 514 | 535 | 549 | 563 | 577 | 591 | 605 | 619 | 633 | 667 | 695 | 695 | |
| | .05 | $ | 598 | 619 | 633 | 646 | 660 | 674 | 688 | 702 | 716 | 751 | 779 | 779 | |
| | .06 | $ | 681 | 702 | 716 | 730 | 744 | 758 | 772 | 786 | 799 | 834 | 862 | 862 | |
| | .07 | $ | 765 | 786 | 799 | 813 | 827 | 841 | 855 | 869 | 883 | 918 | 946 | 946 | |
| | .08 | $ | 855 | 876 | 890 | 904 | 918 | 932 | 946 | 959 | 973 | 1008 | 1036 | 1036 | |
| | .09 | $ | 939 | 959 | 973 | 987 | 1001 | 1015 | 1029 | 1043 | 1057 | 1092 | 1119 | 1119 | BALANCE POINT 22 DEG.F. |
| | .10 | $ | 1022 | 1043 | 1057 | 1071 | 1085 | 1099 | 1112 | 1126 | 1140 | 1175 | 1203 | 1203 | |
| | .12 | $ | 1189 | 1210 | 1224 | 1238 | 1252 | 1266 | 1279 | 1293 | 1307 | 1342 | 1370 | 1370 | |
| 40,000 | | $ | 855 | 925 | 1001 | 1071 | 1140 | 1210 | 1286 | 1356 | 1426 | 1572 | 1718 | 1718 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 507 | 528 | 549 | 570 | 591 | 612 | 626 | 646 | 667 | 709 | 751 | 751 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 598 | 619 | 639 | 660 | 681 | 702 | 716 | 737 | 758 | 799 | 841 | 841 | |
| | .05 | $ | 688 | 709 | 730 | 751 | 772 | 793 | 806 | 827 | 848 | 890 | 932 | 932 | |
| | .06 | $ | 779 | 799 | 820 | 841 | 862 | 883 | 897 | 918 | 939 | 980 | 1022 | 1022 | |
| | .07 | $ | 869 | 890 | 911 | 932 | 952 | 973 | 987 | 1008 | 1029 | 1071 | 1112 | 1112 | |
| | .08 | $ | 959 | 980 | 1001 | 1022 | 1043 | 1064 | 1078 | 1099 | 1119 | 1161 | 1203 | 1203 | |
| | .09 | $ | 1043 | 1064 | 1085 | 1106 | 1126 | 1147 | 1161 | 1182 | 1203 | 1245 | 1286 | 1286 | BALANCE POINT 25 DEG.F. |
| | .10 | $ | 1133 | 1154 | 1175 | 1196 | 1217 | 1238 | 1252 | 1272 | 1293 | 1335 | 1377 | 1377 | |
| | .12 | $ | 1314 | 1335 | 1356 | 1377 | 1398 | 1419 | 1432 | 1453 | 1474 | 1516 | 1558 | 1558 | |
| 50,000 | | $ | 1071 | 1161 | 1252 | 1335 | 1426 | 1516 | 1606 | 1697 | 1787 | 1968 | 2142 | 2142 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 674 | 709 | 737 | 772 | 799 | 834 | 862 | 897 | 932 | 994 | 1057 | 1057 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 772 | 806 | 834 | 869 | 897 | 932 | 959 | 994 | 1029 | 1092 | 1154 | 1154 | |
| | .05 | $ | 869 | 904 | 932 | 966 | 994 | 1029 | 1057 | 1092 | 1126 | 1189 | 1252 | 1252 | |
| | .06 | $ | 966 | 1001 | 1029 | 1064 | 1092 | 1126 | 1154 | 1189 | 1224 | 1286 | 1349 | 1349 | |
| | .07 | $ | 1064 | 1099 | 1126 | 1161 | 1189 | 1224 | 1252 | 1286 | 1321 | 1384 | 1446 | 1446 | |
| | .08 | $ | 1161 | 1196 | 1224 | 1259 | 1286 | 1321 | 1349 | 1384 | 1419 | 1481 | 1544 | 1544 | |
| | .09 | $ | 1259 | 1293 | 1321 | 1356 | 1384 | 1419 | 1446 | 1481 | 1516 | 1579 | 1641 | 1641 | BALANCE POINT 31 DEG.F. |
| | .10 | $ | 1356 | 1391 | 1419 | 1453 | 1481 | 1516 | 1544 | 1579 | 1613 | 1676 | 1739 | 1739 | |
| | .12 | $ | 1551 | 1586 | 1613 | 1648 | 1676 | 1711 | 1739 | 1773 | 1808 | 1871 | 1933 | 1933 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 35 | 47 | 59 | 71 | 83 | 94 | 106 | 118 | 142 | <--THEORETICAL AIR CONDITIONING COST |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: OUTDOOR 30HP04 INDOOR H3AQ OR H3AQ1
ARI RATED COOLING CAP.: BTUH (95 ) 25600; SEER 8.30
ARI RATED HEATING CAP.: BTUH (47 ) 32000; COP(47 ) 2.75, HSPF 6.50 MIN.OHR REG IV
BTUH (17 ) 20200; COP(17 ) 1.90
FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | --- THEORETICAL ANNUAL HEATING COST --- HEAT PUMP WITH ELECTRIC HEAT | ELECTRIC HEAT ONLY | |
|---|---|---|---|---|
| 30,000 | .03 | $ 333 | 556 | |
| | .04 | $ 445 | 744 | |
| | .05 | $ 549 | 925 | |
| | .06 | $ 667 | 1112 | |
| | .07 | $ 779 | 1300 | |
| | .08 | $ 890 | 1488 | |
| | .09 | $ 1001 | 1669 | |
| | .10 | $ 1112 | 1857 | BALANCE POINT 9 DEG.F. |
| | .12 | $ 1335 | 2232 | |
| 35,000 | .03 | $ 389 | 646 | |
| | .04 | $ 514 | 862 | |
| | .05 | $ 646 | 1085 | |
| | .06 | $ 772 | 1300 | |
| | .07 | $ 904 | 1516 | |
| | .08 | $ 1036 | 1732 | |
| | .09 | $ 1161 | 1947 | |
| | .10 | $ 1293 | 2170 | BALANCE POINT 13 DEG.F. |
| | .12 | $ 1544 | 2601 | |
| 40,000 | .03 | $ 445 | 744 | |
| | .04 | $ 591 | 987 | |
| | .05 | $ 737 | 1238 | |
| | .06 | $ 883 | 1488 | |
| | .07 | $ 1036 | 1732 | |
| | .08 | $ 1182 | 1982 | |
| | .09 | $ 1328 | 2232 | |
| | .10 | $ 1481 | 2476 | BALANCE POINT 16 DEG.F. |
| | .12 | $ 1773 | 2977 | |
| 50,000 | .03 | $ 563 | 925 | |
| | .04 | $ 751 | 1238 | |
| | .05 | $ 939 | 1544 | |
| | .06 | $ 1126 | 1857 | |
| | .07 | $ 1314 | 2170 | |
| | .08 | $ 1502 | 2476 | |
| | .09 | $ 1690 | 2789 | |
| | .10 | $ 1878 | 3095 | BALANCE POINT 22 DEG.F. |
| | .12 | $ 2253 | 3721 | |
| 60,000 | .03 | $ 695 | 1112 | |
| | .04 | $ 925 | 1488 | |
| | .05 | $ 1161 | 1857 | |
| | .06 | $ 1391 | 2232 | |
| | .07 | $ 1627 | 2601 | |
| | .08 | $ 1850 | 2977 | |
| | .09 | $ 2086 | 3345 | |
| | .10 | $ 2316 | 3721 | BALANCE POINT 27 DEG.F. |
| | .12 | $ 2775 | 4465 | |
| 70,000 | .03 | $ 834 | 1300 | |
| | .04 | $ 1112 | 1732 | |
| | .05 | $ 1398 | 2170 | |
| | .06 | $ 1676 | 2601 | |
| | .07 | $ 1947 | 3039 | |
| | .08 | $ 2232 | 3471 | |
| | .09 | $ 2511 | 3902 | |
| | .10 | $ 2796 | 4340 | BALANCE POINT 31 DEG.F. |
| | .12 | $ 3345 | 5210 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | <--ELECTRIC RATE $/KWH |
| $ | 42 | 56 | 70 | 85 | 99 | 113 | 127 | 141 | 170 | <--THEORETICAL AIR CONDITIONING COST |

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: OUTDOOR 30HPQ4 INDOOR H3AQ/H3AQ1
ARI RATED COOLING CAP.: BTUH (95 ) 25400. SEER 8.30
ARI RATED HEATING CAP.: BTUH (47 ) 32000. COP(47 ) 2.75. HSPF 6.50 MIN.DHR REG IV
BTUH (17 ) 20200. COP(17 ) 1.90
FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY 65.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | | NATURAL GAS COST - $/THERM .35 | .40 | .45 | .50 | .55 | .60 | .65 | .70 | .75 | .80 | .90 | 1.00 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30,000 | | $ | 340 | 389 | 438 | 486 | 535 | 584 | 633 | 681 | 730 | 779 | 876 | 973 | <--THEORETICAL HEATING COST @ FURNACE ONLY |
| | .03 | $ | 306 | 319 | 326 | 340 | 347 | 361 | 368 | 382 | 396 | 403 | 424 | 445 | THEORETICAL HEATING COST @ FURN.+ HEAT PUMP |
| | .04 | $ | 382 | 396 | 403 | 417 | 424 | 438 | 445 | 459 | 473 | 479 | 500 | 521 | $ PER YEAR |
| | .05 | $ | 459 | 473 | 479 | 493 | 500 | 514 | 521 | 535 | 549 | 556 | 577 | 598 | |
| | .06 | $ | 528 | 542 | 549 | 563 | 570 | 584 | 591 | 605 | 619 | 626 | 646 | 667 | |
| | .07 | $ | 605 | 619 | 626 | 639 | 646 | 660 | 667 | 681 | 695 | 702 | 723 | 744 | |
| | .08 | $ | 681 | 695 | 702 | 716 | 723 | 737 | 744 | 758 | 772 | 779 | 799 | 820 | |
| | .09 | $ | 758 | 772 | 779 | 793 | 799 | 813 | 820 | 834 | 848 | 855 | 876 | 897 | |
| | .10 | $ | 834 | 848 | 855 | 869 | 876 | 890 | 897 | 911 | 925 | 932 | 952 | 973 | BALANCE POINT 9 DEG.F. |
| | .12 | $ | 987 | 1001 | 1008 | 1022 | 1029 | 1043 | 1050 | 1064 | 1078 | 1085 | 1106 | 1126 | |
| 35,000 | | $ | 396 | 452 | 507 | 563 | 626 | 681 | 737 | 793 | 848 | 911 | 1022 | 1133 | <--THEORETICAL HEATING COST @ FURNACE ONLY |
| | .03 | $ | 354 | 368 | 389 | 403 | 424 | 438 | 459 | 473 | 493 | 507 | 542 | 577 | |
| | .04 | $ | 431 | 445 | 466 | 479 | 500 | 514 | 535 | 549 | 570 | 584 | 619 | 653 | THEORETICAL HEATING COST @ FURN.+ HEAT PUMP |
| | .05 | $ | 507 | 521 | 542 | 556 | 577 | 591 | 612 | 626 | 646 | 660 | 695 | 730 | $ PER YEAR |
| | .06 | $ | 584 | 598 | 619 | 633 | 653 | 667 | 688 | 702 | 723 | 737 | 772 | 806 | |
| | .07 | $ | 660 | 674 | 695 | 709 | 730 | 744 | 765 | 779 | 799 | 813 | 848 | 883 | |
| | .08 | $ | 737 | 751 | 772 | 786 | 806 | 820 | 841 | 855 | 876 | 890 | 925 | 959 | |
| | .09 | $ | 813 | 827 | 848 | 862 | 883 | 897 | 918 | 932 | 952 | 966 | 1001 | 1036 | |
| | .10 | $ | 890 | 904 | 925 | 939 | 959 | 973 | 994 | 1008 | 1029 | 1043 | 1078 | 1112 | BALANCE POINT 13 DEG.F. |
| | .12 | $ | 1043 | 1057 | 1078 | 1092 | 1112 | 1126 | 1147 | 1161 | 1182 | 1196 | 1231 | 1266 | |
| 40,000 | | $ | 452 | 514 | 584 | 646 | 716 | 779 | 841 | 911 | 973 | 1036 | 1168 | 1300 | <--THEORETICAL HEATING COST @ FURNACE ONLY |
| | .03 | $ | 396 | 417 | 438 | 459 | 479 | 500 | 514 | 535 | 556 | 577 | 619 | 660 | |
| | .04 | $ | 479 | 500 | 521 | 542 | 563 | 584 | 598 | 619 | 639 | 660 | 702 | 744 | THEORETICAL HEATING COST @ FURN.+ HEAT PUMP |
| | .05 | $ | 563 | 584 | 605 | 626 | 646 | 667 | 681 | 702 | 723 | 744 | 786 | 827 | $ PER YEAR |
| | .06 | $ | 653 | 674 | 695 | 716 | 737 | 758 | 772 | 793 | 813 | 834 | 876 | 918 | |
| | .07 | $ | 737 | 758 | 779 | 799 | 820 | 841 | 855 | 876 | 897 | 918 | 959 | 1001 | |
| | .08 | $ | 820 | 841 | 862 | 883 | 904 | 925 | 939 | 959 | 980 | 1001 | 1043 | 1085 | |
| | .09 | $ | 911 | 932 | 952 | 973 | 994 | 1015 | 1029 | 1050 | 1071 | 1092 | 1133 | 1175 | |
| | .10 | $ | 994 | 1015 | 1036 | 1057 | 1078 | 1099 | 1112 | 1133 | 1154 | 1175 | 1217 | 1259 | BALANCE POINT 16 DEG.F. |
| | .12 | $ | 1161 | 1182 | 1203 | 1224 | 1245 | 1266 | 1279 | 1300 | 1321 | 1342 | 1384 | 1426 | |
| 50,000 | | $ | 563 | 646 | 730 | 813 | 890 | 973 | 1057 | 1133 | 1217 | 1300 | 1460 | 1627 | <--THEORETICAL HEATING COST @ FURNACE ONLY |
| | .03 | $ | 500 | 542 | 584 | 626 | 667 | 709 | 751 | 793 | 834 | 869 | 952 | 1036 | |
| | .04 | $ | 577 | 619 | 660 | 702 | 744 | 786 | 827 | 869 | 911 | 946 | 1029 | 1112 | THEORETICAL HEATING COST @ FURN.+ HEAT PUMP |
| | .05 | $ | 646 | 688 | 730 | 772 | 813 | 855 | 897 | 939 | 980 | 1015 | 1099 | 1182 | $ PER YEAR |
| | .06 | $ | 723 | 765 | 806 | 848 | 890 | 932 | 973 | 1015 | 1057 | 1092 | 1175 | 1259 | |
| | .07 | $ | 793 | 834 | 876 | 918 | 959 | 1001 | 1043 | 1085 | 1126 | 1161 | 1245 | 1328 | |
| | .08 | $ | 869 | 911 | 952 | 994 | 1036 | 1078 | 1119 | 1161 | 1203 | 1238 | 1321 | 1405 | |
| | .09 | $ | 939 | 980 | 1022 | 1064 | 1106 | 1147 | 1189 | 1231 | 1272 | 1307 | 1391 | 1474 | |
| | .10 | $ | 1008 | 1050 | 1092 | 1133 | 1175 | 1217 | 1259 | 1300 | 1342 | 1377 | 1460 | 1544 | BALANCE POINT 22 DEG.F. |
| | .12 | $ | 1154 | 1196 | 1238 | 1279 | 1321 | 1363 | 1405 | 1446 | 1488 | 1523 | 1606 | 1690 | |
| 60,000 | | $ | 681 | 779 | 876 | 973 | 1071 | 1168 | 1266 | 1363 | 1460 | 1558 | 1752 | 1947 | <--THEORETICAL HEATING COST @ FURNACE ONLY |
| | .03 | $ | 612 | 674 | 737 | 799 | 862 | 918 | 980 | 1043 | 1106 | 1161 | 1286 | 1405 | |
| | .04 | $ | 681 | 744 | 806 | 869 | 932 | 987 | 1050 | 1112 | 1175 | 1231 | 1356 | 1474 | THEORETICAL HEATING COST @ FURN.+ HEAT PUMP |
| | .05 | $ | 744 | 806 | 869 | 932 | 994 | 1050 | 1112 | 1175 | 1238 | 1293 | 1419 | 1537 | $ PER YEAR |
| | .06 | $ | 806 | 869 | 932 | 994 | 1057 | 1112 | 1175 | 1238 | 1300 | 1356 | 1481 | 1599 | |
| | .07 | $ | 869 | 932 | 994 | 1057 | 1119 | 1175 | 1238 | 1300 | 1363 | 1419 | 1544 | 1662 | |
| | .08 | $ | 932 | 994 | 1057 | 1119 | 1182 | 1238 | 1300 | 1363 | 1426 | 1481 | 1606 | 1725 | |
| | .09 | $ | 994 | 1057 | 1119 | 1182 | 1245 | 1300 | 1363 | 1426 | 1488 | 1544 | 1669 | 1787 | |
| | .10 | $ | 1057 | 1119 | 1182 | 1245 | 1307 | 1363 | 1426 | 1488 | 1551 | 1606 | 1732 | 1850 | BALANCE POINT 27 DEG.F. |
| | .12 | $ | 1189 | 1252 | 1314 | 1377 | 1439 | 1495 | 1558 | 1620 | 1683 | 1739 | 1864 | 1982 | |
| 70,000 | | $ | 793 | 911 | 1022 | 1133 | 1252 | 1363 | 1481 | 1592 | 1704 | 1822 | 2052 | 2274 | <--THEORETICAL HEATING COST @ FURNACE ONLY |
| | .03 | $ | 716 | 786 | 855 | 925 | 1001 | 1071 | 1140 | 1210 | 1286 | 1356 | 1495 | 1641 | |
| | .04 | $ | 793 | 862 | 932 | 1001 | 1078 | 1147 | 1217 | 1286 | 1363 | 1432 | 1572 | 1718 | THEORETICAL HEATING COST @ FURN.+ HEAT PUMP |
| | .05 | $ | 862 | 932 | 1001 | 1071 | 1147 | 1217 | 1286 | 1356 | 1432 | 1502 | 1641 | 1787 | $ PER YEAR |
| | .06 | $ | 932 | 1001 | 1071 | 1140 | 1217 | 1286 | 1356 | 1426 | 1502 | 1572 | 1711 | 1857 | |
| | .07 | $ | 1008 | 1078 | 1147 | 1217 | 1293 | 1363 | 1432 | 1502 | 1579 | 1648 | 1787 | 1933 | |
| | .08 | $ | 1078 | 1147 | 1217 | 1286 | 1363 | 1432 | 1502 | 1572 | 1648 | 1718 | 1857 | 2003 | |
| | .09 | $ | 1154 | 1224 | 1293 | 1363 | 1439 | 1509 | 1579 | 1648 | 1725 | 1794 | 1933 | 2079 | |
| | .10 | $ | 1224 | 1293 | 1363 | 1432 | 1509 | 1579 | 1648 | 1718 | 1794 | 1864 | 2003 | 2149 | BALANCE POINT 31 DEG.F. |
| | .12 | $ | 1370 | 1439 | 1509 | 1579 | 1655 | 1725 | 1794 | 1864 | 1940 | 2010 | 2149 | 2295 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | <--ELECTRIC RATE $/KWH |
| $ | 42 | 56 | 70 | 85 | 99 | 113 | 127 | 141 | 170 | <--THEORETICAL AIR CONDITIONING COST |

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: OUTDOOR 30H204 INDOOR H3AA2/H3AA1
ARI RATED COOLING CAP.: BTUH (95 ) 29500. SEER 8.30
ARI RATED HEATING CAP.: BTUH (47 ) 32000. COP(47 ) 2.75. HSPF 6.50 MIN.OHR REG IV
BTUH (17 ) 20200. COP(17 ) 1.90
FURNACE TYPE FUEL OIL FURNACE EFFICIENCY 65.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | | HEATING OIL COST - $/GALLON 1.00 | 1.10 | 1.20 | 1.30 | 1.40 | 1.50 | 1.60 | 1.70 | 1.80 | 2.00 | 2.20 | 2.40 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30,000 | | $ | 702 | 772 | 841 | 911 | 980 | 1050 | 1126 | 1196 | 1266 | 1405 | 1544 | 1690 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 354 | 361 | 368 | 382 | 389 | 396 | 403 | 417 | 424 | 445 | 459 | 479 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 445 | 452 | 459 | 473 | 479 | 486 | 493 | 507 | 514 | 535 | 549 | 570 | |
| | .05 | $ | 528 | 535 | 542 | 556 | 563 | 570 | 577 | 591 | 598 | 619 | 633 | 653 | |
| | .06 | $ | 619 | 626 | 633 | 646 | 653 | 660 | 667 | 681 | 688 | 709 | 723 | 744 | |
| | .07 | $ | 709 | 716 | 723 | 737 | 744 | 751 | 758 | 772 | 779 | 799 | 813 | 834 | |
| | .08 | $ | 793 | 799 | 806 | 820 | 827 | 834 | 841 | 855 | 862 | 883 | 897 | 918 | |
| | .09 | $ | 883 | 890 | 897 | 911 | 918 | 925 | 932 | 946 | 952 | 973 | 987 | 1008 | |
| | .10 | $ | 973 | 980 | 987 | 1001 | 1008 | 1015 | 1022 | 1036 | 1043 | 1064 | 1078 | 1099 | BALANCE POINT 9 DEG.F. |
| | .12 | $ | 1147 | 1154 | 1161 | 1175 | 1182 | 1189 | 1196 | 1210 | 1217 | 1238 | 1252 | 1272 | |
| 35,000 | | $ | 920 | 897 | 980 | 1064 | 1147 | 1231 | 1314 | 1391 | 1474 | 1641 | 1801 | 1968 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 417 | 424 | 438 | 452 | 466 | 479 | 486 | 500 | 514 | 535 | 563 | 591 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 514 | 521 | 535 | 549 | 563 | 577 | 584 | 598 | 612 | 633 | 660 | 688 | |
| | .05 | $ | 612 | 619 | 633 | 646 | 660 | 674 | 681 | 695 | 709 | 730 | 758 | 786 | |
| | .06 | $ | 709 | 716 | 730 | 744 | 758 | 772 | 779 | 793 | 806 | 827 | 855 | 883 | |
| | .07 | $ | 806 | 813 | 827 | 841 | 855 | 869 | 876 | 890 | 904 | 925 | 952 | 980 | |
| | .08 | $ | 904 | 911 | 925 | 939 | 952 | 966 | 973 | 987 | 1001 | 1022 | 1050 | 1078 | |
| | .09 | $ | 1001 | 1008 | 1022 | 1036 | 1050 | 1064 | 1071 | 1085 | 1099 | 1119 | 1147 | 1175 | |
| | .10 | $ | 1099 | 1106 | 1119 | 1133 | 1147 | 1161 | 1168 | 1182 | 1196 | 1217 | 1245 | 1272 | BALANCE POINT 13 DEG.F. |
| | .12 | $ | 1293 | 1300 | 1314 | 1328 | 1342 | 1356 | 1363 | 1377 | 1391 | 1412 | 1439 | 1467 | |
| 40,000 | | $ | 939 | 1029 | 1126 | 1217 | 1314 | 1405 | 1502 | 1592 | 1690 | 1878 | 2065 | 2253 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 486 | 500 | 521 | 535 | 549 | 570 | 584 | 598 | 619 | 653 | 681 | 716 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 591 | 605 | 626 | 639 | 653 | 674 | 688 | 702 | 723 | 758 | 786 | 820 | |
| | .05 | $ | 695 | 709 | 730 | 744 | 758 | 779 | 793 | 806 | 827 | 862 | 890 | 925 | |
| | .06 | $ | 799 | 813 | 834 | 848 | 862 | 883 | 897 | 911 | 932 | 966 | 994 | 1029 | |
| | .07 | $ | 904 | 918 | 939 | 952 | 966 | 987 | 1001 | 1015 | 1036 | 1071 | 1099 | 1133 | |
| | .08 | $ | 1015 | 1029 | 1050 | 1064 | 1078 | 1099 | 1112 | 1126 | 1147 | 1182 | 1210 | 1245 | |
| | .09 | $ | 1119 | 1133 | 1154 | 1168 | 1182 | 1203 | 1217 | 1231 | 1252 | 1286 | 1314 | 1349 | |
| | .10 | $ | 1224 | 1238 | 1259 | 1272 | 1286 | 1307 | 1321 | 1335 | 1356 | 1391 | 1419 | 1453 | BALANCE POINT 16 DEG.F. |
| | .12 | $ | 1432 | 1446 | 1467 | 1481 | 1495 | 1516 | 1530 | 1544 | 1565 | 1599 | 1627 | 1662 | |
| 50,000 | | $ | 1168 | 1286 | 1405 | 1523 | 1641 | 1759 | 1878 | 1996 | 2107 | 2344 | 2580 | 2817 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 626 | 653 | 681 | 709 | 737 | 765 | 793 | 820 | 848 | 904 | 959 | 1015 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 744 | 772 | 799 | 827 | 855 | 883 | 911 | 939 | 966 | 1022 | 1078 | 1133 | |
| | .05 | $ | 862 | 890 | 918 | 946 | 973 | 1001 | 1029 | 1057 | 1085 | 1140 | 1196 | 1252 | |
| | .06 | $ | 980 | 1008 | 1036 | 1066 | 1092 | 1119 | 1147 | 1175 | 1203 | 1259 | 1314 | 1370 | |
| | .07 | $ | 1099 | 1126 | 1154 | 1182 | 1210 | 1238 | 1266 | 1293 | 1321 | 1377 | 1432 | 1488 | |
| | .08 | $ | 1224 | 1252 | 1279 | 1307 | 1335 | 1363 | 1391 | 1419 | 1446 | 1502 | 1558 | 1613 | |
| | .09 | $ | 1342 | 1370 | 1398 | 1426 | 1453 | 1481 | 1509 | 1537 | 1565 | 1620 | 1676 | 1732 | |
| | .10 | $ | 1460 | 1488 | 1516 | 1544 | 1572 | 1599 | 1627 | 1655 | 1683 | 1739 | 1794 | 1850 | BALANCE POINT 22 DEG.F. |
| | .12 | $ | 1697 | 1725 | 1752 | 1780 | 1808 | 1836 | 1864 | 1892 | 1919 | 1975 | 2031 | 2086 | |
| 60,000 | | $ | 1405 | 1544 | 1690 | 1829 | 1968 | 2107 | 2253 | 2392 | 2532 | 2817 | 3095 | 3380 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 793 | 834 | 876 | 918 | 959 | 1001 | 1043 | 1085 | 1126 | 1210 | 1286 | 1370 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 925 | 966 | 1008 | 1050 | 1092 | 1133 | 1175 | 1217 | 1259 | 1342 | 1419 | 1502 | |
| | .05 | $ | 1050 | 1092 | 1133 | 1175 | 1217 | 1259 | 1300 | 1342 | 1384 | 1467 | 1544 | 1627 | |
| | .06 | $ | 1175 | 1217 | 1259 | 1300 | 1342 | 1384 | 1426 | 1467 | 1509 | 1592 | 1669 | 1752 | |
| | .07 | $ | 1307 | 1349 | 1391 | 1432 | 1474 | 1516 | 1558 | 1599 | 1641 | 1725 | 1801 | 1885 | |
| | .08 | $ | 1432 | 1474 | 1516 | 1558 | 1599 | 1641 | 1683 | 1725 | 1766 | 1850 | 1926 | 2010 | |
| | .09 | $ | 1565 | 1606 | 1648 | 1690 | 1732 | 1773 | 1815 | 1857 | 1899 | 1982 | 2059 | 2142 | |
| | .10 | $ | 1690 | 1732 | 1773 | 1815 | 1857 | 1899 | 1940 | 1982 | 2024 | 2107 | 2184 | 2267 | BALANCE POINT 27 DEG.F. |
| | .12 | $ | 1947 | 1989 | 2031 | 2072 | 2114 | 2156 | 2198 | 2239 | 2281 | 2365 | 2441 | 2525 | |
| 70,000 | | $ | 1641 | 1801 | 1968 | 2135 | 2295 | 2462 | 2629 | 2789 | 2956 | 3283 | 3610 | 3944 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 980 | 1036 | 1092 | 1154 | 1210 | 1266 | 1321 | 1384 | 1439 | 1558 | 1669 | 1787 | THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ | 1112 | 1168 | 1224 | 1286 | 1342 | 1398 | 1453 | 1516 | 1572 | 1690 | 1801 | 1919 | |
| | .05 | $ | 1252 | 1307 | 1363 | 1426 | 1481 | 1537 | 1592 | 1655 | 1711 | 1829 | 1940 | 2059 | |
| | .06 | $ | 1384 | 1439 | 1495 | 1558 | 1613 | 1669 | 1725 | 1787 | 1843 | 1961 | 2072 | 2191 | |
| | .07 | $ | 1516 | 1572 | 1627 | 1690 | 1745 | 1801 | 1857 | 1919 | 1975 | 2093 | 2205 | 2323 | |
| | .08 | $ | 1655 | 1711 | 1766 | 1829 | 1885 | 1940 | 1996 | 2059 | 2114 | 2232 | 2344 | 2462 | |
| | .09 | $ | 1787 | 1843 | 1899 | 1961 | 2017 | 2072 | 2129 | 2191 | 2246 | 2365 | 2476 | 2594 | |
| | .10 | $ | 1919 | 1975 | 2031 | 2093 | 2149 | 2205 | 2260 | 2323 | 2379 | 2497 | 2608 | 2726 | BALANCE POINT 31 DEG.F. |
| | .12 | $ | 2191 | 2246 | 2302 | 2365 | 2420 | 2476 | 2532 | 2594 | 2650 | 2768 | 2879 | 2998 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 42 | 56 | 70 | 85 | 99 | 113 | 127 | 141 | 170 | <--THEORETICAL AIR CONDITIONING COST |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: OUTDOOR 30HPQ4 INDOOR W3AQ/W3AQ1
ARI RATED COOLING CAP.: BTUH (95 ) 29500 COP(47 ) 3.15 SEER 8.30
ARI RATED HEATING CAP.: BTUH (47 ) 32400 COP(17 ) 1.99 HSPF 6.50 MIN.DHR REG IV
BTUH (17 ) 20700
FURNACE EFFICIENCY .65.00% AFUE
FURNACE TYPE PROPANE GAS

| HEAT LOSS BTUH | ELEC. COST $/KWH | PROPANE GAS COST - $/GALLON .60 | .65 | .70 | .75 | .80 | .85 | .90 | .95 | 1.00 | 1.10 | 1.20 | 1.20 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30,000 | | $ 639 | 695 | 751 | 799 | 855 | 911 | 959 | 1015 | 1071 | 1175 | 1286 | 1286 | <--THEORETICAL HEATING COST @ FURNACE ONLY |
| | .03 | $ 347 | 354 | 361 | 368 | 375 | 382 | 389 | 389 | 396 | 410 | 424 | 424 | THEORETICAL HEATING COST @ FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 438 | 445 | 452 | 459 | 466 | 473 | 479 | 479 | 486 | 500 | 514 | 514 | |
| | .05 | $ 521 | 528 | 535 | 542 | 549 | 556 | 563 | 563 | 570 | 584 | 598 | 598 | |
| | .06 | $ 612 | 619 | 626 | 633 | 639 | 646 | 653 | 653 | 660 | 674 | 688 | 688 | |
| | .07 | $ 702 | 709 | 716 | 723 | 730 | 737 | 744 | 744 | 751 | 765 | 779 | 779 | |
| | .08 | $ 786 | 793 | 799 | 806 | 813 | 820 | 827 | 827 | 834 | 848 | 862 | 862 | |
| | .09 | $ 876 | 883 | 890 | 897 | 904 | 911 | 918 | 918 | 925 | 939 | 952 | 952 | BALANCE POINT 9 DEG.F. |
| | .10 | $ 966 | 973 | 980 | 987 | 994 | 1001 | 1008 | 1008 | 1015 | 1029 | 1043 | 1043 | |
| | .12 | $ 1140 | 1147 | 1154 | 1161 | 1168 | 1175 | 1182 | 1182 | 1189 | 1203 | 1217 | 1217 | |
| 35,000 | | $ 751 | 813 | 876 | 939 | 1001 | 1064 | 1126 | 1189 | 1252 | 1377 | 1502 | 1502 | <--THEORETICAL HEATING COST @ FURNACE ONLY |
| | .03 | $ 403 | 417 | 424 | 431 | 445 | 452 | 459 | 473 | 479 | 500 | 514 | 514 | THEORETICAL HEATING COST @ FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 500 | 514 | 521 | 528 | 542 | 549 | 556 | 570 | 577 | 598 | 612 | 612 | |
| | .05 | $ 598 | 612 | 619 | 626 | 639 | 646 | 653 | 667 | 674 | 695 | 709 | 709 | |
| | .06 | $ 695 | 709 | 716 | 723 | 737 | 744 | 751 | 765 | 772 | 793 | 806 | 806 | |
| | .07 | $ 793 | 806 | 813 | 820 | 834 | 841 | 848 | 862 | 869 | 890 | 904 | 904 | |
| | .08 | $ 890 | 904 | 911 | 918 | 932 | 939 | 946 | 959 | 966 | 987 | 1001 | 1001 | BALANCE POINT 13 DEG.F. |
| | .09 | $ 987 | 1001 | 1008 | 1015 | 1029 | 1036 | 1043 | 1057 | 1064 | 1085 | 1099 | 1099 | |
| | .10 | $ 1085 | 1099 | 1106 | 1112 | 1126 | 1133 | 1140 | 1154 | 1161 | 1182 | 1196 | 1196 | |
| | .12 | $ 1279 | 1293 | 1300 | 1307 | 1321 | 1328 | 1335 | 1349 | 1356 | 1377 | 1391 | 1391 | |
| 40,000 | | $ 855 | 925 | 1001 | 1071 | 1140 | 1210 | 1286 | 1356 | 1426 | 1572 | 1718 | 1718 | <--THEORETICAL HEATING COST @ FURNACE ONLY |
| | .03 | $ 473 | 486 | 493 | 507 | 521 | 535 | 549 | 556 | 570 | 598 | 626 | 626 | THEORETICAL HEATING COST @ FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 577 | 591 | 598 | 612 | 626 | 639 | 653 | 660 | 674 | 702 | 730 | 730 | |
| | .05 | $ 681 | 695 | 702 | 716 | 730 | 744 | 758 | 765 | 779 | 806 | 834 | 834 | |
| | .06 | $ 786 | 799 | 806 | 820 | 834 | 848 | 862 | 869 | 883 | 911 | 939 | 939 | |
| | .07 | $ 890 | 904 | 911 | 925 | 939 | 952 | 966 | 973 | 987 | 1015 | 1043 | 1043 | |
| | .08 | $ 1001 | 1015 | 1022 | 1036 | 1050 | 1064 | 1078 | 1085 | 1099 | 1126 | 1154 | 1154 | BALANCE POINT 16 DEG.F. |
| | .09 | $ 1106 | 1119 | 1126 | 1140 | 1154 | 1168 | 1182 | 1189 | 1203 | 1231 | 1259 | 1259 | |
| | .10 | $ 1210 | 1224 | 1231 | 1245 | 1259 | 1272 | 1286 | 1293 | 1307 | 1335 | 1363 | 1363 | |
| | .12 | $ 1419 | 1432 | 1439 | 1453 | 1467 | 1481 | 1495 | 1502 | 1516 | 1544 | 1572 | 1572 | |
| 50,000 | | $ 1071 | 1161 | 1252 | 1335 | 1426 | 1516 | 1606 | 1697 | 1787 | 1968 | 2142 | 2142 | <--THEORETICAL HEATING COST @ FURNACE ONLY |
| | .03 | $ 605 | 626 | 646 | 667 | 688 | 709 | 730 | 751 | 772 | 813 | 855 | 855 | THEORETICAL HEATING COST @ FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 723 | 744 | 765 | 786 | 806 | 827 | 848 | 869 | 890 | 932 | 973 | 973 | |
| | .05 | $ 841 | 862 | 883 | 904 | 925 | 946 | 966 | 987 | 1008 | 1050 | 1092 | 1092 | |
| | .06 | $ 959 | 980 | 1001 | 1022 | 1043 | 1064 | 1085 | 1106 | 1126 | 1168 | 1210 | 1210 | |
| | .07 | $ 1078 | 1099 | 1119 | 1140 | 1161 | 1182 | 1203 | 1224 | 1245 | 1286 | 1328 | 1328 | |
| | .08 | $ 1203 | 1224 | 1245 | 1266 | 1286 | 1307 | 1328 | 1349 | 1370 | 1412 | 1453 | 1453 | BALANCE POINT 22 DEG.F. |
| | .09 | $ 1321 | 1342 | 1363 | 1384 | 1405 | 1426 | 1446 | 1467 | 1488 | 1530 | 1572 | 1572 | |
| | .10 | $ 1439 | 1460 | 1481 | 1502 | 1523 | 1544 | 1565 | 1586 | 1606 | 1648 | 1690 | 1690 | |
| | .12 | $ 1676 | 1697 | 1718 | 1739 | 1759 | 1780 | 1801 | 1822 | 1843 | 1885 | 1926 | 1926 | |
| 60,000 | | $ 1286 | 1391 | 1502 | 1606 | 1718 | 1822 | 1926 | 2038 | 2142 | 2358 | 2573 | 2573 | <--THEORETICAL HEATING COST @ FURNACE ONLY |
| | .03 | $ 758 | 793 | 820 | 855 | 883 | 918 | 946 | 980 | 1008 | 1071 | 1133 | 1133 | THEORETICAL HEATING COST @ FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 890 | 925 | 952 | 987 | 1015 | 1050 | 1078 | 1112 | 1140 | 1203 | 1266 | 1266 | |
| | .05 | $ 1015 | 1050 | 1078 | 1112 | 1140 | 1175 | 1203 | 1238 | 1266 | 1328 | 1391 | 1391 | |
| | .06 | $ 1140 | 1175 | 1203 | 1238 | 1266 | 1300 | 1328 | 1363 | 1391 | 1453 | 1516 | 1516 | |
| | .07 | $ 1272 | 1307 | 1335 | 1370 | 1398 | 1432 | 1460 | 1495 | 1523 | 1586 | 1648 | 1648 | |
| | .08 | $ 1398 | 1432 | 1460 | 1495 | 1523 | 1558 | 1586 | 1620 | 1648 | 1711 | 1773 | 1773 | BALANCE POINT 27 DEG.F. |
| | .09 | $ 1530 | 1565 | 1592 | 1627 | 1655 | 1690 | 1718 | 1752 | 1780 | 1843 | 1905 | 1905 | |
| | .10 | $ 1655 | 1690 | 1718 | 1752 | 1780 | 1815 | 1843 | 1878 | 1905 | 1968 | 2031 | 2031 | |
| | .12 | $ 1912 | 1947 | 1975 | 2010 | 2038 | 2072 | 2100 | 2135 | 2163 | 2225 | 2288 | 2288 | |
| 70,000 | | $ 1502 | 1627 | 1752 | 1878 | 2003 | 2128 | 2253 | 2379 | 2504 | 2754 | 3005 | 3005 | <--THEORETICAL HEATING COST @ FURNACE ONLY |
| | .03 | $ 932 | 973 | 1015 | 1064 | 1106 | 1147 | 1196 | 1238 | 1279 | 1370 | 1453 | 1453 | THEORETICAL HEATING COST @ FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 1064 | 1106 | 1147 | 1196 | 1238 | 1279 | 1328 | 1370 | 1412 | 1502 | 1586 | 1586 | |
| | .05 | $ 1203 | 1245 | 1286 | 1335 | 1377 | 1419 | 1467 | 1509 | 1551 | 1641 | 1725 | 1725 | |
| | .06 | $ 1335 | 1377 | 1419 | 1467 | 1509 | 1551 | 1599 | 1641 | 1683 | 1773 | 1857 | 1857 | |
| | .07 | $ 1467 | 1509 | 1551 | 1599 | 1641 | 1683 | 1732 | 1773 | 1815 | 1905 | 1989 | 1989 | |
| | .08 | $ 1606 | 1648 | 1690 | 1739 | 1780 | 1822 | 1871 | 1912 | 1954 | 2045 | 2128 | 2128 | |
| | .09 | $ 1739 | 1780 | 1822 | 1871 | 1912 | 1954 | 2003 | 2045 | 2086 | 2177 | 2260 | 2260 | BALANCE POINT 31 DEG.F. |
| | .10 | $ 1871 | 1912 | 1954 | 2003 | 2045 | 2086 | 2135 | 2177 | 2219 | 2309 | 2392 | 2392 | |
| | .12 | $ 2142 | 2184 | 2225 | 2274 | 2316 | 2358 | 2406 | 2448 | 2490 | 2580 | 2664 | 2664 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| <--ELECTRIC RATE $/KWH | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 |
|---|---|---|---|---|---|---|---|---|---|
| <--THEORETICAL AIR CONDITIONING COST | $ 42 | 56 | 70 | 85 | 99 | 113 | 127 | 141 | 170 |

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5

HEAT PUMP MODEL: OUTDOOR 36HPQ4 INDOOR H3AQ DR H3AQ1

ARI RATED COOLING CAP.: BTUH (95 ) 36600, SEER 7.50

ARI RATED HEATING CAP.: BTUH (47 ) 40500, COP(47 ) 2.65, HSPF 6.40 MIN.OHR REG IV

BTUH (17 ) 24800, COP(17 ) 1.95

FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | HEAT PUMP WITH ELECTRIC HEAT | ELECTRIC HEAT ONLY | |
|---|---|---|---|---|
| 40,000 | | --- THEORETICAL ANNUAL HEATING COST --- | | |
| | .03 | $ 445 | 744 | |
| | .04 | $ 591 | 987 | |
| | .05 | $ 737 | 1238 | |
| | .06 | $ 883 | 1488 | |
| | .07 | $ 1036 | 1732 | |
| | .08 | $ 1175 | 1982 | |
| | .09 | $ 1328 | 2232 | |
| | .10 | $ 1474 | 2476 | BALANCE POINT 11 DEG.F. |
| | .12 | $ 1766 | 2977 | |
| 50,000 | | --- THEORETICAL ANNUAL HEATING COST --- | | |
| | .03 | $ 556 | 925 | |
| | .04 | $ 744 | 1238 | |
| | .05 | $ 925 | 1544 | |
| | .06 | $ 1106 | 1857 | |
| | .07 | $ 1293 | 2170 | |
| | .08 | $ 1481 | 2476 | |
| | .09 | $ 1669 | 2789 | |
| | .10 | $ 1850 | 3095 | BALANCE POINT 16 DEG.F. |
| | .12 | $ 2225 | 3721 | |
| 60,000 | | --- THEORETICAL ANNUAL HEATING COST --- | | |
| | .03 | $ 674 | 1112 | |
| | .04 | $ 904 | 1488 | |
| | .05 | $ 1126 | 1857 | |
| | .06 | $ 1349 | 2232 | |
| | .07 | $ 1579 | 2601 | |
| | .08 | $ 1801 | 2977 | |
| | .09 | $ 2031 | 3345 | |
| | .10 | $ 2253 | 3721 | BALANCE POINT 22 DEG.F. |
| | .12 | $ 2705 | 4465 | |
| 70,000 | | --- THEORETICAL ANNUAL HEATING COST --- | | |
| | .03 | $ 806 | 1300 | |
| | .04 | $ 1078 | 1732 | |
| | .05 | $ 1342 | 2170 | |
| | .06 | $ 1613 | 2601 | |
| | .07 | $ 1885 | 3039 | |
| | .08 | $ 2156 | 3471 | |
| | .09 | $ 2420 | 3902 | |
| | .10 | $ 2685 | 4340 | BALANCE POINT 26 DEG.F. |
| | .12 | $ 3227 | 5210 | |
| 80,000 | | --- THEORETICAL ANNUAL HEATING COST --- | | |
| | .03 | $ 952 | 1488 | |
| | .04 | $ 1259 | 1982 | |
| | .05 | $ 1579 | 2476 | |
| | .06 | $ 1892 | 2977 | |
| | .07 | $ 2212 | 3471 | |
| | .08 | $ 2525 | 3965 | |
| | .09 | $ 2845 | 4465 | |
| | .10 | $ 3165 | 4959 | BALANCE POINT 29 DEG.F. |
| | .12 | $ 3791 | 5954 | |
| 90,000 | | --- THEORETICAL ANNUAL HEATING COST --- | | |
| | .03 | $ 1092 | 1669 | |
| | .04 | $ 1453 | 2232 | |
| | .05 | $ 1822 | 2789 | |
| | .06 | $ 2184 | 3345 | |
| | .07 | $ 2552 | 3902 | |
| | .08 | $ 2921 | 4465 | |
| | .09 | $ 3283 | 5022 | |
| | .10 | $ 3645 | 5578 | BALANCE POINT 32 DEG.F. |
| | .12 | $ 4375 | 6698 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | <--ELECTRIC RATE $/KWH |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 58 | 78 | 97 | 117 | 136 | 156 | 175 | 195 | 234 | <--THEORETICAL AIR CONDITIONING COST |

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: OUTDOOR 36HP04 INDOOR H3A0/H3A0L
ARI RATED COOLING CAP.: BTUH (95 ) 36600. SEER 13.50
ARI RATED HEATING CAP.: BTUH (47 ) 40200. COP(47 ) 2.85. HSPF 8.40 MIN.OHR REG IV
BTUH (17 ) 24800. COP(17 ) 1.95
FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY 65.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | | NATURAL GAS COST - $/THERM .35 | .40 | .45 | .50 | .55 | .60 | .65 | .70 | .75 | .80 | .90 | 1.00 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40,000 | | $ | 452 | 514 | 584 | 646 | 716 | 779 | 841 | 911 | 973 | 1036 | 1168 | 1300 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 403 | 417 | 431 | 445 | 459 | 473 | 486 | 500 | 514 | 535 | 563 | 591 | \| |
| | .04 | $ | 507 | 521 | 535 | 549 | 563 | 577 | 591 | 605 | 619 | 639 | 667 | 695 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUM |
| | .05 | $ | 605 | 619 | 633 | 646 | 660 | 674 | 688 | 702 | 716 | 737 | 765 | 793 | \| $ PER YEAR |
| | .06 | $ | 709 | 723 | 737 | 751 | 765 | 779 | 793 | 806 | 820 | 841 | 869 | 897 | \| |
| | .07 | $ | 806 | 820 | 834 | 848 | 862 | 876 | 890 | 904 | 918 | 939 | 966 | 994 | \| |
| | .08 | $ | 911 | 925 | 939 | 952 | 966 | 980 | 994 | 1008 | 1022 | 1043 | 1071 | 1099 | \| |
| | .09 | $ | 1008 | 1022 | 1036 | 1050 | 1064 | 1078 | 1092 | 1106 | 1119 | 1140 | 1168 | 1196 | \| |
| | .10 | $ | 1112 | 1126 | 1140 | 1154 | 1168 | 1182 | 1196 | 1210 | 1224 | 1245 | 1272 | 1300 | \| BALANCE POINT 11 DEG.F. |
| | .12 | $ | 1314 | 1328 | 1342 | 1356 | 1370 | 1384 | 1398 | 1412 | 1426 | 1446 | 1474 | 1502 | \| |
| 50,000 | | $ | 563 | 646 | 730 | 813 | 890 | 973 | 1057 | 1133 | 1217 | 1300 | 1460 | 1627 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 500 | 528 | 549 | 577 | 605 | 626 | 653 | 674 | 702 | 730 | 779 | 827 | \| |
| | .04 | $ | 605 | 633 | 653 | 681 | 709 | 730 | 758 | 779 | 806 | 834 | 883 | 932 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUM |
| | .05 | $ | 716 | 744 | 765 | 793 | 820 | 841 | 869 | 890 | 918 | 946 | 994 | 1043 | \| $ PER YEAR |
| | .06 | $ | 820 | 848 | 869 | 897 | 925 | 946 | 973 | 994 | 1022 | 1050 | 1099 | 1147 | \| |
| | .07 | $ | 932 | 959 | 980 | 1008 | 1036 | 1057 | 1085 | 1106 | 1133 | 1161 | 1210 | 1259 | \| |
| | .08 | $ | 1036 | 1064 | 1085 | 1112 | 1140 | 1161 | 1189 | 1210 | 1238 | 1266 | 1314 | 1363 | \| |
| | .09 | $ | 1147 | 1175 | 1196 | 1224 | 1252 | 1272 | 1300 | 1321 | 1349 | 1377 | 1426 | 1474 | \| |
| | .10 | $ | 1252 | 1279 | 1300 | 1328 | 1356 | 1377 | 1405 | 1426 | 1453 | 1481 | 1530 | 1579 | \| BALANCE POINT 16 DEG.F. |
| | .12 | $ | 1467 | 1495 | 1516 | 1544 | 1572 | 1592 | 1620 | 1641 | 1669 | 1697 | 1745 | 1794 | \| |
| 60,000 | | $ | 681 | 779 | 876 | 973 | 1071 | 1168 | 1266 | 1363 | 1460 | 1558 | 1752 | 1947 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 619 | 667 | 716 | 765 | 813 | 862 | 911 | 959 | 1008 | 1057 | 1154 | 1259 | \| |
| | .04 | $ | 709 | 758 | 806 | 855 | 904 | 952 | 1001 | 1050 | 1099 | 1147 | 1245 | 1349 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUM |
| | .05 | $ | 799 | 848 | 897 | 946 | 994 | 1043 | 1092 | 1140 | 1189 | 1238 | 1335 | 1439 | \| $ PER YEAR |
| | .06 | $ | 890 | 939 | 987 | 1036 | 1085 | 1133 | 1182 | 1231 | 1279 | 1328 | 1426 | 1530 | \| |
| | .07 | $ | 980 | 1029 | 1078 | 1126 | 1175 | 1224 | 1272 | 1321 | 1370 | 1419 | 1516 | 1620 | \| |
| | .08 | $ | 1071 | 1119 | 1168 | 1217 | 1266 | 1314 | 1363 | 1412 | 1460 | 1509 | 1606 | 1711 | \| |
| | .09 | $ | 1161 | 1210 | 1259 | 1307 | 1356 | 1405 | 1453 | 1502 | 1551 | 1599 | 1697 | 1801 | \| |
| | .10 | $ | 1252 | 1300 | 1349 | 1398 | 1446 | 1495 | 1544 | 1592 | 1641 | 1690 | 1787 | 1892 | \| BALANCE POINT 22 DEG.F. |
| | .12 | $ | 1432 | 1481 | 1530 | 1579 | 1627 | 1676 | 1725 | 1773 | 1822 | 1871 | 1968 | 2072 | \| |
| 70,000 | | $ | 793 | 911 | 1022 | 1133 | 1252 | 1363 | 1481 | 1592 | 1704 | 1822 | 2052 | 2274 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 709 | 765 | 820 | 883 | 939 | 994 | 1050 | 1112 | 1168 | 1224 | 1342 | 1453 | \| |
| | .04 | $ | 813 | 869 | 925 | 987 | 1043 | 1099 | 1154 | 1217 | 1272 | 1328 | 1446 | 1558 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUM |
| | .05 | $ | 918 | 973 | 1029 | 1092 | 1147 | 1203 | 1259 | 1321 | 1377 | 1432 | 1551 | 1662 | \| $ PER YEAR |
| | .06 | $ | 1022 | 1078 | 1133 | 1196 | 1252 | 1307 | 1363 | 1426 | 1481 | 1537 | 1655 | 1766 | \| |
| | .07 | $ | 1119 | 1175 | 1231 | 1293 | 1349 | 1405 | 1460 | 1523 | 1579 | 1634 | 1752 | 1864 | \| |
| | .08 | $ | 1224 | 1279 | 1335 | 1398 | 1453 | 1509 | 1565 | 1627 | 1683 | 1739 | 1857 | 1968 | \| |
| | .09 | $ | 1328 | 1384 | 1439 | 1502 | 1558 | 1613 | 1669 | 1732 | 1787 | 1843 | 1961 | 2072 | \| |
| | .10 | $ | 1432 | 1488 | 1544 | 1606 | 1662 | 1718 | 1773 | 1836 | 1892 | 1947 | 2065 | 2177 | \| BALANCE POINT 26 DEG.F. |
| | .12 | $ | 1634 | 1690 | 1745 | 1808 | 1864 | 1919 | 1975 | 2038 | 2093 | 2149 | 2267 | 2379 | \| |
| 80,000 | | $ | 911 | 1036 | 1168 | 1300 | 1432 | 1558 | 1690 | 1822 | 1947 | 2079 | 2344 | 2601 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 834 | 918 | 994 | 1078 | 1161 | 1238 | 1321 | 1405 | 1481 | 1565 | 1732 | 1892 | \| |
| | .04 | $ | 918 | 1001 | 1078 | 1161 | 1245 | 1321 | 1405 | 1488 | 1565 | 1648 | 1815 | 1975 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUM |
| | .05 | $ | 1008 | 1092 | 1168 | 1252 | 1335 | 1412 | 1495 | 1579 | 1655 | 1739 | 1905 | 2065 | \| $ PER YEAR |
| | .06 | $ | 1092 | 1175 | 1252 | 1335 | 1419 | 1495 | 1579 | 1662 | 1739 | 1822 | 1989 | 2149 | \| |
| | .07 | $ | 1182 | 1266 | 1342 | 1426 | 1509 | 1586 | 1669 | 1752 | 1829 | 1912 | 2079 | 2239 | \| |
| | .08 | $ | 1266 | 1349 | 1426 | 1509 | 1592 | 1669 | 1752 | 1836 | 1912 | 1996 | 2163 | 2323 | \| |
| | .09 | $ | 1356 | 1439 | 1516 | 1599 | 1683 | 1759 | 1843 | 1926 | 2003 | 2086 | 2253 | 2413 | \| |
| | .10 | $ | 1439 | 1523 | 1599 | 1683 | 1766 | 1843 | 1926 | 2010 | 2086 | 2170 | 2337 | 2497 | \| BALANCE POINT 29 DEG.F. |
| | .12 | $ | 1613 | 1697 | 1773 | 1857 | 1940 | 2017 | 2100 | 2184 | 2260 | 2344 | 2511 | 2671 | \| |
| 90,000 | | $ | 1022 | 1168 | 1314 | 1460 | 1606 | 1752 | 1899 | 2052 | 2198 | 2344 | 2636 | 2928 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ | 959 | 1064 | 1175 | 1286 | 1391 | 1502 | 1606 | 1718 | 1822 | 1933 | 2149 | 2365 | \| |
| | .04 | $ | 1029 | 1133 | 1245 | 1356 | 1460 | 1572 | 1676 | 1787 | 1892 | 2003 | 2219 | 2434 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUM |
| | .05 | $ | 1092 | 1196 | 1307 | 1419 | 1523 | 1634 | 1739 | 1850 | 1954 | 2065 | 2281 | 2497 | \| $ PER YEAR |
| | .06 | $ | 1161 | 1266 | 1377 | 1488 | 1592 | 1704 | 1808 | 1919 | 2024 | 2135 | 2351 | 2566 | \| |
| | .07 | $ | 1231 | 1335 | 1446 | 1558 | 1662 | 1773 | 1878 | 1989 | 2093 | 2205 | 2420 | 2636 | \| |
| | .08 | $ | 1293 | 1398 | 1509 | 1620 | 1725 | 1836 | 1940 | 2052 | 2156 | 2267 | 2483 | 2698 | \| |
| | .09 | $ | 1363 | 1467 | 1579 | 1690 | 1794 | 1905 | 2010 | 2121 | 2225 | 2337 | 2552 | 2768 | \| |
| | .10 | $ | 1432 | 1537 | 1648 | 1759 | 1864 | 1975 | 2079 | 2191 | 2295 | 2406 | 2622 | 2838 | \| BALANCE POINT 32 DEG.F. |
| | .12 | $ | 1565 | 1669 | 1780 | 1892 | 1996 | 2107 | 2212 | 2323 | 2427 | 2539 | 2754 | 2970 | \| |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 58 | 78 | 97 | 117 | 136 | 156 | 175 | 195 | 234 | <--THEORETICAL AIR CONDITIONING COST |



THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: OUTDOOR 36HPQ4 INDOOR H36Q/H36Q1
ARI RATED COOLING CAP.: BTUH (95 ) 36000, SEER 7.50
ARI RATED HEATING CAP.: BTUH (47 ) 40500, COP(47 ) 2.65, HSPF 6.60 MIN.DHR REG IV
BTUH (17 ) 24800, COP(17 ) 1.95
FURNACE TYPE FUEL OIL FURNACE EFFICIENCY 65.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | HEATING OIL COST - $/GALLON 1.00 | 1.10 | 1.20 | 1.30 | 1.40 | 1.50 | 1.60 | 1.70 | 1.80 | 2.00 | 2.20 | 2.40 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40,000 | | $ 939 | 1029 | 1126 | 1217 | 1314 | 1405 | 1502 | 1592 | 1690 | 1878 | 2065 | 2253 | <--THEORETICAL HEATING COST = FURNACE ONLY |
| | .03 | $ 473 | 486 | 500 | 514 | 521 | 535 | 549 | 563 | 577 | 605 | 633 | 653 | \| |
| | .04 | $ 584 | 598 | 612 | 626 | 633 | 646 | 660 | 674 | 688 | 716 | 744 | 765 | \|THEORETICAL HEATING COST = FURN.+ HEAT PUMP |
| | .05 | $ 702 | 716 | 730 | 744 | 751 | 765 | 779 | 793 | 806 | 834 | 862 | 883 | \| $ PER YEAR |
| | .06 | $ 813 | 827 | 841 | 855 | 862 | 876 | 890 | 904 | 918 | 946 | 973 | 994 | \| |
| | .07 | $ 932 | 946 | 959 | 973 | 980 | 994 | 1008 | 1022 | 1036 | 1064 | 1092 | 1112 | \| |
| | .08 | $ 1043 | 1057 | 1071 | 1085 | 1092 | 1106 | 1119 | 1133 | 1147 | 1175 | 1203 | 1224 | \| |
| | .09 | $ 1154 | 1168 | 1182 | 1196 | 1203 | 1217 | 1231 | 1245 | 1259 | 1286 | 1314 | 1335 | \| |
| | .10 | $ 1272 | 1286 | 1300 | 1314 | 1321 | 1335 | 1349 | 1363 | 1377 | 1405 | 1432 | 1453 | \| BALANCE POINT 11 DEG.F. |
| | .12 | $ 1495 | 1509 | 1523 | 1537 | 1544 | 1558 | 1572 | 1586 | 1599 | 1627 | 1655 | 1676 | \| |
| 50,000 | | $ 1168 | 1286 | 1405 | 1523 | 1641 | 1759 | 1878 | 1996 | 2107 | 2344 | 2580 | 2817 | <--THEORETICAL HEATING COST = FURNACE ONLY |
| | .03 | $ 605 | 626 | 646 | 667 | 688 | 709 | 730 | 751 | 772 | 820 | 862 | 904 | \| |
| | .04 | $ 737 | 758 | 779 | 799 | 820 | 841 | 862 | 883 | 904 | 952 | 994 | 1036 | \|THEORETICAL HEATING COST = FURN.+ HEAT PUMP |
| | .05 | $ 869 | 890 | 911 | 932 | 952 | 973 | 994 | 1015 | 1036 | 1085 | 1126 | 1168 | \| $ PER YEAR |
| | .06 | $ 1001 | 1022 | 1043 | 1064 | 1085 | 1106 | 1126 | 1147 | 1168 | 1217 | 1259 | 1300 | \| |
| | .07 | $ 1133 | 1154 | 1175 | 1196 | 1217 | 1238 | 1259 | 1279 | 1300 | 1349 | 1391 | 1432 | \| |
| | .08 | $ 1266 | 1286 | 1307 | 1328 | 1349 | 1370 | 1391 | 1412 | 1432 | 1481 | 1523 | 1565 | \| |
| | .09 | $ 1391 | 1412 | 1432 | 1453 | 1474 | 1495 | 1516 | 1537 | 1558 | 1606 | 1648 | 1690 | \| |
| | .10 | $ 1523 | 1544 | 1565 | 1586 | 1606 | 1627 | 1648 | 1669 | 1690 | 1739 | 1780 | 1822 | \| BALANCE POINT 16 DEG.F. |
| | .12 | $ 1787 | 1808 | 1829 | 1850 | 1871 | 1892 | 1912 | 1933 | 1954 | 2003 | 2045 | 2086 | \| |
| 60,000 | | $ 1405 | 1544 | 1690 | 1829 | 1968 | 2107 | 2253 | 2392 | 2532 | 2817 | 3095 | 3380 | <--THEORETICAL HEATING COST = FURNACE ONLY |
| | .03 | $ 751 | 786 | 813 | 848 | 876 | 911 | 946 | 973 | 1008 | 1071 | 1133 | 1203 | \| |
| | .04 | $ 897 | 932 | 959 | 994 | 1022 | 1057 | 1092 | 1119 | 1154 | 1217 | 1279 | 1349 | \|THEORETICAL HEATING COST = FURN.+ HEAT PUMP |
| | .05 | $ 1043 | 1078 | 1106 | 1140 | 1168 | 1203 | 1238 | 1266 | 1300 | 1363 | 1426 | 1495 | \| $ PER YEAR |
| | .06 | $ 1189 | 1224 | 1252 | 1286 | 1314 | 1349 | 1384 | 1412 | 1446 | 1509 | 1572 | 1641 | \| |
| | .07 | $ 1335 | 1370 | 1398 | 1432 | 1460 | 1495 | 1530 | 1558 | 1592 | 1655 | 1718 | 1787 | \| |
| | .08 | $ 1474 | 1509 | 1537 | 1572 | 1599 | 1634 | 1669 | 1697 | 1732 | 1794 | 1857 | 1926 | \| |
| | .09 | $ 1620 | 1655 | 1683 | 1718 | 1745 | 1780 | 1815 | 1843 | 1878 | 1940 | 2003 | 2072 | \| |
| | .10 | $ 1766 | 1801 | 1829 | 1864 | 1892 | 1926 | 1961 | 1989 | 2024 | 2086 | 2149 | 2219 | \| BALANCE POINT 22 DEG.F. |
| | .12 | $ 2052 | 2086 | 2114 | 2149 | 2177 | 2212 | 2246 | 2274 | 2309 | 2372 | 2434 | 2504 | \| |
| 70,000 | | $ 1641 | 1801 | 1968 | 2135 | 2295 | 2462 | 2629 | 2789 | 2956 | 3283 | 3610 | 3944 | <--THEORETICAL HEATING COST = FURNACE ONLY |
| | .03 | $ 918 | 966 | 1015 | 1057 | 1106 | 1147 | 1196 | 1238 | 1286 | 1377 | 1467 | 1558 | \| |
| | .04 | $ 1071 | 1119 | 1168 | 1210 | 1259 | 1300 | 1349 | 1391 | 1439 | 1530 | 1620 | 1711 | \|THEORETICAL HEATING COST = FURN.+ HEAT PUMP |
| | .05 | $ 1224 | 1272 | 1321 | 1363 | 1412 | 1453 | 1502 | 1544 | 1592 | 1683 | 1773 | 1864 | \| $ PER YEAR |
| | .06 | $ 1384 | 1432 | 1481 | 1523 | 1572 | 1613 | 1662 | 1704 | 1752 | 1843 | 1933 | 2024 | \| |
| | .07 | $ 1537 | 1586 | 1634 | 1676 | 1725 | 1766 | 1815 | 1857 | 1905 | 1996 | 2086 | 2177 | \| |
| | .08 | $ 1690 | 1739 | 1787 | 1829 | 1878 | 1919 | 1968 | 2010 | 2059 | 2149 | 2239 | 2330 | \| |
| | .09 | $ 1843 | 1892 | 1940 | 1982 | 2031 | 2072 | 2121 | 2163 | 2212 | 2302 | 2392 | 2483 | \| |
| | .10 | $ 2003 | 2052 | 2100 | 2142 | 2191 | 2232 | 2281 | 2323 | 2372 | 2462 | 2552 | 2643 | \| BALANCE POINT 26 DEG.F. |
| | .12 | $ 2309 | 2358 | 2406 | 2448 | 2497 | 2539 | 2587 | 2629 | 2678 | 2768 | 2858 | 2949 | \| |
| 80,000 | | $ 1878 | 2065 | 2253 | 2441 | 2629 | 2817 | 3005 | 3192 | 3380 | 3756 | 4131 | 4507 | <--THEORETICAL HEATING COST = FURNACE ONLY |
| | .03 | $ 1099 | 1161 | 1224 | 1286 | 1342 | 1405 | 1467 | 1530 | 1592 | 1711 | 1836 | 1954 | \| |
| | .04 | $ 1259 | 1321 | 1384 | 1446 | 1502 | 1565 | 1627 | 1690 | 1752 | 1871 | 1996 | 2114 | \|THEORETICAL HEATING COST = FURN.+ HEAT PUMP |
| | .05 | $ 1426 | 1488 | 1551 | 1613 | 1669 | 1732 | 1794 | 1857 | 1919 | 2038 | 2163 | 2281 | \| $ PER YEAR |
| | .06 | $ 1586 | 1648 | 1711 | 1773 | 1829 | 1892 | 1954 | 2017 | 2079 | 2198 | 2323 | 2441 | \| |
| | .07 | $ 1745 | 1808 | 1871 | 1933 | 1989 | 2052 | 2114 | 2177 | 2239 | 2358 | 2483 | 2601 | \| |
| | .08 | $ 1912 | 1975 | 2038 | 2100 | 2156 | 2219 | 2281 | 2344 | 2406 | 2525 | 2650 | 2768 | \| |
| | .09 | $ 2072 | 2135 | 2198 | 2260 | 2316 | 2379 | 2441 | 2504 | 2566 | 2685 | 2810 | 2928 | \| |
| | .10 | $ 2239 | 2302 | 2365 | 2427 | 2483 | 2545 | 2608 | 2671 | 2733 | 2852 | 2977 | 3095 | \| BALANCE POINT 29 DEG.F. |
| | .12 | $ 2559 | 2622 | 2685 | 2747 | 2803 | 2865 | 2928 | 2991 | 3053 | 3172 | 3297 | 3415 | \| |
| 90,000 | | $ 2107 | 2323 | 2532 | 2747 | 2956 | 3165 | 3380 | 3589 | 3798 | 4222 | 4646 | 5071 | <--THEORETICAL HEATING COST = FURNACE ONLY |
| | .03 | $ 1286 | 1363 | 1446 | 1523 | 1599 | 1676 | 1752 | 1836 | 1912 | 2065 | 2225 | 2379 | \| |
| | .04 | $ 1453 | 1530 | 1613 | 1690 | 1766 | 1843 | 1919 | 2003 | 2079 | 2232 | 2392 | 2545 | \|THEORETICAL HEATING COST = FURN.+ HEAT PUMP |
| | .05 | $ 1620 | 1697 | 1780 | 1857 | 1933 | 2010 | 2086 | 2170 | 2246 | 2399 | 2559 | 2712 | \| $ PER YEAR |
| | .06 | $ 1794 | 1871 | 1954 | 2031 | 2107 | 2184 | 2260 | 2344 | 2420 | 2573 | 2733 | 2886 | \| |
| | .07 | $ 1961 | 2038 | 2121 | 2198 | 2274 | 2351 | 2427 | 2511 | 2587 | 2740 | 2900 | 3053 | \| |
| | .08 | $ 2128 | 2205 | 2288 | 2365 | 2441 | 2518 | 2594 | 2678 | 2754 | 2907 | 3067 | 3220 | \| |
| | .09 | $ 2302 | 2379 | 2462 | 2539 | 2615 | 2692 | 2768 | 2852 | 2928 | 3081 | 3241 | 3394 | \| |
| | .10 | $ 2469 | 2545 | 2629 | 2705 | 2782 | 2858 | 2935 | 3018 | 3095 | 3248 | 3408 | 3561 | \| BALANCE POINT 32 DEG.F. |
| | .12 | $ 2803 | 2879 | 2963 | 3039 | 3116 | 3192 | 3269 | 3352 | 3429 | 3582 | 3742 | 3895 | \| |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|
| $ 58 | 78 | 97 | 117 | 136 | 156 | 175 | 195 | 234 | <--THEORETICAL AIR CONDITIONING COST |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5

HEAT PUMP MODEL: OUTDOOR 36HP24 INDOOR H3AQ/H3AQL

ARI RATED COOLING CAP.: BTUH (95 ) 36000 SEER 1.50

ARI RATED HEATING CAP.: BTUH (47 ) 40200 COP(47 ) 2.65 HSPF 9.40 MIN.OHR REG IV

BTUH (17 ) 24800 COP(17 ) 1.95

FURNACE TYPE PROPANE GAS FURNACE EFFICIENCY 65.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | PROPANE GAS COST - $/GALLON .60 | .65 | .70 | .75 | .80 | .85 | .90 | .95 | 1.00 | 1.10 | 1.20 | 1.20 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40,000 | | $ 855 | 925 | 1001 | 1071 | 1140 | 1210 | 1286 | 1356 | 1426 | 1572 | 1718 | 1718 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 459 | 473 | 479 | 493 | 500 | 514 | 521 | 528 | 542 | 563 | 584 | 584 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ 570 | 584 | 591 | 605 | 612 | 626 | 633 | 639 | 653 | 674 | 695 | 695 | |
| | .05 | $ 688 | 702 | 709 | 723 | 730 | 744 | 751 | 758 | 772 | 793 | 813 | 813 | |
| | .06 | $ 799 | 813 | 820 | 834 | 841 | 855 | 862 | 869 | 883 | 904 | 925 | 925 | |
| | .07 | $ 918 | 932 | 939 | 952 | 959 | 973 | 980 | 987 | 1001 | 1022 | 1043 | 1043 | |
| | .08 | $ 1029 | 1043 | 1050 | 1064 | 1071 | 1085 | 1092 | 1099 | 1112 | 1133 | 1154 | 1154 | |
| | .09 | $ 1140 | 1154 | 1161 | 1175 | 1182 | 1196 | 1203 | 1210 | 1224 | 1245 | 1266 | 1266 | |
| | .10 | $ 1259 | 1272 | 1279 | 1293 | 1300 | 1314 | 1321 | 1328 | 1342 | 1363 | 1384 | 1384 | BALANCE POINT 11 DEG.F. |
| | .12 | $ 1481 | 1495 | 1502 | 1516 | 1523 | 1537 | 1544 | 1551 | 1565 | 1586 | 1606 | 1606 | |
| 50,000 | | $ 1071 | 1161 | 1252 | 1335 | 1426 | 1516 | 1606 | 1697 | 1787 | 1968 | 2142 | 2142 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 584 | 598 | 619 | 633 | 653 | 667 | 681 | 702 | 716 | 751 | 779 | 779 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ 716 | 730 | 751 | 765 | 786 | 799 | 813 | 834 | 848 | 883 | 911 | 911 | |
| | .05 | $ 848 | 862 | 883 | 897 | 918 | 932 | 946 | 966 | 980 | 1015 | 1043 | 1043 | |
| | .06 | $ 980 | 994 | 1015 | 1029 | 1050 | 1064 | 1078 | 1099 | 1112 | 1147 | 1175 | 1175 | |
| | .07 | $ 1112 | 1126 | 1147 | 1161 | 1182 | 1196 | 1210 | 1231 | 1245 | 1279 | 1307 | 1307 | |
| | .08 | $ 1245 | 1259 | 1279 | 1293 | 1314 | 1328 | 1342 | 1363 | 1377 | 1412 | 1439 | 1439 | |
| | .09 | $ 1370 | 1384 | 1405 | 1419 | 1439 | 1453 | 1467 | 1488 | 1502 | 1537 | 1565 | 1565 | |
| | .10 | $ 1502 | 1516 | 1537 | 1551 | 1572 | 1586 | 1599 | 1620 | 1634 | 1669 | 1697 | 1697 | BALANCE POINT 16 DEG.F. |
| | .12 | $ 1766 | 1780 | 1801 | 1815 | 1836 | 1850 | 1864 | 1885 | 1899 | 1933 | 1961 | 1961 | |
| 60,000 | | $ 1286 | 1391 | 1502 | 1606 | 1718 | 1822 | 1926 | 2038 | 2142 | 2358 | 2573 | 2573 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 723 | 751 | 772 | 799 | 820 | 848 | 869 | 897 | 918 | 966 | 1015 | 1015 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ 869 | 897 | 918 | 946 | 966 | 994 | 1015 | 1043 | 1064 | 1112 | 1161 | 1161 | |
| | .05 | $ 1015 | 1043 | 1064 | 1092 | 1112 | 1140 | 1161 | 1189 | 1210 | 1259 | 1307 | 1307 | |
| | .06 | $ 1161 | 1189 | 1210 | 1238 | 1259 | 1286 | 1307 | 1335 | 1356 | 1405 | 1453 | 1453 | |
| | .07 | $ 1307 | 1335 | 1356 | 1384 | 1405 | 1432 | 1453 | 1481 | 1502 | 1551 | 1599 | 1599 | |
| | .08 | $ 1446 | 1474 | 1495 | 1523 | 1544 | 1572 | 1592 | 1620 | 1641 | 1690 | 1739 | 1739 | |
| | .09 | $ 1592 | 1620 | 1641 | 1669 | 1690 | 1718 | 1739 | 1766 | 1787 | 1836 | 1885 | 1885 | |
| | .10 | $ 1739 | 1766 | 1787 | 1815 | 1836 | 1864 | 1885 | 1912 | 1933 | 1982 | 2031 | 2031 | BALANCE POINT 22 DEG.F. |
| | .12 | $ 2024 | 2052 | 2072 | 2100 | 2121 | 2149 | 2170 | 2198 | 2219 | 2267 | 2316 | 2316 | |
| 70,000 | | $ 1502 | 1627 | 1752 | 1878 | 2003 | 2128 | 2253 | 2379 | 2504 | 2754 | 3005 | 3005 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 883 | 918 | 952 | 987 | 1022 | 1057 | 1092 | 1126 | 1161 | 1231 | 1300 | 1300 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ 1036 | 1071 | 1106 | 1140 | 1175 | 1210 | 1245 | 1279 | 1314 | 1384 | 1453 | 1453 | |
| | .05 | $ 1189 | 1224 | 1259 | 1293 | 1328 | 1363 | 1398 | 1432 | 1467 | 1537 | 1606 | 1606 | |
| | .06 | $ 1349 | 1384 | 1419 | 1453 | 1488 | 1523 | 1558 | 1592 | 1627 | 1697 | 1766 | 1766 | |
| | .07 | $ 1502 | 1537 | 1572 | 1606 | 1641 | 1676 | 1711 | 1745 | 1780 | 1850 | 1919 | 1919 | |
| | .08 | $ 1655 | 1690 | 1725 | 1759 | 1794 | 1829 | 1864 | 1899 | 1933 | 2003 | 2072 | 2072 | |
| | .09 | $ 1808 | 1843 | 1878 | 1912 | 1947 | 1982 | 2017 | 2052 | 2086 | 2156 | 2225 | 2225 | |
| | .10 | $ 1968 | 2003 | 2038 | 2072 | 2107 | 2142 | 2177 | 2212 | 2246 | 2316 | 2385 | 2385 | BALANCE POINT 26 DEG.F. |
| | .12 | $ 2274 | 2309 | 2344 | 2379 | 2413 | 2448 | 2483 | 2518 | 2552 | 2622 | 2692 | 2692 | |
| 80,000 | | $ 1718 | 1857 | 2003 | 2142 | 2288 | 2427 | 2573 | 2719 | 2858 | 3144 | 3436 | 3436 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 1050 | 1092 | 1140 | 1189 | 1231 | 1279 | 1328 | 1377 | 1419 | 1516 | 1606 | 1606 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ 1210 | 1252 | 1300 | 1349 | 1391 | 1439 | 1488 | 1537 | 1579 | 1676 | 1766 | 1766 | |
| | .05 | $ 1377 | 1419 | 1467 | 1516 | 1558 | 1606 | 1655 | 1704 | 1745 | 1843 | 1933 | 1933 | |
| | .06 | $ 1537 | 1579 | 1627 | 1676 | 1718 | 1766 | 1815 | 1864 | 1905 | 2003 | 2093 | 2093 | |
| | .07 | $ 1697 | 1739 | 1787 | 1836 | 1878 | 1926 | 1975 | 2024 | 2065 | 2163 | 2253 | 2253 | |
| | .08 | $ 1864 | 1905 | 1954 | 2003 | 2045 | 2093 | 2142 | 2191 | 2232 | 2330 | 2420 | 2420 | |
| | .09 | $ 2024 | 2065 | 2114 | 2163 | 2205 | 2253 | 2302 | 2351 | 2392 | 2490 | 2580 | 2580 | |
| | .10 | $ 2191 | 2232 | 2281 | 2330 | 2372 | 2420 | 2469 | 2518 | 2559 | 2657 | 2747 | 2747 | BALANCE POINT 29 DEG.F. |
| | .12 | $ 2511 | 2552 | 2601 | 2650 | 2692 | 2740 | 2789 | 2838 | 2879 | 2977 | 3067 | 3067 | |
| 90,000 | | $ 1926 | 2093 | 2253 | 2413 | 2573 | 2733 | 2893 | 3060 | 3220 | 3540 | 3860 | 3860 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 1224 | 1279 | 1342 | 1398 | 1460 | 1516 | 1579 | 1634 | 1697 | 1815 | 1933 | 1933 | THEORETICAL HEATING COST * FURN.* HEAT PUMP $ PER YEAR |
| | .04 | $ 1391 | 1446 | 1509 | 1565 | 1627 | 1683 | 1745 | 1801 | 1864 | 1982 | 2100 | 2100 | |
| | .05 | $ 1558 | 1613 | 1676 | 1732 | 1794 | 1850 | 1912 | 1968 | 2031 | 2149 | 2267 | 2267 | |
| | .06 | $ 1732 | 1787 | 1850 | 1905 | 1968 | 2024 | 2086 | 2142 | 2205 | 2323 | 2441 | 2441 | |
| | .07 | $ 1899 | 1954 | 2017 | 2072 | 2135 | 2191 | 2253 | 2309 | 2372 | 2490 | 2608 | 2608 | |
| | .08 | $ 2065 | 2121 | 2184 | 2239 | 2302 | 2358 | 2420 | 2476 | 2539 | 2657 | 2775 | 2775 | |
| | .09 | $ 2239 | 2295 | 2358 | 2413 | 2476 | 2532 | 2594 | 2650 | 2712 | 2831 | 2949 | 2949 | |
| | .10 | $ 2406 | 2462 | 2525 | 2580 | 2643 | 2698 | 2761 | 2817 | 2879 | 2998 | 3116 | 3116 | BALANCE POINT 32 DEG.F. |
| | .12 | $ 2740 | 2796 | 2858 | 2914 | 2977 | 3032 | 3095 | 3151 | 3213 | 3332 | 3450 | 3450 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 58 | 78 | 97 | 117 | 136 | 156 | 175 | 195 | 234 | <--THEORETICAL AIR CONDITIONING COST |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: OUTDOOR 42HPQ INDOOR H54Q
ARI RATED COOLING CAP.: BTUH (95 ) 42500; SEER 8.00
ARI RATED HEATING CAP.: BTUH (47 ) 41500; COP(47 ) 2.70; HSPF 6.25 MIN.OHR REG IV
BTUH (17 ) 24000; COP(17 ) 1.80
FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | --- THEORETICAL ANNUAL HEATING COST --- HEAT PUMP WITH ELECTRIC HEAT | ELECTRIC HEAT ONLY | |
|---|---|---|---|---|
| 40,000 | | | | |
| | .03 | $ 466 | 744 | |
| | .04 | $ 619 | 987 | |
| | .05 | $ 772 | 1238 | |
| | .06 | $ 925 | 1488 | |
| | .07 | $ 1085 | 1732 | |
| | .08 | $ 1238 | 1982 | |
| | .09 | $ 1398 | 2232 | |
| | .10 | $ 1551 | 2476 | BALANCE POINT 12 DEG.F. |
| | .12 | $ 1857 | 2977 | |
| 50,000 | | | | |
| | .03 | $ 584 | 925 | |
| | .04 | $ 779 | 1238 | |
| | .05 | $ 966 | 1544 | |
| | .06 | $ 1161 | 1857 | |
| | .07 | $ 1349 | 2170 | |
| | .08 | $ 1544 | 2476 | |
| | .09 | $ 1739 | 2789 | |
| | .10 | $ 1933 | 3095 | BALANCE POINT 17 DEG.F. |
| | .12 | $ 2323 | 3721 | |
| 60,000 | | | | |
| | .03 | $ 702 | 1112 | |
| | .04 | $ 939 | 1488 | |
| | .05 | $ 1175 | 1857 | |
| | .06 | $ 1405 | 2232 | |
| | .07 | $ 1641 | 2601 | |
| | .08 | $ 1871 | 2977 | |
| | .09 | $ 2107 | 3345 | |
| | .10 | $ 2337 | 3721 | BALANCE POINT 22 DEG.F. |
| | .12 | $ 2810 | 4465 | |
| 70,000 | | | | |
| | .03 | $ 834 | 1300 | |
| | .04 | $ 1112 | 1732 | |
| | .05 | $ 1391 | 2170 | |
| | .06 | $ 1669 | 2601 | |
| | .07 | $ 1947 | 3039 | |
| | .08 | $ 2225 | 3471 | |
| | .09 | $ 2504 | 3902 | |
| | .10 | $ 2782 | 4340 | BALANCE POINT 26 DEG.F. |
| | .12 | $ 3332 | 5210 | |
| 80,000 | | | | |
| | .03 | $ 973 | 1488 | |
| | .04 | $ 1300 | 1982 | |
| | .05 | $ 1620 | 2476 | |
| | .06 | $ 1947 | 2977 | |
| | .07 | $ 2274 | 3471 | |
| | .08 | $ 2594 | 3965 | |
| | .09 | $ 2921 | 4465 | |
| | .10 | $ 3248 | 4959 | BALANCE POINT 29 DEG.F. |
| | .12 | $ 3895 | 5954 | |
| 90,000 | | | | |
| | .03 | $ 1119 | 1669 | |
| | .04 | $ 1488 | 2232 | |
| | .05 | $ 1857 | 2789 | |
| | .06 | $ 2232 | 3345 | |
| | .07 | $ 2608 | 3902 | |
| | .08 | $ 2984 | 4465 | |
| | .09 | $ 3352 | 5022 | |
| | .10 | $ 3721 | 5578 | BALANCE POINT 31 DEG.F. |
| | .12 | $ 4465 | 6698 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 63 | 85 | 106 | 127 | 148 | 170 | 191 | 212 | 255 | <--THEORETICAL AIR CONDITIONING COST |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: OUTDOOR 42HPQ INDOOR HSAQ
ARI RATED COOLING CAP.: BTUH 135 ) 42500; SEER 8.00
ARI RATED HEATING CAP.: BTUH 147 ) 41500; COP(47) 2.10; HSPF 6.25 MIN.DHR REG IV
BTUH 117 ) 24000; COP(17) 1.80
FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY 65.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | NATURAL GAS COST - $/THERM .35 | .40 | .45 | .50 | .55 | .60 | .65 | .70 | .75 | .80 | .90 | 1.00 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $ 452 | 514 | 584 | 646 | 716 | 779 | 841 | 911 | 973 | 1036 | 1168 | 1300 | <--THEORETICAL HEATING COST ÷ FURNACE ONLY |
| 40,000 | .03 | $ 410 | 431 | 452 | 473 | 493 | 514 | 528 | 549 | 570 | 591 | 633 | 674 | THEORETICAL HEATING COST ÷ FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 507 | 528 | 549 | 570 | 591 | 612 | 626 | 646 | 667 | 688 | 730 | 772 | |
| | .05 | $ 598 | 619 | 639 | 660 | 681 | 702 | 716 | 737 | 758 | 779 | 820 | 862 | |
| | .06 | $ 688 | 709 | 730 | 751 | 772 | 793 | 806 | 827 | 848 | 869 | 911 | 952 | |
| | .07 | $ 779 | 799 | 820 | 841 | 862 | 883 | 897 | 918 | 939 | 959 | 1001 | 1043 | |
| | .08 | $ 869 | 890 | 911 | 932 | 952 | 973 | 987 | 1008 | 1029 | 1050 | 1092 | 1133 | |
| | .09 | $ 959 | 980 | 1001 | 1022 | 1043 | 1064 | 1078 | 1099 | 1119 | 1140 | 1182 | 1224 | BALANCE POINT 12 DEG.F. |
| | .10 | $ 1057 | 1078 | 1099 | 1119 | 1140 | 1161 | 1175 | 1196 | 1217 | 1238 | 1279 | 1321 | |
| | .12 | $ 1238 | 1259 | 1279 | 1300 | 1321 | 1342 | 1356 | 1377 | 1398 | 1419 | 1460 | 1502 | |
| | | $ 563 | 646 | 730 | 813 | 890 | 973 | 1057 | 1133 | 1217 | 1300 | 1460 | 1627 | <--THEORETICAL HEATING COST ÷ FURNACE ONLY |
| 50,000 | .03 | $ 514 | 542 | 577 | 605 | 639 | 674 | 702 | 737 | 772 | 799 | 869 | 932 | THEORETICAL HEATING COST ÷ FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 612 | 639 | 674 | 702 | 737 | 772 | 799 | 834 | 869 | 897 | 966 | 1029 | |
| | .05 | $ 709 | 737 | 772 | 799 | 834 | 869 | 897 | 932 | 966 | 994 | 1064 | 1126 | |
| | .06 | $ 799 | 827 | 862 | 890 | 925 | 959 | 987 | 1022 | 1057 | 1085 | 1154 | 1217 | |
| | .07 | $ 897 | 925 | 959 | 987 | 1022 | 1057 | 1085 | 1119 | 1154 | 1182 | 1252 | 1314 | |
| | .08 | $ 994 | 1022 | 1057 | 1085 | 1119 | 1154 | 1182 | 1217 | 1252 | 1279 | 1349 | 1412 | BALANCE POINT 17 DEG.F. |
| | .09 | $ 1092 | 1119 | 1154 | 1182 | 1217 | 1252 | 1279 | 1314 | 1349 | 1377 | 1446 | 1509 | |
| | .10 | $ 1182 | 1210 | 1245 | 1272 | 1307 | 1342 | 1370 | 1405 | 1439 | 1467 | 1537 | 1599 | |
| | .12 | $ 1377 | 1405 | 1439 | 1467 | 1502 | 1537 | 1565 | 1599 | 1634 | 1662 | 1732 | 1794 | |
| | | $ 681 | 779 | 876 | 973 | 1071 | 1168 | 1266 | 1363 | 1460 | 1558 | 1752 | 1947 | <--THEORETICAL HEATING COST ÷ FURNACE ONLY |
| 60,000 | .03 | $ 619 | 667 | 716 | 765 | 813 | 862 | 911 | 959 | 1008 | 1057 | 1154 | 1259 | THEORETICAL HEATING COST ÷ FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 709 | 758 | 806 | 855 | 904 | 952 | 1001 | 1050 | 1099 | 1147 | 1245 | 1349 | |
| | .05 | $ 799 | 848 | 897 | 946 | 994 | 1043 | 1092 | 1140 | 1189 | 1238 | 1335 | 1439 | |
| | .06 | $ 890 | 939 | 987 | 1036 | 1085 | 1133 | 1182 | 1231 | 1279 | 1328 | 1426 | 1530 | |
| | .07 | $ 980 | 1029 | 1078 | 1126 | 1175 | 1224 | 1272 | 1321 | 1370 | 1419 | 1516 | 1620 | |
| | .08 | $ 1078 | 1126 | 1175 | 1224 | 1272 | 1321 | 1370 | 1419 | 1467 | 1516 | 1613 | 1718 | BALANCE POINT 22 DEG.F. |
| | .09 | $ 1168 | 1217 | 1266 | 1314 | 1363 | 1412 | 1460 | 1509 | 1558 | 1606 | 1704 | 1808 | |
| | .10 | $ 1259 | 1307 | 1356 | 1405 | 1453 | 1502 | 1551 | 1599 | 1648 | 1697 | 1794 | 1899 | |
| | .12 | $ 1439 | 1488 | 1537 | 1586 | 1634 | 1683 | 1732 | 1780 | 1829 | 1878 | 1975 | 2079 | |
| | | $ 793 | 911 | 1022 | 1133 | 1252 | 1363 | 1481 | 1592 | 1704 | 1822 | 2052 | 2274 | <--THEORETICAL HEATING COST ÷ FURNACE ONLY |
| 70,000 | .03 | $ 716 | 772 | 827 | 890 | 946 | 1001 | 1057 | 1119 | 1175 | 1231 | 1349 | 1460 | THEORETICAL HEATING COST ÷ FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 813 | 869 | 925 | 987 | 1043 | 1099 | 1154 | 1217 | 1272 | 1328 | 1446 | 1558 | |
| | .05 | $ 918 | 973 | 1029 | 1092 | 1147 | 1203 | 1259 | 1321 | 1377 | 1432 | 1551 | 1662 | |
| | .06 | $ 1022 | 1078 | 1133 | 1196 | 1252 | 1307 | 1363 | 1426 | 1481 | 1537 | 1655 | 1766 | |
| | .07 | $ 1126 | 1182 | 1238 | 1300 | 1356 | 1412 | 1467 | 1530 | 1586 | 1641 | 1759 | 1871 | |
| | .08 | $ 1231 | 1286 | 1342 | 1405 | 1460 | 1516 | 1572 | 1634 | 1690 | 1745 | 1864 | 1975 | BALANCE POINT 26 DEG.F. |
| | .09 | $ 1335 | 1391 | 1446 | 1509 | 1565 | 1620 | 1676 | 1739 | 1794 | 1850 | 1968 | 2079 | |
| | .10 | $ 1439 | 1495 | 1551 | 1613 | 1669 | 1725 | 1780 | 1843 | 1899 | 1954 | 2072 | 2184 | |
| | .12 | $ 1641 | 1697 | 1752 | 1815 | 1871 | 1926 | 1982 | 2045 | 2100 | 2156 | 2274 | 2385 | |
| | | $ 911 | 1036 | 1168 | 1300 | 1432 | 1558 | 1690 | 1822 | 1947 | 2079 | 2344 | 2601 | <--THEORETICAL HEATING COST ÷ FURNACE ONLY |
| 80,000 | .03 | $ 827 | 911 | 987 | 1071 | 1154 | 1231 | 1314 | 1398 | 1474 | 1558 | 1725 | 1885 | THEORETICAL HEATING COST ÷ FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 918 | 1001 | 1078 | 1161 | 1245 | 1321 | 1405 | 1488 | 1565 | 1648 | 1815 | 1975 | |
| | .05 | $ 1001 | 1085 | 1161 | 1245 | 1328 | 1405 | 1488 | 1572 | 1648 | 1732 | 1899 | 2059 | |
| | .06 | $ 1092 | 1175 | 1252 | 1335 | 1419 | 1495 | 1579 | 1662 | 1739 | 1822 | 1989 | 2149 | |
| | .07 | $ 1175 | 1259 | 1335 | 1419 | 1502 | 1579 | 1662 | 1745 | 1822 | 1905 | 2072 | 2232 | |
| | .08 | $ 1266 | 1349 | 1426 | 1509 | 1592 | 1669 | 1752 | 1836 | 1912 | 1996 | 2163 | 2323 | BALANCE POINT 29 DEG.F. |
| | .09 | $ 1349 | 1432 | 1509 | 1592 | 1676 | 1752 | 1836 | 1919 | 1996 | 2079 | 2246 | 2406 | |
| | .10 | $ 1439 | 1523 | 1599 | 1683 | 1766 | 1843 | 1926 | 2010 | 2086 | 2170 | 2337 | 2497 | |
| | .12 | $ 1613 | 1697 | 1773 | 1857 | 1940 | 2017 | 2100 | 2184 | 2260 | 2344 | 2511 | 2671 | |
| | | $ 1022 | 1168 | 1314 | 1460 | 1606 | 1752 | 1899 | 2052 | 2198 | 2344 | 2636 | 2928 | <--THEORETICAL HEATING COST ÷ FURNACE ONLY |
| 90,000 | .03 | $ 925 | 1015 | 1106 | 1203 | 1293 | 1384 | 1474 | 1565 | 1655 | 1752 | 1933 | 2114 | THEORETICAL HEATING COST ÷ FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 1022 | 1112 | 1203 | 1300 | 1391 | 1481 | 1572 | 1662 | 1752 | 1850 | 2031 | 2212 | |
| | .05 | $ 1119 | 1210 | 1300 | 1398 | 1488 | 1579 | 1669 | 1759 | 1850 | 1947 | 2128 | 2309 | |
| | .06 | $ 1217 | 1307 | 1398 | 1495 | 1586 | 1676 | 1766 | 1857 | 1947 | 2045 | 2225 | 2406 | |
| | .07 | $ 1307 | 1398 | 1488 | 1586 | 1676 | 1766 | 1857 | 1947 | 2038 | 2135 | 2316 | 2497 | |
| | .08 | $ 1405 | 1495 | 1586 | 1683 | 1773 | 1864 | 1954 | 2045 | 2135 | 2232 | 2413 | 2594 | BALANCE POINT 31 DEG.F. |
| | .09 | $ 1502 | 1592 | 1683 | 1780 | 1871 | 1961 | 2052 | 2142 | 2232 | 2330 | 2511 | 2692 | |
| | .10 | $ 1599 | 1690 | 1780 | 1878 | 1968 | 2059 | 2149 | 2239 | 2330 | 2427 | 2608 | 2789 | |
| | .12 | $ 1787 | 1878 | 1968 | 2065 | 2156 | 2246 | 2337 | 2427 | 2518 | 2615 | 2796 | 2977 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 63 | 85 | 106 | 127 | 148 | 170 | 191 | 212 | 255 | <--THEORETICAL AIR CONDITIONING COST |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 1

HEAT PUMP MODEL: OUTDOOR 42HPQ_____ INDOOR HSAQ_____

ARI RATED COOLING CAP.: BTUH (95 ) 42300. SEER 8.00

ARI RATED HEATING CAP.: BTUH (47 ) 41500. COP(47 ) 2.20 HSPF 6.25 MIN.DHR REG IV

BTUH (17 ) 24000. COP(17 ) 1.80

FURNACE TYPE FUEL OIL FURNACE EFFICIENCY 65.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | HEATING OIL COST - $/GALLON 1.00 | 1.10 | 1.20 | 1.30 | 1.40 | 1.50 | 1.60 | 1.70 | 1.80 | 2.00 | 2.20 | 2.40 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40,000 | | $ 939 | 1029 | 1126 | 1217 | 1314 | 1405 | 1502 | 1592 | 1690 | 1878 | 2065 | 2253 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 493 | 507 | 521 | 535 | 556 | 570 | 584 | 598 | 612 | 639 | 667 | 702 | \| |
| | .04 | $ 612 | 626 | 639 | 653 | 674 | 688 | 702 | 716 | 730 | 758 | 786 | 820 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .05 | $ 730 | 744 | 758 | 772 | 793 | 806 | 820 | 834 | 848 | 876 | 904 | 939 | \| |
| | .06 | $ 848 | 862 | 876 | 890 | 911 | 925 | 939 | 952 | 966 | 994 | 1022 | 1057 | \| |
| | .07 | $ 966 | 980 | 994 | 1008 | 1029 | 1043 | 1057 | 1071 | 1085 | 1112 | 1140 | 1175 | \| |
| | .08 | $ 1078 | 1092 | 1106 | 1119 | 1140 | 1154 | 1168 | 1182 | 1196 | 1224 | 1252 | 1286 | \| |
| | .09 | $ 1196 | 1210 | 1224 | 1238 | 1259 | 1272 | 1286 | 1300 | 1314 | 1342 | 1370 | 1405 | \| |
| | .10 | $ 1314 | 1328 | 1342 | 1356 | 1377 | 1391 | 1405 | 1419 | 1432 | 1460 | 1488 | 1523 | \| BALANCE POINT 12 DEG.F. |
| | .12 | $ 1551 | 1565 | 1579 | 1592 | 1613 | 1627 | 1641 | 1655 | 1669 | 1697 | 1725 | 1759 | \| |
| 50,000 | | $ 1168 | 1286 | 1405 | 1523 | 1641 | 1759 | 1878 | 1996 | 2107 | 2344 | 2580 | 2817 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 639 | 660 | 681 | 709 | 730 | 751 | 779 | 799 | 820 | 869 | 918 | 959 | \| |
| | .04 | $ 772 | 793 | 813 | 841 | 862 | 883 | 911 | 932 | 952 | 1001 | 1050 | 1092 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .05 | $ 904 | 925 | 946 | 973 | 994 | 1015 | 1043 | 1064 | 1085 | 1133 | 1182 | 1224 | \| |
| | .06 | $ 1036 | 1057 | 1078 | 1106 | 1126 | 1147 | 1175 | 1196 | 1217 | 1266 | 1314 | 1356 | \| |
| | .07 | $ 1175 | 1196 | 1217 | 1245 | 1266 | 1286 | 1314 | 1335 | 1356 | 1405 | 1453 | 1495 | \| |
| | .08 | $ 1307 | 1328 | 1349 | 1377 | 1398 | 1419 | 1446 | 1467 | 1488 | 1537 | 1586 | 1627 | \| |
| | .09 | $ 1439 | 1460 | 1481 | 1509 | 1530 | 1551 | 1579 | 1599 | 1620 | 1669 | 1718 | 1759 | \| |
| | .10 | $ 1572 | 1592 | 1613 | 1641 | 1662 | 1683 | 1711 | 1732 | 1752 | 1801 | 1850 | 1892 | \| BALANCE POINT 17 DEG.F. |
| | .12 | $ 1843 | 1864 | 1885 | 1912 | 1933 | 1954 | 1982 | 2003 | 2024 | 2072 | 2121 | 2163 | \| |
| 60,000 | | $ 1405 | 1544 | 1690 | 1829 | 1968 | 2107 | 2253 | 2392 | 2532 | 2817 | 3095 | 3380 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 786 | 820 | 855 | 890 | 925 | 952 | 987 | 1022 | 1057 | 1126 | 1196 | 1266 | \| |
| | .04 | $ 932 | 966 | 1001 | 1036 | 1071 | 1099 | 1133 | 1168 | 1203 | 1272 | 1342 | 1412 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .05 | $ 1078 | 1112 | 1147 | 1182 | 1217 | 1245 | 1279 | 1314 | 1349 | 1419 | 1488 | 1558 | \| |
| | .06 | $ 1224 | 1259 | 1293 | 1328 | 1363 | 1391 | 1426 | 1460 | 1495 | 1565 | 1634 | 1704 | \| |
| | .07 | $ 1370 | 1405 | 1439 | 1474 | 1509 | 1537 | 1572 | 1606 | 1641 | 1711 | 1780 | 1850 | \| |
| | .08 | $ 1523 | 1558 | 1592 | 1627 | 1662 | 1690 | 1725 | 1759 | 1794 | 1864 | 1933 | 2003 | \| |
| | .09 | $ 1669 | 1704 | 1739 | 1773 | 1808 | 1836 | 1871 | 1905 | 1940 | 2010 | 2079 | 2149 | \| |
| | .10 | $ 1815 | 1850 | 1885 | 1919 | 1954 | 1982 | 2017 | 2052 | 2086 | 2156 | 2225 | 2295 | \| BALANCE POINT 22 DEG.F. |
| | .12 | $ 2107 | 2142 | 2177 | 2212 | 2246 | 2274 | 2309 | 2344 | 2379 | 2448 | 2518 | 2587 | \| |
| 70,000 | | $ 1641 | 1801 | 1968 | 2135 | 2295 | 2462 | 2629 | 2789 | 2956 | 3283 | 3610 | 3944 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 946 | 994 | 1043 | 1092 | 1133 | 1182 | 1231 | 1279 | 1328 | 1419 | 1516 | 1613 | \| |
| | .04 | $ 1106 | 1154 | 1203 | 1252 | 1293 | 1342 | 1391 | 1439 | 1488 | 1579 | 1676 | 1773 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .05 | $ 1259 | 1307 | 1356 | 1405 | 1446 | 1495 | 1544 | 1592 | 1641 | 1732 | 1829 | 1926 | \| |
| | .06 | $ 1419 | 1467 | 1516 | 1565 | 1606 | 1655 | 1704 | 1752 | 1801 | 1892 | 1989 | 2086 | \| |
| | .07 | $ 1579 | 1627 | 1676 | 1725 | 1766 | 1815 | 1864 | 1912 | 1961 | 2052 | 2149 | 2246 | \| |
| | .08 | $ 1732 | 1780 | 1829 | 1878 | 1919 | 1968 | 2017 | 2065 | 2114 | 2205 | 2302 | 2399 | \| |
| | .09 | $ 1892 | 1940 | 1989 | 2038 | 2079 | 2128 | 2177 | 2225 | 2274 | 2365 | 2462 | 2559 | \| |
| | .10 | $ 2052 | 2100 | 2149 | 2198 | 2239 | 2288 | 2337 | 2385 | 2434 | 2525 | 2622 | 2719 | \| BALANCE POINT 26 DEG.F. |
| | .12 | $ 2365 | 2413 | 2462 | 2511 | 2552 | 2601 | 2650 | 2698 | 2747 | 2838 | 2935 | 3032 | \| |
| 80,000 | | $ 1878 | 2065 | 2253 | 2441 | 2629 | 2817 | 3005 | 3192 | 3380 | 3756 | 4131 | 4507 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 1119 | 1182 | 1245 | 1307 | 1370 | 1432 | 1495 | 1565 | 1627 | 1752 | 1878 | 2003 | \| |
| | .04 | $ 1286 | 1349 | 1412 | 1474 | 1537 | 1599 | 1662 | 1732 | 1794 | 1919 | 2045 | 2170 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .05 | $ 1453 | 1516 | 1579 | 1641 | 1704 | 1766 | 1829 | 1899 | 1961 | 2086 | 2212 | 2337 | \| |
| | .06 | $ 1620 | 1683 | 1745 | 1808 | 1871 | 1933 | 1996 | 2065 | 2128 | 2253 | 2379 | 2504 | \| |
| | .07 | $ 1787 | 1850 | 1912 | 1975 | 2038 | 2100 | 2163 | 2232 | 2295 | 2420 | 2545 | 2671 | \| |
| | .08 | $ 1947 | 2010 | 2072 | 2135 | 2198 | 2260 | 2323 | 2392 | 2455 | 2580 | 2705 | 2831 | \| |
| | .09 | $ 2114 | 2177 | 2239 | 2302 | 2365 | 2427 | 2490 | 2559 | 2622 | 2747 | 2872 | 2998 | \| |
| | .10 | $ 2281 | 2344 | 2406 | 2469 | 2532 | 2594 | 2657 | 2726 | 2789 | 2914 | 3039 | 3165 | \| BALANCE POINT 29 DEG.F. |
| | .12 | $ 2615 | 2678 | 2740 | 2803 | 2865 | 2928 | 2991 | 3060 | 3123 | 3248 | 3373 | 3498 | \| |
| 90,000 | | $ 2107 | 2323 | 2532 | 2747 | 2956 | 3165 | 3380 | 3589 | 3798 | 4222 | 4646 | 5071 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 1300 | 1384 | 1460 | 1537 | 1620 | 1697 | 1773 | 1857 | 1933 | 2093 | 2246 | 2406 | \| |
| | .04 | $ 1474 | 1558 | 1634 | 1711 | 1794 | 1871 | 1947 | 2031 | 2107 | 2267 | 2420 | 2580 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUMP $ PER YEAR |
| | .05 | $ 1648 | 1732 | 1808 | 1885 | 1968 | 2045 | 2121 | 2205 | 2281 | 2441 | 2594 | 2754 | \| |
| | .06 | $ 1822 | 1905 | 1982 | 2059 | 2142 | 2219 | 2295 | 2379 | 2455 | 2615 | 2768 | 2928 | \| |
| | .07 | $ 1996 | 2079 | 2156 | 2232 | 2316 | 2392 | 2469 | 2552 | 2629 | 2789 | 2942 | 3102 | \| |
| | .08 | $ 2170 | 2253 | 2330 | 2406 | 2490 | 2566 | 2643 | 2726 | 2803 | 2963 | 3116 | 3276 | \| |
| | .09 | $ 2337 | 2420 | 2497 | 2573 | 2657 | 2733 | 2810 | 2893 | 2970 | 3130 | 3283 | 3443 | \| |
| | .10 | $ 2511 | 2594 | 2671 | 2747 | 2831 | 2907 | 2984 | 3067 | 3144 | 3304 | 3457 | 3617 | \| BALANCE POINT 31 DEG.F. |
| | .12 | $ 2858 | 2942 | 3018 | 3095 | 3178 | 3255 | 3332 | 3415 | 3491 | 3651 | 3805 | 3965 | \| |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|
| $ 63 | 85 | 106 | 127 | 148 | 170 | 191 | 212 | 255 | <--THEORETICAL AIR CONDITIONING COST |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: OUTDOOR 42HPQ INDOOR H5AQ
ARI RATED COOLING CAP.: BTUH (95 ) 22500, SEER 8.00
ARI RATED HEATING CAP.: BTUH (47 ) 21500, COP(47 ) 2.70, HSPF 6.25 MIN.DHR REG IV
BTUH (17 ) 24000, COP(17 ) 1.80
FURNACE TYPE PROPANE GAS FURNACE EFFICIENCY 65.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | PROPANE GAS COST - $/GALLON .60 | .65 | .70 | .75 | .80 | .85 | .90 | .95 | 1.00 | 1.10 | 1.20 | 1.20 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40,000 | | $ 855 | 925 | 1001 | 1071 | 1140 | 1210 | 1286 | 1356 | 1426 | 1572 | 1718 | 1718 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 479 | 493 | 500 | 514 | 528 | 535 | 549 | 563 | 570 | 591 | 619 | 619 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUMP |
| | .04 | $ 598 | 612 | 619 | 633 | 646 | 653 | 667 | 681 | 688 | 709 | 737 | 737 | $ PER YEAR |
| | .05 | $ 716 | 730 | 737 | 751 | 765 | 772 | 786 | 799 | 806 | 827 | 855 | 855 | \| |
| | .06 | $ 834 | 848 | 855 | 869 | 883 | 890 | 904 | 918 | 925 | 946 | 973 | 973 | \| |
| | .07 | $ 952 | 966 | 973 | 987 | 1001 | 1008 | 1022 | 1036 | 1043 | 1064 | 1092 | 1092 | \| |
| | .08 | $ 1064 | 1078 | 1085 | 1099 | 1112 | 1119 | 1133 | 1147 | 1154 | 1175 | 1203 | 1203 | \| |
| | .09 | $ 1182 | 1196 | 1203 | 1217 | 1231 | 1238 | 1252 | 1266 | 1272 | 1293 | 1321 | 1321 | \| BALANCE POINT 12 DEG.F. |
| | .10 | $ 1300 | 1314 | 1321 | 1335 | 1349 | 1356 | 1370 | 1384 | 1391 | 1412 | 1439 | 1439 | \| |
| | .12 | $ 1537 | 1551 | 1558 | 1572 | 1586 | 1592 | 1606 | 1620 | 1627 | 1648 | 1676 | 1676 | \| |
| 50,000 | | $ 1071 | 1161 | 1252 | 1335 | 1426 | 1516 | 1606 | 1697 | 1787 | 1968 | 2142 | 2142 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 619 | 633 | 653 | 667 | 688 | 702 | 723 | 744 | 758 | 793 | 827 | 827 | \| |
| | .04 | $ 751 | 765 | 786 | 799 | 820 | 834 | 855 | 876 | 890 | 925 | 959 | 959 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUMP |
| | .05 | $ 883 | 897 | 918 | 932 | 952 | 966 | 987 | 1008 | 1022 | 1057 | 1092 | 1092 | $ PER YEAR |
| | .06 | $ 1015 | 1029 | 1050 | 1064 | 1085 | 1099 | 1119 | 1140 | 1154 | 1189 | 1224 | 1224 | \| |
| | .07 | $ 1154 | 1168 | 1189 | 1203 | 1224 | 1238 | 1259 | 1279 | 1293 | 1328 | 1363 | 1363 | \| |
| | .08 | $ 1286 | 1300 | 1321 | 1335 | 1356 | 1370 | 1391 | 1412 | 1426 | 1460 | 1495 | 1495 | \| |
| | .09 | $ 1419 | 1432 | 1453 | 1467 | 1488 | 1502 | 1523 | 1544 | 1558 | 1592 | 1627 | 1627 | \| |
| | .10 | $ 1551 | 1565 | 1586 | 1599 | 1620 | 1634 | 1655 | 1676 | 1690 | 1725 | 1759 | 1759 | \| BALANCE POINT 17 DEG.F. |
| | .12 | $ 1822 | 1836 | 1857 | 1871 | 1892 | 1905 | 1926 | 1947 | 1961 | 1996 | 2031 | 2031 | \| |
| 60,000 | | $ 1286 | 1391 | 1502 | 1606 | 1718 | 1822 | 1926 | 2038 | 2142 | 2358 | 2573 | 2573 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 758 | 786 | 806 | 834 | 862 | 883 | 911 | 939 | 966 | 1015 | 1071 | 1071 | \| |
| | .04 | $ 904 | 932 | 952 | 980 | 1008 | 1029 | 1057 | 1085 | 1112 | 1161 | 1217 | 1217 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUMP |
| | .05 | $ 1050 | 1078 | 1099 | 1126 | 1154 | 1175 | 1203 | 1231 | 1259 | 1307 | 1363 | 1363 | $ PER YEAR |
| | .06 | $ 1196 | 1224 | 1245 | 1272 | 1300 | 1321 | 1349 | 1377 | 1405 | 1453 | 1509 | 1509 | \| |
| | .07 | $ 1342 | 1370 | 1391 | 1419 | 1446 | 1467 | 1495 | 1523 | 1551 | 1599 | 1655 | 1655 | \| |
| | .08 | $ 1495 | 1523 | 1544 | 1572 | 1599 | 1620 | 1648 | 1676 | 1704 | 1752 | 1808 | 1808 | \| |
| | .09 | $ 1641 | 1669 | 1690 | 1718 | 1745 | 1766 | 1794 | 1822 | 1850 | 1899 | 1954 | 1954 | \| |
| | .10 | $ 1787 | 1815 | 1836 | 1864 | 1892 | 1912 | 1940 | 1968 | 1996 | 2045 | 2100 | 2100 | \| BALANCE POINT 22 DEG.F. |
| | .12 | $ 2079 | 2107 | 2128 | 2156 | 2184 | 2205 | 2232 | 2260 | 2288 | 2337 | 2392 | 2392 | \| |
| 70,000 | | $ 1502 | 1627 | 1752 | 1878 | 2003 | 2128 | 2253 | 2379 | 2504 | 2754 | 3005 | 3005 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 904 | 946 | 980 | 1015 | 1050 | 1085 | 1119 | 1161 | 1196 | 1266 | 1342 | 1342 | \| |
| | .04 | $ 1064 | 1106 | 1140 | 1175 | 1210 | 1245 | 1279 | 1321 | 1356 | 1426 | 1502 | 1502 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUMP |
| | .05 | $ 1217 | 1259 | 1293 | 1328 | 1363 | 1398 | 1432 | 1474 | 1509 | 1579 | 1655 | 1655 | $ PER YEAR |
| | .06 | $ 1377 | 1419 | 1453 | 1488 | 1523 | 1558 | 1592 | 1634 | 1669 | 1739 | 1815 | 1815 | \| |
| | .07 | $ 1537 | 1579 | 1613 | 1648 | 1683 | 1718 | 1752 | 1794 | 1829 | 1899 | 1975 | 1975 | \| |
| | .08 | $ 1690 | 1732 | 1766 | 1801 | 1836 | 1871 | 1905 | 1947 | 1982 | 2052 | 2128 | 2128 | \| |
| | .09 | $ 1850 | 1892 | 1926 | 1961 | 1996 | 2031 | 2065 | 2107 | 2142 | 2212 | 2288 | 2288 | \| |
| | .10 | $ 2010 | 2052 | 2086 | 2121 | 2156 | 2191 | 2225 | 2267 | 2302 | 2372 | 2448 | 2448 | \| BALANCE POINT 26 DEG.F. |
| | .12 | $ 2323 | 2365 | 2399 | 2434 | 2469 | 2504 | 2539 | 2580 | 2615 | 2685 | 2761 | 2761 | \| |
| 80,000 | | $ 1718 | 1857 | 2003 | 2142 | 2288 | 2427 | 2573 | 2719 | 2858 | 3144 | 3436 | 3436 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 1071 | 1112 | 1161 | 1210 | 1259 | 1307 | 1356 | 1405 | 1453 | 1544 | 1641 | 1641 | \| |
| | .04 | $ 1238 | 1279 | 1328 | 1377 | 1426 | 1474 | 1523 | 1572 | 1620 | 1711 | 1808 | 1808 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUMP |
| | .05 | $ 1405 | 1446 | 1495 | 1544 | 1592 | 1641 | 1690 | 1739 | 1787 | 1878 | 1975 | 1975 | $ PER YEAR |
| | .06 | $ 1572 | 1613 | 1662 | 1711 | 1759 | 1808 | 1857 | 1905 | 1954 | 2045 | 2142 | 2142 | \| |
| | .07 | $ 1739 | 1780 | 1829 | 1878 | 1926 | 1975 | 2024 | 2072 | 2121 | 2212 | 2309 | 2309 | \| |
| | .08 | $ 1899 | 1940 | 1989 | 2038 | 2086 | 2135 | 2184 | 2232 | 2281 | 2372 | 2469 | 2469 | \| |
| | .09 | $ 2065 | 2107 | 2156 | 2205 | 2253 | 2302 | 2351 | 2399 | 2448 | 2538 | 2636 | 2636 | \| |
| | .10 | $ 2232 | 2274 | 2323 | 2372 | 2420 | 2469 | 2518 | 2566 | 2615 | 2705 | 2803 | 2803 | \| BALANCE POINT 29 DEG.F. |
| | .12 | $ 2566 | 2608 | 2657 | 2705 | 2754 | 2803 | 2852 | 2900 | 2949 | 3039 | 3137 | 3137 | \| |
| 90,000 | | $ 1926 | 2093 | 2253 | 2413 | 2573 | 2733 | 2893 | 3060 | 3220 | 3540 | 3860 | 3860 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 1238 | 1293 | 1356 | 1419 | 1474 | 1537 | 1592 | 1655 | 1718 | 1836 | 1954 | 1954 | \| |
| | .04 | $ 1412 | 1467 | 1530 | 1592 | 1648 | 1711 | 1766 | 1829 | 1892 | 2010 | 2128 | 2128 | \|THEORETICAL HEATING COST * FURN.+ HEAT PUMP |
| | .05 | $ 1586 | 1641 | 1704 | 1766 | 1822 | 1885 | 1940 | 2003 | 2065 | 2184 | 2302 | 2302 | $ PER YEAR |
| | .06 | $ 1759 | 1815 | 1878 | 1940 | 1996 | 2059 | 2114 | 2177 | 2239 | 2358 | 2476 | 2476 | \| |
| | .07 | $ 1933 | 1989 | 2052 | 2114 | 2170 | 2232 | 2288 | 2351 | 2413 | 2532 | 2650 | 2650 | \| |
| | .08 | $ 2107 | 2163 | 2225 | 2288 | 2344 | 2406 | 2462 | 2525 | 2587 | 2705 | 2824 | 2824 | \| |
| | .09 | $ 2274 | 2330 | 2392 | 2455 | 2511 | 2573 | 2629 | 2692 | 2754 | 2872 | 2991 | 2991 | \| |
| | .10 | $ 2448 | 2504 | 2566 | 2629 | 2685 | 2747 | 2803 | 2865 | 2928 | 3046 | 3165 | 3165 | \| BALANCE POINT 31 DEG.F. |
| | .12 | $ 2796 | 2852 | 2914 | 2977 | 3032 | 3095 | 3151 | 3213 | 3276 | 3394 | 3512 | 3512 | \| |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | <--ELECTRIC RATE $/KWH |
| $ | 63 | 85 | 106 | 127 | 148 | 170 | 191 | 212 | 255 | <--THEORETICAL AIR CONDITIONING COST |

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: OUTDOOR 48HB02 INDOOR HS40
ARI RATED COOLING CAP.: BTUH (95 ) 46500, SEER 8.10
ARI RATED HEATING CAP.: BTUH (47 ) 44000, COP(47 ) 2.60, HSPF 6.15 MIN.OHR REG IV
BTUH (17 ) 26800, COP(17 ) 1.85
FURNACE TYPE ELECTRIC FURNACE EFFICIENCY 100.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | THEORETICAL ANNUAL HEATING COST --- HEAT PUMP WITH ELECTRIC HEAT | ELECTRIC HEAT ONLY | |
|---|---|---|---|---|
| 40,000 | .03 | $ 466 | 744 | |
| | .04 | $ 619 | 991 | |
| | .05 | $ 772 | 1238 | |
| | .06 | $ 932 | 1488 | |
| | .07 | $ 1085 | 1732 | |
| | .08 | $ 1231 | 1982 | |
| | .09 | $ 1384 | 2232 | |
| | .10 | $ 1544 | 2476 | BALANCE POINT 9 DEG.F. |
| | .12 | $ 1850 | 2977 | |
| 50,000 | .03 | $ 577 | 925 | |
| | .04 | $ 772 | 1238 | |
| | .05 | $ 966 | 1544 | |
| | .06 | $ 1154 | 1857 | |
| | .07 | $ 1349 | 2170 | |
| | .08 | $ 1544 | 2476 | |
| | .09 | $ 1732 | 2789 | |
| | .10 | $ 1919 | 3095 | BALANCE POINT 15 DEG.F. |
| | .12 | $ 2309 | 3721 | |
| 60,000 | .03 | $ 695 | 1112 | |
| | .04 | $ 932 | 1488 | |
| | .05 | $ 1161 | 1857 | |
| | .06 | $ 1391 | 2232 | |
| | .07 | $ 1620 | 2601 | |
| | .08 | $ 1857 | 2977 | |
| | .09 | $ 2086 | 3345 | |
| | .10 | $ 2323 | 3721 | BALANCE POINT 19 DEG.F. |
| | .12 | $ 2789 | 4465 | |
| 70,000 | .03 | $ 827 | 1300 | |
| | .04 | $ 1099 | 1732 | |
| | .05 | $ 1377 | 2170 | |
| | .06 | $ 1648 | 2601 | |
| | .07 | $ 1919 | 3039 | |
| | .08 | $ 2198 | 3471 | |
| | .09 | $ 2469 | 3902 | |
| | .10 | $ 2747 | 4340 | BALANCE POINT 23 DEG.F. |
| | .12 | $ 3297 | 5210 | |
| 80,000 | .03 | $ 959 | 1488 | |
| | .04 | $ 1272 | 1982 | |
| | .05 | $ 1599 | 2476 | |
| | .06 | $ 1912 | 2977 | |
| | .07 | $ 2232 | 3471 | |
| | .08 | $ 2552 | 3965 | |
| | .09 | $ 2872 | 4465 | |
| | .10 | $ 3199 | 4959 | BALANCE POINT 27 DEG.F. |
| | .12 | $ 3832 | 5954 | |
| 90,000 | .03 | $ 1099 | 1669 | |
| | .04 | $ 1474 | 2232 | |
| | .05 | $ 1843 | 2789 | |
| | .06 | $ 2205 | 3345 | |
| | .07 | $ 2573 | 3902 | |
| | .08 | $ 2942 | 4465 | |
| | .09 | $ 3304 | 5022 | |
| | .10 | $ 3672 | 5578 | BALANCE POINT 30 DEG.F. |
| | .12 | $ 4417 | 6698 | |
| 100,000 | .03 | $ 1252 | 1857 | |
| | .04 | $ 1669 | 2476 | |
| | .05 | $ 2079 | 3095 | |
| | .06 | $ 2497 | 3721 | |
| | .07 | $ 2921 | 4340 | |
| | .08 | $ 3338 | 4959 | |
| | .09 | $ 3756 | 5578 | |
| | .10 | $ 4173 | 6197 | |
| | .12 | $ 5008 | 7443 | BALANCE POINT 32 DEG.F. |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 68 | 91 | 114 | 137 | 160 | 183 | 206 | 229 | 275 | <--THEORETICAL AIR CONDITIONING COST |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5
HEAT PUMP MODEL: OUTDOOR 48HPQZ INDOOR HSAQ
ARI RATED COOLING CAP.: BTUH [95 ] 44000, SEER 8.10
ARI RATED HEATING CAP.: BTUH [47 ] 44000, COP[47 ] 2.60, HSPF 6.15 MIN.DHR REG IV
BTUH [17 ] 26800, COP[17 ] 1.85
FURNACE TYPE NATURAL GAS FURNACE EFFICIENCY 65.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | NATURAL GAS COST - $/THERM .35 | .40 | .45 | .50 | .55 | .60 | .65 | .70 | .75 | .80 | .90 | 1.00 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40,000 | | $ 452 | 514 | 584 | 646 | 716 | 779 | 841 | 911 | 973 | 1036 | 1168 | 1300 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 424 | 438 | 452 | 466 | 479 | 493 | 507 | 521 | 535 | 556 | 584 | 612 | THEORETICAL HEATING COST * FURN.* HEAT PUMP |
| | .04 | $ 528 | 542 | 556 | 570 | 584 | 598 | 612 | 626 | 639 | 660 | 688 | 716 | $ PER YEAR |
| | .05 | $ 639 | 653 | 667 | 681 | 695 | 709 | 723 | 737 | 751 | 772 | 799 | 827 | |
| | .06 | $ 744 | 758 | 772 | 786 | 799 | 813 | 827 | 841 | 855 | 876 | 904 | 932 | |
| | .07 | $ 848 | 862 | 876 | 890 | 904 | 918 | 932 | 946 | 959 | 980 | 1008 | 1036 | |
| | .08 | $ 959 | 973 | 987 | 1001 | 1015 | 1029 | 1043 | 1057 | 1071 | 1092 | 1119 | 1147 | |
| | .09 | $ 1064 | 1078 | 1092 | 1106 | 1119 | 1133 | 1147 | 1161 | 1175 | 1196 | 1224 | 1252 | BALANCE POINT 9 DEG.F. |
| | .10 | $ 1168 | 1182 | 1196 | 1210 | 1224 | 1238 | 1252 | 1266 | 1279 | 1300 | 1328 | 1356 | |
| | .12 | $ 1384 | 1398 | 1412 | 1426 | 1439 | 1453 | 1467 | 1481 | 1495 | 1516 | 1544 | 1572 | |
| 50,000 | | $ 563 | 646 | 730 | 813 | 890 | 973 | 1057 | 1133 | 1217 | 1300 | 1460 | 1627 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 514 | 542 | 563 | 591 | 619 | 639 | 667 | 688 | 716 | 744 | 793 | 841 | THEORETICAL HEATING COST * FURN.* HEAT PUMP |
| | .04 | $ 633 | 660 | 681 | 709 | 737 | 758 | 786 | 806 | 834 | 862 | 911 | 959 | $ PER YEAR |
| | .05 | $ 744 | 772 | 793 | 820 | 848 | 869 | 897 | 918 | 946 | 973 | 1022 | 1071 | |
| | .06 | $ 862 | 890 | 911 | 939 | 966 | 987 | 1015 | 1036 | 1064 | 1092 | 1140 | 1189 | |
| | .07 | $ 973 | 1001 | 1022 | 1050 | 1078 | 1099 | 1126 | 1147 | 1175 | 1203 | 1252 | 1300 | |
| | .08 | $ 1092 | 1119 | 1140 | 1168 | 1196 | 1217 | 1245 | 1266 | 1293 | 1321 | 1370 | 1419 | |
| | .09 | $ 1203 | 1231 | 1252 | 1279 | 1307 | 1328 | 1356 | 1377 | 1405 | 1432 | 1481 | 1530 | BALANCE POINT 15 DEG.F. |
| | .10 | $ 1314 | 1342 | 1363 | 1391 | 1419 | 1439 | 1467 | 1488 | 1516 | 1544 | 1592 | 1641 | |
| | .12 | $ 1544 | 1572 | 1592 | 1620 | 1648 | 1669 | 1697 | 1718 | 1745 | 1773 | 1822 | 1871 | |
| 60,000 | | $ 681 | 779 | 876 | 973 | 1071 | 1168 | 1266 | 1363 | 1460 | 1558 | 1752 | 1947 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 619 | 660 | 695 | 737 | 772 | 813 | 848 | 890 | 932 | 966 | 1043 | 1119 | |
| | .04 | $ 737 | 779 | 813 | 855 | 890 | 932 | 966 | 1008 | 1050 | 1085 | 1161 | 1238 | THEORETICAL HEATING COST * FURN.* HEAT PUMP |
| | .05 | $ 848 | 890 | 925 | 966 | 1001 | 1043 | 1078 | 1119 | 1161 | 1196 | 1272 | 1349 | $ PER YEAR |
| | .06 | $ 966 | 1008 | 1043 | 1085 | 1119 | 1161 | 1196 | 1238 | 1279 | 1314 | 1391 | 1467 | |
| | .07 | $ 1085 | 1126 | 1161 | 1203 | 1238 | 1279 | 1314 | 1356 | 1398 | 1432 | 1509 | 1586 | |
| | .08 | $ 1196 | 1238 | 1272 | 1314 | 1349 | 1391 | 1426 | 1467 | 1509 | 1544 | 1620 | 1697 | |
| | .09 | $ 1314 | 1356 | 1391 | 1432 | 1467 | 1509 | 1544 | 1586 | 1627 | 1662 | 1739 | 1815 | BALANCE POINT 19 DEG.F. |
| | .10 | $ 1432 | 1474 | 1509 | 1551 | 1586 | 1627 | 1662 | 1704 | 1745 | 1780 | 1857 | 1933 | |
| | .12 | $ 1662 | 1704 | 1739 | 1780 | 1815 | 1857 | 1892 | 1933 | 1975 | 2010 | 2086 | 2163 | |
| 70,000 | | $ 793 | 911 | 1022 | 1133 | 1252 | 1363 | 1481 | 1592 | 1704 | 1822 | 2052 | 2274 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 730 | 786 | 841 | 904 | 959 | 1015 | 1071 | 1133 | 1189 | 1245 | 1363 | 1474 | |
| | .04 | $ 834 | 890 | 946 | 1008 | 1064 | 1119 | 1175 | 1238 | 1293 | 1349 | 1467 | 1579 | THEORETICAL HEATING COST * FURN.* HEAT PUMP |
| | .05 | $ 946 | 1001 | 1057 | 1119 | 1175 | 1231 | 1286 | 1349 | 1405 | 1460 | 1579 | 1690 | $ PER YEAR |
| | .06 | $ 1050 | 1106 | 1161 | 1224 | 1279 | 1335 | 1391 | 1453 | 1509 | 1565 | 1683 | 1794 | |
| | .07 | $ 1161 | 1217 | 1272 | 1335 | 1391 | 1446 | 1502 | 1565 | 1620 | 1676 | 1794 | 1905 | |
| | .08 | $ 1266 | 1321 | 1377 | 1439 | 1495 | 1551 | 1606 | 1669 | 1725 | 1780 | 1899 | 2010 | |
| | .09 | $ 1377 | 1432 | 1488 | 1551 | 1606 | 1662 | 1718 | 1780 | 1836 | 1892 | 2010 | 2121 | BALANCE POINT 23 DEG.F. |
| | .10 | $ 1488 | 1544 | 1599 | 1662 | 1718 | 1773 | 1829 | 1892 | 1947 | 2003 | 2121 | 2232 | |
| | .12 | $ 1704 | 1759 | 1815 | 1878 | 1933 | 1989 | 2045 | 2107 | 2163 | 2219 | 2337 | 2448 | |
| 80,000 | | $ 911 | 1036 | 1168 | 1300 | 1432 | 1558 | 1690 | 1822 | 1947 | 2079 | 2344 | 2601 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 841 | 925 | 1001 | 1085 | 1168 | 1245 | 1328 | 1412 | 1488 | 1572 | 1739 | 1899 | |
| | .04 | $ 939 | 1022 | 1099 | 1182 | 1266 | 1342 | 1426 | 1509 | 1586 | 1669 | 1836 | 1996 | THEORETICAL HEATING COST * FURN.* HEAT PUMP |
| | .05 | $ 1029 | 1112 | 1189 | 1272 | 1356 | 1432 | 1516 | 1599 | 1676 | 1759 | 1926 | 2086 | $ PER YEAR |
| | .06 | $ 1119 | 1203 | 1279 | 1363 | 1446 | 1523 | 1606 | 1690 | 1766 | 1850 | 2017 | 2177 | |
| | .07 | $ 1210 | 1293 | 1370 | 1453 | 1537 | 1613 | 1697 | 1780 | 1857 | 1940 | 2107 | 2267 | |
| | .08 | $ 1300 | 1384 | 1460 | 1544 | 1627 | 1704 | 1787 | 1871 | 1947 | 2031 | 2198 | 2358 | |
| | .09 | $ 1391 | 1474 | 1551 | 1634 | 1718 | 1794 | 1878 | 1961 | 2038 | 2121 | 2288 | 2448 | BALANCE POINT 27 DEG.F. |
| | .10 | $ 1481 | 1565 | 1641 | 1725 | 1808 | 1885 | 1968 | 2052 | 2128 | 2212 | 2379 | 2538 | |
| | .12 | $ 1669 | 1752 | 1829 | 1912 | 1996 | 2072 | 2156 | 2239 | 2316 | 2399 | 2566 | 2726 | |
| 90,000 | | $ 1022 | 1168 | 1314 | 1460 | 1606 | 1752 | 1899 | 2052 | 2198 | 2344 | 2636 | 2928 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 939 | 1029 | 1119 | 1217 | 1307 | 1398 | 1488 | 1579 | 1669 | 1766 | 1947 | 2128 | |
| | .04 | $ 1043 | 1133 | 1224 | 1321 | 1412 | 1502 | 1592 | 1683 | 1773 | 1871 | 2052 | 2232 | THEORETICAL HEATING COST * FURN.* HEAT PUMP |
| | .05 | $ 1140 | 1231 | 1321 | 1419 | 1509 | 1599 | 1690 | 1780 | 1871 | 1968 | 2149 | 2330 | $ PER YEAR |
| | .06 | $ 1245 | 1335 | 1426 | 1523 | 1613 | 1704 | 1794 | 1885 | 1975 | 2072 | 2253 | 2434 | |
| | .07 | $ 1342 | 1432 | 1523 | 1620 | 1711 | 1801 | 1892 | 1982 | 2072 | 2170 | 2351 | 2532 | |
| | .08 | $ 1446 | 1537 | 1627 | 1725 | 1815 | 1905 | 1996 | 2086 | 2177 | 2274 | 2455 | 2636 | |
| | .09 | $ 1544 | 1634 | 1725 | 1822 | 1912 | 2003 | 2093 | 2184 | 2274 | 2372 | 2552 | 2733 | BALANCE POINT 30 DEG.F. |
| | .10 | $ 1648 | 1739 | 1829 | 1926 | 2017 | 2107 | 2198 | 2288 | 2379 | 2476 | 2657 | 2838 | |
| | .12 | $ 1850 | 1940 | 2031 | 2128 | 2219 | 2309 | 2399 | 2490 | 2580 | 2678 | 2858 | 3039 | |
| 100,000 | | $ 1133 | 1300 | 1460 | 1627 | 1787 | 1947 | 2114 | 2274 | 2441 | 2601 | 2928 | 3255 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 1071 | 1189 | 1314 | 1432 | 1551 | 1669 | 1794 | 1912 | 2031 | 2149 | 2392 | 2636 | |
| | .04 | $ 1147 | 1266 | 1391 | 1509 | 1627 | 1745 | 1871 | 1989 | 2107 | 2225 | 2469 | 2712 | THEORETICAL HEATING COST * FURN.* HEAT PUMP |
| | .05 | $ 1224 | 1342 | 1467 | 1586 | 1704 | 1822 | 1947 | 2065 | 2184 | 2302 | 2545 | 2789 | $ PER YEAR |
| | .06 | $ 1300 | 1419 | 1544 | 1662 | 1780 | 1899 | 2024 | 2142 | 2260 | 2379 | 2622 | 2865 | |
| | .07 | $ 1377 | 1495 | 1620 | 1739 | 1857 | 1975 | 2100 | 2219 | 2337 | 2455 | 2698 | 2942 | |
| | .08 | $ 1453 | 1572 | 1697 | 1815 | 1933 | 2052 | 2177 | 2295 | 2413 | 2532 | 2775 | 3018 | |
| | .09 | $ 1530 | 1648 | 1773 | 1892 | 2010 | 2128 | 2253 | 2372 | 2490 | 2608 | 2852 | 3095 | BALANCE POINT 32 DEG.F. |
| | .10 | $ 1606 | 1725 | 1850 | 1968 | 2086 | 2205 | 2330 | 2448 | 2566 | 2685 | 2928 | 3172 | |
| | .12 | $ 1759 | 1878 | 2003 | 2121 | 2239 | 2358 | 2483 | 2601 | 2719 | 2838 | 3081 | 3325 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | <--ELECTRIC RATE $/KWH |
| $ | 68 | 91 | 114 | 137 | 160 | 183 | 206 | 229 | 275 | <--THEORETICAL AIR CONDITIONING COST |

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 3
HEAT PUMP MODEL: OUTDOOR 48HPQ2 INDOOR HS40
ARI RATED COOLING CAP.: BTUH 195 ( 46500. SEER 8.10
ARI RATED HEATING CAP.: BTUH 47 ( 24000. COP(47) 2.60 HSPF 8.15 MIN.OHR REG IV
BTUH 17 ( 26800. COP(17) 1.85
FURNACE TYPE FUEL OIL FURNACE EFFICIENCY 85.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | HEATING OIL COST - $/GALLON 1.00 | 1.10 | 1.20 | 1.30 | 1.40 | 1.50 | 1.60 | 1.70 | 1.80 | 2.00 | 2.20 | 2.40 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40,000 | | $ 939 | 1029 | 1126 | 1217 | 1314 | 1405 | 1502 | 1592 | 1690 | 1878 | 2065 | 2253 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 493 | 500 | 514 | 528 | 542 | 556 | 563 | 577 | 591 | 612 | 639 | 667 | \| |
| | .04 | $ 612 | 619 | 633 | 646 | 660 | 674 | 681 | 695 | 709 | 730 | 758 | 786 | \| THEORETICAL HEATING COST * FURN.+ HEAT PUMP |
| | .05 | $ 737 | 744 | 758 | 772 | 786 | 799 | 806 | 820 | 834 | 855 | 883 | 911 | \| $ PER YEAR |
| | .06 | $ 862 | 869 | 883 | 897 | 911 | 925 | 932 | 946 | 959 | 980 | 1008 | 1036 | \| |
| | .07 | $ 980 | 987 | 1001 | 1015 | 1029 | 1043 | 1050 | 1064 | 1078 | 1099 | 1126 | 1154 | \| |
| | .08 | $ 1106 | 1112 | 1126 | 1140 | 1154 | 1168 | 1175 | 1189 | 1203 | 1224 | 1252 | 1279 | \| |
| | .09 | $ 1231 | 1238 | 1252 | 1266 | 1279 | 1293 | 1300 | 1314 | 1328 | 1349 | 1377 | 1405 | \| |
| | .10 | $ 1349 | 1356 | 1370 | 1384 | 1398 | 1412 | 1419 | 1432 | 1446 | 1467 | 1495 | 1523 | \| |
| | .12 | $ 1592 | 1599 | 1613 | 1627 | 1641 | 1655 | 1662 | 1676 | 1690 | 1711 | 1739 | 1766 | \| BALANCE POINT 9 DEG.F. |
| 50,000 | | $ 1168 | 1286 | 1405 | 1523 | 1641 | 1759 | 1878 | 1996 | 2107 | 2344 | 2580 | 2817 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 626 | 639 | 660 | 681 | 702 | 723 | 744 | 765 | 779 | 820 | 862 | 904 | \| |
| | .04 | $ 765 | 779 | 799 | 820 | 841 | 862 | 883 | 904 | 918 | 959 | 1001 | 1043 | \| THEORETICAL HEATING COST * FURN.+ HEAT PUMP |
| | .05 | $ 911 | 925 | 946 | 966 | 987 | 1008 | 1029 | 1050 | 1064 | 1106 | 1147 | 1189 | \| $ PER YEAR |
| | .06 | $ 1050 | 1064 | 1085 | 1106 | 1126 | 1147 | 1168 | 1189 | 1203 | 1245 | 1286 | 1328 | \| |
| | .07 | $ 1196 | 1210 | 1231 | 1252 | 1272 | 1293 | 1314 | 1335 | 1349 | 1391 | 1432 | 1474 | \| |
| | .08 | $ 1335 | 1349 | 1370 | 1391 | 1412 | 1432 | 1453 | 1474 | 1488 | 1530 | 1572 | 1613 | \| |
| | .09 | $ 1474 | 1488 | 1509 | 1530 | 1551 | 1572 | 1592 | 1613 | 1627 | 1669 | 1711 | 1752 | \| |
| | .10 | $ 1620 | 1634 | 1655 | 1676 | 1697 | 1718 | 1739 | 1759 | 1773 | 1815 | 1857 | 1899 | \| |
| | .12 | $ 1899 | 1912 | 1933 | 1954 | 1975 | 1996 | 2017 | 2038 | 2052 | 2093 | 2135 | 2177 | \| BALANCE POINT 15 DEG.F. |
| 60,000 | | $ 1405 | 1544 | 1690 | 1829 | 1968 | 2107 | 2253 | 2392 | 2532 | 2817 | 3095 | 3380 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 772 | 799 | 827 | 855 | 890 | 918 | 946 | 973 | 1008 | 1064 | 1126 | 1182 | \| |
| | .04 | $ 925 | 952 | 980 | 1008 | 1043 | 1071 | 1099 | 1126 | 1161 | 1217 | 1279 | 1335 | \| THEORETICAL HEATING COST * FURN.+ HEAT PUMP |
| | .05 | $ 1085 | 1112 | 1140 | 1168 | 1203 | 1231 | 1259 | 1286 | 1321 | 1377 | 1439 | 1495 | \| $ PER YEAR |
| | .06 | $ 1245 | 1272 | 1300 | 1328 | 1363 | 1391 | 1419 | 1446 | 1481 | 1537 | 1599 | 1655 | \| |
| | .07 | $ 1398 | 1426 | 1453 | 1481 | 1516 | 1544 | 1572 | 1599 | 1634 | 1690 | 1752 | 1808 | \| |
| | .08 | $ 1558 | 1586 | 1613 | 1641 | 1676 | 1704 | 1732 | 1759 | 1794 | 1850 | 1912 | 1968 | \| |
| | .09 | $ 1711 | 1739 | 1766 | 1794 | 1829 | 1857 | 1885 | 1912 | 1947 | 2003 | 2065 | 2121 | \| |
| | .10 | $ 1871 | 1899 | 1926 | 1954 | 1989 | 2017 | 2045 | 2072 | 2107 | 2163 | 2225 | 2281 | \| |
| | .12 | $ 2184 | 2212 | 2239 | 2267 | 2302 | 2330 | 2358 | 2385 | 2420 | 2476 | 2539 | 2594 | \| BALANCE POINT 19 DEG.F. |
| 70,000 | | $ 1641 | 1801 | 1968 | 2135 | 2295 | 2462 | 2629 | 2789 | 2956 | 3283 | 3610 | 3944 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 925 | 966 | 1008 | 1050 | 1092 | 1133 | 1175 | 1217 | 1259 | 1342 | 1426 | 1509 | \| |
| | .04 | $ 1099 | 1140 | 1182 | 1224 | 1266 | 1307 | 1349 | 1391 | 1432 | 1516 | 1599 | 1683 | \| THEORETICAL HEATING COST * FURN.+ HEAT PUMP |
| | .05 | $ 1266 | 1307 | 1349 | 1391 | 1432 | 1474 | 1516 | 1558 | 1599 | 1683 | 1766 | 1850 | \| $ PER YEAR |
| | .06 | $ 1432 | 1474 | 1516 | 1558 | 1599 | 1641 | 1683 | 1725 | 1766 | 1850 | 1933 | 2017 | \| |
| | .07 | $ 1606 | 1648 | 1690 | 1732 | 1773 | 1815 | 1857 | 1899 | 1940 | 2024 | 2107 | 2191 | \| |
| | .08 | $ 1773 | 1815 | 1857 | 1899 | 1940 | 1982 | 2024 | 2065 | 2107 | 2191 | 2274 | 2358 | \| |
| | .09 | $ 1940 | 1982 | 2024 | 2065 | 2107 | 2149 | 2191 | 2232 | 2274 | 2358 | 2441 | 2525 | \| |
| | .10 | $ 2114 | 2156 | 2198 | 2239 | 2281 | 2323 | 2365 | 2406 | 2448 | 2532 | 2615 | 2698 | \| |
| | .12 | $ 2455 | 2497 | 2539 | 2580 | 2622 | 2664 | 2705 | 2747 | 2789 | 2872 | 2956 | 3039 | \| BALANCE POINT 23 DEG.F. |
| 80,000 | | $ 1878 | 2065 | 2253 | 2441 | 2629 | 2817 | 3005 | 3192 | 3380 | 3756 | 4131 | 4507 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 1099 | 1154 | 1210 | 1259 | 1314 | 1370 | 1426 | 1481 | 1537 | 1648 | 1759 | 1871 | \| |
| | .04 | $ 1272 | 1328 | 1384 | 1432 | 1488 | 1544 | 1599 | 1655 | 1711 | 1822 | 1933 | 2045 | \| THEORETICAL HEATING COST * FURN.+ HEAT PUMP |
| | .05 | $ 1453 | 1509 | 1565 | 1613 | 1669 | 1725 | 1780 | 1836 | 1892 | 2003 | 2114 | 2225 | \| $ PER YEAR |
| | .06 | $ 1634 | 1690 | 1745 | 1794 | 1850 | 1905 | 1961 | 2017 | 2072 | 2184 | 2295 | 2406 | \| |
| | .07 | $ 1815 | 1871 | 1926 | 1975 | 2031 | 2086 | 2142 | 2198 | 2253 | 2365 | 2476 | 2587 | \| |
| | .08 | $ 1996 | 2052 | 2107 | 2156 | 2212 | 2267 | 2323 | 2379 | 2434 | 2545 | 2657 | 2768 | \| |
| | .09 | $ 2177 | 2232 | 2288 | 2337 | 2392 | 2448 | 2504 | 2559 | 2615 | 2726 | 2838 | 2949 | \| |
| | .10 | $ 2351 | 2406 | 2462 | 2511 | 2566 | 2622 | 2678 | 2733 | 2789 | 2900 | 3012 | 3123 | \| |
| | .12 | $ 2712 | 2768 | 2824 | 2872 | 2928 | 2984 | 3039 | 3095 | 3151 | 3262 | 3373 | 3485 | \| BALANCE POINT 27 DEG.F. |
| 90,000 | | $ 2107 | 2323 | 2532 | 2747 | 2956 | 3165 | 3380 | 3589 | 3798 | 4222 | 4646 | 5071 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 1279 | 1349 | 1426 | 1495 | 1565 | 1641 | 1711 | 1780 | 1857 | 1996 | 2142 | 2288 | \| |
| | .04 | $ 1460 | 1530 | 1606 | 1676 | 1745 | 1822 | 1892 | 1961 | 2038 | 2177 | 2323 | 2469 | \| THEORETICAL HEATING COST * FURN.+ HEAT PUMP |
| | .05 | $ 1648 | 1718 | 1794 | 1864 | 1933 | 2010 | 2079 | 2149 | 2225 | 2365 | 2511 | 2657 | \| $ PER YEAR |
| | .06 | $ 1836 | 1905 | 1982 | 2052 | 2121 | 2198 | 2267 | 2337 | 2413 | 2552 | 2698 | 2845 | \| |
| | .07 | $ 2024 | 2093 | 2170 | 2239 | 2309 | 2385 | 2455 | 2525 | 2601 | 2740 | 2886 | 3032 | \| |
| | .08 | $ 2212 | 2281 | 2358 | 2427 | 2497 | 2573 | 2643 | 2712 | 2789 | 2928 | 3074 | 3220 | \| |
| | .09 | $ 2399 | 2469 | 2545 | 2615 | 2685 | 2761 | 2831 | 2900 | 2977 | 3116 | 3262 | 3408 | \| |
| | .10 | $ 2587 | 2657 | 2733 | 2803 | 2872 | 2949 | 3018 | 3088 | 3165 | 3304 | 3450 | 3596 | \| |
| | .12 | $ 2956 | 3025 | 3102 | 3172 | 3241 | 3318 | 3387 | 3457 | 3533 | 3672 | 3818 | 3965 | \| BALANCE POINT 30 DEG.F. |
| 100,000 | | $ 2344 | 2580 | 2817 | 3046 | 3283 | 3519 | 3756 | 3985 | 4222 | 4695 | 5161 | 5634 | <--THEORETICAL HEATING COST * FURNACE ONLY |
| | .03 | $ 1467 | 1558 | 1641 | 1732 | 1822 | 1912 | 2003 | 2086 | 2177 | 2358 | 2532 | 2712 | \| |
| | .04 | $ 1662 | 1752 | 1836 | 1926 | 2017 | 2107 | 2198 | 2281 | 2372 | 2552 | 2726 | 2907 | \| THEORETICAL HEATING COST * FURN.+ HEAT PUMP |
| | .05 | $ 1857 | 1947 | 2031 | 2121 | 2212 | 2302 | 2392 | 2476 | 2566 | 2747 | 2921 | 3102 | \| $ PER YEAR |
| | .06 | $ 2045 | 2135 | 2219 | 2309 | 2399 | 2490 | 2580 | 2664 | 2754 | 2935 | 3109 | 3290 | \| |
| | .07 | $ 2239 | 2330 | 2413 | 2504 | 2594 | 2685 | 2775 | 2858 | 2949 | 3130 | 3304 | 3485 | \| |
| | .08 | $ 2434 | 2525 | 2608 | 2698 | 2789 | 2879 | 2970 | 3053 | 3144 | 3325 | 3498 | 3679 | \| |
| | .09 | $ 2629 | 2719 | 2803 | 2893 | 2984 | 3074 | 3165 | 3248 | 3338 | 3519 | 3693 | 3874 | \| |
| | .10 | $ 2817 | 2907 | 2991 | 3081 | 3172 | 3262 | 3352 | 3436 | 3526 | 3707 | 3881 | 4062 | \| |
| | .12 | $ 3206 | 3297 | 3380 | 3471 | 3561 | 3651 | 3742 | 3825 | 3916 | 4097 | 4271 | 4451 | \| BALANCE POINT 32 DEG.F. |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 68 | 91 | 114 | 137 | 160 | 183 | 206 | 229 | 275 | <--THEORETICAL AIR CONDITIONING COST |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.

BARD MANUFACTURING COMPANY

DUAL FUEL ADD-ON HEAT PUMP GUIDE TO ENERGY COST SAVINGS

REGION 5

HEAT PUMP MODEL: OUTDOOR 48HP02 INDOOR H540

ARI RATED COOLING CAP.: BTUH 95 ) 36500; SEER 8.10

ARI RATED HEATING CAP.: BTUH 47 ) 34000; COP 47 ) 2.60; HSPF 6.15 MIN.OHR REG IV

BTUH 17 ) 26800; COP 17 ) 1.85

FURNACE TYPE PROPANE GAS FURNACE EFFICIENCY 65.00% AFUE

| HEAT LOSS BTUH | ELEC. COST $/KWH | PROPANE GAS COST - $/GALLON .60 | .65 | .70 | .75 | .80 | .85 | .90 | .95 | 1.00 | 1.10 | 1.20 | 1.20 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40,000 | | $ 855 | 926 | 1001 | 1071 | 1140 | 1210 | 1286 | 1356 | 1426 | 1572 | 1718 | 1718 | <--THEORETICAL HEATING COST = FURNACE ONLY |
| | .03 | $ 479 | 493 | 500 | 507 | 521 | 528 | 535 | 549 | 556 | 577 | 591 | 591 | THEORETICAL HEATING COST = FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 598 | 612 | 619 | 626 | 639 | 646 | 653 | 667 | 674 | 695 | 709 | 709 | |
| | .05 | $ 723 | 737 | 744 | 751 | 765 | 772 | 779 | 793 | 799 | 820 | 834 | 834 | |
| | .06 | $ 848 | 862 | 869 | 876 | 890 | 897 | 904 | 918 | 925 | 946 | 959 | 959 | |
| | .07 | $ 966 | 980 | 987 | 994 | 1008 | 1015 | 1022 | 1036 | 1043 | 1064 | 1078 | 1078 | |
| | .08 | $ 1092 | 1106 | 1112 | 1119 | 1133 | 1140 | 1147 | 1161 | 1168 | 1189 | 1203 | 1203 | |
| | .09 | $ 1217 | 1231 | 1238 | 1245 | 1259 | 1266 | 1272 | 1286 | 1293 | 1314 | 1328 | 1328 | BALANCE POINT 9 DEG.F. |
| | .10 | $ 1335 | 1349 | 1356 | 1363 | 1377 | 1384 | 1391 | 1405 | 1412 | 1432 | 1446 | 1446 | |
| | .12 | $ 1579 | 1592 | 1599 | 1606 | 1620 | 1627 | 1634 | 1648 | 1655 | 1676 | 1690 | 1690 | |
| 50,000 | | $ 1071 | 1161 | 1252 | 1335 | 1426 | 1516 | 1606 | 1697 | 1787 | 1968 | 2142 | 2142 | <--THEORETICAL HEATING COST = FURNACE ONLY |
| | .03 | $ 605 | 619 | 639 | 653 | 667 | 681 | 695 | 709 | 730 | 758 | 786 | 786 | THEORETICAL HEATING COST = FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 744 | 758 | 779 | 793 | 806 | 820 | 834 | 848 | 869 | 897 | 925 | 925 | |
| | .05 | $ 890 | 904 | 925 | 939 | 952 | 966 | 980 | 994 | 1015 | 1043 | 1071 | 1071 | |
| | .06 | $ 1029 | 1043 | 1064 | 1078 | 1092 | 1106 | 1119 | 1133 | 1154 | 1182 | 1210 | 1210 | |
| | .07 | $ 1175 | 1189 | 1210 | 1224 | 1238 | 1252 | 1266 | 1279 | 1300 | 1328 | 1356 | 1356 | |
| | .08 | $ 1314 | 1328 | 1349 | 1363 | 1377 | 1391 | 1405 | 1419 | 1439 | 1467 | 1495 | 1495 | |
| | .09 | $ 1453 | 1467 | 1488 | 1502 | 1516 | 1530 | 1544 | 1558 | 1579 | 1606 | 1634 | 1634 | BALANCE POINT 15 DEG.F. |
| | .10 | $ 1599 | 1613 | 1634 | 1648 | 1662 | 1676 | 1690 | 1704 | 1725 | 1752 | 1780 | 1780 | |
| | .12 | $ 1878 | 1892 | 1912 | 1926 | 1940 | 1954 | 1968 | 1982 | 2003 | 2031 | 2059 | 2059 | |
| 60,000 | | $ 1286 | 1391 | 1502 | 1606 | 1718 | 1822 | 1926 | 2038 | 2142 | 2358 | 2573 | 2573 | <--THEORETICAL HEATING COST = FURNACE ONLY |
| | .03 | $ 744 | 765 | 786 | 813 | 834 | 855 | 876 | 904 | 925 | 966 | 1015 | 1015 | THEORETICAL HEATING COST = FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 897 | 918 | 939 | 966 | 987 | 1008 | 1029 | 1057 | 1078 | 1119 | 1168 | 1168 | |
| | .05 | $ 1057 | 1078 | 1099 | 1126 | 1147 | 1168 | 1189 | 1217 | 1238 | 1279 | 1328 | 1328 | |
| | .06 | $ 1217 | 1238 | 1259 | 1286 | 1307 | 1328 | 1349 | 1377 | 1398 | 1439 | 1488 | 1488 | |
| | .07 | $ 1370 | 1391 | 1412 | 1439 | 1460 | 1481 | 1502 | 1530 | 1551 | 1592 | 1641 | 1641 | |
| | .08 | $ 1530 | 1551 | 1572 | 1599 | 1620 | 1641 | 1662 | 1690 | 1711 | 1752 | 1801 | 1801 | |
| | .09 | $ 1683 | 1704 | 1725 | 1752 | 1773 | 1794 | 1815 | 1843 | 1864 | 1905 | 1954 | 1954 | BALANCE POINT 19 DEG.F. |
| | .10 | $ 1843 | 1864 | 1885 | 1912 | 1933 | 1954 | 1975 | 2003 | 2024 | 2065 | 2114 | 2114 | |
| | .12 | $ 2156 | 2177 | 2198 | 2225 | 2246 | 2267 | 2288 | 2316 | 2337 | 2379 | 2427 | 2427 | |
| 70,000 | | $ 1502 | 1627 | 1752 | 1878 | 2003 | 2128 | 2253 | 2379 | 2504 | 2754 | 3005 | 3005 | <--THEORETICAL HEATING COST = FURNACE ONLY |
| | .03 | $ 890 | 918 | 952 | 980 | 1015 | 1050 | 1078 | 1112 | 1140 | 1203 | 1272 | 1272 | THEORETICAL HEATING COST = FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 1064 | 1092 | 1126 | 1154 | 1189 | 1224 | 1252 | 1286 | 1314 | 1377 | 1446 | 1446 | |
| | .05 | $ 1231 | 1259 | 1293 | 1321 | 1356 | 1391 | 1419 | 1453 | 1481 | 1544 | 1613 | 1613 | |
| | .06 | $ 1398 | 1426 | 1460 | 1488 | 1523 | 1558 | 1586 | 1620 | 1648 | 1711 | 1780 | 1780 | |
| | .07 | $ 1572 | 1599 | 1634 | 1662 | 1697 | 1732 | 1759 | 1794 | 1822 | 1885 | 1954 | 1954 | |
| | .08 | $ 1739 | 1766 | 1801 | 1829 | 1864 | 1899 | 1926 | 1961 | 1989 | 2052 | 2121 | 2121 | |
| | .09 | $ 1905 | 1933 | 1968 | 1996 | 2031 | 2065 | 2093 | 2128 | 2156 | 2219 | 2288 | 2288 | BALANCE POINT 23 DEG.F. |
| | .10 | $ 2079 | 2107 | 2142 | 2170 | 2205 | 2239 | 2267 | 2302 | 2330 | 2392 | 2462 | 2462 | |
| | .12 | $ 2420 | 2448 | 2483 | 2511 | 2545 | 2580 | 2608 | 2643 | 2671 | 2733 | 2803 | 2803 | |
| 80,000 | | $ 1718 | 1857 | 2003 | 2142 | 2288 | 2427 | 2573 | 2719 | 2858 | 3144 | 3436 | 3436 | <--THEORETICAL HEATING COST = FURNACE ONLY |
| | .03 | $ 1050 | 1092 | 1133 | 1175 | 1217 | 1259 | 1300 | 1342 | 1384 | 1467 | 1558 | 1558 | THEORETICAL HEATING COST = FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 1224 | 1266 | 1307 | 1349 | 1391 | 1432 | 1474 | 1516 | 1558 | 1641 | 1732 | 1732 | |
| | .05 | $ 1405 | 1446 | 1488 | 1530 | 1572 | 1613 | 1655 | 1697 | 1739 | 1822 | 1912 | 1912 | |
| | .06 | $ 1586 | 1627 | 1669 | 1711 | 1752 | 1794 | 1836 | 1878 | 1919 | 2003 | 2093 | 2093 | |
| | .07 | $ 1766 | 1808 | 1850 | 1892 | 1933 | 1975 | 2017 | 2059 | 2100 | 2184 | 2274 | 2274 | |
| | .08 | $ 1947 | 1989 | 2031 | 2072 | 2114 | 2156 | 2198 | 2239 | 2281 | 2365 | 2455 | 2455 | |
| | .09 | $ 2128 | 2170 | 2212 | 2253 | 2295 | 2337 | 2379 | 2420 | 2462 | 2545 | 2636 | 2636 | BALANCE POINT 27 DEG.F. |
| | .10 | $ 2302 | 2344 | 2385 | 2427 | 2469 | 2511 | 2552 | 2594 | 2636 | 2719 | 2810 | 2810 | |
| | .12 | $ 2664 | 2705 | 2747 | 2789 | 2831 | 2872 | 2914 | 2956 | 2998 | 3081 | 3172 | 3172 | |
| 90,000 | | $ 1926 | 2093 | 2253 | 2413 | 2573 | 2733 | 2893 | 3060 | 3220 | 3540 | 3860 | 3860 | <--THEORETICAL HEATING COST = FURNACE ONLY |
| | .03 | $ 1217 | 1272 | 1328 | 1384 | 1439 | 1495 | 1544 | 1599 | 1655 | 1766 | 1878 | 1878 | THEORETICAL HEATING COST = FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 1398 | 1453 | 1509 | 1565 | 1620 | 1676 | 1725 | 1780 | 1836 | 1947 | 2059 | 2059 | |
| | .05 | $ 1586 | 1641 | 1697 | 1752 | 1808 | 1864 | 1912 | 1968 | 2024 | 2135 | 2246 | 2246 | |
| | .06 | $ 1773 | 1829 | 1885 | 1940 | 1996 | 2052 | 2100 | 2156 | 2212 | 2323 | 2434 | 2434 | |
| | .07 | $ 1961 | 2017 | 2072 | 2128 | 2184 | 2239 | 2288 | 2344 | 2399 | 2511 | 2622 | 2622 | |
| | .08 | $ 2149 | 2205 | 2260 | 2316 | 2372 | 2427 | 2476 | 2532 | 2587 | 2698 | 2810 | 2810 | |
| | .09 | $ 2337 | 2392 | 2448 | 2504 | 2559 | 2615 | 2664 | 2719 | 2775 | 2886 | 2998 | 2998 | BALANCE POINT 30 DEG.F. |
| | .10 | $ 2525 | 2580 | 2636 | 2692 | 2747 | 2803 | 2852 | 2907 | 2963 | 3074 | 3185 | 3185 | |
| | .12 | $ 2893 | 2949 | 3005 | 3060 | 3116 | 3172 | 3220 | 3276 | 3332 | 3443 | 3554 | 3554 | |
| 100,000 | | $ 2142 | 2323 | 2504 | 2678 | 2858 | 3039 | 3220 | 3394 | 3575 | 3937 | 4291 | 4291 | <--THEORETICAL HEATING COST = FURNACE ONLY |
| | .03 | $ 1391 | 1460 | 1523 | 1592 | 1662 | 1732 | 1794 | 1864 | 1933 | 2065 | 2205 | 2205 | THEORETICAL HEATING COST = FURN.+ HEAT PUMP $ PER YEAR |
| | .04 | $ 1586 | 1655 | 1718 | 1787 | 1857 | 1926 | 1989 | 2059 | 2128 | 2260 | 2399 | 2399 | |
| | .05 | $ 1780 | 1850 | 1912 | 1982 | 2052 | 2121 | 2184 | 2253 | 2323 | 2455 | 2594 | 2594 | |
| | .06 | $ 1968 | 2038 | 2100 | 2170 | 2239 | 2309 | 2372 | 2441 | 2511 | 2643 | 2782 | 2782 | |
| | .07 | $ 2163 | 2232 | 2295 | 2365 | 2434 | 2504 | 2566 | 2636 | 2705 | 2838 | 2977 | 2977 | |
| | .08 | $ 2358 | 2427 | 2490 | 2559 | 2629 | 2698 | 2761 | 2831 | 2900 | 3032 | 3172 | 3172 | |
| | .09 | $ 2552 | 2622 | 2685 | 2754 | 2824 | 2893 | 2956 | 3025 | 3095 | 3227 | 3366 | 3366 | BALANCE POINT 32 DEG.F. |
| | .10 | $ 2740 | 2810 | 2872 | 2942 | 3012 | 3081 | 3144 | 3213 | 3283 | 3419 | 3554 | 3554 | |
| | .12 | $ 3130 | 3199 | 3262 | 3332 | 3401 | 3471 | 3533 | 3603 | 3672 | 3805 | 3944 | 3944 | |

ANNUAL AIR CONDITIONING COST WHEN COOLING LOAD IS SIZED TO MATCH COOLING CAPACITY OF HEAT PUMP.

| | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .12 | |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 68 | 91 | 114 | 137 | 160 | 183 | 206 | 229 | 275 | <--THEORETICAL AIR CONDITIONING COST |

<--ELECTRIC RATE $/KWH

THE ABOVE ANNUAL HEATING AND COOLING OPERATING COSTS ARE THEORETICAL ESTIMATES ONLY AND ARE PROVIDED FOR A COMMON BASIS OF COMPARISON BETWEEN VARIOUS TYPES OF HEATING AND COOLING SYSTEMS. ACTUAL VALUES MAY VARY DEPENDING ON ACTUAL WEATHER CONDITIONS AND INDIVIDUAL USAGE PATTERN.