Are You Ready?
2015 DOE (Department of Energy) Final Rule Effective April 16th, 2015

The new 2015 DOE (Department of Energy) Final Rule energy efficiency mandates will require higher Energy Factor (EF) ratings on virtually all residential gas, electric, oil and tankless gas water heaters, completely altering the water heater landscape. These changes will have an impact on how water heaters are manufactured, distributed and installed, affecting manufacturers, wholesalers, installers and customers alike.

The New Requirements

Energy Factor (EF): *Energy Factor is the ratio of useful energy output from the water heater to the total amount of energy delivered to the water heater. The higher the EF is, the more efficient the water heater*.

2015 Energy Conservation Standards for Residential Water Heaters		
Product Classes Affected by Change	***Rated Storage Volumes/Inputs Affected by Change***	***New Energy Factor Requirements***
Gas-fired	≥ 20 gal and ≤ 55 gal, ≤ 75,000 BTU/Hr.	0.675 – (0.0015 x V)
	> 55 gal and ≤ 100 gal, ≤ 75,000 BTU/Hr.	0.8012 – (0.00078 x V)
Oil-fired	≤ 50 gal, ≤ 105,000 BTU/Hr.	0.68 – (0.0019 x V)
Electric	≥ 20 gal and ≤ 55 gal, ≤ 12 KW input	0.960 – (0.0003 x V)
	> 55 gal and ≤ 120 gal, ≤ 12 KW input	2.057 – (0.00113 x V)
Instantaneous Gas-fired	≤ 2 gal, ≤ 200,000 BTU/Hr.	0.82 – (0.0019 x V)
Instantaneous Electric *	≤ 2 gal, ≤ 12 KW input	0.93 – (0.00132 x V)

* no change

While all affected models will see an increase in the EF requirement, the most dramatic changes are in larger capacity models. The DOE established the EF requirement for residential gas and electric water heaters over 55 gallons so as to drive manufacturers to implement new, more energy efficient technologies. While the new rule does not require a specific technology, the only currently viable technologies to meet the EF requirement over 55 gallons are heat pump water heaters for electric and high efficiency condensing gas water heaters**.**

What Changes?

Electric water heaters, already very efficient, will likely require more insulation. This will increase the diameter and/or height of the water heater. Additional insulation may be required for piping and fittings such as drain and T&P valves. For electric water heaters over 55 gallons, the only currently available technology able to meet the EF requirement is a heat pump water heater.

To meet the required minimum EF, gas models may require additional insulation, incorporate newer flue baffling technologies (including flue dampers), incorporate electronic ignition in lieu of the standing pilot, or any combination of these. Again, the likely impact will be an increase in the overall tank size, especially in diameter. For gas water heaters over 55 gallons, high efficiency, fully condensing combustion technology will be required. This will mean that line voltage will have to be available, as well as a means for condensate disposal.

Similar challenges are faced with the oil-fired products. Much like gas products, oil-fired water heaters will likely require additional insulation or completely new combustion systems.

The new minimum Energy Factor for tankless (instantaneous) gas goes from .62 to .82. For installations requiring a tankless approach, most of these water heaters currently have EF ratings of .82 or better.

Impact on Water Heater Manufacturers

Changes required for the 2015 Final Rule will prove time-consuming and costly. Resources will have to be added, or shifted from other projects to complete the R&D, manufacturing equipment selection and installation, testing and certification, training, sales and marketing. Because the product will likely increase in size, additional distribution facilities may be required. Logistics costs will increase as fewer units may fit in a trailer or shipping container. Manufacturers will have to balance their inventory and production as there will be increased demand for the current products just ahead of the effective date.

Impact on the Distributor

Distributors will be required to re-train their employees so that they understand the intricacies of the new standards and the changes to the new water heaters. As with the manufacturer, space is always a premium, and these new products will take up more space in the warehouse.

In addition to understanding the technical changes in the product, the distributor will also have to understand and train personnel as to any new handling and logistics requirements. For example, handling an integrated heat pump water heater can be very much different from handling a standard electric water heater. It is taller and heavier. It is top-heavy because of the additional weight of the heat pump components on the top of the unit. Stack height may be impacted.

The charts below show the Current and 2015 Energy Factor requirements in a variety of common size water heaters

2015 Standards: GAS – Common Sizes

	≤55 Gallons				> 55 Gallons		
Calculation	EF = 0.675 – (0.0015 × V)				EF = 0.8012 – (0.00078 × V)		
Rated Storage Volume	Tankless	30	40	50	60	65	75
Current Standard	.62	.61	.59	.58	.56	.55	.53
2015 Standard	.82	.63	.62	.60	.75	.75	.74

2015 Standards: ELECTRIC – Common Sizes

	≤55 Gallons				> 55 Gallons		
Calculation	EF = 0.960 – (0.0003 × V)				EF = 2.057 – (0.00113 × V)		
Rated Storage Volume	20	30	40	50	65	80	120
Current Standard	.94	.93	.92	.90	.88	.86	.81
2015 Standard	.95	.95	.95	.95	1.98	1.97	1.92

2015 Standards: OIL – Common Sizes

Calculation	EF = 0.68 – (0.0019 × V)		
Rated Storage Volume	**30**	**32**	**50**
Current Standard	.53	.53	.50
2015 Standard	.62	.62	.59

Because the new style water heaters may require additional components for installation, such as venting material and condensate pumps, the distributor may have to stock additional SKU's to support their customer.

On the positive side, when products become more complex, it is less likely that they will be purchased and installed by the do-it-yourself consumer. Therefore, a potential impact of the 2015 water heater changes will be an increase in the share sold through wholesale distribution, thereby, increasing installer opportunities.

Impact on the Installer

Contracting business owners will strongly feel the effects of the 2015 Final Rule and the associated water heater changes. First, there are real costs associated with getting employees up to speed on the new technologies. Training on the new products will be critical. While manufacturers and distributors will provide resources to train installers, a significant amount of time will be required for training. This obviously comes at the sacrifice of revenue generating production from the employee.

Many installations that were once a one-person job will now require two people. As water heaters get larger and heavier, they will prove to be too awkward to handle by one person. This is especially true when talking about those models over 55-gallons. Not only will the larger models require two people, the contractor or business owner may need a larger work truck to deliver the water heater to the job. For example, the height of a heat pump water heater may exceed the height of the installers van. If the product cannot be laid down horizontally, the only solution may be to acquire a larger box van or open truck.

Condensing gas water heaters are generally a much heavier product than their standard counterparts. There are other requirements that must be met when installing these types of water heaters. First, 120 VAC is required. Electric is required for a gas water heater. Depending on the design, even gas water heaters under the 55-gallon threshold may now require electricity. Plumbing contractors will have to invest in electrical equipment (such as multi-meters) for installations and troubleshooting, and installers will have to become well-versed in electronic control systems.

By their nature, high efficiency gas water heaters produce condensate. Many installations will require a drain somewhere in the vicinity of the water heater, and/or a condensate pump. The installer will have to understand local codes with respect to condensate disposal.

What about the exhaust system? Condensing gas water heaters extract enough heat from the exhaust that it is generally cool enough to vent with plastic pipe, either through the sidewall or through the roof. Some models even require a plastic pipe for combustion air (intake). The venting system, usually PVC, CPVC or ABS, has to be constructed by the installer.

The location of the old water heater may not be appropriate for the new one. A heat pump water heater generally requires a 10 ft. x 10ft. room, or a duct to adjoining room to operate properly.

The installer must also be cognizant of the impact of noise. Whereas the existing water heater may produce very little noise, the new model may operate at a noise level which will lead to homeowner complaints if not addressed up front.

Impact on the Homeowner

The homeowner will have to deal with increased product and installation costs. In some cases, the water heater will have to be re-located to operate properly, or mitigate noise. While the operating cost of the new water heaters will be less because of their increased energy efficiency, it is likely that the maintenance costs will increase because of a more complex design, and the integration of electronics, blowers, fans, condensers, etc.

In some cases, the performance of the new water heater in terms of hot water deliverability will be less than the model which was replaced.

Conclusion

The above represents just a brief overview of the changes in water heaters mandated for 2015, and you are encouraged to spend the time to become well-versed in these changes. The time to prepare for these changes is now.