

# Utah Central Air Conditioner or Heat Pump Tune-up Worksheet

For tune-ups completed in Utah on or after November 14, 2012



Let's turn the answers on.

## Instructions

This worksheet is to be submitted when applying for the Central Air Conditioner or Heat Pump Tune-up incentive.

A **qualified** program trade ally must complete this worksheet and submit it with a completed application and any additional required documents within 90 days of work completed date.

Need help completing a worksheet? Call 1-800-942-0287 or e-mail [HESTradeAllyRMP@rockymountainpower.net](mailto:HESTradeAllyRMP@rockymountainpower.net)

### Customer information

Name on account \_\_\_\_\_ Daytime phone number \_\_\_\_\_

Installation address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

### Trade ally information

Company name \_\_\_\_\_ Daytime phone number \_\_\_\_\_

Technician name \_\_\_\_\_

### Existing equipment information

#### Outdoor (Condenser) unit

Manufacturer \_\_\_\_\_

Model number \_\_\_\_\_

Metering device:  Fixed orifice  TXV

#### Indoor (Coil) unit

Manufacturer \_\_\_\_\_

Model number \_\_\_\_\_

Metering device:  Fixed orifice  TXV

### TrueFlow™ test *Instructions provided on page 3*

Tested in:  Heating (outdoor temp below 65 °F)  
 Cooling (outdoor temp above 65 °F)

Filter size (i.e. 16 x 20) \_\_\_\_\_ x \_\_\_\_\_  
 Tested using:  Pascals  Inches H<sub>2</sub>O

1) Stage/capacity tested:  
 High  Low

2) Tons tested  
 \_\_\_\_\_ tons

3) Plate installed:  
 Filter slot @ ID unit  Filter grille  
 Other \_\_\_\_\_

4) Measure normal supply operating pressure (NSOP)  
 \_\_\_\_\_ (A)

5) Insert plate size:  
 14  20

6) Measure supply pressure with plate in (TFSOP)  
 \_\_\_\_\_ (B)

7) Correction factor <sup>1</sup>  
 \_\_\_\_\_ or  $\sqrt{\frac{\text{Box 4}}{\text{Box 6}}}$

8) Plate pressure  
 \_\_\_\_\_

9) Raw flow (CFM)  
 \_\_\_\_\_

10) Corrected flow (CFM)  
 \_\_\_\_\_ (Box 9 × Box 7)

11) CFM/ton  
 \_\_\_\_\_ (Box 10 ÷ Box 2)

Is **minimum 350 CFM/ton** target met?  
 Yes  No

Notes

<sup>1</sup> Found in Utah HVAC Trade Ally Program Manual Attachment - Correction Factors and Plate Pressures

### Central air conditioner performance check and refrigerant charge testing

- Perform one of the following tests
- Run unit for at least 15 minutes in compressor only mode before taking readings
- Outdoor temperatures must be within manufacturer testing requirements
- For outdoor temperatures at or above 65 °F, test in cooling mode

Outdoor temperature \_\_\_\_\_ °F

### Central air conditioner cooling mode testing options

#### Option 1: Subcooling test – For central air conditioners with a TXV

- |  |  |
|--|--|
| 1) Measured discharge pressure   | _____  |
| 2) Discharge (saturation) temperature  | _____ (A)  |
| 3) Measured liquid line temperature  | _____ (B)  |
| 4) Measured subcooling   | _____ (A – B)  |
| 5) Manufacturer target subcooling ( <i>found in equipment installation manual</i> )                        | _____  |
| 6) Is measured subcooling within $\pm 3$ °F of target subcooling or within manufacturer's suggested range? | <input type="checkbox"/> Yes <input type="checkbox"/> No |

#### Option 2: Super heat test – For central air conditioners without a TXV

- |  |  |
|--|--|
| 1) Indoor wet bulb temperature   | _____  |
| 2) Suction (vapor) pressure  | _____  |
| 3) Suction (vapor) line temperature  | _____ (C)  |
| 4) Evaporator saturation temperature   | _____ (D)  |
| 5) Measured super heat   | _____ (D – C)  |
| 6) Manufacturer target super heat ( <i>found in equipment installation manual</i> )                        | _____  |
| 7) Is measured super heat within $\pm 5$ °F of target super heat or within manufacturer's suggested range? | <input type="checkbox"/> Yes <input type="checkbox"/> No |

### Heat pump performance check and refrigerant charge testing

- Perform one of the following tests
- Run unit for at least 15 minutes in compressor only mode before taking readings
- Outdoor temperatures must be within manufacturer testing requirements
- For outdoor temperatures at 65 °F, test in heating or cooling mode
- For outdoor temperatures below 65 °F, test in heating mode
- For outdoor temperatures above 65 °F, test in cooling mode

Outdoor temperature \_\_\_\_\_ °F

### Heat pump cooling mode testing options

#### Option 1: Subcooling test – For heat pumps with a TXV

- |  |  |
|--|--|
| 1) Measured discharge pressure   | _____  |
| 2) Discharge (saturation) temperature  | _____ (A)  |
| 3) Measured liquid line temperature  | _____ (B)  |
| 4) Measured subcooling   | _____ (A – B)  |
| 5) Manufacturer target subcooling ( <i>found in equipment installation manual</i> )                        | _____  |
| 6) Is measured subcooling within $\pm 3$ °F of target subcooling or within manufacturer's suggested range? | <input type="checkbox"/> Yes <input type="checkbox"/> No |

#### Option 2: Super heat test – For heat pumps without a TXV

- |  |  |
|--|--|
| 1) Indoor wet bulb temperature   | _____  |
| 2) Suction (vapor) pressure  | _____  |
| 3) Suction (vapor) line temperature  | _____ (C)  |
| 4) Evaporator saturation temperature   | _____ (D)  |
| 5) Measured super heat   | _____ (D – C)  |
| 6) Manufacturer target super heat ( <i>found in equipment installation manual</i> )                        | _____  |
| 7) Is measured super heat within $\pm 5$ °F of target super heat or within manufacturer's suggested range? | <input type="checkbox"/> Yes <input type="checkbox"/> No |

## Heat pump heating mode testing options

### Option 1: Subcooling test – For heat pumps with a TXV

1) Did you confirm auxiliary heat was not operating?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2) Measured discharge pressure	_____
3) Discharge (saturation) temperature	_____ (A)
4) Measured liquid line temperature	_____ (B)
5) Measured subcooling	_____ (A – B)
6) Manufacturer target subcooling ( <i>found in equipment installation manual</i> )	_____
7) Is measured subcooling within $\pm 3$ °F of target subcooling or within manufacturer's suggested range?	<input type="checkbox"/> Yes <input type="checkbox"/> No

### Option 2: Operating pressure test – For heat pumps without a TXV

1) Did you confirm auxiliary heat was not operating?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2) Measured liquid pressure	_____
3) Measured vapor pressure	_____
4) Manufacturer's normal operating liquid pressure ( <i>found in equipment installation manual</i> )	_____
5) Manufacturer's normal operating vapor pressure ( <i>found in equipment installation manual</i> )	_____
6) Are measured pressures within the manufacturer's acceptable ranges?	<input type="checkbox"/> Yes <input type="checkbox"/> No

## Trade ally acceptance of terms

I hereby certify that all information on this worksheet is accurate and the items on the worksheet were completed at the time of the service.

Signature \_\_\_\_\_ Date \_\_\_\_\_

## TrueFlow™ 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 where you install the TrueFlow plate (**Box 3**). 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 4**). If reading is very "jumpy", press the Average key and wait at least 5 seconds for the average value to display.
5. Note TrueFlow plate size (**Box 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 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 more than 350 CFM/ton, the system meets program specs.

Program requirements for central air conditioner or heat pump tune-up	
Air flow	<ul style="list-style-type: none"> <li>Confirm air flow across the coil is 350 CFM/ton or greater, tested at highest heating or cooling capacity</li> </ul>
Refrigerant charge and performance check	<p>Central air conditioners</p> <ul style="list-style-type: none"> <li>For outdoor temperatures <u>above</u> 65° F: <ul style="list-style-type: none"> <li>If unit has a TXV, confirm measured sub cooling is within +/- 3°F of manufacturer's target value</li> <li>If unit does not have a TXV, confirm measured superheat is within +/- 5°F of manufacturer's target value</li> </ul> </li> </ul> <p>Heat pumps</p> <ul style="list-style-type: none"> <li>For outdoor temperatures <u>above</u> 65° F: <ul style="list-style-type: none"> <li>If unit has a TXV, confirm measured sub cooling is within +/- 3° F of manufacturer's target value</li> <li>If unit does not have a TXV, confirm measured superheat is within +/- 5° F of manufacturer's target value</li> </ul> </li> <li>For outdoor temperatures <u>below</u> 65° F: <ul style="list-style-type: none"> <li>If unit has a TXV, confirm measured sub cooling is within +/- 3° F of manufacturer's target value (if target sub cooling is available)</li> <li>If unit does not have a TXV, confirm measured operating pressures are within the manufacturer's acceptable ranges</li> </ul> </li> </ul>