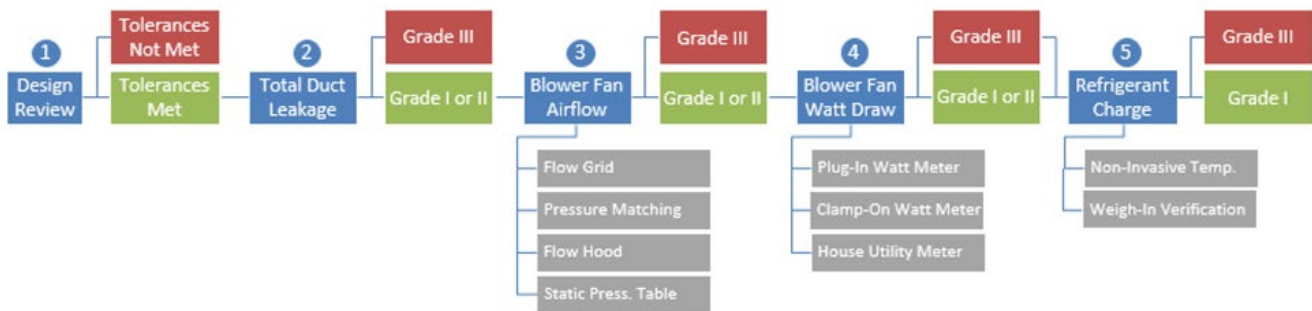


Technical Bulletin: Standard 310 HVAC Grading

Residential New Construction Program

The new Standard 310 (Std. 310) provides a method for evaluating the installation quality of HVAC systems. Ekotrope currently has the HVAC grading system in Beta and plans to release the working version in April. Regardless of the determined HVAC grade, the RNC Program will only use Grade III for kWh savings calculations. The RNC Program plans to consider incorporating HVAC grading fully after raters understand the new Standard and the savings impacts are analyzed. ICF will provide ample notice to raters before HVAC grading is mandatory, or impacts savings.

Standard 310 applies to forced-air HVAC systems including furnaces, air conditioners, and heat pumps that serve family dwellings with their own HVAC system. The process is comprised of five tasks, which are explained in detail below.



Task 1: Design Review

1. Rater collects design documentation for the dwelling with the HVAC system being tested.
2. Rater reviews design documentation for completeness and compares it to the dwelling. Key features must fall within defined tolerances.
3. If the home meets the requirements described in ANSI/RESNET/ACCA Section 4, proceed to the next task. Otherwise, stop here.

Task 2: Evaluate Total Duct Leakage

1. Rater measures total duct leakage according to Standard 380 (Std. 380), evaluates the results, and assigns a grade:

| Grade | Test Stage | # Returns | Total Leakage Limit (CFM per 100 ft ² or Total CFM) |
|-------|------------|-----------|--|
| I | Rough-In | < 3 | 4 or 40 total |
| | | ≥ 3 | 6 or 60 total |
| | Final | < 3 | 8 or 80 total |
| | | ≥ 3 | 12 or 120 total |
| II | Rough-In | < 3 | 6 or 60 total |
| | | ≥ 3 | 8 or 80 total |
| | Final | < 3 | 10 or 100 total |
| | | ≥ 3 | 14 or 140 total |
| III | N/A | N/A | No Limit |

2. If Grade I or II is achieved, proceed to the next task. Otherwise, stop here.

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BUILDING A SMARTER ENERGY FUTURESM

Task 3: Evaluate Blower Fan Airflow

- Raters measure the total volumetric airflow going through the blower fan using one of four test methods:
 - Flow Hood, Flow Grid, Pressure Matching, OEM Static Pressure Table
- This is a single measurement. It is not measuring the airflow from each register and summing those measurements.
- The result is compared to the design airflow. The closer the better. This difference is used to assign Grade I, II, or III.
- If Grade I or II is achieved, proceed to the next task. Otherwise, stop here.

Task 4: Evaluate Blower Fan Watt Draw

- Raters evaluate the watt draw of the blower fan using one of three test methods:
 - Plug-In Watt Meter, Clamp-On Watt Meter, Utility Meter
- The airflow and watt draw is used to calculate fan efficiency. The more efficient, the better. This is used to assign Grade I, II, or III.
- Regardless of grade, you can proceed to the next task.

Task 5: Evaluate Refrigerant Charge

- Raters evaluate the refrigerant charge of the system using one of two test methods:
 - Non-Invasive Method
 - No gauges connected to the refrigerant system.
 - Instead, the temperature of the air and refrigerant lines are used.
 - Triage systems into two bins:
 - Grade I—Charge is okay.
 - Grade II—Charge is not okay.
 - Weigh-In Verification Method
 - This method can be used year-round and it must be used for:
 - Extreme outdoor conditions.
 - Mini/multi-split systems.
 - This method is primarily a document review rather than a performance test.