

HEATING AND COOLING EFFICIENCY PROGRAM

Ducted Air Source Heat Pump Worksheet Non Variable Speed Compressor



An IDACORP Company

CUSTOMER INFORMATION

Official Use Only: ID number

Name (as listed on the Idaho Power account) _____

CONTRACTOR INFORMATION

Installer name _____

Company name _____

NEW UNIT DATA

Manufacturer _____ AHRI reference # _____ Outdoor unit model # _____

Indoor unit model # _____ HSPF _____ or HSPF2 _____

OTHER INFORMATION

When system fan is turned on, does air flow from all supply registers?

Yes No If No, then provisions must be made for disconnects to be fixed

Installation Date _____

Existing Primary Cooling Source

Central A/C Window A/C Evaporative Cooler None Other

TrueFlow® Test (see step by step instructions on page 3)

| | | |
|---|-------------------------------|--|
| Tested in <input type="checkbox"/> Heating <input type="checkbox"/> Cooling | Filter size (16x20 etc) _____ | ¹ Stage/capacity tested? |
| ² _____ tons tested | | ³ Insert plate size 14 20 |
| ⁴ Note where plate installed Filter slot Filter grille | | ⁵ Measure normal supply operating pressure (NSOP) _____ |
| ⁶ Measure supply pressure with plate in (TFSOP) _____ | | ⁷ Correction factor (found in Manual) _____ or $\sqrt{\frac{\text{Box 5}}{\text{Box 6}}}$ |
| ⁸ Plate pressure _____ | | ⁹ Raw flow (CFM) _____ |
| ¹⁰ Corrected flow (CFM) _____ Box 9 x Box 7 | | ¹¹ CFM/ton _____ or Box 10 / Box 2 |

Optional Test Method Instead of True Flow Test

Record External Static Pressure (ESP). Use ESP to lookup airflow on manufacturer table (ESP vs total airflow). Divide by tonnage and record CFM/Ton. Confirm CFM/Ton meets manufacture requirement. Range is 325-500 CFM/Ton. If not met, change speed setting.

External Static Pressure _____ CFM/Ton meets manufacture requirements Yes No

CFM/Ton _____

ACCEPTANCE OF TERMS

I hereby certify that all information on this worksheet is accurate, services have been performed to program requirements. I certify that we have complied with all the terms outlined in the Idaho Power Heating and Cooling Efficiency Program Contractor Participation Agreement.

Installer

Print First and Last Name

Signature

Date

Ducted Air Source Heat Pump Worksheet

System Testing

| | | | Measured | Manufacturer's Target |
|-------------------|---------|---------|----------|-----------------------|
| Tested In | Heating | Cooling | | |
| Outside temp (°F) | | | | |

Refrigerant Charge Verification

Refrigerant charge method when outdoor temperature is above 65 degrees F. Must meet manufacture requirements.

| | | |
|---|--|--|
| Condenser saturation temp (from gauge °F) | | |
| Liquid line temp (°F) | | |
| Subcooling (°F) (Condenser saturation temp—liquid line temp) | | |

Refrigerant charge method when outdoor temperature is below 65 degrees F. Must be at or below chart value.

| | | |
|---|--|--|
| Supply dry bulb temp (°F) | | |
| Return dry bulb temp (°F) | | |
| Temperature split (°F) | | |
| Compare measured temperature split to minimum temperature split shown on page 4 chart for given 'CFM/Ton versus Outdoor Air Temperature' condition. Temp split must be at or above chart value. | | |

CONTROL SETUP/CHECKOUT (all systems)

| | | |
|--|-----|----|
| Auxiliary heat cannot operate at outside temperatures above 35 F | Yes | No |
|--|-----|----|

DOCUMENT SUBMITTAL CHECKLIST

Copy of Paid Invoice Load Calculation
Incentive Application AHRI Certificate of Product Ratings
Air Source Heat Pump Worksheet

HEATING AND COOLING EFFICIENCY PROGRAM DUCTED AIR SOURCE HEAT PUMP SPECIFICATION – NON VARIABLE SPEED COMPRESSOR

General

Residential customers can receive the Idaho Power incentive for having a qualified ducted air source heat pump installed into a qualified home. The incentive is available for homeowners, builders, and property owners. Incentive is available to residential customers throughout Idaho Power's service area. The Participating Contractor will install the equipment and process all incentive forms. Homes receiving this incentive may not receive incentives for the same equipment under another Idaho Power incentive program. Up to two incentives per home are available for two new ducted air source heat pumps in new construction or when replacing two qualified existing systems. No minimum length of residency required. Home can be primary residence, vacation home, or rental. Home must be single family site built, manufactured, duplex, triplex, or fourplex.

Requirements

- Heat pump is minimum 8.5 HSPF or 7.2 HSPF2 as listed on AHRI's Directory of Certified Product Performance found at www.ahridirectory.org.
- Heat pump is 5 tons or less and sized using Idaho Power Heating and Cooling Load Worksheet, ACCA Manual J or similar calculator.
- Heat pump is selected using dominant load with capacity up to 6000 BTUs/Hr higher than the calculated dominant load.
- Winter design temperature no higher than 30 degrees F.
- Confirm supplemental heat cannot operate above 35 degrees F.
- Confirm system airflow is between 325 - 500 CFM/Ton when measured with TrueFlow test kit, or by comparing external static pressure (ESP) to manufacturer CFM versus ESP table.
- Confirm refrigerant charge as indicated in this worksheet.
- Visually inspect ductwork to ensure air flows from all registers.
- If an existing system is being replaced and is electric forced air, any supplemental heat in the new heat pump must be electric.
- If new construction or if the home is existing and the system is being replaced is oil or propane forced air furnace, natural gas cannot be available

Air-Source Heat Pump Worksheet

TrueFlow® Meter Test Instructions

1. Turn on air handler (by using fan-only switch or by turning on heat/AC). It is best to call for the flow that will be used during most of the year (probably heating). Make sure you know which stage is operating so you will divide the measured flow by the right number of tons. Check size of outdoor unit to get capacity (tons). Record which stage (if multistage compressor) that you test (Box 1) and the tons tested (Box 2). Note TrueFlow plate size (Box 3) and where you will install the TrueFlow (Box 4). Normally you will install the TrueFlow in place of the filter, but you can also install it at a return filter grille if needed.
2. Place static pressure tap in supply plenum; drill hole if needed. The hooked end of the tap should face into the air stream. Note it is generally better to place tap at least 6" away from any take-off or turning vane. If this position was used to measure static pressure as part of the external static pressure measurement, the tap does not need to be moved. If the system tested is a manufactured home, access the supply system through the nearest supply register. Temporarily remove the magnet from the static pressure tap, reach down into the supply boot (look out for sharp edges) and toss the tap back toward the furnace. You can also put this tap in another place on the supply side (refrigerant line penetration into air handler cabinet, for example).
3. Connect other end of hose (that leads to the pressure tap) to the Input side of the pressure gauge (Channel A). Turn on gauge (if using DG-700 or similar). If using DG-700, switch to inches of water mode by using Units switch. Keep gauge in pressure/pressure mode for all tests.
4. Record normal supply operating pressure (NSOP) on worksheet in (Box 5). If reading is very "jumpy", press the Average key and wait at least 5 seconds for the average value to display.
5. Now remove system filter and replace with TrueFlow outfitted with any needed spacers. Plate should be positioned so side with labels faces oncoming air flow. Connect plate hoses to Channel B of pressure gauge (if using DG-700); otherwise, connect plate hoses so they will read pressure drop across plate. If TrueFlow is installed on a non-ducted return (on the top/front of the furnace cabinet or on a return grille), you will need to apply a 1.04 multiplier to the raw flow in addition to any Correction Factor.
6. Look at the pressure in supply system with TrueFlow installed (TFSOP). This will read from Channel A on the gauge; record on worksheet in (Box 6).
7. Look at NSOP and TFSOP. If they differ by more than 3 Pa or 0.02" water, look up a Correction Factor. Use look up table on TrueFlow laminated card to figure any needed correction. Record Correction Factor $\sqrt{\frac{NSOP}{TFSOP}}$ on worksheet in (Box 7).
8. Read pressure across plate; record on worksheet in (Box 8).
9. Using plate pressure, look up Raw Flow on laminated card. Make sure you look up the flow for the correct plate (#14 or #20). Record Raw Flow on worksheet in (Box 9).
10. Multiply Raw Flow (Box 9) by Correction Factor (Box 7); this is Corrected Flow. Record on worksheet in (Box 10).
11. Divide Corrected Flow (Box 10) by Tested Tons (Box 2) to get CFM/ton. Record in (Box 11). If flow is between 325 to 500 CFM/ton, the system meets program specs.

Temperature Split - CFM/Ton versus Outdoor Air Temperature
R-410A Minimum Expected Temperature Split (Supply - Return)

| Outdoor Temp. | CFM/TON | | | | | | | | | | | | | | | |
|---------------|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 300 | 310 | 320 | 330 | 340 | 350 | 360 | 370 | 380 | 390 | 400 | 410 | 420 | 430 | 440 | 450 |
| 5 | 13.0 | 12.6 | 12.2 | 11.8 | 11.4 | 11.0 | 10.8 | 10.6 | 10.4 | 10.2 | 10.0 | 9.8 | 9.6 | 9.4 | 9.2 | 9.0 |
| 7 | 13.8 | 13.4 | 13.0 | 12.6 | 12.2 | 11.8 | 11.6 | 11.3 | 11.1 | 10.8 | 10.6 | 10.4 | 10.1 | 9.9 | 9.6 | 9.4 |
| 9 | 14.6 | 14.2 | 13.8 | 13.4 | 13.0 | 12.6 | 12.3 | 12.0 | 11.8 | 11.5 | 11.2 | 10.9 | 10.6 | 10.4 | 10.1 | 9.8 |
| 11 | 15.4 | 15.0 | 14.6 | 14.2 | 13.8 | 13.4 | 13.1 | 12.8 | 12.4 | 12.1 | 11.8 | 11.5 | 11.2 | 10.8 | 10.5 | 10.2 |
| 13 | 16.2 | 15.8 | 15.4 | 15.0 | 14.6 | 14.2 | 13.8 | 13.5 | 13.1 | 12.8 | 12.4 | 12.0 | 11.7 | 11.3 | 11.0 | 10.6 |
| 15 | 17.0 | 16.6 | 16.2 | 15.8 | 15.4 | 15.0 | 14.6 | 14.2 | 13.8 | 13.4 | 13.0 | 12.6 | 12.2 | 11.8 | 11.4 | 11.0 |
| 17 | 17.6 | 17.2 | 16.8 | 16.4 | 16.0 | 15.6 | 15.2 | 14.8 | 14.4 | 14.0 | 13.6 | 13.2 | 12.8 | 12.4 | 12.0 | 11.6 |
| 19 | 18.2 | 17.8 | 17.4 | 17.0 | 16.6 | 16.2 | 15.8 | 15.4 | 15.0 | 14.6 | 14.2 | 13.8 | 13.4 | 13.0 | 12.6 | 12.2 |
| 21 | 18.8 | 18.4 | 18.0 | 17.6 | 17.2 | 16.8 | 16.4 | 16.0 | 15.6 | 15.2 | 14.8 | 14.4 | 14.0 | 13.6 | 13.2 | 12.8 |
| 23 | 19.4 | 19.0 | 18.6 | 18.2 | 17.8 | 17.4 | 17.0 | 16.6 | 16.2 | 15.8 | 15.4 | 15.0 | 14.6 | 14.2 | 13.8 | 13.4 |
| 25 | 20.0 | 19.6 | 19.2 | 18.8 | 18.4 | 18.0 | 17.6 | 17.2 | 16.8 | 16.4 | 16.0 | 15.6 | 15.2 | 14.8 | 14.4 | 14.0 |
| 27 | 20.6 | 20.2 | 19.8 | 19.4 | 19.0 | 18.6 | 18.2 | 17.7 | 17.3 | 16.8 | 16.4 | 16.0 | 15.6 | 15.2 | 14.8 | 14.4 |
| 29 | 21.2 | 20.8 | 20.4 | 20.0 | 19.6 | 19.2 | 18.7 | 18.2 | 17.8 | 17.3 | 16.8 | 16.4 | 16.0 | 15.6 | 15.2 | 14.8 |
| 31 | 21.8 | 21.4 | 21.0 | 20.6 | 20.2 | 19.8 | 19.3 | 18.8 | 18.2 | 17.7 | 17.2 | 16.8 | 16.4 | 16.0 | 15.6 | 15.2 |
| 33 | 22.4 | 22.0 | 21.6 | 21.2 | 20.8 | 20.4 | 19.8 | 19.3 | 18.7 | 18.2 | 17.6 | 17.2 | 16.8 | 16.4 | 16.0 | 15.6 |
| 35 | 23.0 | 22.6 | 22.2 | 21.8 | 21.4 | 21.0 | 20.4 | 19.8 | 19.2 | 18.6 | 18.0 | 17.6 | 17.2 | 16.8 | 16.4 | 16.0 |
| 37 | 24.0 | 23.6 | 23.1 | 22.7 | 22.2 | 21.8 | 21.2 | 20.6 | 20.0 | 19.4 | 18.8 | 18.4 | 18.0 | 17.6 | 17.2 | 16.8 |
| 39 | 25.0 | 24.5 | 24.0 | 23.6 | 23.1 | 22.6 | 22.0 | 21.4 | 20.8 | 20.2 | 19.6 | 19.2 | 18.8 | 18.4 | 18.0 | 17.6 |
| 41 | 26.0 | 25.5 | 25.0 | 24.4 | 23.9 | 23.4 | 22.8 | 22.2 | 21.6 | 21.0 | 20.4 | 20.0 | 19.6 | 19.2 | 18.8 | 18.4 |
| 43 | 27.0 | 26.4 | 25.9 | 25.3 | 24.8 | 24.2 | 23.6 | 23.0 | 22.4 | 21.8 | 21.2 | 20.8 | 20.4 | 20.0 | 19.6 | 19.2 |
| 45 | 28.0 | 27.4 | 26.8 | 26.2 | 25.6 | 25.0 | 24.4 | 23.8 | 23.2 | 22.6 | 22.0 | 21.6 | 21.2 | 20.8 | 20.4 | 20.0 |
| 47 | 29.2 | 28.5 | 27.8 | 27.2 | 26.5 | 25.8 | 25.2 | 24.6 | 24.0 | 23.4 | 22.8 | 22.4 | 21.9 | 21.5 | 21.0 | 20.6 |
| 49 | 30.4 | 29.6 | 28.9 | 28.1 | 27.4 | 26.6 | 26.0 | 25.4 | 24.8 | 24.2 | 23.6 | 23.1 | 22.6 | 22.2 | 21.7 | 21.2 |
| 51 | 31.6 | 30.8 | 29.9 | 29.1 | 28.2 | 27.4 | 26.8 | 26.2 | 25.6 | 25.0 | 24.4 | 23.9 | 23.4 | 22.8 | 22.3 | 21.8 |
| 53 | 32.8 | 31.9 | 31.0 | 30.0 | 29.1 | 28.2 | 27.6 | 27.0 | 26.4 | 25.8 | 25.2 | 24.6 | 24.1 | 23.5 | 23.0 | 22.4 |
| 55 | 34.0 | 33.0 | 32.0 | 31.0 | 30.0 | 29.0 | 28.4 | 27.8 | 27.2 | 26.6 | 26.0 | 25.4 | 24.8 | 24.2 | 23.6 | 23.0 |
| 57 | 34.8 | 33.8 | 32.8 | 31.8 | 30.8 | 29.8 | 29.2 | 28.5 | 27.9 | 27.2 | 26.6 | 26.0 | 25.4 | 24.8 | 24.2 | 23.6 |
| 59 | 35.6 | 34.6 | 33.6 | 32.6 | 31.6 | 30.6 | 29.9 | 29.2 | 28.6 | 27.9 | 27.2 | 26.6 | 26.0 | 25.4 | 24.8 | 24.2 |
| 61 | 36.4 | 35.4 | 34.4 | 33.4 | 32.4 | 31.4 | 30.7 | 30.0 | 29.2 | 28.5 | 27.8 | 27.2 | 26.6 | 26.0 | 25.4 | 24.8 |
| 63 | 37.2 | 36.2 | 35.2 | 34.2 | 33.2 | 32.2 | 31.4 | 30.7 | 29.9 | 29.2 | 28.4 | 27.8 | 27.2 | 26.6 | 26.0 | 25.4 |
| 65 | 38.0 | 37.0 | 36.0 | 35.0 | 34.0 | 33.0 | 32.2 | 31.4 | 30.6 | 29.8 | 29.0 | 28.4 | 27.8 | 27.2 | 26.6 | 26.0 |