AN XOi WHITE PAPER

Preparing for New Efficiency Standards

If you're up to speed on the latest in HVAC, you've likely heard the news. Come January 1, 2023, the Department of Energy's (DOE) new efficiency standards for split system air conditioners and split system heat pumps (HPs) are slated to go into effect.

As part of the DOE's ongoing plan to reduce the nation's overall energy consumption, these new standards will require all split system air conditioners and heat pumps to meet new minimum energy efficiency standards. As a result, these new standards will raise the **SEER** (Seasonal Energy Efficiency Ratio) for air conditioners and the **HSPF** (Heating Seasonal Performance Factor) for heat pumps.

Changes of this kind typically happen every six years when the DOE reevaluates the effects of energy consumption to determine if changes to existing requirements and standards are needed. Today's current efficiency standards went into effect in 2015 when DOE last evaluated energy consumption.

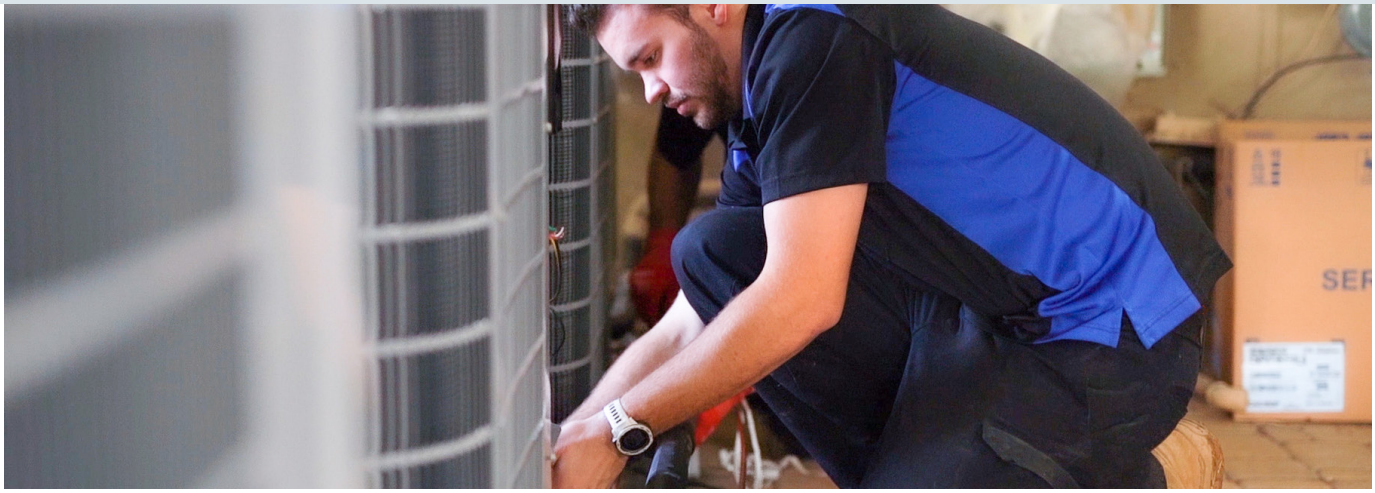
In 2023, in addition to increasing the minimum efficiency standards, HVAC manufacturers will be required to comply with a new testing procedure for developing efficiency ratings to better reflect conditions in the field. While the goal of these new standards and protocols is simple: to increase energy efficiency—new regulations and standards are not without their complexities.

In a survey conducted by Emerson, it was revealed that while about 87% of HVAC professionals are familiar with the changes coming in 2023, nearly half of respondents–44%–have yet to make plans to take action in response to these upcoming regulations.

In this white paper, we'll walk through the details and remedy any questions regarding preparation and implementation of the new efficiency standards coming in 2023.

Under the Energy Policy and Conservation Act (EPCA), the Department Of Energy (DOE) is required to review energy conservation standards at least once every six years, or in the event the ASHRAE 90.1 standard updates efficiency requirements for covered products. Any new or amended energy conservation standard must be designed to achieve the maximum improvement in energy efficiency that is technologically feasible and economically justified.*

*Source: *HVAC Regulations Efficiency Standards E-Book by Emerson*



What Does SEER Mean?

SEER stands for Seasonal Energy Efficiency Ratio, which is essentially the measure of a system's cooling performance. The SEER is a standard HVAC metric that tells you how well an air conditioner will perform during the summer season, efficiency wise. Along with SEER, you will also see EER as a standard rating for HVAC units. The EER rating tells you the efficiency of an air conditioner at perfect conditions (95°F). The SEER rating gives you performance efficiency during the whole summer season (65°F to 104°F).

SEER = (1 × EER100% + 42 × EER75% + 45 × EER50% + 12 × EER250%)/100

2023 Standards - What To Expect

Generally, the new 2023 efficiency standards will require a 1-point SEER increase from the current (2015) standards. However, those increases will vary slightly depending on geographical region.

SEER Requirements

North Region	Southeast Region	Southwest Region
• The North region contains states including New York, Massachusetts, Pennsylvania, Ohio, and Indiana • For air conditioners in the North, the minimum efficiency will increase from 13.0 to 14.0 SEER • Any 13.0 SEER AC system built before January 1, 2023 can still be **installed** on or after January 1, 2023. All units **manufactured** after this date must meet new SEER requirements	• The Southeast region contains states including Virginia, Tennessee, Florida, Louisiana, and Texas • For air conditioners < 45K BTU in the Southeast, the minimum efficiency will increase from 14.0 to 15.0 SEER • For air conditioners ≥ 45K BTU, the SEER will increase to 14.5 • Any AC system that does not meet the requirements **cannot be installed** on or after January 1, 2023	• The Southwest region consists of California, Nevada, Arizona, and New Mexico • The Southwest will also include an EER requirement • For air conditioners < 45K BTU in the Southwest, the minimum efficiency will increase from 14.0 to 15.0 SEER with a 12.2 EER • For air conditioners ≥ 45K BTU, the SEER will increase to 14.5 with a 11.7 EER • Same as the Southeast, any AC system that does not meet the requirements cannot be **installed** on or after January 1, 2023

The SEER is higher in the southern part of the United States, where units typically run longer during the hotter summer months, contributing to a larger share of home energy consumption.

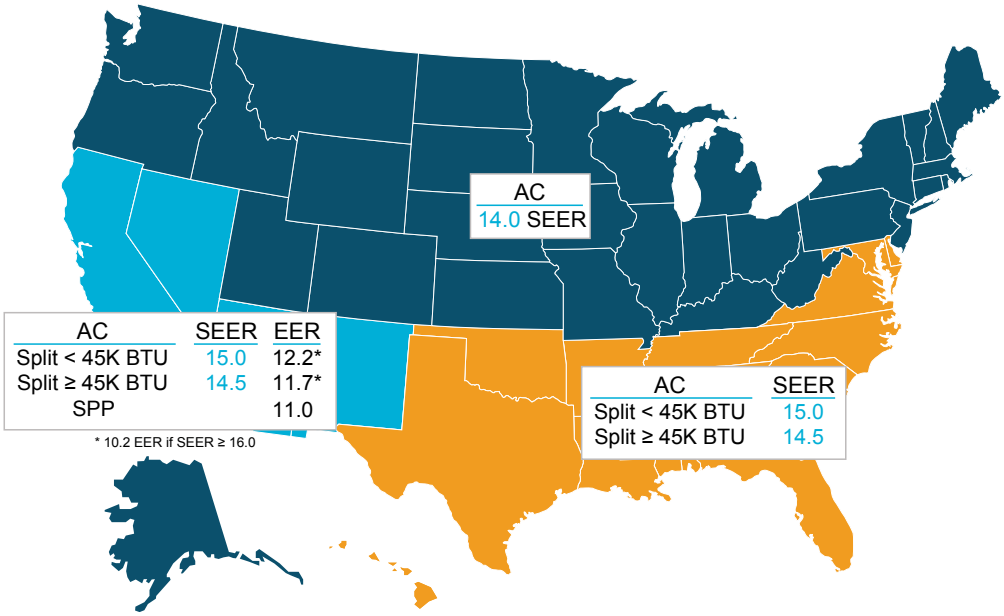
Source: "Are HVACR contractors Preparing for 2023 Efficiency Requirements?" by Contracting Business

Heat Pumps

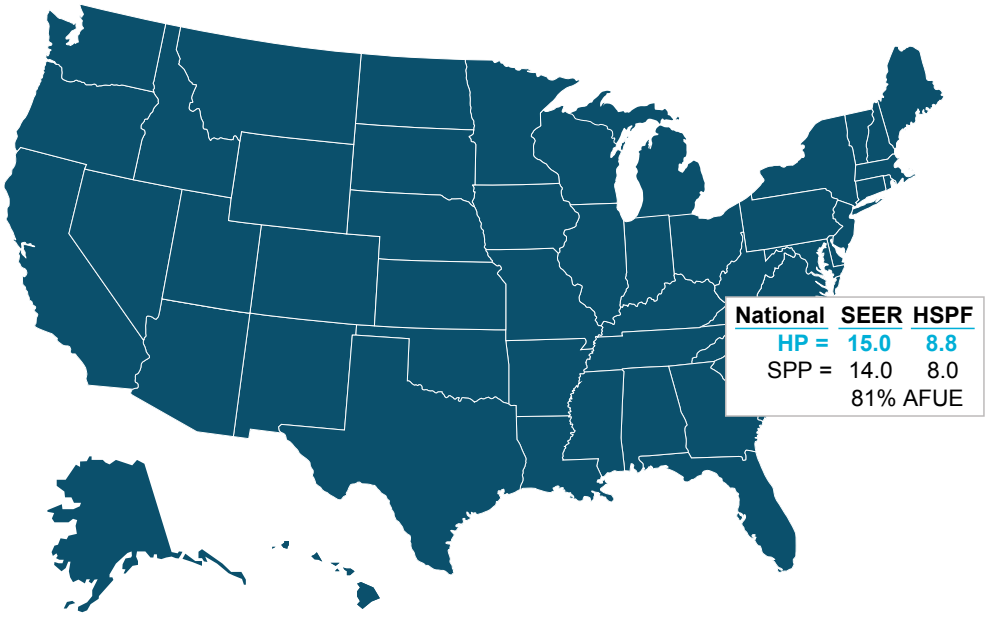
- Heat pumps are measured by the equipment's heating seasonal performance factor (HSPF)
- For heat pumps, the minimum efficiency will increase to 8.8 from the current 8.2 HSPF

Most modern air conditioners have a SEER that ranges from 31 to 21. The higher the SEER, the more efficient the unit will be, although a 13 or 14 SEER rating doesn't necessarily mean a unit is inefficient. On all accounts, the 2023 efficiency standards represent a 7-8% SEER increase from current minimums.

2023 Regional Efficiencies for AC Units



2023 National Standards for HP and SPP Units



*Source: *Introduction to Regulatory Requirements by Day & Night*

This is Just a Test

While increasing the SEER efficiency standard is not something new, the new testing procedures are. Prior to 2023, testing procedures for developing efficiency ratings have not accurately emulated real-world applications. By increasing a systems' external static pressure by a factor of five, from current SEER (0.1 in. of water) to SEER2 (0.5 in. of water), new 2023 testing procedures will more accurately reflect current field conditions. With this change, new nomenclature will be used to denote the new rating metrics— SEER2, EER2 and HSPF2.

Compared to the SEER ratings on the same system, the new SEER2 ratings will be lower and the minimum efficiencies will be reduced to account for the more difficult testing procedures.

Split System Air Conditioners – 2023 Regional Standards

System Type	North Region	Southeast Region	Southwest Region
	SEER2 (SEER)	SEER2 (SEER)	SEER2 (SEER)
Split System ACs (AC < 45K Btu/h)	13.4 (14)	14.3 (15)	14.3 SEER2 and 11.7 EER2 (15.0 SEER and 12.2 EER*)
Split System ACs (AC ≥ 45K Btu/h)	13.4 (14)	13.8 (14.5)	13.8 SEER2 and 11.2 EER2** (14.5 SEER and 11.7 EER*)

Split System Heat Pump – 2023 National Standards

System Type	HSPF2 (HSPF)	SEER2 (SEER)
Heat Pump	7.5 (8.8)	14.3 (15)

*Higher static pressure, required in the new testing procedures, requires higher watts, reducing the resulting numeric efficiency rating. (SEER2, EER2, HSPF2)**

Source: Explaining 2023 HVAC Regulation Changes to Homeowners by AC Heating & Connect for Emerson

Consumer Benefits

Approximately 76 million U.S. homes use central air-conditioning equipment, and about 13 million homes use heat pumps for heating or cooling.* When defining the new standards, the DOE calculated that, in total, households using central air conditioners or heat pumps will collectively save $2.5 billion to $12.2 billion on energy bills during the 30-year period following implementation of the standards.**

*Source: EIA.gov Residential Energy Consumption Survey ** Source: EIA.gov*

As mentioned previously, the higher the SEER, the more efficient a unit will be — and that includes expense efficiency. You save about 7% per 1 SEER on electricity cost. In comparison, a 20 SEER AC unit is 43% more energy-efficient than a 14 SEER AC unit.

Let's calculate the savings from a 14-to-20 SEER unit:

- Per 1 year: $101.48 electricity savings
- Per 10 years: $1,014.80 electricity savings
- Per 20 years: $2,029.60 electricity savings

Source: Learn Metrics SEER Ratings Calculator

Legislation & Regulations

In 2021, new legislation was unveiled to curtail consumer confusion surrounding the new 2023 energy efficiency standards. The SMART Energy Efficiency Standards Act states that the date a furnace, central air conditioner, and/or heat pump manufacturer must comply with regional energy efficiency standards would change to the date of manufacture, instead of what it currently is, which is the date of installation. With the current state of our supply chain, Congressman Bob Latta, a senior member of the House Energy and Commerce Committee, foresaw issues with the new efficiency standards that may complicate a consumer's access to appliances when a replacement is needed.

By ensuring the regional standards' date of compliance is in sync with the rest of the Energy Policy and Conservation Act, Rep. Latta states, "… all products will be able to make their way through the supply and distribution chain without delay and still be available for sale and installation." *

*Source: *SMART Energy Efficiency Standards Act Unveiled by Latta by Ripon Advance*

"Beginning in January, residential air conditioners (AC) will be required to meet new minimum energy efficiency requirements to help consumers reduce their energy usage. Manufacturers must retest all existing AC models to meet the new metric, as well as re-write and re-distribute marketing literature, update model numbers, and re-list the equipment in certification programs to verify its efficiency and qualify for rebates. Because these requirements will be applied to products based on their date of installation rather than their date of manufacture, it will result in the stranding of products that were previously legally manufactured, purchased, and distributed but now will no longer be eligible for installation. The SMART Energy Efficiency Standards Act will prevent this problem from happening."

- From Latta.House.Gov

This SMART Energy Efficiency Standards Act legislation is supported by:

ACCA Air Conditioning Contractors of America

PHCC PLUMBING-HEATING-COOLING CONTRACTORS ASSOCIATION Best People. Best Practices.

HARDI

AHRI AIR-CONDITIONING, HEATING, & REFRIGERATION INSTITUTE

Staying on Track

With the rollout of new standards, regulations, and legislation, it's more important than ever to ensure the equipment under your jurisdiction is properly documented.

Technology will ease the pains of proper tracking and documentation immensely. Having a centralized database, where all equipment data, SEER/SEER2/EER ratings, installation and manufacture dates, and more can be stored and easily accessible will be crucial to ensuring your business remains on track to meet testing deadlines and efficiency compliance requirements.

In the northern part of the U.S., inventory tracking will be very important on the residential side. Inventory manufactured prior to the January 1, 2023 deadline will still be eligible for sale and installation after the deadline has passed.

Beginning in 2023, dealer/contractors, distributors, and manufacturers will also be required to record the model and serial numbers of equipment sold, delivered, and installed, as well as delivery addresses and installation locations. These records will protect you in the event of a DOE investigation. Because adherence to these new standards is imperative, many proactive service providers have already implemented new tools to streamline the reporting and documentation process for HVAC installs in order to avoid potentially costly fines in the future.

"After January 1, 2023 contractors in the South and Southwest will have to keep a record of each installation that includes the following information: manufacturer, model number, serial number, date of purchase, contact information of the distributor, date of sale, contact information of customer, install address, and date of installation. In the Southwest, this will apply to both split systems and single package units. In the South it will only apply to split systems. The Department of Energy will have the authority to request this information from contractors at any time. Contractors that are non-compliant or refuse to turn over the information in a timely manner could be added to "do not sell lists," which would prohibit distributors from selling to them by threat of fine.

DOE has signaled that they are going to prioritize enforcement of this policy. While we don't know what the regulations impact will have on industry in practice, contractors in the South and Southwest should prepare themselves. First, they should always know whether the equipment they are buying is legal to install in their region. Second, they should start thinking about how they will store and access the required information since they may be asked to pull any installation over a four year period once the regulation takes effect."

- Chris Czarnecki, Government Relations Manager, Air Conditioning Contractors of America (ACCA)

Easing Growing Pains For Property Owners

In the midst of inflation pains and growing supply chain concerns, enforcing these new regulations will be costly if business and property owners are not proactive.

"In a world where you've already been seeing runaway inflation, the average cost of HVAC is north of 20 percent higher already. Now you're going to introduce new units that add another 15 to 20 percent," said Karl Pomeroy, President and General Manager at Motili. "If you're a multifamily owner that has 1000 units, you could be looking at substantial cost increases." *

*Source: *New HVAC Regulations Have Major Property Management Impact by Propmodo Studio*

HVAC industry leaders are issuing a call-to-action for building owners and operators: understand how your equipment is functioning now, and save costs later. What is the condition of each unit? Can it be replaced now, when equipment costs are lower? How much new equipment will be needed in order to meet the new efficiency standards?

For owners and operators, relying on software that collects diagnostic equipment information will provide an accurate snapshot of the lifecycle of the equipment in the field. A tool that can perform advanced data analysis can assist in better predicting when a piece of equipment is reaching end-of-life status. By having this information, businesses can proactively schedule replacement work and ultimately save costs on equipment and labor.

Efficiency Breeds Innovation

Manufacturers are now faced with the task of increasing their units' efficiency and performance to comply with the new efficiency standards. They'll need to decrease energy consumption while increasing efficiency, which means we will see new innovations in the design and functionality of newer devices that were typically not equipped on pre-2023 units.

"For OEMs, (new efficiency regulations) means redesigning units to meet the standard changes without significantly impacting the weight, size and cost of the equipment. One way this is being accomplished is through the use of modulating compressor technology that can adjust capacity and reduce compressor cycling to achieve higher part-load efficiency."*

Source: HVAC Regulations Efficiency Standards E-Book by Emerson

What does this mean for technicians? Not only will they need to understand and effectively communicate the minimum efficiency levels and compliance requirements in their regions, they'll need to learn how to install and perform maintenance on all-new equipment types. A technology-based tool that stores knowledge, resources and workflows on this new equipment will be invaluable during a time with so much change. The ability to build deep institutional knowledge bases will support technician expertise, continuity, and informed decision making in real-time.

With the assistance of advanced technology, capturing data and insights such as current and historical job data, financials, and customer information can be simple. Extracting and leveraging meaningful data empowers your company to identify key trends, forecast growth, and boost sales.

Maybe most importantly in this particular circumstance, utilizing equipment and manufacturer data to identify and understand how well a manufacturer's products are performing and standing up over time will determine if these innovations in product technology are actually resulting in better efficiency and reduced energy consumption in the U.S.

New Efficiencies, Higher Standards

For seasoned field service company owners and HVAC technicians, you've likely experienced a number of regulatory changes to efficiency standards during your tenure. Government updates like those expected to go into effect in 2023 aren't uncommon, and many HVAC professionals have set the expectation of adjusting quickly to new mandates as the HVAC industry grows and evolves. Because changes like these aren't a rare occurrence, it's important for HVAC professionals to equip their staff with the tools and information necessary to effectively respond to industry-wide changes and understand the environmental impact of regulatory changes on a larger scale.