Carrier

INTRODUCTION TO DOE 2023 REGULATORY REQUIREMENTS

ecoblue™ technology

- 75% fewer moving parts
- Intuitive fan speed adjustment controls
- Up to 40% more energy efficient
- No belts or pulleys
- No shaft or shaft bearings

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Dear Carrier Expert:

We are getting ready for the 2023 regulatory requirements and we want you to be ready too!

On January 1, 2023, the Department of Energy's (DOE) new minimum efficiency standards for commercial packaged air conditioners (ACs) and heat pumps (HPs) will go into effect. These new regulations are part of the DOE's ongoing initiative to reduce overall energy consumption in the United States. These changes will present new complexities, but Carrier is prepared, and we are here to support you through this transition.

HVAC manufacturers will be required to comply with a new testing procedure for developing efficiency ratings. Carrier is committed to leading our industry in compliance and we have developed this comprehensive launch kit to help you fully understand and be prepared for these changes.

The 2023 Regulatory Launch Kit provides information to help you get up to speed with the new requirements, including:

- Minimum efficiency changes
- Regulatory-ready product updates
- New technologies

We are all in this together. As your trusted manufacturer, we will continue to make resources available to you leading up to January 1, 2023. Be sure to visit Carrier's 2023 Regulatory Launch Kit site on HVACpartners for the most current marketing resources.

Thank you for your support!

CARRIER READINESS

TIME FOR A NEW CHANGE

As the innovative leader in building comfort and the inventor of modern air conditioning, Carrier has thrived by continuously looking for the next advancement in comfort technology. That's why we are always prepared when it's time to meet new, federally mandated minimum efficiency standards.*

Why the Change

Every six years the Department of Energy (DOE) reanalyzes the effects of energy usage, sets minimum efficiency requirements and manages the testing standards by which those efficiencies are measured. In 2018 the DOE started the first phase of their six-year plan requiring a 13% increase in energy efficiency for commercial packaged air conditioners, heat pumps and split systems. The second phase of this plan will start in 2023.

2023 Minimum Efficiency Change

Starting on January 1, 2023 all commercial air conditioning and heat pump equipment from 65,000 btu/h to 760,000 btu/h will require an additional 15% efficiency increase from the existing ratings set in 2018. Combined with the efficiency requirements implemented in 2018 this will result in a 30% increase over the six-year period.

Additionally, all gas fired commercial air conditioners will be required to meet an 81% gas efficiency rating

In 2023, there will not be any changes to the testing procedures mandated for commercial air conditioners and heat pumps greater than 65,000 btu/h.

2023 Single Phase Commercial – SEER2, EER2 and HSPF2

The DOE has also reanalyzed and adjusted the minimum efficiencies of single-phase air conditioners and heat pumps, 5 tons or less. Single phase and residential products will also be required to comply with a new testing procedure for developing efficiency ratings. Compared to today's test procedure, the external static pressure used when testing will be increased by up to 5X to better reflect field conditions.

Since the new testing requirements are more stringent and reduce the resulting efficiency rating, there will be new metrics and nomenclature — SEER2, EER2 and HSPF2. On the same system, compared to SEER ratings, the new SEER2 ratings will be lower and the minimum efficiencies will be reduced to account for the more difficult test procedure required for 2023 products.

DOE Enforcement for the Manufacture

After January 1, 2023, Carrier will no longer manufacture any rooftop units that are not compliant with the new DOE energy efficiency mandates. According to 10CFR part 431.97, compliance is only on the date of manufacture — this means any three-phase product produced on 12/31/2022 or earlier is still able to be sold after the compliance date.

Please refer to the residential DOE 2023 regulatory brochure for more details on single phase requirements and enforcement.

*www.energy.gov

COMMERCIAL PACKAGED AIR CONDITIONER AND HEAT PUMP RATINGS

The new 2023 minimum efficiency standards for packaged air conditioners and heat pumps will increase the minimum efficiency by 15% over the January 1, 2018 efficiency standards. This second phase of regulatory increases will bring the total efficiency of these air conditioning system up by 30% from 2015.

Packaged Air Conditioning Units – Air Cooled Direct Expansion			
Equipment Type		**Existing January 1, 2018**	**New January 1, 2023**
Small Commercial Packaged AC's (≥ 65,000 Btu/h < 135,000 Btu/h)	**Electric Resistance or No Heating**	**12.9 IEER**	**14.8 IEER**
	All Other Types of Heating	**12.7 IEER**	**14.6 IEER**
Large Commercial Packaged AC's (≥ 135,000 Btu/h < 240,000 Btu/h)	**Electric Resistance or No Heating**	**12.4 IEER**	**14.2 IEER**
	All Other Types of Heating	**12.2 IEER**	**14.0 IEER**
Very Large Commercial Packaged AC's (≥ 240,000 Btu/h < 760,000 Btu/h)	**Electric Resistance or No Heating**	**11.6 IEER**	**13.2 IEER**
	All Other Types of Heating	**11.4 IEER**	**13.0 IEER**

Packaged Air Conditioning Units – Air Cooled Heat Pumps			
Equipment Type		**Existing January 1, 2018**	**New January 1, 2023**
Small Commercial Packaged AC's (≥ 65,000 Btu/h < 135,000 Btu/h)	**Electric Resistance or No Heating**	**12.2 IEER, 3.3 COP**	**14.1 IEER, 3.4 COP**
	All Other Types of Heating	**12.0 IEER, 3.3 COP**	**13.9 IEER, 3.4 COP**
Large Commercial Packaged AC's (≥ 135,000 Btu/h < 240,000 Btu/h)	**Electric Resistance or No Heating**	**11.6 IEER, 3.2 COP**	**13.5 IEER, 3.3 COP**
	All Other Types of Heating	**11.4 IEER, 3.2 COP**	**13.3 IEER, 3.3 COP**
Very Large Commercial Packaged AC's (≥ 240,000 Btu/h < 760,000Btu/h)	**Electric Resistance or No Heating**	**10.6 IEER**	**NA**

3 to 5 Tons Packaged Air Conditioning Units – Air Cooled DX and Heat Pumps			
Equipment Type		**Three Phase***	**Single Phase**
Small Commercial Packaged AC's (< 65,000 Btu/h)	**All Heat Types**	**14 SEER, 8.0 HSPF**	**13.4 SEER2, 6.7 HSPF2**

*Three phase 3-5 ton models have the same efficiency as existing models today. There is no change for SEER or HSPF for three phase models, only single phase is moving to SEER2 and HSPF2. Please refer to the residential DOE 2023 regulatory brochure for more details on SEER2 and HSPF2.

COMMERCIAL SPLIT SYSTEM AIR CONDITIONER AND HEAT PUMP RATINGS

The new 2023 minimum efficiency standards for split system air conditioners and heat pumps will increase the minimum efficiency by 15% over the January 1, 2018 efficiency standards. This second phase of regulatory increases will bring the total efficiency of these air conditioning system up by 30% from 2015.

Commercial Split Air Conditioning Units – Air Cooled Direct Expansion			
Equipment Type		**Existing January 1, 2018**	**New January 1, 2023**
Small Commercial Split AC's (≥ 65,000 Btu/h < 135,000 Btu/h)	**Electric Resistance or No Heating**	**12.9 IEER**	**14.8 IEER**
	All Other Types of Heating	**12.7 IEER**	**14.6 IEER**
Large Commercial Split AC's (≥ 135,000 Btu/h < 240,000 Btu/h)	**Electric Resistance or No Heating**	**12.4 IEER**	**14.2 IEER**
	All Other Types of Heating	**12.2 IEER**	**14.0 IEER**
Very Large Commercial Split AC's (≥ 240,000 Btu/h < 760,000000 Btu/h)	**Electric Resistance or No Heating**	**11.6 IEER**	**13.2 IEER**
	All Other Types of Heating	**11.4 IEER**	**13.0 IEER**

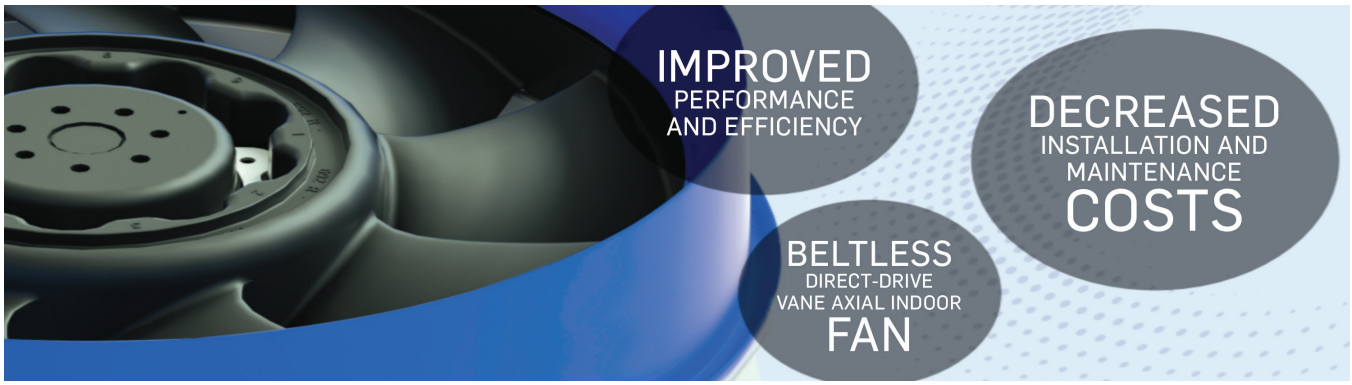
Commercial Split Air Conditioning Units – Air Cooled Heat Pumps			
Equipment Type		**Existing January 1, 2018**	**New January 1, 2023**
Small Commercial Split AC's (≥ 65,000 Btu/h < 135,000 Btu/h)	**Electric Resistance or No Heating**	**12.2 IEER, 3.3 COP**	**14.1 IEER, 3.4 COP**
	All Other Types of Heating	**12.0 IEER, 3.3 COP**	**13.9 IEER, 3.4 COP**
Large Commercial Split AC's (≥ 135,000 Btu/h < 240,000 Btu/h)	**Electric Resistance or No Heating**	**11.6 IEER, 3.2 COP**	**13.5 IEER, 3.3 COP**
	All Other Types of Heating	**11.4 IEER, 3.2 COP**	**13.3 IEER, 3.3 COP**
Very Large Commercial Split AC's (≥ 240,000 Btu/h < 760,000000 Btu/h)	**Electric Resistance or No Heating**	**10.6 IEER, 3.2 COP**	**12.5 IEER, 3.2 COP**
	All Other Types of Heating	**10.4 IEER, 3.2 COP**	**12.3 IEER, 3.2 COP**

What It All Means

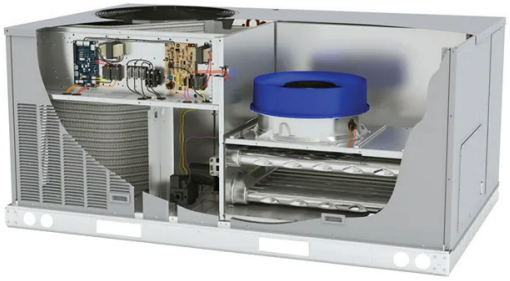
Breaking down the numbers, the 2023 efficiency standards represent a 15% energy efficiency increase from current standards, across the board. Many of our current products already meet or exceed the minimum efficiency standards set for 2023. We have been working for several years in anticipation of these changes and are ready to increase the efficiency of our remaining product lines before the new standards take effect on January 1, 2023.

ECOBLUE™ TECHNOLOGY

As we continue to look for measured improvements in the energy efficiency and performance of our heating and cooling systems leading up to 2023, we continue to expand our EcoBlue technology across our product lines.



Currently the EcoBlue direct drive vane axial fan systems with EC motors only exist on our 3–6 ton, small rooftop units. This technology will soon be available on all small and medium light commercial rooftop units up to 27.5 tons. EcoBlue Technology has been designed to improve performance and efficiency while decreasing maintenance and installation costs.



Most notable of EcoBlue Technology's many features is the exclusive beltless direct-drive vane axial fan system an industry first for rooftop units. This patent-pending technology replaces traditional belts and pulleys with a simpler, more compact design, all with 75 percent fewer moving parts. The outdoor fan system's high-density composite blade fan is also an exclusive design. Other technological advances that differentiate these units include: a new control board and coil technology, increased factory options and a tool-less filter access door.

- Units with EcoBlue Technology are up to 60 percent more efficient than RTUs of 17 years ago, and 40% more efficient than traditional forward curve fans today. This ensures lower operating costs while increasing the opportunity for utility rebates.
- 75% fewer moving parts compared to traditional fans. No fan belts, pullies, shafts and bearings.
- Maintaining our historical footprints while increasing energy efficiency, allows for faster, easier, and less costly replacement opportunities
- In addition, optional SystemVu controls bring the benefits of smarter diagnostics by providing ongoing, real-time information to help ensure the efficient operation and optimum performance of the unit.

Split System with EcoBlue Fans

Carrier is expanding the use of the highly efficient EcoBlue direct drive fan system into the Commercial Split System market. All 6 to 10 ton split system air handlers will soon be available with direct drive van axial fans. All of the same efficiencies and convenience of the EcoBlue fan system apply to the 40RU product line.

Multistage – Single Circuit Design

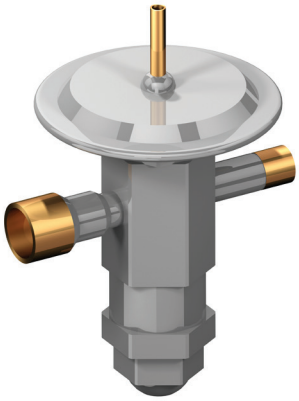
Carrier rooftop units will continue to utilize a single circuit Multistage compression system across our product lines that is designed to increase energy efficiency and heat transfer rates across the condenser coil. Using the full surface of the condenser coil throughout full load or part load conditions allows our units to achieve greater cooling efficiencies without the need to increase the footprint of the unit.

NEW TECHNOLOGIES

Thermal Expansion Valves - TXVs

The use of Thermal Expansion Valves will take over for the older style fixed orifice metering devices in our light commercial 6 to 27.5 tons rooftop units. A TXV is capable of operating more efficiently at part load conditions compared to a fixed orifice system due to its ability to precisely control the rate of refrigerant flow based on the temperatures and load of the system.

While a fixed orifice metering device will always deliver a fixed amount of refrigerant regardless of system load, a smart system using a TXV can avoid operating with improper refrigerant levels and reduce the amount of resulting temperature swings. TXV's will not only greatly impact energy efficiency of the system but also increase the durability of the refrigeration system as well as occupant comfort.



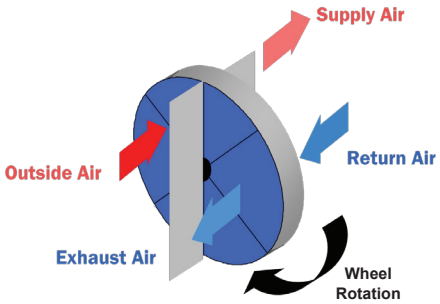
SystemVu™

Carrier rooftop units will continue to offer the SystemVu controller, which is designed to enhance energy efficiency and occupant comfort control. The controller's capability to utilize advanced sequences and staging techniques ensure the connected systems are operating at their most efficient point and making the most of part load hours. SystemVu also provides superior reliability and diagnostic capabilities including historical.

The SystemVu controller's intuitive display menu allows quick and easy access to more than 300 possible configuration points and more than 300 status, troubleshooting, diagnostic and maintenance points. A USB port makes data exchanging easy and accurate, further enhancing one of the most efficient packaged rooftop product lines.

Energy Recovery

Another exciting product that will be used to boost energy efficiency is the EnergyX® integrated factory installed energy recovery system. This system provides a greater degree of operational and application flexibility while providing high system efficiencies and enhanced operational control, all with a packaged rooftop unit. This energy recovery system will not only boost energy efficiency but provide extra cooling capacity, dehumidification, heating capacity and can even allow the entire system to be downsized.



Puron ADVANCE™

A New Refrigerant for a New Standard

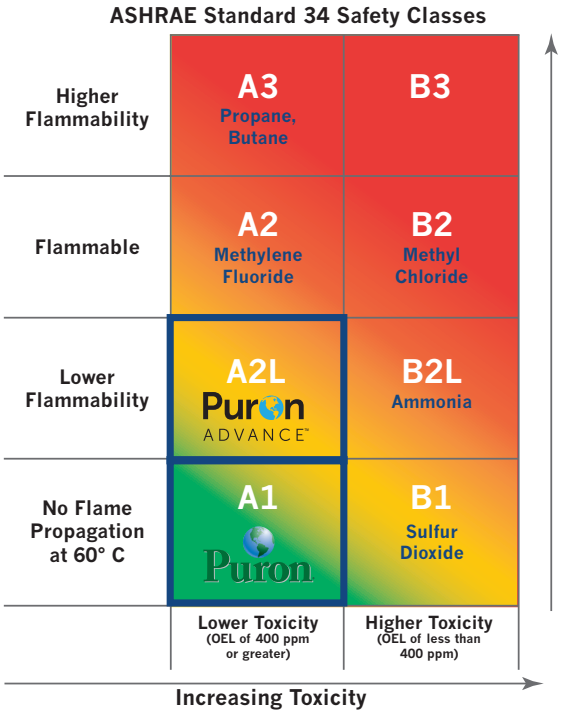
In a worldwide effort to address climate change concerns, global leaders have proposed a phase down of high Global Warming Potential (GWP) refrigerants as a part of the Kigali Amendment to the United Nations' Montreal Protocol. Although the United States as a whole has not yet ratified this agreement, states involved in the U.S. Climate Alliance* are embracing the reductions. Based on proposed California regulations, it is anticipated that many U.S. states will be limiting the GWP for refrigerants used in HVAC applications at a maximum of 750, possibly as early as 2025.

Our current Puron® refrigerant, while excellent at providing a non-ozone-depleting alternative to R-22, has a GWP of 2088, well above the anticipated future limit. That is why we are in the process of developing new products that will use Puron Advance™ refrigerant. The new Puron Advance is composed of R-454B, a blend of R-32 and R-1234yf. It has a much lower GWP — 465 — which easily surpasses the proposed 2025 requirement. And, it will continue to meet the anticipated future Kigali phase down requirements well into the 2030s.

What's the Big Difference?

Puron Advance falls into a new classification on the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 34 flammability and toxicity matrix — A2L. A2L refrigerants are classified by ASHRAE as having lower toxicity and lower flammability. Our current Puron refrigerant, R-410A, falls into the A1 category for refrigerants with no ignition at or below 60° C. And while that makes A2Ls more flammable than A1s, such as R-410A, they are still much less flammable than natural gas or propane. According to AHRI research studies, the risk of fire remains low. Here's why:

- A2Ls, like Puron Advance, are hard to ignite (they require significant ignition energy) so they will not be ignited by static electricity
- A significant leak of an A2L, such as Puron Advance, would be required to reach a flammable concentration of 11.8% lower flame limit (LFL)
- Concentrations of A2Ls, like Puron Advance, below the LFL will only burn while passing through a flame and will not ignite and sustain a flame
- If an unlikely ignition does occur, the resulting energy is very low with a burning velocity of about 2.0 inches per second



As an added precaution, Carrier will add safety features in all systems containing Puron Advance which could include leak detection sensors and mitigation procedures.

The change to Puron Advance is just that — a change. But since it will meet regulatory requirements far into the future, it should be a change that lasts quite a while. As we move forward with implementing Puron Advance, Carrier will support you all along the way making the transition as smooth as possible.

WHERE TO GO FOR MORE INFORMATION

Make the Commitment

Remember, we ALL have a stake in this. As your trusted supplier, we will invest the time and resources to make compliance as easy as possible. That includes training, updated product labeling, and continued communications about this topic.

In the end, we encourage you to make the commitment as well. Start preparing now by getting up to speed on the upcoming 2023 regulations and taking advantage of your resources. If you have any questions regarding the new 2023 regulations, reach out to your local distributor.

HVAC PARTNERS

HVAC Partners

Visit HVACpartners.com for access to the 2023 Regulatory Launch Kit page. Visit often, as we will be adding new product information and regulatory details to the site as they become available.

Go to: *HVACpartners > Marketing Tools > Sales Tools > Marketing Launch Kits > 2023 Regulatory*

Content includes:

- 2023 Readiness Flyer
- 2023 Regulatory Resource Guide
- 2023 Regulatory Readiness Sales PPT

Other Resources

- U.S. Department of Energy – www.energy.gov
- U.S. Environmental Protection Agency – www.epa.gov
- EPA and DOE Energy Efficiency – www.energystar.gov
- U.S. Government's national archives – www.federalregister.gov

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