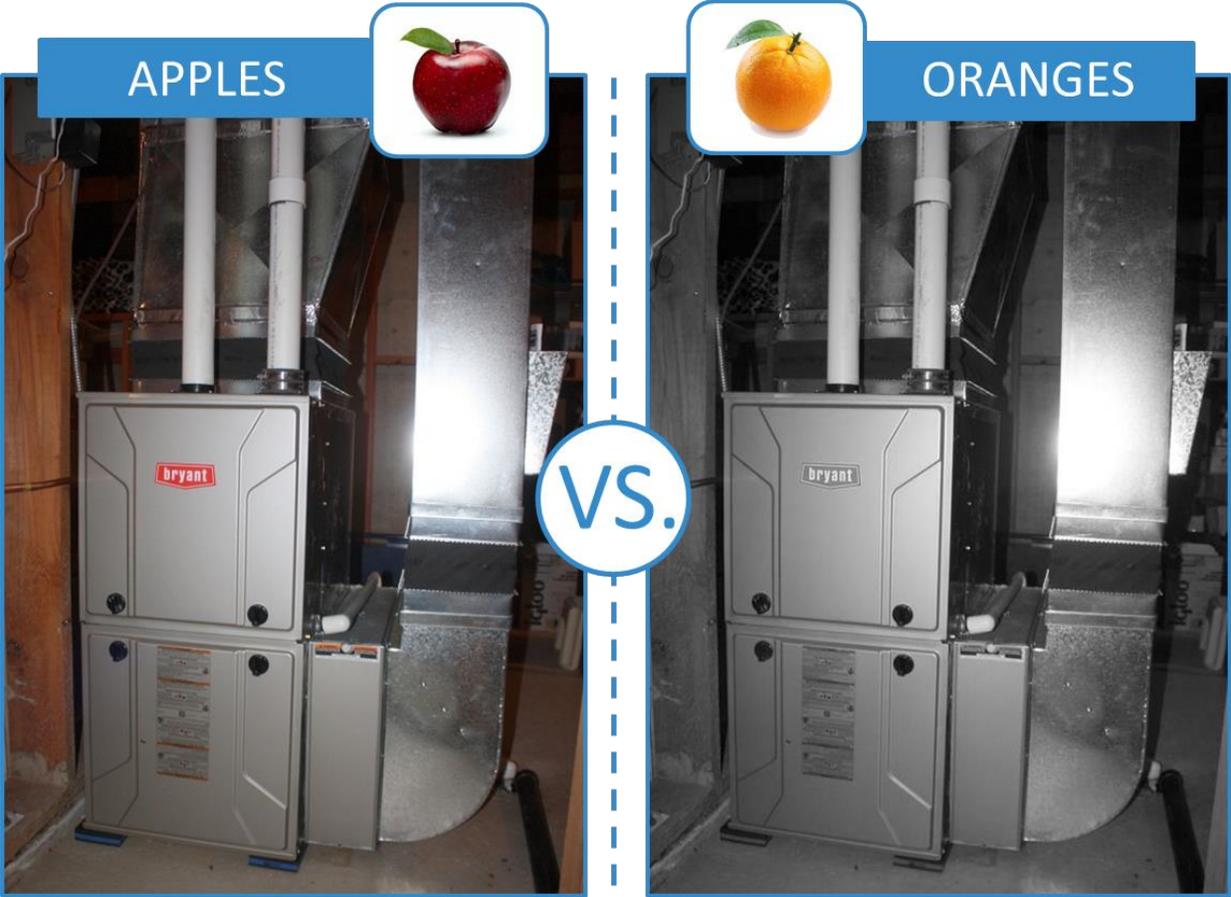


INSTALLATION OF A HIGH-EFFICIENCY FURNACE

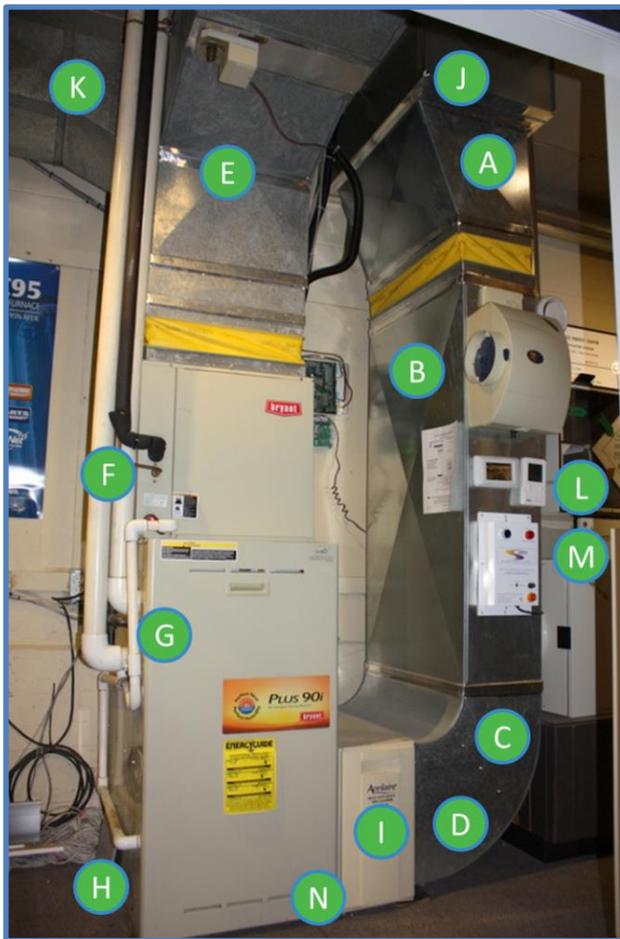
Did you know the ultimate performance and longevity of a high-efficiency furnace in the home depends on the quality of the installation? To help you save money on energy bills, improve the longevity of the equipment and reduce maintenance, Energy Save New West is pleased to provide you with an information sheet to help you understand the installation considerations when purchasing a new high-efficiency furnace.



VISUAL FOURTEEN-POINT CHECKLIST

The following graphic outlines each of the fourteen (14) installation points around a high-efficiency furnace that you'll want to consider when choosing to upgrade your heating system. This checklist is derived from the Quality First™ installation standard developed by BC's Thermal Environmental Comfort Association (TECA). Each of these points will have an effect on overall system performance and details of individual features and benefits are outlined on Pages 2 through 3.

It is important to note that the ability to address each of these components as part of your new furnace installation will be dependent on the existing condition of your current installation set-up and mechanical room.



- A. Tapered transition at top of return air drop
- B. Correct return air drop duct sizing
- C. Rounded throat return air drop elbow
- D. Turning vanes in return air drop elbow
- E. Sealed joints on furnace room ducting
- F. Venting sized correctly
- G. Double piped vent installed
- H. Tipped to drain (when manufacturer required)
- I. Pleated filter (2" minimum thickness)
- J. Removed / seal existing combustion air from return air
- K. Tapered takeoff on supply air plenum
- L. Matching or compatible thermostat
- M. Matching thermostat wiring
- N. Waffle pads or feet off existing floor

FEATURE & BENEFITS	
A	<p>TAPERED TRANSITION AT TOP OF RETURN AIR DROP:</p> <ul style="list-style-type: none"> • Noise reduction (through less turbulence) of the return air arriving at the elbow and filter. • Reduces electrical consumption associated with bad fittings and ECM motor ramping up (i.e. drawing more power) to deliver the necessary air passing through heat exchanger to achieve correct temperature rise. • Increases the duct capability of the return air drop to handle air.
B	<p>CORRECT RETURN AIR DROP DUCT SIZING:</p> <ul style="list-style-type: none"> • Increased comfort with ability to heat house more evenly since a proper pressure drop connected to the return air duct will support better air distribution. This may lead to energy savings since you may not require turning thermostat up to create comfort in some areas while overheating others. • Noise reduction when return air arrives at the elbow and filter. • Reduces electrical consumption associated with bad fittings which create higher external static pressure.
C	<p>ROUNDED THROAT RETURN AIR ELBOW:</p> <ul style="list-style-type: none"> • Improved system performance through reduction of static pressure on the return air arriving at the filter. • Better filter performance and indoor air quality with even loading of dust/dirt particulate into filter. Also, the even air flow results in longer life for the filter too. • Noise reduction (through less turbulence) of the return air arriving at filter.
D	<p>TURNING VANES IN RETURN AIR DROP ELBOW:</p> <ul style="list-style-type: none"> • Improved system performance that complements and enhances the benefits of (C). In elbows without turning vanes, the particulates tend to fall to the bottom and eventually the filter loads in the bottom half of the filter. Over time, the air will need to jump over the top of the loaded portion of this filter creating more turbulence or pressure drop.
E	<p>SEALED JOINTS ON FURNACE ROOM DUCTING:</p> <ul style="list-style-type: none"> • Improved comfort and energy-savings with more even heating throughout the home resulting from good layout, proper sizing and sealed joints. On the supply side, the ductwork of the furnace is to deliver all heated or cooled air to the design areas. If air is lost or leaked along the route there will not be enough static pressure or velocity for all the heated air to get to its final destination as this air will just fall out the first and easiest path. • Addresses potential CO health and safety issue since if return air connections are leaky and air is drawn from the furnace room this could produce a health and safety issue as negative air pressure created could back vent a naturally aspirating domestic hot water (DHW) tank.
F	<p>VENTING SIZED CORRECTLY:</p> <ul style="list-style-type: none"> • Improved energy-efficiency and increased equipment lifecycle since improper combustion process from poor venting can lead to significant maintenance issues, reduced efficiencies and premature equipment failure.
G	<p>DOUBLE PIPE SYSTEM INSTALLED:</p> <ul style="list-style-type: none"> • Better system performance since when both exhaust and combustion air pipes are in the same barometric pressure zone this leads to more controlled combustion. In a single pipe exhaust, combustion air is drawn from inside the home creating negative pressure which results in wasting energy to heat the resulting infiltrating outside winter air. Also, a single pipe exhaust system which requires outside make-up air creates another hole in the house creating uncomfortable drafts and air leakage through the building envelope. • Addresses potential CO health and safety issue in a single pipe exhaust when combustion air is drawn from inside the home this could create some challenges for the combustion process when high capacity exhaust fans or a combination of exhaust fans are engaged.
H	<p>TIPPED TO DRAIN (when manufacturer required):</p> <ul style="list-style-type: none"> • Equipment longevity and reduced maintenance since the combustion process in high-efficiency furnaces produces an acidic condensate. While the heat exchangers and all parts of the furnace in contact with this acidic condensate are resistant to degradation, they are not impervious to it. When this acidic condensate is not drained and left to build up inside the furnace for long periods premature equipment failure may occur.
I	<p>PLEATED FILTER (2" minimum thickness):</p> <ul style="list-style-type: none"> • Improved indoor air quality since pleated filters (or equivalent) are more effective in filtering the one (1) to ten (10) micron particulates sizes. • Longevity of equipment and reduced maintenance since pleated filters or equivalent protect and keep the very small passages / spacing in the secondary heat exchanger cleaner resulting in proper heat transfer and less maintenance over long term. • Energy-savings, equipment longevity and quieter operation. Thicker pleated filters have significantly more surface area. Because of this larger surface area, there is high efficiency with no static pressure penalty as the air travels through it which means the blower (ECM) doesn't have to ramp up and work so hard to pull air through the system. This results in quieter operation, equipment longevity and electrical energy-savings.



J	<p>REMOVED / SEAL EXISTING COMBUSTION AIR FROM RETURN AIR:</p> <ul style="list-style-type: none"> • Energy-savings since removing existing combustion air from the return air duct will make the structure less drafty and more comfortable. In the past, when all furnaces and DHW tanks were naturally aspirating (i.e. drawing combustion air from inside the home) the gas code required make-up air. Most often, outside air was connected to the return air ducting. Every time the furnace fired and operated, cold air was pulled from outside to pressurize the structure driving warm heated air out of the home. When the largest combustion appliance is now a sealed combustion furnace, the old combustion air should be removed and sealed off as it is energy wasteful.
K	<p>TAPERED TAKEOFF ON SUPPLY AIR PLENUM:</p> <ul style="list-style-type: none"> • Energy-savings and noise reduction since air velocities are maintained and reduced pressure drops are achieved. The reduced pressure drops means less noise and ECM motors do not need to ramp up which means electrical savings.
L	<p>MATCHING OR COMPATIBLE THERMOSTAT:</p> <ul style="list-style-type: none"> • System performance, comfort, equipment longevity and energy-savings. Today, all manufactures have a choice of a two, three and/or variable stage gas valves in their furnace offerings. To achieve the benefits of these features these furnaces require a matching thermostat. These thermostats are mini micro-processors which are collecting data about temperature performance and they need to communicate this information with the processor in the furnace. A matching thermostat allows for quick recoveries to high-fire in the morning after turn down for night sleeping. In addition, long gentle run times in low fire contribute to overall comfort with more precise heating including anticipation of temperature requirements and quieter operation. Lastly, gentle run times in low fire can contribute to equipment longevity.
M	<p>MATCHING THERMOSTAT WIRING:</p> <ul style="list-style-type: none"> • System performance, comfort, equipment longevity and energy-savings. To achieve the maximum benefits of the matching thermostat most manufactures still require at least a 4 or 6 LTV wire. Installing a new wire in an existing, finished home can be a challenge so manufactures have sensors that can be fixed to the old 2 LTV wire and connected at the furnace to the matching thermostat. The challenge with this set-up for homeowner is that in order to read or adjust the thermostat it requires going to the furnace location.
N	<p>WAFFLE PADS OR FEET OFF THE FLOOR:</p> <ul style="list-style-type: none"> • Equipment longevity, noise reduction and reduced maintenance. It is rare to find a floor laser level therefore a three part waffle pad can be adjusted to accommodate proper drainage of the furnace. By having the furnace raised, you mitigate potential corrosion possibilities to the metal base and waffle pads can absorb vibration thus reducing noise. Also, in the event of a minor flood or liquid spilling on the floor the furnace is protected.

FINDING A CONTRACTOR

If you're looking for a licensed professional to install or service your natural gas heating system, FortisBC offers a contractor directory online at: www.fortisbc.com/findacontractor. Each of the contractors listed on their website are licensed with the BC Safety Authority and have been in business for a minimum of one (1) year.

Additional resources to help with finding and selecting a contractor include:

- BC's Thermal Environmental Comfort Association's Member Directory: www.teca.ca
- Canadian Home Builders Association's "Get It In Writing" Program: www.hiringacontractor.ca

DISCLAIMER: It is understood that City of New Westminster does not make any warranty, expressed or implied, of any products or measures that have been completed, installed, or claimed for the Energy Save New West (ESNW) program. The City of New Westminster has no liability concerning:

- The quality, safety, and/or installation of the products or measures.
- The estimated energy savings of the products or measures.
- The workmanship of any third parties.
- The installation or use of the products or measures.

The Participant in ESNW is responsible for obtaining any required building, electrical and/or gas permits or ensuring that the contractor(s) have done so. The Participant shall further be responsible to ensure that the installation of products or measures meets applicable requirements of the British Columbia Building Code and applicable bylaws and is acceptable to inspection authorities.

