

Technical Bulletin: Refrigerant Charge

Residential New Construction Program



BUILDING A SMARTER ENERGY FUTURESM

In previous Technical Bulletins, the RNC Program has outlined measuring blower fan airflow for Task 3 and measuring blower fan watt draw for Task 4 of HVAC Grading. To ensure participants get the most out of incentives, this technical bulletin will cover HVAC grading Task 5, Refrigerant Charge. These technical bulletins serve as guides, raters should visit [RESNET's training portal for HVAC grading best practices](#).

Task 5: Evaluate Refrigerant Charge

Methods: Raters can use one of two methods to measure the refrigerant charge; Non-Invasive Method or the Weigh-In Method. This technical bulletin will cover how to perform the Non-Invasive Method. To learn more about the Weigh-In Method, refer to RESNET's training portal.

- 1. Meet the prerequisites:** The blower fan airflow must have been evaluated per Task 3 and achieved Grade I or II. If the blower fan air flow achieved Grade III, then the system cannot be further evaluated, and refrigerant charge will be designated Grade III.
- 2. Determine the applicable test method:** As this technical bulletin focusses on the Non-Invasive method, the temperature requirements and necessary equipment for the method are below.
 - For equipment with a SEER less than 17, the outdoor air dry-bulb temperature must be **between 70 and 115 °F**.
 - The air at the return must have a dry bulb temperature between **70 and 80 °F** and the wet-bulb temperature must be **less than or equal to 50 °F**.
 - To perform the field measurements, a digital thermometer, digital hygrometer and digital pipe temperature probe are needed. This can be one device capable of all these functions.
- 3. Set up dwelling and HVAC system:** Run the system on cool at the lowest setting for 15 minutes, this can be the same run time for previous tasks so long as power has not been interrupted.
- 4. Take Field Measurements:** The measurements include the following:
 - **Return air temperature:** Measure and record the return wet and dry bulb temperature over a 10 second period at one of the 2 possible locations.
 - The preferred test location is at a test hole in the return out of the line of sight of the evaporator coil
 - The alternative test location is at the return grill closest to the HVAC system.

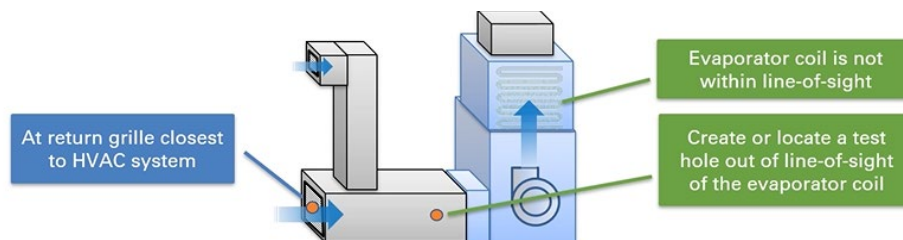


Image produced by RESNET of the two possible test locations for return air temperature test

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- **Outdoor air Dry-bulb temperature:** Five minutes after collecting the return and air temperature, measure and record the outdoor air-dry bulb temperature over a 10 second period on a side of the unit shaded from direct sunlight.
- **Refrigerant lines temperature:** Measure the suction and liquid line temperatures over a 10 second period within 6 inches of the service valve with the sensor in contact at the 10 or 2 O'clock position. The suction line is larger, insulated, and colder than the liquid line.

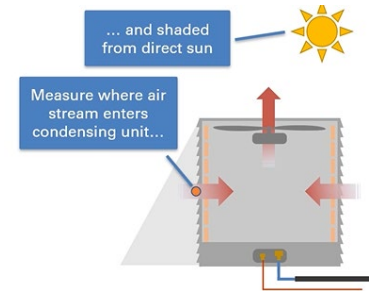


Image from RESNET shows the area shaded from sunlight and where air enters the unit.



Image from RESNET shows the temperature test location and depicts the difference in the suction and liquid lines.

5. **Assign the Grade:** Raters will also need to have the HVAC design report on hand and enter the design cooling blower fan volumetric air flow, maximum total heat gain and the metering device type into The Standard 310 Field Data Tool. With these inputs and the recorded data from the above steps, the tool will automatically assign the Grade.

The steps in this document were taken from the new RESNET standard 310 and the courses at RESNET's training portal. Raters can see an overview of standard 310 in the technical bulletin from March 2021.