Residential HVAC Changeouts

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

A空间系统被认为是新或更换的，当两者中的所有组件都被安装或更换时：
- 所有的管道
- 送风器（或包装系统上的加热单元）

新或更换的空调系统必须满足所有相关的强制性措施（参见“强制性措施”在下一页）。此外，新或更换的系统必须满足气候区项目的适用HERS措施（参见“HERS措施”在下一页）。

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

一个空间系统被认为是改动的，当它不是新或更换的系统，并且下列任何组件被安装或更换时：
- 冷却器
- 加热器或加热型冷凝器
- 送风器
- 冷凝器

替换其他组件——除了管道——被认为是维修，而不是替换或改动。例如，替换压缩机，但不换整个冷凝器，即为维修。

改动的空调系统必须满足所有相关的强制性措施（参见“强制性措施”在下一页）。此外，这些系统必须满足项目气候区的适用HERS措施（参见“HERS措施”在下一页）。

Ducts

新或更换的管道

当所有管道都被安装或更换（无现有管道）时，管道包括新或更换的管道。靴子和风管可以保留。

在气候区2和9至16，管道密封和测试（HERS措施）是必要的，并且最高泄漏率不超过6%。

Altered Ducts

当超过40英尺的管道被添加或更换至未加温空间，并且一些现有管道仍然保留时，管道包括改动的管道。

在气候区2和9至16，管道密封和测试（HERS措施）是必要的，并且最高泄漏率不超过15%。有替代方案能达到<15%的泄漏率最大值。咨询你的建筑部门或§152 (b)1Dii在标准中。

Both New/Replacement Ducts and Altered Ducts

如果超过40英尺的管道被添加或更换至未加温空间，管道绝缘必须达到或超过Prescriptive Package D。

Package D Requirements for Duct Insulation

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>6–8</th>
<th>1–5, 9–13</th>
<th>14–16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Insulation</td>
<td>R-4.2</td>
<td>R-6.0</td>
<td>R-8.0</td>
</tr>
</tbody>
</table>

Packaged Systems

当安装包装系统时，它必须满足所有相关的强制性措施（参见“强制性措施”在下一页）。

对于气候区2和9至16，管道密封和测试适用于。除其他HERS措施外，包装系统不适用。
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(j2)

### 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

<table>
<thead>
<tr>
<th>HERS Measure by Climate Zone</th>
<th>Project Requirements</th>
<th>Type of Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate Zones 1 and 3–7</td>
<td></td>
<td>New System Altered System All New Ducts Altered Ducts</td>
</tr>
<tr>
<td>Duct Sealing and Testing</td>
<td>na na na na</td>
<td></td>
</tr>
<tr>
<td>Cooling Coil Airflow &amp; Fan Watt Draw</td>
<td>na na na na</td>
<td></td>
</tr>
<tr>
<td>Refrigerant Charge Verification</td>
<td>na na na na</td>
<td></td>
</tr>
<tr>
<td>Climate Zones 2 and 9</td>
<td></td>
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</tr>
<tr>
<td>Duct Sealing and Testing</td>
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<td></td>
</tr>
<tr>
<td>Cooling Coil Airflow &amp; Fan Watt Draw</td>
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<td></td>
</tr>
<tr>
<td>Refrigerant Charge Verification</td>
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<tr>
<td>Climate Zone 8</td>
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<tr>
<td>Cooling Coil Airflow &amp; Fan Watt Draw</td>
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<td>Climate Zone 10–15</td>
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<tr>
<td>Cooling Coil Airflow &amp; Fan Watt Draw</td>
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<td>Refrigerant Charge Verification</td>
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<td>Climate Zone 16</td>
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<tr>
<td>Cooling Coil Airflow &amp; Fan Watt Draw</td>
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<td></td>
</tr>
<tr>
<td>Refrigerant Charge Verification</td>
<td>YES YES na na</td>
<td></td>
</tr>
</tbody>
</table>

| A Duct Sealing and Testing: Maximum leakage is calculated based measured airflow or the default nominal airflow of 400 cfm/ton. |
| B Cooling Coil Airflow and Fan Watt Draw: Airflow and watt draw measurements must be made simultaneously. In order to pass the test: |
| 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. |

### 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 homeowner
- 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 Diagnostic 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
- CF-6R-MECH-21-HERS: Existing Duct System
- CF-4R-MECH-20 or 21

#### For Refrigerant Charge Verification:
- CF-6R-MECH-25-HERS: Standard Measurement Procedure
- CF-6R-MECH-26-HERS: Alternate Measurement Procedure
- CF-4R-MECH-25

#### For Cooling Coil Air Flow & Fan Watt Draw:
- CF-6R-MECH-22-HERS
- CF-4R-MECH-22

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