Residential HVAC Changeouts

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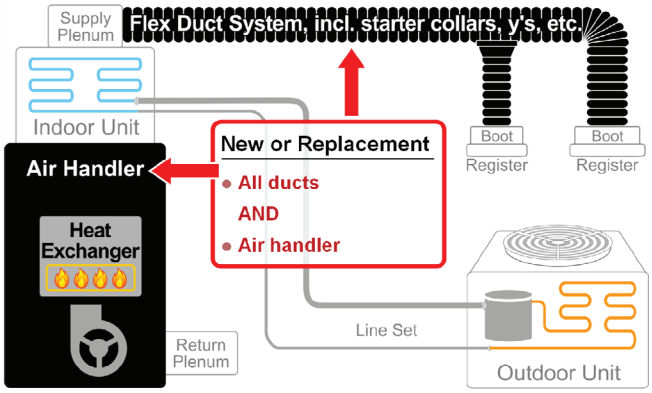
New or Replacement Space Conditioning System — §152(b)1C



A space system is considered a new or replacement when **both** of the following are installed or replaced:

- All the ducts
  AND
- The air handler (or the furnace unit on a packaged system)

New or replacement space conditioning systems must meet all relevant mandatory measures (see "Mandatory Measures" on the next page).

In addition, new or replacement systems must meet the HERS Measures that apply to the climate zone where the project is located (see "HERS Measures" on the next page).

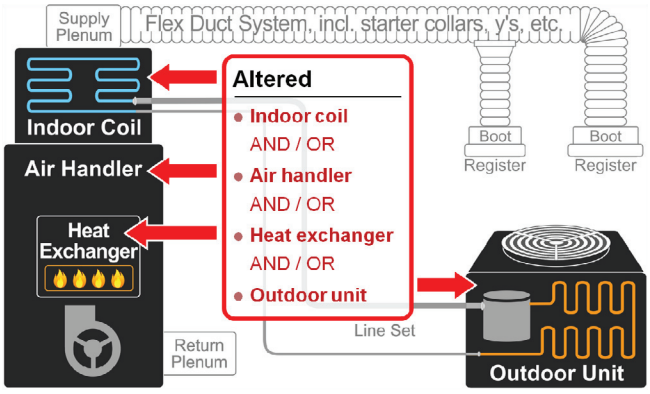
Altered Space Conditioning System — §152(b)1E,1F

A space system is considered altered when it is not a new or replacement system and **any** of the following components is installed or replaced:

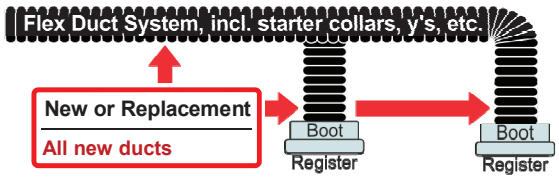
- Cooling coil
- Heat exchanger or heating coil
- Air handler
- Condensing unit

Replacing other components — except ducts — is considered a repair — not a replacement or alteration. For example, replacing the compressor, but not the whole condensing unit, is a repair.

Altered space conditioning systems must meet all relevant mandatory measures (see "Mandatory Measures" on the next page). In addition, they must meet the HERS Measures that apply to the project's climate zone (see "HERS Measures" on the next page).



Ducts



Completely New or Replacement Ducts

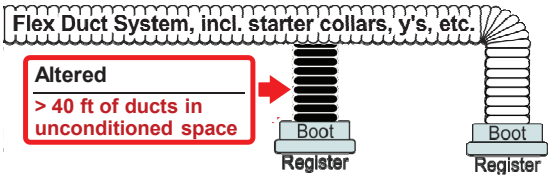
When all ducts are installed or replaced (no existing ducts remain), the job includes **new or replacement ducts**. (Boots and registers may remain.)

In **climate zones 2 and 9 through 16, Duct Sealing and Testing** (HERS measure) is required, and the maximum leakage is less than 6%.

Altered Ducts

When more than 40 feet of ducts are added or replaced in unconditioned space, and some existing ducts remain, the job includes **altered ducts**.

In **climate zone 2 and 9 through 16, Duct Sealing and Testing** (HERS measure) is required, and the maximum leakage is less than 15%. (There are alternatives to meeting the <15% leakage maximum. Consult your Building Department or §152 (b)1Dii in the Standards.)



Both New/Replacement Ducts and Altered Ducts

If more than 40 feet of ducts are added or replaced in unconditioned space, duct insulation must meet or exceed the Prescriptive Package D.

Package D Requirements for Duct Insulation

Climate Zone	6–8	1–5 , 9–13	14–16
Minimum Insulation	R-4.2	R-6.0	R-8.0

Packaged Systems

When installing a packaged system, it must meet all relevant mandatory measures (see "Mandatory Measures" on the next page).

For climate zones 2 and 9 through 16, Duct Sealing and Testing applies. No other HERS measures apply to Packaged systems.

Mandatory Measures

New or replacement systems must meet **all** the mandatory measures noted below. Altered systems must meet only the measures for the equipment involved in the alteration.

Example of how only relevant Mandatory measures apply to altered systems: If the condensing unit is the only component replaced during an alteration, minimum efficiencies for heating equipment do not apply.

Component	Requirement
Any / all	Setback thermostat (programmable for 4 periods within 24 hrs) Load calculations (ASHRAE, SMACNA, or ACCA) if heating/cooling equipment or area of conditioned space served changes
Gas furnaces <225kBtu/h	78% AFUE or better (Exception: Wall and floor furnaces; room heaters)
Heat pumps	7.7 HSPF
Central air conditioners & heat pumps <65,000 Btu/hr	13 SEER or better
Cooling system line	Cooling system line insulation described in §150(j)2
Newly installed or replaced ducts ■ 40 feet or less of ducts installed or replaced (For more than 40 feet of ducts installed or replaced, see table, "Package D Requirements for Duct Insulation," on previous page.)	Installation described in §150(m) (joints, connections, support, etc.) ■ R-4.2 or better insulation

HERS Measures

HERS Measure by Climate Zone	Type of Project: New System	Altered System	All New Ducts	Altered Ducts
Climate Zones 1 and 3–7				
Duct Sealing and Testing [A]	na	na	na	na
Cooling Coil Airflow & Fan Watt Draw [B]	na	na	na	na
Refrigerant Charge Verification [C]	na	na	na	na
Climate Zones 2 and 9				
Duct Sealing and Testing [A]	**YES**	**YES**	**YES**	**YES**
Cooling Coil Airflow & Fan Watt Draw [B]	na	na	na	na
Refrigerant Charge Verification [C]	**YES**	**YES**	na	na
Climate Zone 8				
Duct Sealing and Testing [A]	na	na	na	na
Cooling Coil Airflow & Fan Watt Draw [B]	na	na	na	na
Refrigerant Charge Verification [C]	**YES**	**YES**	na	na
Climate Zone 10–15				
Duct Sealing and Testing [A]	**YES**	**YES**	**YES**	**YES**
Cooling Coil Airflow & Fan Watt Draw [B]	**YES**	na	na	na
Refrigerant Charge Verification [C]	**YES**	**YES**	na	na
Climate Zone 16				
Duct Sealing and Testing [A]	**YES**	**YES**	**YES**	**YES**
Cooling Coil Airflow & Fan Watt Draw [B]	na	na	na	na
Refrigerant Charge Verification [C]	na	na	na	na

[A] **Duct Sealing and Testing:** Maximum leakage is calculated based measured airflow or the default nominal airflow of 400 cfm/ton.

- Max. leakage rate for new systems and projects with all new ducts <6%.
- Max. leakage rate for altered systems and projects with altered ducts <15%.

Ducts insulated or sealed with asbestos do not need to be tested. There are alternatives to meeting the <15% leakage maximum for altered space conditioning or duct systems. Consult your Building Department or S152 (b)1Dii in the Standards.

[B] **Cooling Coil Airflow and Fan Watt Draw:** Airflow and watt draw measurements must be made simultaneously. In order to pass the test:

- The air handler must deliver airflow of ≥350 cfm per nominal ton of capacity.
- The calculated result must be ≤0.58 Watts per cfm of measured airflow.

[C] **Refrigerant Charge Verification:** For a valid test, the system must meet or exceed a minimum cooling coil airflow rate of 300 cfm/ton, and the outdoor air dry-bulb temperature must be above 55° F.

- Temperature measurement access holes (TMAH) are required for both new/replacement systems and altered systems
- Saturation temperature measurement sensors (STMS) are required only for new/replacement systems

Required Documentation

For All HVAC Changeouts

All HVAC changeout projects require:

- **Permit**
- **CF-1R-ALT-HVAC** (for the climate zone): Certificate of Compliance for HVAC Alterations
  Submitted to the building department by the contractor or the home owner
- **CF-6R-MECH 04**: Installation Certificate for Space Conditioning Systems, Ducts and Fans
  Completed and signed by the installing contractor and made available for final inspection by building department

For Projects with HERS Measures

Projects with HERS measures also require:

- **Registration of the CF-1R, via HERS Provider**
- **CF-6R-HERS**, Installation Certificates for HERS measures are completed and signed by the installing contractor. They must be:
  - Submitted to a HERS Provider Registry after the contractor has signed it.
  - Available for inspection by the building department
- **CF-4R,** Certificates of Field Verification and Diag-nostic Testing are completed and registered by a HERS Rater for each CF-6R HERS.
  The HERS Rater or contractor ensures the relevant CF-4Rs are available for final inspection by the building department.

For Duct Leakage Test, Seal & Verification:

- CF-6R-MECH-20-HERS: Completely New or Replacement Duct System

OR

- CF-6R-MECH-21-HERS: Existing Duct System

AND

- CF-4R-MECH-20 or 21

For Refrigerant Charge Verification:

- CF-6R-MECH-25-HERS: Standard Measurement Procedure

OR

- CF-6R-MECH-26-HERS: Alternate Measurement Procedure

AND

- CF-4R-MECH-25

For Cooling Coil Air Flow & Fan Watt Draw:

- CF-6R-MECH-22-HERS

AND

- CF-4R-MECH-22