

HEAT WAVES

HIGH-EFFICIENCY FURNACES, BOILERS & HEAT PUMPS

New federal energy-efficiency requirements are here for boilers and on the way for furnaces. The changes mean that the least expensive boilers will reduce heating bills slightly. But the changes also mean that residents of northern states must purchase a more expensive furnace that has a higher minimum energy efficiency than furnaces in southern states require.

By Drew Vass

Although the latest energy-efficiency requirements for boilers, furnaces and heat pumps are designed to reduce the country's overall energy consumption, you should take comfort in knowing that most consumers will realize slightly lower home-heating costs if they buy a new boiler in 2012 or buy a new furnace in 2013.

New Department of Energy requirements for gas and oil boilers increase the required minimum annual fuel utilization efficiency (AFUE) ratings for products that are made on or after Sept. 1, 2012. (AFUE measures how efficiently that a system converts fuel to heat.) Manufacturers also are required to incorporate on all boilers technologies that were used previously on only some models, but experts whom we interviewed say these changes won't increase the price of boilers by much or at all.

But when DOE introduces requirements for gas and oil furnaces in May 2013, the benefits for consumers will be more complicated. The minimum level of efficiency that will be required for a furnace will be significantly higher for residents of the northern half of the United States than it will be for people who live in the warmer southern half of the country. That's because furnaces must be more efficient in colder climates to achieve DOE's goal to reduce energy use. But home-heating experts say northerners will pay



more money upfront for the better-performing furnaces and wait longer to realize financial returns than southerners will.

But don't worry if you are looking for a new heat pump. Regulations on those products won't change until 2015, and many of today's products already meet the 2015 standards.

BOILER POINTS. Minimum AFUE requirements for boilers vary by type—gas- or oil-powered, steam or hot-water

producing—but all types face increases that range from 2 percentage points to 5 percentage points. For instance, gas-powered steam boilers are required to have a minimum AFUE rating of 80 percent after Sept. 1, 2012, which is up from 75 percent. Minimum AFUE ratings for gas-powered hot-water boilers will increase to 82 percent from 80 percent; they will increase to 84 percent from 80 percent for oil-powered hot-water boilers; and they will increase to 82 percent from 80 per-

cent for oil-powered steam boilers.

Although the changes affect only boilers that have the lowest AFUE ratings, experts tell us that those modest figures should reduce annual heating costs by roughly 2 percent to 5 percent, which amounts to a savings of between \$38 and \$94 per year for the average household.

Other DOE requirements affect boilers that are at every price point. For instance, gas boilers that use a pilot flame (a small flame that burns constantly to

✓ Best Buys in Furnaces & Boilers

Best Buy Categories

[P]=Premium selection
[M]=Midrange selection
[E]=Economy selection



SEE PAGE 72

Best Buys in furnaces and boilers were selected based on efficiency, features, ease of use, ease of maintenance, and the manufacturer's reputation for quality and reliability.

Peak efficiency is rated in AFUE (annual fuel utilization efficiency). The ratings are taken from Air-Conditioning, Heating and Refrigeration Institute. Manufacturers might claim better ratings under operation during specific temperatures. Efficiency ratings can vary from model to model within a series.

Input reflects the amount of fuel energy that a unit consumes and is measured in MBH (thousands of Btu per hour). The terms *horizontal*, *counterflow*, *downflow* and *lowboy* relate to a furnace's configuration depending on where it's installed.



All Best Buys are for a series of units, thus a range of prices and inputs is listed.

Unless otherwise noted, all Best Buy boilers prorate the replacement cost of the heat exchanger after a certain period of time. The boiler warranties that are listed cover single-family residences.

It's important that you read the warranty for all Best Buy selections carefully, because the warranties have terms with which you must comply to be eligible for the maximum benefits. Many of these warranty terms apply to registration requirements.

Manufacturers typically don't disclose prices, so most MSRPs are based on input from contractors and distributors and data from installer price books. MSRPs don't include installation.

GAS FURNACES

[P] ~~XXXXXXXXXX~~
~~XXXXXXXXXX~~
~~XXXXXXXXXX~~
MSRP: \$4,128–\$5,665

>> The ~~XXXXXX~~ is a repeat Best Buy selection, because it's one of the most efficient gas furnaces that you can buy. The burner modulation system that's in this series adjusts heat in 0.65 percent increments based on outdoor temperatures, which helps to minimize the energy that's used to achieve the indoor temperature that you desire. This series has the smallest modulation increments that we found.

Features:
* Peak efficiency: 98.0 AFUE
* Input: 60–120 MBH

* Warranty: Lifetime heat exchanger; 10 yrs. parts

[M] ~~XXXXXXXXXX~~
MSRP: \$3,390–\$4,150
>> The ~~XXXXXX~~ has premium features and produces premium performance at a midrange price. No other series that's in this price range can match the efficiency of the ~~XXXXXX~~, which has a 95.0 AFUE across the entire line. Its modulating technology and the blower's variable-speed motor match what you would get in more-expensive models.

Features:
* Peak efficiency: 95.0 AFUE
* Input: 60–120 MBH
* Warranty: Lifetime heat exchanger; 10 yrs. parts

[E] ~~XXXXXXXXXX~~
~~XXXXXXXXXX~~
~~XXXXXXXXXX~~
MSRP: \$1,274–\$1,718
>> The ~~XXXXXX~~ has the best combination of performance and warranty that we found among models that are in this price range. This line has the widest range of inputs among economy models that have a blower that uses an electrically commutated motor. This type of motor makes the blower quieter and more efficient than are those that are in models that use a standard blower motor.

Features:
* Peak efficiency: 80.0 AFUE
* Input: 45–135 MBH
* Warranty: 20 yrs. heat exchanger; 10 yrs. parts



OIL FURNACES

[P] ~~XXXXXXXXXX~~
~~XXXXXXXXXX~~
MSRP: \$6,562–\$6,856
>> The ~~XXXXXX~~ is a repeat Best Buy selection, because no other oil furnace still comes close to matching this line's peak efficiency. The next-most efficient oil furnace that we found has a peak efficiency of 88.1 AFUE. A combustion analysis, which shows that this model was installed properly, is required to activate the warranty; this analysis typically is provided at no cost by the installer. The horizontal ~~XXXXXX~~, counterflow ~~XXXXXX~~ and lowboy ~~XXXXXX~~ (all \$6,475–\$6,750), are also Best Buys.

Features:
* Peak efficiency: 95.0 AFUE
* Input: 50–125 MBH
* Warranty: 20 yrs. heat exchanger; 5 yrs. parts

keep older systems ready to fire) must convert to an electronic-ignition system, which adds a 2 percent increase to efficiency, experts tell us.

But the largest energy-efficiency gains for boilers of every type come from mandated technologies that automatically monitor water temperature. These controls, which often are referred to as *reset systems*, manage water-temperature output to match only what's required to adjust your home's tempera-

ture to the desired level, rather than always heating the water to the maximum temperature. These technologies don't show up in AFUE ratings, but experts tell us that they add 8 percent to overall boiler efficiency.

Neither electronic-ignition nor reset functions are new to boilers, so boilers that already have these features meet the new design requirements. Boilers that were made before Sept. 1, 2012, and that don't meet the new require-

ments will be sold until dealer inventories are depleted, and we have no idea when that will happen.

We also are told that some contractors will continue to seek out and install systems that don't have electronic-ignition and reset functions, because the contractors consider such systems to be easier to set up and maintain. Although you can request that your contractor install a model that has these features, the only way that you can determine wheth-

[M] ~~XXXXXXXXXX~~
MSRP: \$3,514-\$4,957

>> The ~~XXXXXXXXXX~~ is a four-time repeat Best Buy selection, because we found no other series that's more efficient and more reliable that's in this price range. This line is more effective than most others are at transferring heat into living areas because of its eight-sided heat exchanger. The ~~XXXXXXXXXX~~ (\$3,568-\$5,075), which comes in horizontal and down-flow configurations, and the ~~XXXXXXXXXX~~ (\$4,800), which ranges from 119 MBH to 156 MBH, are also Best Buys.

Features:

- * Peak efficiency: 86.1 AFUE
- * Input: 70-106 MBH
- * Warranty: Lifetime heat exchanger; 10 yrs. parts

[E] ~~XXXXXXXXXX~~
MSRP: \$1,930-\$2,525

>> The ~~XXXXXXXXXX~~ is a repeat Best Buy selection, because no other series that's in this price range delivers better efficiency and a wider input range than this series does. You also can choose from three types of branded burners on this line to match your method of exhausting gases; most other economy models give you just two choices. The lowboy ~~XXXXXXXXXX~~ series (\$1,420-\$1,775) is also a Best Buy.

Features:

- * Peak efficiency: 85.9 AFUE
- * Input: 84-175 MBH
- * Warranty: Lifetime heat exchanger; 5 yrs. parts

GAS BOILERS

[P] ~~XXXXXXXXXX~~
MSRP: \$3,849-\$4,199

>> The ~~XXXXXXXXXX~~ is one of the most efficient gas-boiler series that we found, and it's the only series that we evaluated that has a stainless steel heat exchanger. Other models have an aluminum heat exchanger, which requires more maintenance than a stainless steel heat exchanger does. The heat-exchanger warranty for this series is not prorated.

Features:

- * Peak efficiency: 97.3 AFUE
- * Input: 70-155 MBH
- * Warranty: 12 yrs. heat exchanger; 2 yrs. parts

[M] ~~XXXXXXXXXX~~
MSRP: \$3,242-\$3,799

>> The ~~XXXXXXXXXX~~ is a repeat Best Buy selection, because it's the most efficient line of gas boilers that's in this price range. This series also has performance-boosting features that are rare for a midrange model, such as an energy-saving heat-recovery function.

Features:

- * Peak efficiency: 97.3 AFUE
- * Input: 50-210 MBH
- * Warranty: 12 yrs. heat exchanger (7 yrs. free); 1 yr. parts

[E] ~~XXXXXXXXXX~~
MSRP: \$1,973-\$2,228

>> The ~~XXXXXXXXXX~~ is a repeat Best Buy selection, because you can't beat the quality and efficiency of this series when compared with that of other economy models. This series also has the broadest input range among the economy models that we evalu-

ated, and it has one of the best warranties that we found among series that are in any price range.

Features:

- * Peak efficiency: 85.0 AFUE
- * Input: 70-280 MBH
- * Warranty: Lifetime heat exchanger (10 yrs. free); 1 yr. parts

OIL BOILERS

[P] ~~XXXXXXXXXX~~
MSRP: \$5,530-\$7,169

>> The ~~XXXXXXXXXX~~ is the most efficient oil boiler that we evaluated, and this model also has the best construction quality among models that we evaluated. For instance, it has a stainless steel heat exchanger, which makes this boiler less prone to corrosion than are boilers that have aluminum heat exchangers.

Features:

- * Peak efficiency: 92.0 AFUE
- * Input: 70-84 MBH
- * Warranty: 12 yrs. heat exchanger (7 yrs. free); 1 yr. parts

[M] ~~XXXXXXXXXX~~
MSRP: \$2,138-\$2,447

>> The ~~XXXXXXXXXX~~ is a repeat Best Buy selection, because you can't beat its combination of efficiency and quality among models that are in this price range. This model has among the best capacity for water heating that you'll get among midrange models. And it has a plug-and-play control system that helps to speed up installation and service, thus reducing costs.

Features:

- * Peak efficiency: 87.0 AFUE
- * Input: 84-231 MBH

- * Warranty: Lifetime heat exchanger (10 yrs. free); 1 yr. parts

[E] ~~XXXXXXXXXX~~
MSRP: \$1,871-\$2,460

>> The ~~XXXXXXXXXX~~ is a repeat Best Buy selection that's strong on efficiency and ease-of-use features. This model's three-pass heat exchanger helps to make it among the most efficient models that we found in this price range. And you can control its settings via an LCD screen that provides service alerts, which is rare for a series that's in this price range. The heat exchanger warranty is not prorated.

Features:

- * Peak efficiency: 86.5 AFUE
- * Input: 112-196 MBH
- * Warranty: 20 yrs. heat exchanger; 2 yrs. parts

For more information about the above Best Buys, contact the manufacturers directly. See page 64.



Best Buys in Heat Pumps

Best Buy Categories

- [P]=Premium selection
- [M]=Midrange selection
- [E]=Economy selection



SEE PAGE 72

Best Buys in heat pumps were selected based on efficiency, ease of use, ease of maintenance, and the manufacturer's reputation for quality and reliability.

Peak efficiency is rated in SEER (seasonal energy efficiency ratio) for cooling efficiency and HSPF (heating seasonal performance



factor) for heating efficiency. The ratings are taken from Air-Conditioning, Heating and Refrigeration Institute.

All Best Buys are for a series of units, thus the range of prices and inputs.

Because manufacturers typically don't disclose prices, MSRPs are based on input from contractors and distributors and data from installer price books. MSRPs don't include installation.

[P] *[Redacted]*
MSRP: \$5,934-\$7,574

>> The *[Redacted]* series has more to like than any other heat-pump line has. This series is the most efficient series that we found that has an inverter-driven compressor. An inverter-driven compressor is rare among heat pumps, and it modulates operation speeds in a way that allows the models that are in this line to use only the energy that you need to heat or

cool your living space. The *[Redacted]* (\$6,527-\$8,331), which has a 12-year warranty, is also a Best Buy.

Features:

- * Peak efficiency: 22.0 SEER / 10.0 HSPF
- * Input: 2-4 tons
- * Warranty: 10 yrs. compressor, parts

[M] *[Redacted]*

MSRP: \$3,740-\$4,950

>> The *[Redacted]* is the most efficient and the quietest series of heat pumps that we found. Its 13 HSPF rating is higher than that of any other series that we evaluated, thanks in part to its variable-speed modulation system. Its decibel rating of 58 matches the noise level of an economy dishwasher.

Features:

- * Peak efficiency: 20.5 SEER / 13.0 HSPF

- * Input: 2-5 tons
- * Warranty: 10 yrs. compressor, parts

[E] *[Redacted]*

MSRP: \$1,360-\$2,410

>> The *[Redacted]* is a repeat Best Buy selection, because no other series that's in this price range has a better combination of efficiency and warranty than this one does. We couldn't find a line that was priced lower that has a lifetime warranty on the compressor. However, you must purchase a new indoor coil (\$800) to activate the maximum terms of the warranty.

Features:

- * Peak efficiency: 15.0 SEER / 9.0 HSPF
- * Input: 1.5-5 tons
- * Warranty: Lifetime compressor; 10 yrs. parts

For more information about the above Best Buys, contact the manufacturers directly. See page 64.

er a boiler was made before Sept. 1, 2012, is to cross-reference the boiler's serial number with the manufacturer.

As a result, you should demand that the installer give you a contract that lists the serial number of the boiler that's being installed or at least notes that the boiler that's being installed was manufactured on or after Sept. 1, 2012.

NORTHERN EXPOSURE. New standards for gas furnaces will split the country in two Civil War-era blue-gray climate areas that might make some consumers who live in the northern half see red in the years ahead. In May 2013, DOE is scheduled to adjust its minimum AFUE requirements for furnaces to 80 percent from 78 percent in southern states and to 90 percent from 78 percent in northern states. It means that when you replace your existing furnace or install a furnace in a new home, it must meet the new minimum AFUE standards.

The independent experts whom we interviewed say higher minimum AFUE mandates for northern states help DOE to achieve its goal of reducing energy

use, because homeowners in southern states use less heat than do homeowners in northern states. Making homeowners in northern states install a furnace that consumes less energy makes practical sense, experts say.

However, consumers who live in northern states could pay at least \$1,000 more for a new furnace because of the increase. It also means that roughly half of the furnaces that are on the market today can't be installed in homes that are in northern states in 2013.

But the added cost for a more efficient furnace doesn't stop with the furnace alone. The only furnaces that are capable of meeting DOE's requirements in northern states are those that have condensing technology; such furnaces have a different set of venting requirements than do noncondensing furnaces. That means that whether your existing furnace shares a venting system with a water heater or is vented through a steel or masonry flue system, you will have to pay anywhere from \$200 to \$1,000 extra to have an alternative venting system installed.

Experts tell us that consumers who

have to shell out extra money for a more expensive furnace and a new ventilation system might not see a return on their investment via energy-cost savings for at least 10 years. Consumers who install a new furnace that will work with the existing flue will get an energy-cost savings payback in as little as 5 years.

And if you live in a northern state, don't bother to make a dash south to buy a bootleg furnace. Although DOE hasn't said how it plans to enforce these requirements, independent experts tell us that enforcement likely will occur at the contractor level. In other words, you might get a sub-90 percent AFUE furnace home without engaging in a high-speed chase, but you never will find a contractor who will install it. ●

Drew Vass is a regular contributor to Consumers Digest. He also has written about energy-efficiency issues that pertain to replacement windows and doors.



Go to ConsumersDigest.com to see how your state will be affected by efficiency requirements for gas furnaces in 2013.