Refrigeration in 2026 and Beyond Open Forum

CALIFORNIA ENERGY WISE

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Food Service Tech Center

FrontierFSTC.com

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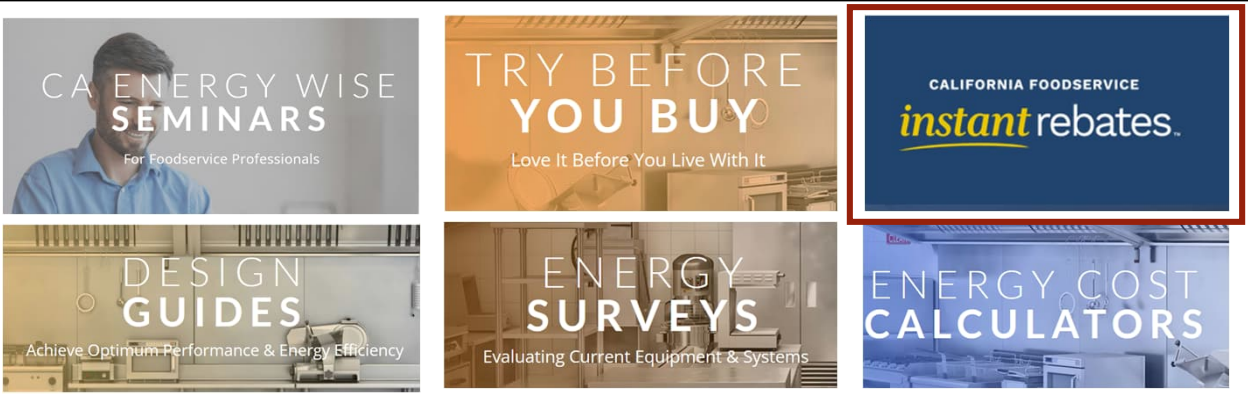

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Refrigerant Properties

- The ideal refrigerant:
  - Safe -- non-corrosive, non-toxic, non-flammable
  - Environmentally friendly -- No ODP, no GWP
  - Energy Efficient (under all operating temperature conditions)
  - Inexpensive -- both for the refrigerant and the related system
  - Azeotropic blend (if not a single-component)

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Refrigerant Safety Classifications

- ASHRAE 34 – Designation and Safety Classification of Refrigerants
- Refrigerants are categorized for toxicity

- Refrigerants are classified with respect to flammability

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Image Source: *www.ul.com*

Environmental Effects

- ODP (Ozone Depleting Potential) – chlorine is ODP
- GWP (Global Warming Potential) – fluorine is GWP
- High energy efficiency (Coefficient of Performance) = decreased power plant CO2 emissions

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Common Refrigerant (Chemical) Types

- Chlorofluorocarbon (CFC) → ODP
- Hydrochlorofluorocarbon (HCFC) → ODP
- Hydrofluorocarbon (HFC) → GWP = 1500-5000
- Hydrofluoroolefin (HFO) (Variant of HFC) → Very Low GWP
- Hydrocarbon (HC) – Natural → Very Low GWP
- Other unique natural refrigerants:
  - Carbon Dioxide (R-744) → Low GWP but High Pressure
  - Ammonia (R-717) → Safety Class B2

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HC: Propane R-290 ↔ HFO: "A2L" R-454 b/c

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R-290

- HC - Propane
- Low GWP (3.3), zero ODP
- ASHRAE Safety Group A3
  - Natural and non-toxic
  - Flammable
  - Charge Limits:
    - Formerly 150g (5.3 oz) (per refrigeration circuit)
    - Newly adopted (2025) charge limits: 300g for closed (door) units and 500g for open units
- More efficient than HFCs

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A2L Refrigerants

- Flammability Class Properties:
  - **A2L is much less flammable than A3**
  - **Charge up to 12kg**
- Most Favored:
  - R-454c (HFO) GWP = 148 → Refrigeration
    - Upcoming systems
  - R-454b (HFO) GWP = 466 → HVAC
    - Currently offered

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Small Self-contained Refrigeration Equipment

- R-290 is the lowest GWP solution for most:
  - 1-3 door reach in coolers
  - 1-2 door freezers
  - Chef bases
  - Prep tables
- Determined to have low enough flammability risk under the previous 150g and new 300g (closed) and 500g(open) charge limits.

Walk-In Coolers and Freezers
and Large Display Cases

- Split Systems:
  - R-454c has the best low-GWP (148) outlook for larger systems
- Packaged units:
  - Same as above, and including R-290
  - Increased A3 charge limits and/or number of circuits increases system capacity
  - Multiple R-290 packaged systems can be installed per box for greater total capacity

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EPA AIM Act

- Retail food – refrigeration stand-alone units: 150 GWP / January 1, 2025 (R-290 or R-454c)
- Retail food – remote condensing units: 300 GWP (less than 200 lb. refrigerant charge) / January 1, 2026 (R-454c)
- Note: Under reconsideration in 2025/26 but would still apply in 2032 so our humble opinion is to future proof and follow the current rules.

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DOE Appliance Standards Overturned by Congress

- ✕ H.J. Res. 20 that rescinded the final rule for **residential gas instantaneous water heaters.** Current standards for all covered products in this category stay in place and are "frozen".
- ✕ H.J. Res. 24 that rescinded the 2024 final rule for **commercial walk-in coolers and freezers.**
- ✕ H.J. Res. 42 that rescinds a final rule for **certification requirements, labeling requirements, and enforcement provisions of appliance standards.**
- ✕ H.J. Res. 75 that rescinds the 2024 final rule for **commercial refrigerators / freezers.**

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Source: Steve Rosenstock, Senior Manager, Customer Technical Solutions, EEI

DOE Proposes Rollbacks or Rescinding of 20 Appliance Standards (2)

Commercial appliances / equipment include:

- Air Compressors
- Automatic Commercial Ice Makers
- Commercial Clothes Washers
- Commercial Fans/Blowers
- Commercial Prerinse Spray Valves (water efficiency)
- External Power Supplies
- Faucets (water efficiency)
- Miscellaneous Refrigeration Products

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Source: Steve Rosenstock, Senior Manager, Customer Technical Solutions, EEI

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DOE Has Not Finalized Changes to Most of the *Compliance Dates* (yet)

EFFECTIVE DATE

When a final rule officially goes into effect and becomes part of federal law (as published in the US *Code of Federal Regulations*).

COMPLIANCE DATE

The "*compliance date*" is the first date when appliance manufacturers have to meet the new or updated energy conservation standard(s).

No appliance energy efficiency standards have been rolled back as of April 2026.

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Source: Steve Rosenstock, Senior Manager, Customer Technical Solutions, EEI

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Rules for Discussion: Please stand and introduce yourself. That's all....

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Questions, Questions, Questions...!!

- When do you switch the the design from reach-in to walk-in and why?
- What is the experience with CO_2 and what is holding back US adoption?
- Any knowledge of challenges air shipping packaged units with R290?
- How much of the industry for packaged equipment has already converted to R290?
- Of the mfgs. who are using R290, how many have moved to the higher allowed amounts (from 150g to 300g?)
- How big does an R290 system need to be (number of 300g circuits) before it makes sense to go to A2L?
- Reclamation??

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Questions, Questions, Questions…!!

- Blast chiller adoption?
- How many designs also spec an energy management system to keep track of refrigeration systems? (temps, compressor cycles, maintenance, etc?)
- Are any mfgs. making or working on self-contained A2L units?
- Current state of regulations?
- Are you taking advantage of chef bases on the line in electric kitchens?
- Other refrigeration tricks that can be shared?
- Are installers and service techs prepared for R290, A2L, and CO_2?

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