

Technical Bulletin: Measuring Blower Fan Airflow

Residential New Construction Program

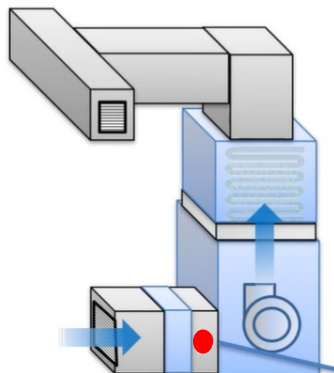
The RNC team wants to ensure raters understand the HVAC grading testing process to help builders get the most out of RNC Program incentives. There are five tasks to complete HVAC grading, but this technical bulletin will focus on HVAC grading task 3, Blower Fan Airflow. Future technical bulletins will cover the remaining tasks. This document serves as a guide, but raters should review [RESNET's training portal](#), procedures, and best practices for HVAC grading as outlined by RESNET.

Task 3: Measuring Blower Fan Airflow

We will cover the Static Pressure Table method as it only requires a static pressure probe, some tubing, and a manometer. The other three methods require special equipment or is more complicated to complete. To understand the other methods, raters can review the courses at [RESNET's training portal](#). Determining the blower fan airflow with static pressure tables can be completed by following the below steps.

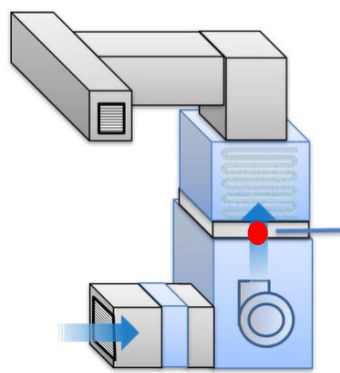
1. **Heating/Cooling mode:** The first step is determining if the HVAC system should be in heating or cooling mode while testing. Refer to the design review documentation to determine which mode will have the highest airflow and set the system to run continuously in that mode. Depending on the mode and ambient temperatures outside, it's important to disconnect the power to the compressor without disconnecting the indoor blower fan. Otherwise, the compressor may become damaged. Disconnect the compressor during the following scenarios.
 - Cooling mode - When the ambient temperature is **55 °F or less**.
 - Heating mode – When the ambient temperature is **50 °F or more**.
2. **Obtain the system's OEM Static Pressure Table:** This can often be found in the manufactures installation guide or by reaching out to the HVAC installers or manufacturer.
3. **Fan speed configuration:** Systems need to be configured to the designed fan speed. To verify this, look for the wire color connected to the control board. If this cannot be seen, contact the installer. If you can determine the wire color or fan speed, record and verify if it is the designed speed.
4. **Drill or verify holes in the air handler:** To measure the airflow, the air handler will need a hole on the return side and supply side. Verify the installers drilled the holes in the correct places. If the installers did not drill the holes, contact the builder on how best to proceed. The images below highlight the location of the holes in red. The return hole location is the same for all systems, but the supply side changes based on the system type.

Return Side (All systems)



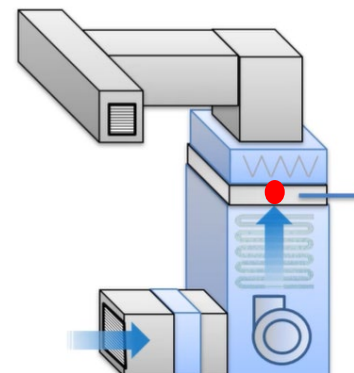
The test hole should be located after the filter but before the blower fan.

Supply Side (Furnace/AC)



The test hole must be after the furnace but before the evaporator coil

Supply Side (ASHP)



The test hole must be located after the fan-coil but before other components not accounted for in the blower table.

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5. **Read the system pressures:** Run the unit for **10 minutes** prior to inserting the test probe. Place the probe in the supply side first and then the return side. For both sides, record the pressure over a 10 second period. Record the supply and return side as **Psop** and **Prop** respectively.
6. **Calculate external static pressure:** Add the absolute values of Psop and Prop to calculate **Ptop**, or external static pressure
7. **Read the airflow with the static pressure table:** Using the OEM Static Pressure Table for the correct configuration, read the chart using the motor speed and external static pressure to determine the fan speed in CFM. Below is an example of a static pressure table. If we assume the speed configuration as medium and the external static pressure as 0.40 WG, the fan speed is 825 CFM.

External Static Pressure in. w.g.	Air Volume / Watts at Various Blower Speeds									
	High		Medium-High		Medium		Medium-Low		Low	
	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts	cfm	Watts
0.00	1380	265	1155	165	995	120	975	115	945	105
0.10	1345	270	1120	175	950	120	880	105	865	100
0.20	1320	285	1080	190	900	125	805	105	700	85
0.30	1290	295	1055	200	875	135	750	110	640	90
0.40	1265	310	1010	205	825	145	710	120	595	95
0.50	1230	315	990	215	790	155	660	125	535	100
0.60	1190	330	945	230	750	165	630	135	500	110
0.70	1165	340	915	235	705	170	570	140	435	115
0.80	1130	350	880	245	670	180	535	150	380	120

An example of an OEM Static Pressure Chart with the purple area as the fan speed setting, the orange area as the external static pressure, and the green as the resulting air flow.

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.