

# City of Fort Collins Residential Mechanical Systems Performance Report

Updated 2/6/2023



This form is a record of testing targets and results, with Pass/Fail outcomes. For information on measurement tools and testing techniques, see the "Residential New Construction Mechanical Systems Testing Guide." The guide and this form may be periodically updated; check the Building Services energy code web site for the current version.

This form must be completed and submitted to Building Services as a requirement for receiving a C.O.

<b>Color key</b>	Target or limit	Measured value to compare with target or limit	Pass	Fail	Caution	Other data

**ADCF** = Air Density Correction Factor, based on tool, altitude (5000'), air temperature through tool  
**Volumetric flow** (CFM 5000') = ADCF x Indicated flow (CFM)

**Heating & Cooling equipment installed matches the approved mechanical system design** Confirm

## 1. House Data

Address

Builder

HVAC contractor

As-built changes vs mech design submittal

Testing date(s)  /  /  /  /  /

Date of "Residential Mechanical Systems Design Submittal" information referenced by testing technicians  /  /

## 2. Local Exhaust (Spot Ventilation)

**Bath exhaust** Testing tech (initials)

Flow tool  Flow box  Pitot tube duct traverse   
 Passive flow hood  Other (note below)

Air temp through tool (F)

ADCF

Exhaust Pickup Location	Design Airflow (CFM 5000')	Minimum Airflow Requirement (CFM 5000') + Type of Operation	Measured Airflow		Pass	Fail
			Indicated Flow (CFM)	Volumetric Flow (CFM 5000')		
		<input type="checkbox"/> 50 Intermittent <input type="checkbox"/> 20 Continuous			<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> 50 Intermittent <input type="checkbox"/> 20 Continuous			<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> 50 Intermittent <input type="checkbox"/> 20 Continuous			<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> 50 Intermittent <input type="checkbox"/> 20 Continuous			<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> 50 Intermittent <input type="checkbox"/> 20 Continuous			<input type="checkbox"/>	<input type="checkbox"/>

Testing notes

**Kitchen exhaust** N/A - hood does not vent to outside  Testing tech (initials)

Oven fuel  Gas  Electric  Minimum airflow requirement (CFM 5000') + operation  100 Intermittent  25 Continuous

Measured airflow

Flow tool  Flow box  Pitot tube traverse   
 Passive flow hood  Flow grid   
 Powered flow hood  Other (note below)

Tool location  Interior grille   
 Exhaust duct (Exterior termination not OK)

Air temp through tool (F)

ADCF

Indicated flow  CFM Volumetric flow  CFM 5000'  Pass  Fail

Testing notes

### 3. Whole-House Ventilation

#### Systems other than sub-structural floor exhaust

Testing tech (initials)

Code-minimum ventilation airflow (based on CFA and # of BR)  CFM 5000'

Design ventilation airflow  CFM 5000'

System type  
 Exhaust-only  
 Supply-only  
 Balanced

Target ventilation airflow range  to  CFM 5000'  
(code-minimum) (120% of design flow)

	Measurement Method	Tool Location	Air Temp Through Tool (F)	ADCF	Measured Airflow		Pass	Fail
					Indicated Flow (CFM)	Volumetric Flow (CFM 5000')		
Total exhaust airflow	<input type="checkbox"/> N/A <input type="checkbox"/> Passive flow hood <input type="checkbox"/> Flow box <input type="checkbox"/> Pitot tube traverse <input type="checkbox"/> Flow collar <input type="checkbox"/> Other (note below)						<input type="checkbox"/>	<input type="checkbox"/>
Total supply airflow	<input type="checkbox"/> N/A <input type="checkbox"/> Passive flow hood <input type="checkbox"/> Flow box <input type="checkbox"/> Pitot tube traverse <input type="checkbox"/> Flow collar <input type="checkbox"/> Other (note below)						<input type="checkbox"/>	<input type="checkbox"/>

When supply airflow is circulated by air handler fan, fan speed for measurement  Heating  Cooling  Continuous fan

Balanced airflow in balanced systems

Average of measured supply + exhaust flows  CFM 5000' Target flow range (average +/- 15%)  to  CFM 5000'  Pass  Fail

Testing notes

#### Sub-structural floor exhaust

N/A -- no sub-structural floor exhaust system

Testing tech (initials)

Design exhaust airflow (based on approved design)  CFM 5000'

Target airflow limits (design +/- 15%)  to  CFM 5000'

Measured airflow

Flow tool  Flow box  Pitot tube traverse  
 Passive flow hood  Flow collar  
 Powered flow hood  Other (note below)

Tool location

Air temp through tool (F)

ADCF

Indicated flow  CFM

Volumetric flow  CFM 5000'  Pass  Fail

Testing notes

### 4. Heating + Cooling Duct Leakage

No ductwork Testing notes (incl multiple sys)

Duct leakage test firm and test tech  Date of test  /  /

Sq ft conditioned floor area served by system (include basement)  Air temp through tool (F)  ADCF

Test Parameter and Conditions		Normalized (CFM25 5000' / 100 sf)	Max leakage (CFM25 5000')	Measured (CFM25)	Volumetric (CFM25 5000')	System #1		System #2	
Leakage Type	Air Handler					Pass	Fail	Pass	Fail
Total leakage	Excluded	3				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Total leakage	Included	4				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Note:** All new heating and cooling duct systems are required to be tested for duct leakage per 2021 IECC R403.3.5 and meet the required leakage target within 2021 IECC R403.3.6 amended. Ducts within conditioned space are not exempt from testing.

# 5. Heating + Cooling Equipment

For multiple systems, attach one page per system

System #  Which parts of house does it serve?

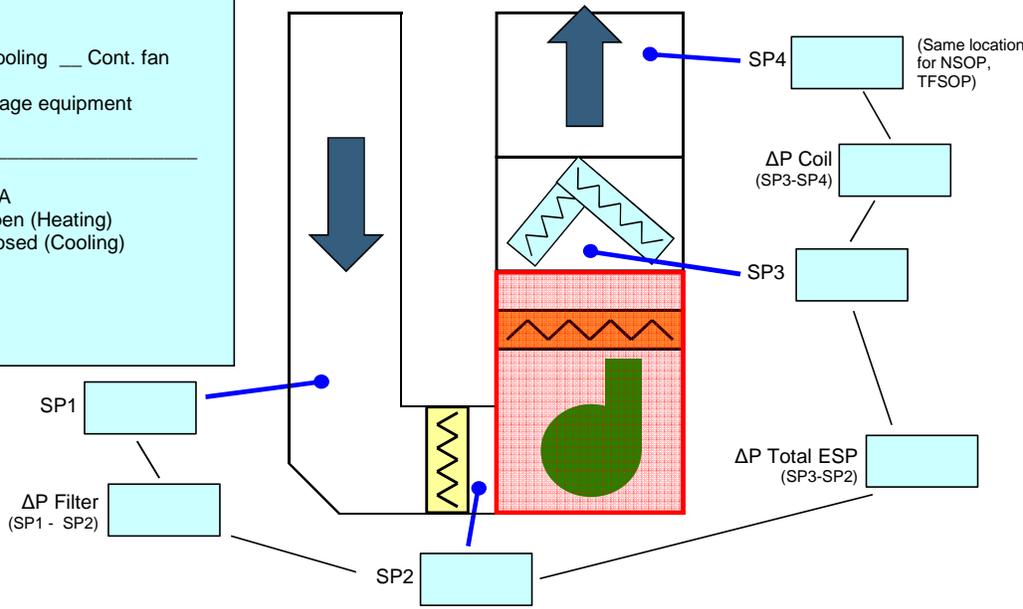
**Installed equipment** (Be clear about which AC components are installed at time of testing) Testing tech (initials)

	Furnace or Boiler	AC or Heat Pump Condenser	AC or Heat Pump Coil
Manufacturer	<input type="text"/>	<input type="text"/>	<input type="text"/>
Model #	<input type="text"/>	<input type="text"/>	<input type="text"/>

Filter brand  Type  Basic fiberglass  Electrostatic  
 Basic pleated  Other:  
 High-effic pleated Thickness (inches)  MERV (optional)

## Static pressures

**Setup**  
 Speed:  Heating  Cooling  Cont. fan  
 High-stage for multi-stage equipment  
 Blower speed tap: \_\_\_\_\_  
 Humidifier damper:  N/A  
 Open (Heating)  
 Closed (Cooling)  
 All registers open  
 Zone dampers open



## Cooling: Measured air flow through indoor coil

N/A -- no AC installed

Testing tech (initials)

Design cooling airflow (high stage)  CFM 5000' Target airflow limits (design +/- 15%)  to  CFM 5000'

### Measured airflow

Flow grid plate size  14  20 Air temp through tool (F)  ADCF  NSOP  TFSOP  Flow Resistance Correction Factor

Measured airflow, no adjustment/correction  CFM Indicated airflow Measured AF x FRCF  CFM Volumetric airflow Indicated AF x ADCF  CFM 5000'  Pass  Fail

Testing notes

## Heating: Gas manifold pressure

(high stage)

Testing tech (initials)

Manifold pressure OEM spec @ 5000'  IWC Target manifold P limits (spec +/- 5%)  to  IWC Measured pressure  IWC  Pass  Fail

## Heating: Temperature rise

Testing tech (initials)

OEM temperature rise limits (high stage)  to  F

Measured temps (F): Supply air  - Return air  = Temp rise   Pass  Fail  Caution: within 10F of top of range

## 6. Refrigerant Charge

Testing tech (initials)

### Testing approach and targets

- N/A: No complete AC system   
  N/A: House completed November - April (installing contractor responsible for testing in warm weather)  
 TXV: Subcooling + SH check   
  Non-TXV: Superheat   
  OEM-specific: Approach   
  Other OEM-specific (documentation required)

Temperatures (F): entering air temp    
 Condenser saturation T (5000' chart)    
 Non-TXV: Return air wet-bulb temp    
 Target superheat    
 Target subcooling    
 Target approach

### Subcooling

Discharge pressure (PSI)    
 Condenser saturation T (5000' chart)  F   
 Liquid line temp  F   
 Actual subcooling (Cond T - liq line T)  F

TXV Pass: Actual SC within +/- 3 F of target SC, 2 F min  
 TXV Fail

### Superheat

Suction pressure (PSI)    
 Evaporator saturation T (5000' chart)  F   
 Suction line temp  F   
 Actual superheat (Suct line T - evap T)  F

Non-TXV Pass: Actual SH within +/- 5 F of target SH  
 Non-TXV Fail

TXV checks:  Pass: Field-installed TXV installed in accordance with OEM instructions   
 Caution: Actual SH outside mfg range

### Approach

Liquid line temp  F   
 Actual approach (Liq line T - condenser EAT)  F

Approach Pass: Actual approach within +/- 1 F of target approach  
 Approach Fail

Testing notes

## 7. Room Air Flow + Pressure Balance

### Register air flows

Testing tech (initials)

All registers are cut through finish materials and moving air   
 Pass   
 Fail

### Pressure balance

Testing tech (initials)

Bedroom (match names on plans or provide room location identifiers)	Room-to-Core Pressure Drop Target Range (Pa)	Measured Pressure Drop (Pa)	Pass	Fail
<input type="text"/>	-3 to +3	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>	-3 to +3	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>	-3 to +3	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>	-3 to +3	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>	-3 to +3	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>	-3 to +3	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>

## 8. Combustion Safety

Combustion safety testing N/A -- no natural-draft combustion appliances

Testing tech (initials)

## 9. System Controls

Testing tech (initials)

System	Controls Operating Per Design Intent						Testing Notes
	<input type="checkbox"/>	N/A	<input type="checkbox"/>	Pass	<input type="checkbox"/>	Fail	
Local exhaust (all fans)	<input type="checkbox"/>	N/A	<input type="checkbox"/>	Pass	<input type="checkbox"/>	Fail	
Whole-house ventilation	<input type="checkbox"/>	N/A	<input type="checkbox"/>	Pass	<input type="checkbox"/>	Fail	
Sub-structural floor exhaust	<input type="checkbox"/>	N/A	<input type="checkbox"/>	Pass	<input type="checkbox"/>	Fail	
Heating (all systems)	<input type="checkbox"/>	N/A	<input type="checkbox"/>	Pass	<input type="checkbox"/>	Fail	
Cooling (all systems)	<input type="checkbox"/>	N/A	<input type="checkbox"/>	Pass	<input type="checkbox"/>	Fail	

## Signatures

### Technician #1 performing inspection and testing documented on this report

I certify that the tests referenced above, in sections bearing my initials, were performed in accordance with protocols specified by the City of Fort Collins Building Services Department, and that the reported results are accurate to the best of my knowledge.

Name (print)

Phone/email

Company

### Technician #2 / Builder representative performing or verifying inspection and testing documented on this report

I certify that the tests referenced above, in sections bearing my initials, were performed in accordance with protocols specified by the City of Fort Collins Building Services Department, and that the reported results are accurate to the best of my knowledge.

Name (print)

Phone/email

Company

### HVAC Contractor (City of Fort Collins license holder)

I certify that I have reviewed this report and that the test results are an accurate representation of the performance of the installed mechanical systems.

Name (print)

Phone/email

Company