

City of Fort Collins Residential Mechanical Systems Performance Report

Updated 1/25/2023



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 web site for the current version.

This form must be completed and signed by an "Approved Agency," and submitted to Building Services as a requirement for receiving a C.O.

Color key	Target or limit	Measured value to compare with target or limit	Pass	Fail	Caution	Other data
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ADCF = Air Density Correction Factor, based on tool, altitude (5000'), air temperature through tool

Volumetric flow (CFM 5000') = ADCF x Indicated flow (CFM)

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

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

Air temp through tool (F)

ADCF

Testing tech (initials)

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="text"/>	<input type="text"/>	<input type="checkbox"/> 50 Intermittent <input type="checkbox"/> 20 Continuous	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>	<input type="text"/>	<input type="checkbox"/> 50 Intermittent <input type="checkbox"/> 20 Continuous	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>	<input type="text"/>	<input type="checkbox"/> 50 Intermittent <input type="checkbox"/> 20 Continuous	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>	<input type="text"/>	<input type="checkbox"/> 50 Intermittent <input type="checkbox"/> 20 Continuous	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>	<input type="text"/>	<input type="checkbox"/> 50 Intermittent <input type="checkbox"/> 20 Continuous	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>	<input type="text"/>	<input type="checkbox"/> 50 Intermittent <input type="checkbox"/> 20 Continuous	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>	<input type="text"/>	<input type="checkbox"/> 50 Intermittent <input type="checkbox"/> 20 Continuous	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>

Testing notes

Kitchen exhaust

Oven fuel Gas Electric

Minimum airflow requirement (CFM 5000') + operation 100 Intermittent 25 Continuous

N/A - hood does not vent to outside

Testing tech (initials)

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 data source Testing tech (initials):
 Energy rater (name, company, testing date):

Conditioned floor area served by system (include full basement) sf 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. 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?

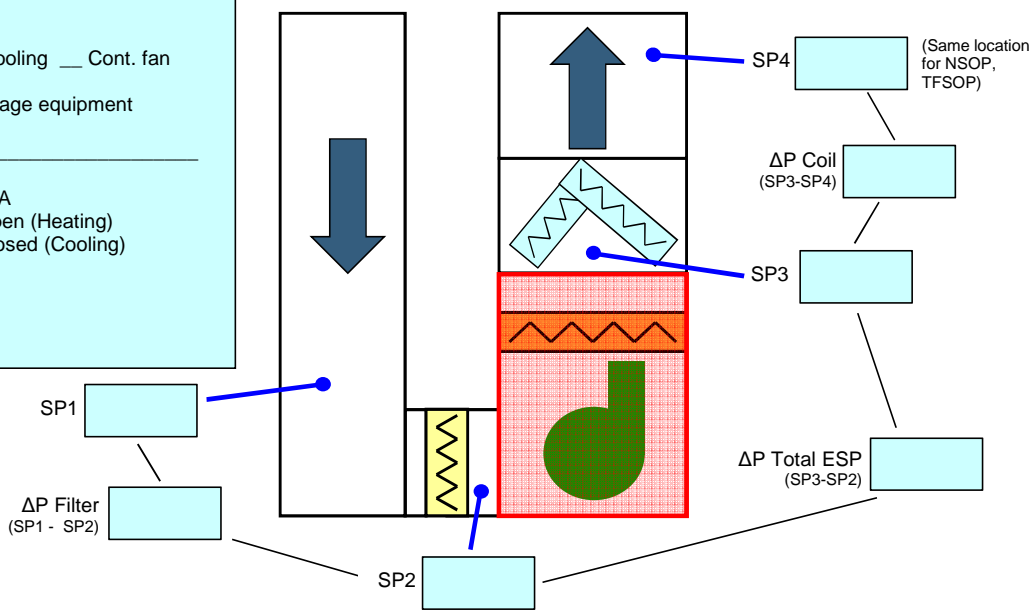
Installed equipment (Be clear about which AC components are installed at time of testing) Testing tech (initials)

	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



Testing tech (initials)

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

(Remainder of register air flow section under development, not yet being enforced)

Pressure balance

Testing tech (initials)

Room (match names on plans, include basement if there is a door)	Room-to-Core Pressure Drop Target Range (Pa)	Measured Pressure Drop (Pa)	Pass	Fail
	-3 to +3		<input style="width: 20px; height: 15px; border: 1px solid green;" type="checkbox"/>	<input style="width: 20px; height: 15px; border: 1px solid pink;" type="checkbox"/>
	-3 to +3		<input style="width: 20px; height: 15px; border: 1px solid green;" type="checkbox"/>	<input style="width: 20px; height: 15px; border: 1px solid pink;" type="checkbox"/>
	-3 to +3		<input style="width: 20px; height: 15px; border: 1px solid green;" type="checkbox"/>	<input style="width: 20px; height: 15px; border: 1px solid pink;" type="checkbox"/>
	-3 to +3		<input style="width: 20px; height: 15px; border: 1px solid green;" type="checkbox"/>	<input style="width: 20px; height: 15px; border: 1px solid pink;" type="checkbox"/>
	-3 to +3		<input style="width: 20px; height: 15px; border: 1px solid green;" type="checkbox"/>	<input style="width: 20px; height: 15px; border: 1px solid pink;" type="checkbox"/>
	-3 to +3		<input style="width: 20px; height: 15px; border: 1px solid green;" type="checkbox"/>	<input style="width: 20px; height: 15px; border: 1px solid pink;" type="checkbox"/>
	-3 to +3		<input style="width: 20px; height: 15px; border: 1px solid green;" type="checkbox"/>	<input style="width: 20px; height: 15px; border: 1px solid pink;" type="checkbox"/>
	-3 to +3		<input style="width: 20px; height: 15px; border: 1px solid green;" type="checkbox"/>	<input style="width: 20px; height: 15px; border: 1px solid pink;" type="checkbox"/>
	-3 to +3		<input style="width: 20px; height: 15px; border: 1px solid green;" type="checkbox"/>	<input style="width: 20px; height: 15px; border: 1px solid pink;" type="checkbox"/>
	-3 to +3		<input style="width: 20px; height: 15px; border: 1px solid green;" type="checkbox"/>	<input style="width: 20px; height: 15px; border: 1px solid pink;" type="checkbox"/>

8. Combustion Safety

Combustion safety testing N/A -- no natural-draft combustion appliances
(Appliance Types table must be completed for every home)

Testing tech (initials)

Appliance types

Appliance	Combustion Type						
	N/A	Draft-hood (Natural-draft)	Induced-draft (Natural-draft)	Power-vent	Direct-vent	Powered sealed-combustion	Electric
Furnace #1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Furnace #2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boiler #1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boiler #2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water heater #1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water heater #2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fireplace #1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fireplace #2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Worst-case depressurization performance

House setup

<input type="checkbox"/> # of bath fans on <input type="checkbox"/> Vented range hood on <input type="checkbox"/> Clothes dryer on <input type="checkbox"/> Air handler on Other fans on:	These doors are closed: Other setup notes:
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Outdoor temperature F

Tested appliances		
Appliance		
Location		

CAZ pressure

BPI depressurization limit (Pa wrt outside)			
Measured net CAZ depressurization (Pa wrt outside)			
OK (less negative) Caution (more negative)	<input type="checkbox"/> OK <input type="checkbox"/> Caution	<input type="checkbox"/> OK <input type="checkbox"/> Caution	<input type="checkbox"/> OK <input type="checkbox"/> Caution

Spillage

BPI maximum limit (seconds)	60	60	60
Measured spillage duration (seconds)			
Pass = duration not exceeding limit	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	<input type="checkbox"/> Pass <input type="checkbox"/> Fail

Draft pressure

BPI limit (Pa wrt CAZ)			
Measured (Pa wrt CAZ)			
Pass = pressure more negative than limit	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	<input type="checkbox"/> Pass <input type="checkbox"/> Fail

CO concentration in undiluted flue gas

BPI maximum limit (ppm)	100	100	100
Measured CO (ppm)			
Pass = CO level not exceeding limit	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	<input type="checkbox"/> Pass <input type="checkbox"/> Fail	<input type="checkbox"/> Pass <input type="checkbox"/> Fail
Caution = CO level 25 to 100 ppm	<input type="checkbox"/> Caution	<input type="checkbox"/> Caution	<input type="checkbox"/> Caution

Testing notes

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