THE IMPORTANCE OF FURNACE

commissioning

Nothing builds a long-term customer base and increased referrals faster than inspiring trust from homeowners when you've met their needs with properly installed mechanical equipment that is set up to optimize system performance.

Although proper equipment selection and installation get much of the performance credit, it's the commissioning side of a high-efficiency furnace that is often overlooked to ensure a system is operating at its peak.

The 6 steps to success

1

Gas Pressure – Step 1 is measuring inlet gas pressure to confirm that the correct amount of gas is getting to the furnace. It is also critical to measure and dial in the gas pressure at the manifold on both high- and low-fire to get an accurate baseline before directing attention to other commissioning components. If the gas pressure is too high or too low, it means the combustion process will not burn at engineered design.

Once the gas pressure is set, if the temperature rise is out you will know to adjust fan speeds. That said, some high-efficiency furnaces with variable speed motors (ECM) are engineered to ramp up air speed to produce a temperature rise that will protect the heat exchanger.

Gas pressure measured at the manifold should be close to 1.7" of water column (WC) on the rating plate for low-fire and 3.5" WC on the rating plate for high-fire. In any case, it is important to read the rating plate to confirm the desired pressure.

In terms of tools, whether you're using an old oil slack tube manometer or a new digital manometer, checking and adjusting gas pressure is fast and easy.

2

Clocking the Meter – Step 2 is completing a gas meter reading to confirm that the furnace is burning gas as labeled on the rating plate. Clocking the meter will also show if the wrong size orifices were installed.

An acceptable measured BTU versus sized BTU range should fall within a variance of five per cent. If the BTU measures too high or too low, it means the furnace is not firing or performing to engineered design.

To properly clock a meter, you need only a timer and calculator in your technician's tool kit. As an alternate option, rather than clocking the meter one can use properly sized orifice drill bits to determine the orifices are the correct size.

3

Temperature Rise – Step 3 requires an installer to complete a temperature rise to ensure that there is sufficient airflow across the heat exchanger.

This is probably the most critical part of commissioning. A furnace testing outside of manufacturer's specifications for temperature rise will result in poor comfort levels and potential premature degradation of the heat exchanger if results are too high. Condensation may occur in the primary heat exchanger if the temperature rise is too low.

The temperature rise is best set close to the centre of a manufacturer's recommended range. For example, if the setup range was 45 to 75 degrees, the fan speed adjustment should be as close to the middle of that range, or 60 degrees, as possible.

A simple thermometer can be used to check temperature rise, but a digital multi-meter is the recommended tool for completing the testing since even the entry level multi-meters have an option for a temperature probe, and this tool is useful for additional mechanical system troubleshooting.

Furnaces that are not commissioned may exhibit unexpected noise in operation, equipment faults and breakdowns, higher than expected utility bills and, ultimately, unsatisfied customers.

By ensuring performance measurements of the operating furnace are right on the mark, contractors can be confident the equipment will run more smoothly, quietly and with less maintenance over its life cycle. At the same time, a homeowner should experience lower operating costs and a home that is more comfortable and healthier.

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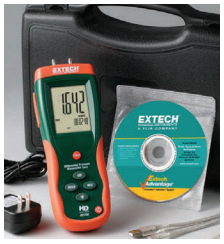

External Static Pressure – Step 4 is to complete external static pressure (ESP) tests on the supply and return air.

An ESP is a simple single point pressure test that provides repeatable, quantifiable results indicating the adequacy of both the return air and supply air duct systems to handle required air flow.

The ESP is also useful for measuring the additional pressure drop imposed by the air filter, furnace cabinet, elbow connection or overall "system effect."

A high static pressure reading could result in poor air distribution, noise, premature degradation of equipment, higher operating costs, and increased service and maintenance costs. A low static pressure reading could result in poor air distribution as the forced air will just fall out at the first or easiest air flow grille.

For supply air and return air, an "okay" test range is within 0.03 of the supply pressure plus 0.10" WC and within 0.03 of the return pressure minus 0.10" WC. For design purposes, both are considered to be positive results, so the sum of the supply and return air should be close to 0.20, which is preferable for gas and required when there is a heat pump, up to 0.30, which is still considered acceptable with a gas only furnace.

For ESP, either a magnehelic gauge or digital manometer can be used, with the latter having a reading capability into the hundredths (0.01) scale.

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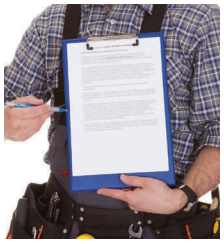

Documentation – The importance of documenting the results of commissioning should not be overlooked, so be sure to fill out a start-up sheet – usually included with the manufacturer's equipment installation manual.

Both pieces of literature should be left in a visible pocket in the mechanical room for easy access by future service technicians. The ability to reference this information during future service calls is extremely helpful.

Proper documentation will give future service technicians a comparison to see if anything has changed with the furnace operation.

6

Customer Education – Step 6 is to educate the customer on their new equipment and its operation. Key elements to include in the conversation are an explanation of preventative care and service requirements, an overview of thermostat operation and set-backs, and an explanation of indoor air quality, including the importance of filter service and replacement.

As an added benefit, customer education also offers a contractor an opening to promote and sell service contracts as part of an overall customer retention strategy.

PRO TIP: **The ESP test should be done before furnace change-out, so that any considerations to the duct system can be anticipated if the initial assessment shows issues. High-efficiency furnaces typically have higher air flows, which needs to be understood and taken into consideration at pre-change-out.**