

Temperature Rise Method

Estimating how much air is flowing through an Air Handler/Furnace can be done by checking the temperature rise that occurs during heating operation of an electric heat air handler or a gas/oil furnace.

The Btuh Output of the heating system is needed to perform this measurement. There are three separate methods for determining Btuh Output, two for gas/oil furnaces and the other for electric heat air handlers.

The formula for finding CFM is: $CFM =$

Manufacture name plate Btuh OUTPUT or Btuh Input x %Efficiency/ Temp Rise x 1.08 x (ACF)*

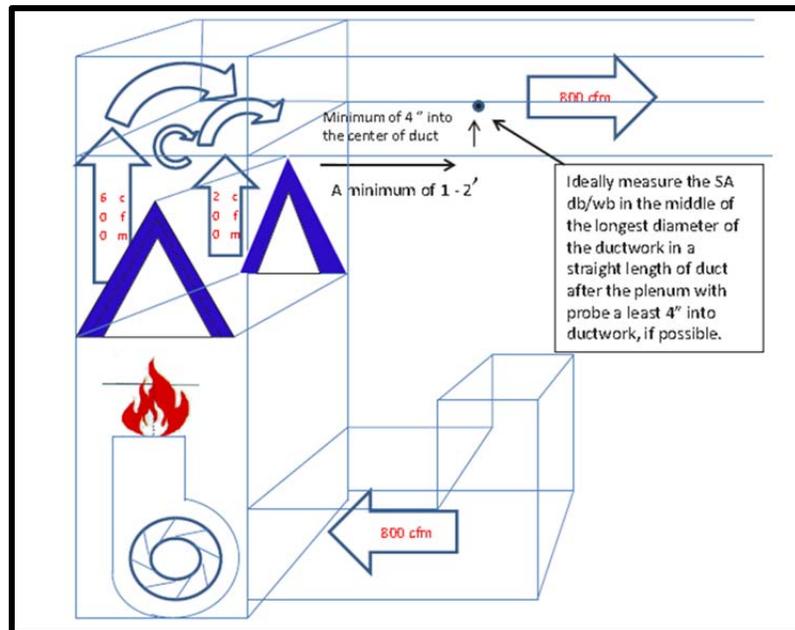
*Altitude Correction Factor

| Altitude | Correction Factor |
|----------|-------------------|
| <1000 | 1.08 |
| 1000 | 1.04 |
| 2000 | 1.00 |
| 3000 | 0.97 |
| 4000 | 0.93 |
| 5000 | 0.90 |
| 6000 | 0.86 |

Temperature Rise Method (Gas/Oil Heat)

First determine Btuh Output of the furnace, and measure air temperatures. Determine Btuh Output of a Gas/Oil Furnace; from the manufactures name plate (or perform combustion efficiency test).

1. Drill a two test holes; one into the return air @ the furnace, another in the supply air that should be taken out of direct sight of furnace heat exchangers and in the main airstream. See diagram below.



2. Set thermostat for heat call. Make sure all furnace stages are calling for heat and the burners are operating at high fire rate.
3. Gas pressure/Oil nozzle set and installed per manufactures specifications.
4. Optional; perform combustion efficiency test, record results.
5. A temperature rise must be taken by the technician. It is recommended using the same thermometer for measuring supply air and return air temperatures. Remember for ECM motors wait for motor to ramp-up to full speed. The temperature difference between the supply air and return air temperatures is the Delta T. Delta T must be within the manufactures specifications.
6. Example; Supply temperature 120⁰F Return temperature 70⁰F = delta T of 50⁰F, furnace Btuh Output 75,000/Input 80,000 Btuh. Combustion efficiency test results 94%. Furnace installed at 300' above sea level, Air Correction Fact = 1.
Estimated airflow option 1 = $75,000/50 \times 1.08 \times 1 = 1389$ cfm
Estimated airflow option 2 = $(80000 \times .94) = 75,200/50 \times 1.08 \times 1 = 1393$ cfm

Temperature Rise Method (Electric Heat)

Same method as above, except cfm and Btuh Output is calculated using the following formulas

Single phase heaters; $CFM = (\text{volts} \times \text{amps} \times 3.41)/(1.08 \times \Delta T)$.

Three phase heaters; $CFM = (\text{volts} \times \text{amps} \times 3.41 \times 1.73)/(1.08 \times \Delta T)$.

Note electric heat and blower are only items running during Temperature Rise Test.