MEASURING UP

UNDERSTANDING THE U.S. DEPARTMENT OF ENERGY'S NEW WEIGHTED ENERGY FACTOR FOR POOL PUMPS

HAYWARD®

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Summary

NEW, MORE ENERGY-EFFICIENT POOL PUMPS

U.S. Department of Energy (DOE) regulatory changes for dedicated-purpose pool pumps (DPPPs) go into effect on **July 19, 2021**. As a result, the energy-efficiency standard for new pumps will be higher. Older pool pumps manufactured prior to the effective date are exempt from this requirement and may still be maintained, sold and installed. No product has to be returned based on date of manufacture. However, new pumps for both residential and commercial use must comply with DOE's new energy efficiency, testing and labeling standards.

NEW WAY OF TESTING FOR ENERGY EFFICIENCY

The DOE regulatory changes impact pool pump manufacturers and will bring about the development of more efficient pumps. As one output of the new DOE requirements, manufacturers are required to test pumps for their energy efficiency. The new method of measuring energy efficiency is based on weighted energy factor (WEF); **pumps that have higher WEF ratings are more energy efficient**. Hayward pool pumps have the highest WEF ratings and are the most energy-efficient pool pumps in the industry.

Hayward pool pumps have the highest WEF ratings, saving more energy and money than comparable pool pumps on the market.

NEW LABELING REQUIREMENT FOR ENERGY EFFICIENCY

Another output of the new DOE regulatory changes is that manufacturers are required to label pumps with their WEF rating. Due to the new labeling requirements, consumers will now have the tools to evaluate and compare the energy efficiency of new pool pumps. Hayward pool pumps have the highest WEF ratings, saving more energy and money than comparable pool pumps on the market. As a result of the new labeling requirement, consumers are expected to choose more energy-efficient pumps that deliever energy and utility bill savings.

Highlights

RECENT DEVELOPMENT OF ENERGY-EFFICIENT PUMPS

With the introduction of variable-speed pumps, pool pumps have become more efficient in recent years. **Variable-speed pumps cut energy costs by up to 90%** over older single-speed pumps. However, many consumers do not understand the value of energy-efficient variable-speed pumps. This is due in part to a lack of energy conservation standards and independent testing data on energy efficiency. Without standards and accepted testing metrics for evaluating pumps, consumers have been less likely to adopt more efficient pumps.

DOE PURPOSE AND GOALS

The DOE and industry leaders have developed new standards and a test for evaluating pool pump energy efficiency.

The result of the test is called WEF, a new way to rate pool-pump efficiency—**the higher the WEF rating, the more energy efficient the pump**.

Pool pumps must be labeled with their tested WEF rating by July 19, 2021.

WEF AND HOW IT MOVES DOE GOALS FORWARD

Using the labeled WEF rating, consumers will have the information they need to evaluate and compare the amount of energy used by pumps. Hayward® is the authority on WEF and **Hayward pumps have the highest WEF ratings**.

Many consumers want an energy-saving swimming pool that's environmentally friendly. These responsible consumers will purchase newer, more efficient pumps that save energy and they will replace older inefficient pumps with energy-saving models.

Consumers and the nation will save money and energy.

New DOE Requirements

NEW ENERGY CONSERVATION STANDARD

The DOE issued its first-ever Energy Conservation Standard (ECS) for certain Clean Water Pumps. The standard incorporates feedback from pool product manufacturers and other industry experts. In addition, the final rule incorporates by reference industry standards from the following:

- Hydraulic Institute (HI)
- Canadian Standards Association (CSA)
- Institute of Electrical and Electronics Engineers (IEEE)
- NSF International (NSF)/American National Standards Institute (ANSI)
- Underwriters Laboratories (UL)

Published on January 18, 2017, ECS became effective May 18, 2017. The Direct Final Rule and Test Procedure Final Rule were finalized on September 6, 2017. After February 5, 2018, manufacturers are required to implement the new test procedure that results in the product's WEF and other test procedure metrics. Compliance with the Direct Final Rule, establishing new energy conservation standards for DPPPs, including product labeling, is required on and after **July 19, 2021**.

New DOE Requirements, cont.

REGULATORY CHANGES

The pool industry is preparing for the new DOE regulatory changes to go into effect on July 19, 2021. On and after that date, pool pumps are required to meet stricter DOE regulations, in keeping with the Energy Conservation Program: Test Procedure for Dedicated-Purpose Pool Pumps dated September 6, 2017. "DOE established a new metric, as well as new definitions, test procedures, certification requirements, enforcement testing procedures and labeling provisions for DPPPs. Specifically, DOE is adopting a test procedure for measuring the WEF for certain varieties of DPPPs."

Responsibility for compliance lies with pump manufacturers—manufacturers will not be able to produce non-compliant pumps. Pump dealers/distributors will not need to return older non-compliant pumps.

Going forward, **energy-efficient pumps will be a regulatory requirement**. This applies to all pool pumps, except waterfall pumps, integral sand and cartridge filter pumps and portable electric spa pumps. It does not currently apply to replacement motors, although this is under consideration. Responsibility for compliance lies with pump manufacturers—manufacturers will not be able to produce non-compliant pumps. Pump dealers/distributors will not need to return older non-compliant pumps. The most important output of these new regulations is a pump's WEF. Similar to measuring the efficiency of a car in miles per gallon, the efficiency of a pump can be measured in WEF. New pumps are required to be labeled with their WEF rating.

TESTING PROCEDURES

The new test method measures the volumetric flow rate and input power in order to calculate the WEF rating. The required test procedures are designed to "measure energy efficiency, energy use or estimated annual operating cost of a pool pump during a representative average use cycle or period of use." Pool pump manufacturers will use the test procedures to certify that their products comply with the applicable energy conservation standards.

According to ENERGY STAR®, WEF is defined as follows: "Pump performance based on the EF [Energy Factor] at two operating points, one at a High Flow Measurement Point, the other at a Low Flow Measurement Point. These measurements are weighted differently to represent real world use. WEF is measured in gallons per watt hour (gal/Wh)."

Going forward, efficiency levels will be a function of hydraulic horsepower, which is directly proportional to pump flow and not related to motor horsepower.

Understanding WEF and its Expected Impact

WEF, A NEW WAY TO RATE POOL PUMP EFFICIENCY

As part of DOE's regulatory changes, a new test procedure is mandated for measuring the WEF for certain varieties of DPPPs. "**WEF is determined as a weighted average of water volumetric flow rate divided by the input power to the DPPP at different load points**. The specific load points and weights depend on the variety of the DPPP and the number of operating speeds with which it is distributed in commerce." WEF represents the pump's maximum potential under ideal environmental conditions.

Once the requirements go into effect on July 19, 2021, every new pool pump must be labeled with a WEF rating. **The WEF rating on the label will assist pool pros and homeowners in evaluating and comparing the energy efficiency of pool pumps.** Consumers, including pool owners and industry professionals, will want to prepare for the coming changes by learning about WEF ratings and how they can be used to evaluate and compare pumps.

WHAT DOES WEF MEAN FOR THE POOL INDUSTRY AND CONSUMERS?

Current U.S. pool ownership is estimated at over 10.5 million and there are more than 7 million spas in operation, according to The Spruce. **According to ENERGY STAR®, a pool pump can be a home's second largest energy user. However, the cost of running a pool pump could be reduced and a significant amount of energy could be saved by replacing inefficient pumps with more efficient models.** For example, an ENERGY STAR certified pump can save thousands of dollars over the life of the product and pay for itself in less than two years.

The new WEF ratings are important because they enable consumers to compare the energy efficiency of a variety of pool pumps. **Consumers are now empowered to make better, more educated choices.** And choosing a more energy-efficient pump will save energy and money. In addition, consumer adoption of more energy-efficient products is expected to lead to reduced greenhouse gas emissions, reduced equipment noise and reduced peak load on electrical utility companies. Similar to the effect of MPG ratings labels on new cars, WEF labeling is expected to increase consumer preference and sales of energy-efficient pool pumps.

Comparing WEF Ratings with Current (and Better Known) Energy Factors

The following well-known examples of energy factors for vehicles and air conditioners help to understand how the new WEF ratings are derived and applied to pool pumps.

AUTOMOBILES AND TRUCKS

Energy Factor: Miles per gallon (MPG)

Measurement: MPG is calculated by dividing the distance driven by the amount of fuel consumed. The more miles you are able to drive on a tank of gas, the more efficient the vehicle.

Efficient Vehicle Rating: The higher the MPG rating, the greater the vehicle's efficiency. 30+ MPG is considered an efficient automobile rating.

AIR CONDITIONING UNITS

Energy Factor: Seasonal Energy Efficiency Ratio (SEER)

Measurement: SEER is calculated by dividing the amount of cooling produced (BTU) by the amount of electricity (watts) used. The more cooling produced by a watt of electricity, the more efficient the air conditioning unit.

Efficient Air Conditioner Rating: The higher the SEER rating, the greater the air conditioner's efficiency. 13 to 22 SEER is considered an efficient air conditioner rating.

POOL PUMPS

Energy Factor: Weighted Energy Factor (WEF)

Measurement: WEF is calculated by dividing the amount of water moved by the amount of electricity used. The more water moved by a watt of electricity, the more efficient the pump.

Efficient Pool Pump Rating: The higher the WEF rating, the greater the pool pump's efficiency.

TRISTAR®
VS 950 OMNI®

TRISTAR®
VS 900 OMNI®

SUPER PUMP®
VS 700 OMNI®

MAXFLO VS™
500 OMNI®

New Minimum Performance Requirements

THE FOLLOWING PUMPS FALL WITHIN THE NEW MINIMUM PERFORMANCE REQUIREMENTS:

Self-Priming Pumps (All In-ground):

- Small size: <0.711 hydraulic horsepower (approx. 1.2 total horsepower)
- Large size: > or = 0.711 hydraulic horsepower to < or = 2.5 hydraulic horsepower (approx. 1.2 - 5 total horsepower)

Non-Self Priming Pumps (Majority of Above Ground):

- Priming is defined as a minimum of 5 feet in 10 minutes

Pressure Cleaner Booster Pump:

- Pumps used to operate a pressure automatic pool cleaner (APC)

THE FOLLOWING PUMPS **DO NOT** FALL WITHIN THE NEW MINIMUM PERFORMANCE REQUIREMENTS:

Waterfall Pump:

- Maximum head less than or equal to 30 feet
- Maximum speed less than or equal to 1,800 RPM
- Based on the pump, not the installation or application
- No performance requirements

Integral Sand and Cartridge Filter Pool Pumps:

- "Integral" is defined as a pump that cannot be plumbed to bypass the filter
- Used with storable pool equipment (e.g. Intex)
- Prescriptive requirement: must include timer that automatically turns off the pump after a run time of no more than 10 hours

Portable Electric Spa Pump:

- No performance requirements

Using WEF Ratings to Compare Pumps

WEF ratings will be helpful for comparing similar pumps. The following list of pump WEF ratings demonstrates the wide variation in energy efficiency that can be found between different models.

WEF RATINGS FOR VARIABLE-SPEED PUMPS

Hayward® MaxFlo VS™ (115V): 11.45 WEF

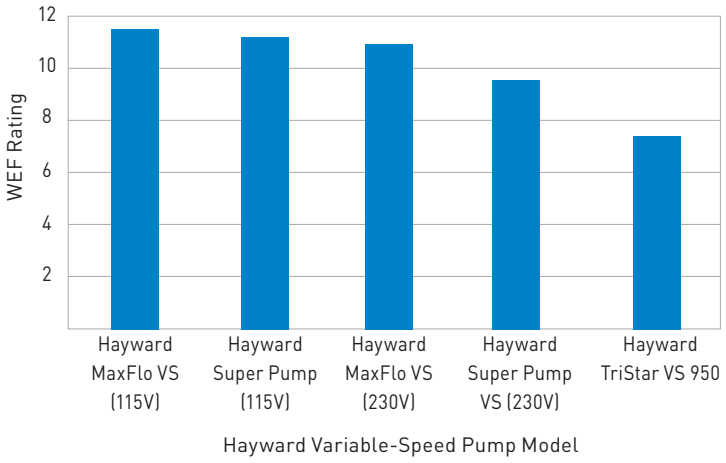
Hayward Super Pump® (115V): 11.39 WEF

Hayward MaxFlo VS (230V): 10.73 WEF

Hayward Super Pump VS (230V): 9.30 WEF

Hayward TriStar® VS 950: 7.27 WEF

Hayward pumps have the highest WEF ratings in the industry.



Shopping for an ENERGY STAR® Pool Pump

BENEFITS OF NEW WEF RATINGS LABELS

The DOE's new WEF ratings are beneficial to consumers and the pool industry as a whole. For the first time, consumers will be able to compare the energy efficiency of a variety of pool pump products. Like consumers of automobiles and air conditioners, pool pump consumers will be able to make better, more educated choices. **Consumers who want an energy-efficient pump will be able to compare pumps based on their WEF ratings label and will be able to estimate their energy and cost savings.**

COMPARING PUMPS

What should consumers look for when shopping for a pool pump? Look for the ENERGY STAR label. The ENERGY STAR label will "make it easy for consumers to identify and purchase energy-efficient products that offer savings on energy bills without sacrificing performance, features and comfort." Also, the labels identify products that help to "reduce greenhouse gas emissions and other pollutants caused by the inefficient use of energy." **Read the label** for important information including the pump's WEF rating—a higher number is better. **Compare the WEF rating** on a variety of pumps to understand the relative energy efficiency of each product. **Save money and energy** with pumps that have a higher WEF rating.

CHOOSE THE HIGHEST WEF-RATED PUMPS

Pumps with a high WEF rating are a more efficient choice, saving more energy and money than other similar pumps. Higher WEF-rated pool pumps are especially valuable to homeowners who use their pool for many months, live in a hot climate or want to reduce their energy usage and save money on energy bills. An additional benefit of energy-efficient pumps includes quieter operation since variable-speed pumps can run at lower speeds during times of lower load. Finally, it is expected that the installation of more energy-efficient pool pumps will lead to reduced greenhouse gas emissions and reduced peak load on electrical utility companies. Hayward® pool pumps are the highest WEF-rated pumps on the market.

FAQs: Pool Professionals

Q: AS A POOL PROFESSIONAL, WHAT DO I HAVE TO DO TO BE PREPARED FOR THE NEW DOE REGULATIONS?

A: Pool professionals should educate themselves about the new regulations as they impact their business and the pool industry as a whole. With the new regulations, the DOE is encouraging higher pool pump energy efficiency and more consumer-friendly product labeling.

Q: WHAT PUMPS ARE INCLUDED IN THE NEW FEDERAL MINIMUM EFFICIENCY REGULATIONS?

A: **The new DOE regulations impact all DPPPs of up to 2.5 hydraulic horsepower.** They include pumps for **in-ground and above-ground pools,** whether for **residential or commercial use.** The regulations are not based on how a pump is used; they are performance-based on pump design, physical features, performance characteristics, etc. Because of this, manufacturers can continue to innovate new technologies.

The following are considered DPPPs that fall within the regulations: self-priming pool filter pump, non-self-priming pool filter pump and pressure cleaner booster pump. The following pumps do not fall within the new performance requirements: waterfall pumps, integral sand and cartridge filter pumps and portable electric spa pumps.

Q: WHEN DO THE NEW REGULATIONS GO INTO EFFECT?

A: Enforcement starts on **July 19, 2021** and pump manufacturers bear total responsibility for product compliance.

Q: WHAT DOES WEF MEAN?

A: WEF stands for weighted energy factor. It is a new way of measuring the energy efficiency of a pool pump. The DOE is requiring new pumps to be tested and labeled for their energy efficiency. WEF is calculated by dividing the amount of water moved by the amount of electricity used. The more water moved by a watt of electricity, the more efficient the pump. **Pumps with a higher WEF rating will save more energy and will reduce utility bills.**

Pool pros can help consumers understand WEF ratings so they can make an educated comparison when purchasing a pool pump.

Q: CAN I SELL AND/OR INSTALL PUMPS MADE PRIOR TO THE EFFECTIVE DATE?

A: Yes, the **regulations affect pool pump manufacturers only**. After the effective date, manufacturers may only sell pumps which meet the new requirements for energy efficiency and labeling. Pool builders, pool servicers and pool stores may still sell and/or install pumps made prior to the effective date.

Q: CAN MANUFACTURERS STILL MAKE PUMPS UNDER THE OLD REGULATIONS?

A: No, pump manufacturers are required to produce only the more efficient pumps after the effective date.

FAQs: Pool Professionals, cont.

Q: WHAT ABOUT PUMPS I ALREADY HAVE IN STOCK?

A: Yes, you may continue to sell, install and maintain older pumps that you have in inventory. After the effective date, pool manufacturers may not manufacture older pump models that do not meet the new regulations for energy efficiency and labeling.

Q: WHAT ABOUT PUMPS I HAVE PREVIOUSLY INSTALLED OR SOLD?

A: Previously manufactured, sold or installed pumps are not subject to the new regulations. Older model pumps may still be sold and installed, but they may not be manufactured any longer. Only the newer, more energy-efficient pumps, which comply with the new DOE regulations, can be manufactured after the effective date.

Example: This is a similar situation to the phasing out of incandescent light bulbs in the lighting industry. After the effective date, lighting manufacturers were no longer able to produce and sell incandescent light bulbs. However, stores that had a stock of incandescent light bulbs could still sell them.

Q: WHICH POOL PUMP BRAND CARRIES THE BROADEST RANGE OF COMPLIANT PUMPS?

A: Hayward® Pool Products has the broadest range of DOE-compliant pumps.

Q: WHICH POOL PUMPS HAVE THE BEST WEF RATING?

A: Hayward pumps have the highest (best) WEF rating of all pumps in the pool industry.

Q: IN A NUTSHELL, WHAT ARE THE KEY TECHNICAL TAKEAWAYS?

A:

- DOE enforcement begins July, 2021
- Applies to both residential and commercial pumps
- Smaller single-speed pumps will still be available
- For in-ground pumps, variable-speed models will be the most common
- For above-ground and cleaner booster pumps, single-speeds will remain the most common

FAQs: Consumers

Q: AS A CONSUMER, WHAT SHOULD I DO TO BE PREPARED FOR THE NEW DOE REGULATIONS?

A: Consumers who currently own or are interested in owning a swimming pool or spa should educate themselves about the new regulations. The new DOE regulations are intended to help consumers save energy and make educated decisions.

Q: WHAT SHOULD I LOOK FOR WHEN SHOPPING FOR A NEW POOL PUMP?

A: Look for the **ENERGY STAR® label** on the pump packaging. The ENERGY STAR label helps you to identify and purchase energy-efficient pumps that save on your energy bills without sacrificing performance, features and comfort. Read the label for important information including the pump's WEF rating—a higher number is better. **Compare the WEF rating** on a variety of pumps to understand the relative energy efficiency of each product. You'll save money and energy when you purchase a pump with a higher WEF rating.

Q: WHAT DOES WEF MEAN?

A: WEF stands for weighted energy factor. It is a new way of measuring the energy efficiency of a pool pump. The DOE is requiring pumps to be tested and labeled for their energy efficiency. WEF is calculated by dividing the amount of water moved by the amount of electricity used. The more water moved by a watt of electricity, the more efficient the pump. Compare pumps and choose one with a higher WEF rating to save energy and money.

Q: WHAT IF THE PUMP DOES NOT HAVE A WEF RATING?

A: Pumps without a WEF rating may have been manufactured prior to the effective date of the new energy-efficiency regulations. The older pump may still be an energy-efficient choice, especially if it is a variable-speed pump. However, it is not likely to be as efficient as a new pump that meets the new DOE regulations.

Example: This is a similar situation to the phasing out of incandescent light bulbs in homes and businesses. After the effective date, lighting manufacturers were no longer able to produce and sell incandescent light bulbs. However, consumers could still purchase and install older, less efficient incandescent light bulbs in their homes and businesses.

Q: HOW CAN I SAVE MONEY ON A NEW DOE-COMPLIANT POOL PUMP?

A: Consumers can save money over the long term by choosing an energy-efficient pump with a high WEF rating. They may also save on their initial purchase with a variety of discounts and rebates. For instance, pump manufacturers may offer rebates on new DOE-compliant pool pumps. In addition, pool builders, servicers and pool stores may have special offers and discounts. Many utility companies also offer rebates as an incentive for pool owners to choose more energy-efficient pumps. ENERGY STAR offers more strategies for saving money and making your pool more energy efficient.

Conclusion

The DOE's new WEF ratings and mandatory product labeling are beneficial to consumers and the pool industry as a whole. For the first time, consumers will be able to compare the energy efficiency of a variety of pool pumps. Similar to the effect of MPG ratings labels on new car sales, WEF labeling is expected to increase consumer preference and sales of energy-efficient pool pumps.

Hayward® variable-speed pumps are the most energy efficient of any leading brand. They have the highest WEF ratings, according to independent testing in accordance with the new DOE requirements. For example, the Hayward MaxFlo VS™ pump has a WEF rating of 11.45 and is **up to 50% more efficient** than the nearest competitor. In addition, Hayward pool pumps are already compliant with the upcoming DOE regulations.

Hayward has been recognized as ENERGY STAR® Partner of the Year. Scott Petty, Hayward Pool Products Global Product Manager of Pumps and Filters and WEF expert, presented on the topic of "Department of Energy regulatory changes for dedicated-purpose pool pumps" at the recent National Pool & Spa Show in 2019.

ENERGY STAR AWARD 2019
PARTNER OF THE YEAR

"The new DOE requirements make good sense for the pool industry and for consumers. Accurate efficiency ratings and clear labeling will bring pool pumps in line with other consumer products, such as cars and air conditioners. In fact, Hayward pumps are already DOE compliant, with industry-leading energy-efficiency ratings and cost savings."

As ENERGY STAR Partner of the Year, Hayward has demonstrated "superior leadership, innovation and commitment to environmental protection through energy efficiency and ENERGY STAR."

Visit the Hayward Pool Products website for more information on Hayward's industry-leading pool pumps.