

2013 Efficiency Requirements for Gas Furnaces

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The U.S. Department of Energy (DOE) published a direct final rule to establish amended energy conservation standards for residential furnaces and residential central air conditioners and heat pumps in the Federal Register on June 27, 2011. Compliance with the standards in the direct final rule will be required on May 1, 2013 for non-weatherized furnaces.

How does this affect you as a homeowner? If you have an 80% efficient unit and need to replace it after May 1, 2013 then it will need to be replaced with a minimum 90% efficient furnace. Gas-fired furnaces with efficiency rating of less than 90% will not be allowed to be sold or installed in Illinois.

During the DOE's analysis leading up to its final decision, The American Gas Association (AGA) argued against this new regulation and stated that:

- replacing a non-condensing gas furnace with a condensing gas furnace may be infeasible for some homes where side-wall venting is not an option (e.g., in row houses, historic homes, or multi-story housing complexes),
- may be cost-prohibitive in other homes,
- may lead to orphaned water heaters,
- would increase installation costs and require trained installers to ensure proper venting of all combustion appliances

- DOE's analysis significantly underestimates the costs associated with installation of condensing gas furnaces that consumers would actually incur, both as a result of underestimating specific cost items and of failing to include specific cost items.

In response to AGA's claims the DOE acknowledged that there may be increased technical complexity associated with replacing a non-condensing gas furnace with a condensing gas furnace, but DOE disagreed with AGA's contention that replacing a non-condensing gas furnace with a condensing gas furnace may be infeasible for some homes where side-wall venting is not an option.

Therefore, on May 1, 2013 the minimum efficiency requirement for furnaces in Illinois and surrounding states in the northern region of the U.S. will be 90% AFUE. The annual fuel utilization efficiency (AFUE) is a thermal efficiency measure of combustion equipment like furnaces, boilers, and water heaters. 90%+ furnaces are condensing units, meaning they emit water vapor along with carbon dioxide in the flue gases which will rust the sheet metal piping that 80% furnaces are exhausted with. Due to the corrosion 90%+ furnaces require a new PVC flue to be installed. High efficiency gas furnaces convert most of the energy they require directly into heat. These furnaces create efficiency by going back through their exhaust and drawing out any leftover heat to use again. High efficiency furnaces must be properly vented which may mean modifications to your home if you currently have an 80% efficient, gas-fired furnace with a metal vent that routes up through the roof.

Some systems have the furnace vented using a two-pipe system that goes directly from the furnace to the outside air. One pipe brings in air necessary for combustion, while the other pipe carries away the exhaust safely, with corrosion protection and the other features necessary to deal with the furnace gas. Other systems have single pipe venting whereby both exhaust and supply air are taken care of with a single pipe. This type of pipe vent is actually made from an outer pipe and an inner pipe so that exhaust and supply air can both be channeled separately.

This leads to issues especially for those living in a multi-family condominium or townhome, some of which were indicated by The American Gas Association. We have outlined potential issues with recommendations as follows:

1. 80% efficient furnaces are vented through the roof. A 90% efficient furnace cannot use the same vent. A new PVC vent will be required and will need to be vented horizontally through an exterior wall. The PVC vent is routed horizontally with a slight downward pitch to drain the water vapor.

Homeowners should be pro-active in working with their Association Boards and Property Managers to determine the best course of action in advance of the need for a furnace replacement. If the mechanical room is located near the center of your building then the routing of the PVC vents will typically need to travel along the ceiling of a living area, bedroom, or similar space which will be unsightly if left exposed. Routing the vent through existing interior walls will most likely not be an option and would be cost prohibitive. A gypsum board soffit may be

considered to enclose the exposed length of PVC vent within the home. The aesthetics of this decision may include the location of the soffit, the size, and whether other false soffits should be added for room symmetry.

Associations and their Property Managers should be pro-active to create an Association construction guideline that includes the specific location, detailing and appearance that a side-wall vent may have. Whether a two pipe or single pipe vent system is used for a new furnace this condition will be another maintenance issue that is prone to water infiltration. Imagine the side of your brick clad building with 100 vents randomly projecting out the side in various configurations. Also, what implication does cutting holes through the exterior wall of your building have on the structural integrity of the wall construction? These are questions best coordinated with an architectural/engineering consultant.

2. Whether mechanical vents are routed through the roof or exterior wall there are minimum required clearances from certain other elements such as air intake devices and windows. Proper venting of a condensing furnace, which is guided by the National Fuel Gas Code and, in many cases, by local building codes, is designed to alleviate health and safety risks. A minimum distance of 4'-0" from window openings is typically required although this should be confirmed with the local municipality. Associations and their Property Managers should be pro-active about this issue. What will you do if your building is entirely clad in a glass storefront system?

3. 80% efficient furnaces are often vented together with gas-fired water heaters.

The metal vent will need to be modified for the remaining water heater when a 90% efficient furnace is installed with its PVC venting. As with any modifications this work should be performed by a qualified, licensed contractor.

Note: Although not required, it is possible to replace the water heater with a high efficiency unit also. High efficiency water heaters have blowers and PVC piping that is routed horizontally.

4. In most cases the size of the 90% efficient furnace should work in the existing space; however, this is not guaranteed. Spatial constraints may require modifications to surrounding elements to install the new mechanical unit.

5. Depending on the age of your air conditioner (a/c) it may also need to be replaced to be compatible with the new furnace. Since January of 2006, the Federal Government required air conditioners to have a SEER rating of 13 or higher. The Seasonal Energy Efficiency Ratio (SEER rating) measures the efficiency of air conditioners. Additionally, in 2010, Freon 22, began being phased out due to the laws and regulations set forth by the EPA and the Federal Government. All manufacturers of air conditioning and heating equipment are now required by law, to only produce HVAC equipment that uses, environmentally friendly, R-410A Freon. Freon Manufacturers will continue

producing R-22 for servicing and repairs until 2020, when R-22 will become obsolete.

In conclusion, if your household has an 80% efficient furnace that is at or near the end of its useful life consider having it replaced with a similar furnace before May 1st, 2013. Otherwise be prepared to replace your furnace with a 90% efficient unit and be aware in advance of the other modifications that may be necessary.

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