



ENERGY STAR® Program Requirements Product Specification for Furnaces

Eligibility Criteria Draft 1 Version 5.0

Following is the **Version 5.0** product specification for ENERGY STAR certified furnaces. A product shall meet all of the identified criteria if it is to earn the ENERGY STAR.

1) **Definitions:** Below are the definitions of the relevant terms in this document.

- A. **Residential Furnace**¹: A product which utilizes only single-phase electric current, or single-phase electric current or DC current in conjunction with natural gas, propane, or home heating oil, and which is designed to be the principal heating source for the living space of a residence, is not contained within the same cabinet with a central air conditioner whose rated cooling capacity is above 65,000 Btu per hour, is an electric central furnace, forced-air central furnace, or gravity central furnace, and has a heat input rate of less than 225,000 Btu per hour for forced-air central furnaces, gravity central furnaces, and electric central furnaces. Available furnace configurations² are provided below:
 - a. **Upflow:** A model with the airflow discharge vertically upward at or near the top of the furnace, with the blower mounted below the heating element.
 - b. **Downflow:** A model with the airflow discharge vertically downward at or near the bottom of the furnace, with the blower mounted above the heating element.
 - c. **Horizontal:** A model designed for low headroom installation with airflow across the heating element in a horizontal path.
- B. **Basic Model:** All units of a given type of covered product (or class thereof) manufactured by one manufacturer and which have the same primary energy source and, which have essentially identical electrical, physical, or functional (or hydraulic) characteristics that affect energy consumption, energy efficiency, water consumption or water efficiency.³ Further, all individual models within a basic model have the same certified rating based on the applicable sampling criteria per U.S. Department of Energy's (DOE) regulations in Part 429⁴, and this rating must be used for all manufacturer literature, the qualified product list and certification of compliance to DOE standards.
- C. **Annual Fuel Utilization Efficiency (AFUE)**¹: The efficiency descriptor for furnaces, which is the ratio of annual output energy to annual input energy, which includes any non-heating season pilot input loss and, for gas or oil-fired furnaces, does not include electric energy. This assumes that all warm air furnaces which are not weatherized are located indoors and all combustion and ventilation air is admitted through grill or ducts from the outdoors and does not communicate with air in the conditioned space.
- D. **Air Leakage (Q_{leak})**: The percent of the rated airflow of the fan that is required to maintain the applied pressures, accounting for air that leaves or enters through cracks, joints and penetrations in the furnace cabinet rather than through supply and return ducts installed in accordance with manufacturer's instructions.

¹ Based on definition in 10 CFR §430.2. When in conflict, the definitions in the 10 CFR §430.2 take precedence.

² <https://www.ahrinet.org/certification/ahri-certification-programs/residential-furnaces-rfrn>

³ 10 CFR Part 430, Subpart B, Appendix N

⁴ 10 CFR Part 429, Subpart B

2) Scope:

- A. Included Products: Products that meet the definition of a Residential Furnace as specified herein are eligible for ENERGY STAR certification, with the exception of products listed in Section 2B. Only non-weatherized furnaces approved for residential installation are eligible.
- B. Excluded Products: Furnaces intended only for commercial installation and/or with a rating of 225,000 Btu per hour energy or higher are not eligible for ENERGY STAR. Weatherized furnaces are not eligible for ENERGY STAR.

Note: The EPA is aware of industry efforts to provide seasonal ratings for dual fuel systems of heat pumps and furnaces. The EPA and DOE will continue learning about this effort and hope to work with stakeholders in 2024 to develop ratings to recognize dual fuel systems.

The EPA is also interested in understanding the efficiency implications of installing a heat pump with an existing furnace and making such installations when sensible eligible for the ENERGY STAR label. We encourage stakeholders to consider the discussion on that topic included in a note box for the “Considerations for Future Specification Revisions” section at the end of this document and provide feedback.

3) Certification Criteria:

A. Product Performance Requirements for Furnaces:

Table 1: ENERGY STAR Gas and Oil Furnace Requirements

Product Type	AFUE	Air Leakage (Q_{leak})
Gas Furnace	$\geq 97.0\%$	$\leq 2.0\%$
Oil Furnace	$\geq 87.0\%$	

- B. Multiple Configurations: To earn the ENERGY STAR, models offered in multiple configurations (i.e., upflow, downflow, and horizontal) shall meet the ENERGY STAR level presented in Table 1 for all configurations they are offered in. Manufacturers cannot claim that a model meets ENERGY STAR when installed in the downflow configuration only.
- C. Biofuel Certification: All oil-fired furnaces must be certified to the UL 726 B20 specification. Within 6 months of B100 being published in UL 726, oil-fired furnaces must be certified to B100.

Note: The EPA proposes removing the regional split for gas furnaces to align with the DOE standard, simplify the label for consumers, and to simplify program administration for certification bodies and manufacturers.

The EPA proposes increasing the AFUE requirement for gas and oil furnaces. For gas furnaces, the EPA proposes increasing the AFUE requirement to 97%. With this change the number of certified models would shift from 47% to 4.5% of units (455/10,065) currently on the market, with offerings from all major manufacturers. Given that this level aligns with the eligibility requirements for federal tax credits, the EPA anticipates more models at this level to be introduced into the market in advance of the Version 5.0 effective date. For oil furnaces, the EPA proposes increasing the AFUE requirement from 85% to 87%. 13% of units (279/2,152) on the market currently meet or exceed 87% AFUE. For gas furnaces, the annual savings compared to a standard new furnace are 9.2 MMBtu and the

consumer payback is about 10.5 years. For oil furnaces, the annual savings are 3.2 MMBtu and the consumer payback is 1.5 years.

The EPA proposes simplifying the specification by removing warranty requirements given our understanding that the market typically provides sufficient warranties for this product. In addition, language and organization throughout the specification has been updated to reflect recent practice for the ENERGY STAR program.

The EPA proposes requiring UL 726 certification that oil-fired furnaces are safe burning biofuel mixes, as the oil furnace tax credit in the Inflation Reduction Act does. In general, little modification or additional cost is required for an oil furnace to burn biofuel, but there is an issue of making sure it burns the fuel safely. The UL 726 standard includes certification that burners can burn a mix with up to 20% biofuel (B20) now, aligning with tax credit requirements. While the tax credit names a 50% biofuel requirement for 2026, we understand there is ongoing work to also test for 100% biofuel instead.

The EPA welcomes stakeholder feedback on these changes.

5) Test Requirements:

A. One of the following sampling plans shall be used for purposes of testing for ENERGY STAR certification:

- 1) A single unit is selected, obtained, and tested. The measured performance of this unit and of each subsequent unit manufactured must be equal to or better than the ENERGY STAR specification requirements. Results of the tested unit may be used to certify additional model variations within a basic model as long as the definition for basic model provided in Section 1, above, is met; or
- 2) Units are selected for testing and results calculated according to the sampling requirements defined in 10 CFR Part 429, Subpart B § 429.18. The certified rating must be equal to or better than the ENERGY STAR specification requirements. Results of the tested unit may be used to certify additional variations within a basic model as long as the definition for basic model provided in Section 1, above, is met. Further, all individual models within a basic model must have the same certified rating based on the applicable sampling criteria. This rating must be used for all manufacturer literature, the qualified products list, and certification of compliance to DOE standards.

B. When testing residential furnaces, the following test methods shall be used to determine ENERGY STAR certification:

Table 2: Test Methods for ENERGY STAR Certification

ENERGY STAR Requirement	Test Method Reference
AFUE	10 CFR Part 430, Appendix N
Q_{leak}	ANSI/ASHRAE 193-2010

C. Significant Digits and Rounding:

- 1) All calculations shall be carried out with actual measured (unrounded) values. Only the final result of a calculation shall be rounded.

- 2) Unless otherwise noted in this section, compliance with specification limits shall be evaluated using exact values without any benefit from rounding.
- 3) Reporting on the ENERGY STAR website shall be performed using calculation results or measured values that are rounded to the nearest unit in the last right-hand digit as specified in the corresponding specification requirement below.

Note: Partner must ensure that all configurations certified as ENERGY STAR continue to meet the certification criteria through subsequent firmware, software, or other changes to the certified product.

6) Effective Date:

The ENERGY STAR Furnace Version 5 specification shall take effect on **TBD**. To certify as ENERGY STAR, a product model shall meet the ENERGY STAR specification in effect on its date of manufacture. The date of manufacture is specific to each unit and is the date on which a unit is considered to be completely assembled.

Note: The EPA is targeting an effective date of 2026. This will provide an extended transition period during which existing stock of furnaces and of collateral material can be used up. The EPA often works with manufacturers to avoid a transition at an inconvenient time given the production and sales cycles of seasonal products. The effective date refers to date of manufacture, so if partners have input into when the yearly production of units take place, the EPA will attempt to take it into account.

7) Considerations for Future Revisions:

The EPA reserves the right to change this specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through stakeholder discussions. In the event of a specification revision, please note that the ENERGY STAR certification is not automatically granted for the life of a product model.

- A. The EPA will continue to monitor environmental policies and the HVAC market to signal future changes to the specification. In the short term, the EPA will be working to understand the use of heat pumps with existing furnaces in replacement scenarios, as well as new dual fuel systems in replacement and new construction.
- B. To the extent that gas powered heat pumps have a place in forced air heating, our technical understanding is that they will use hydronic coils and therefore would not be covered by this specification.
- C. The EPA continues to believe that HVAC system self-monitoring to confirm a good installation and during operation has an important role to play in efficiency, as does system control. Information from and control signals to furnaces play a key role in these benefits. The EPA will continue to monitor the development of these capabilities in the market.

Note: When pairing a heat pump with furnace, split system Heat pump efficiency is rated for a combination of outdoor unit (condenser) and indoor unit (coil). Manufacturers have the option of also specifying the furnace or air handler unit for the rating, which for high efficiency units will generally lead to a higher efficiency rating than that with a generic furnace/air handler. Many heat pumps that earn the ENERGY STAR label use these furnace-specific ratings. As a result, heat pumps installed with existing furnaces are likely not to perform as well as their rating and may not be eligible for incentives and rebates. Meanwhile, the draft AHRI 210/240-202x heat pump test method includes a new metric to characterize the performance of dual fuel systems as a whole, including a way to estimate the performance of a heat pump with an assumed default furnace. In addition, several manufacturers of variable speed heat pumps have released models specifically intended to work well with existing furnaces. The EPA welcomes feedback from all stakeholders as we continue to assess these issues.