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Celebrating 50 Years (1974–2024)

Overview and Compliance Strategies for the New HFC Management Rule

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01

Regulatory Background

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Basic Refrigerant Types

Sorted by Generation

1st

CFCs – Chlorofluorocarbons

- Examples: R-11, R-12
- Class I ODS with ODP > 0.2
- Production phased out since 1996

2nd

HCFCs – Hydro-chlorofluorocarbons

- Examples: R-22, R-141b, R-142b
- Class II ODS with ODP < 0.2
- Production being phased out by 2020 (R-22 phase out started in 2010)

3rd

HFCs – Hydrofluorocarbons

- Examples: R-134a, R-407C, R-410A
- Non-ODS, but several have high global warming potential (GWP)
- Production targeted for future phase down

4th

Next generation refrigerants

- Non-ODS and low GWP
- Hydrocarbons - e.g., R-290 (propane), R-600a (isobutane)
- Hydrofluoroolefins (HFOs) – e.g., R-1234yf
- HFC/HFO blends - e.g., R-448A, R-449A

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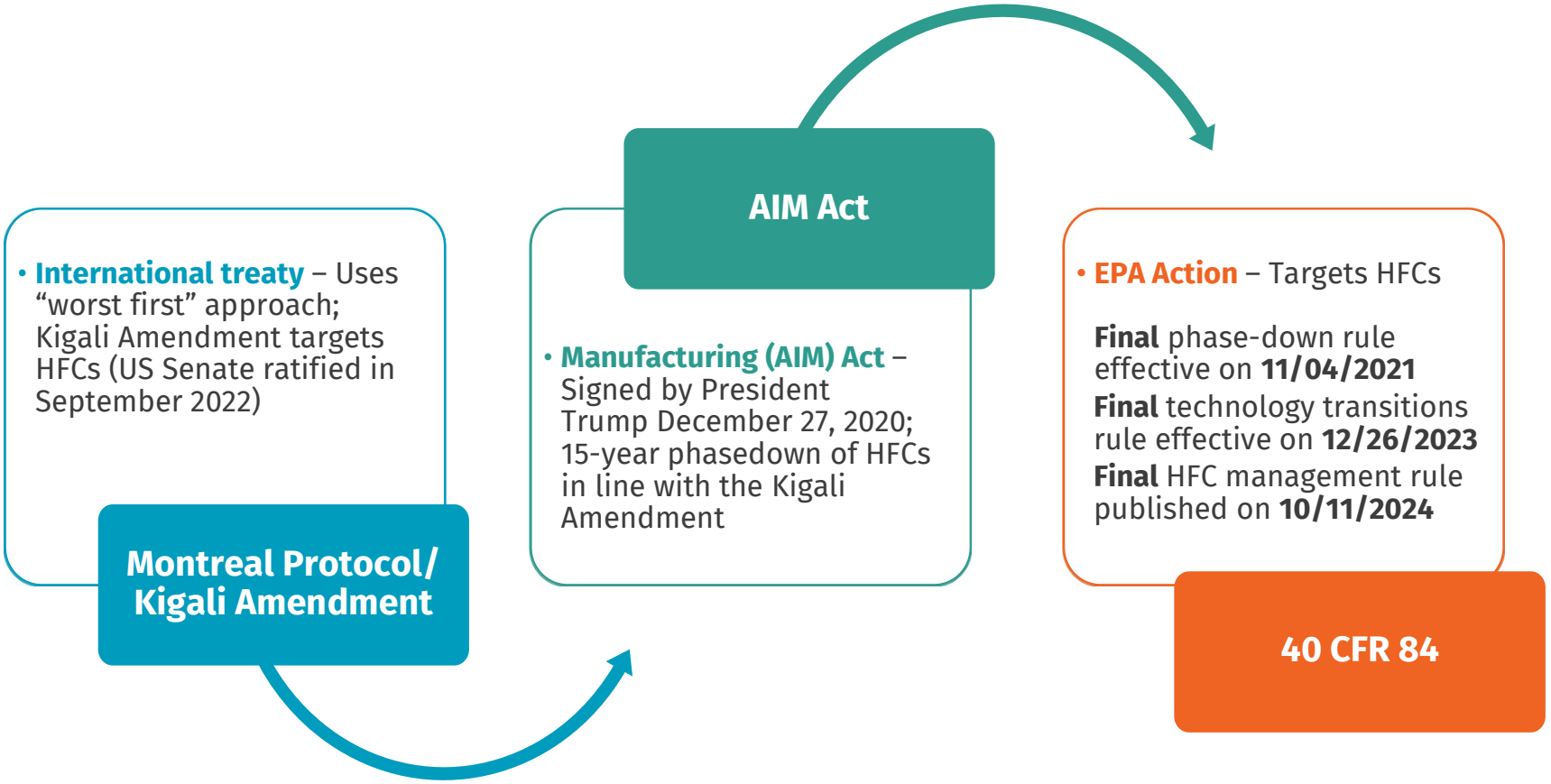
EPA Action on HFCs and Substitute Refrigerants



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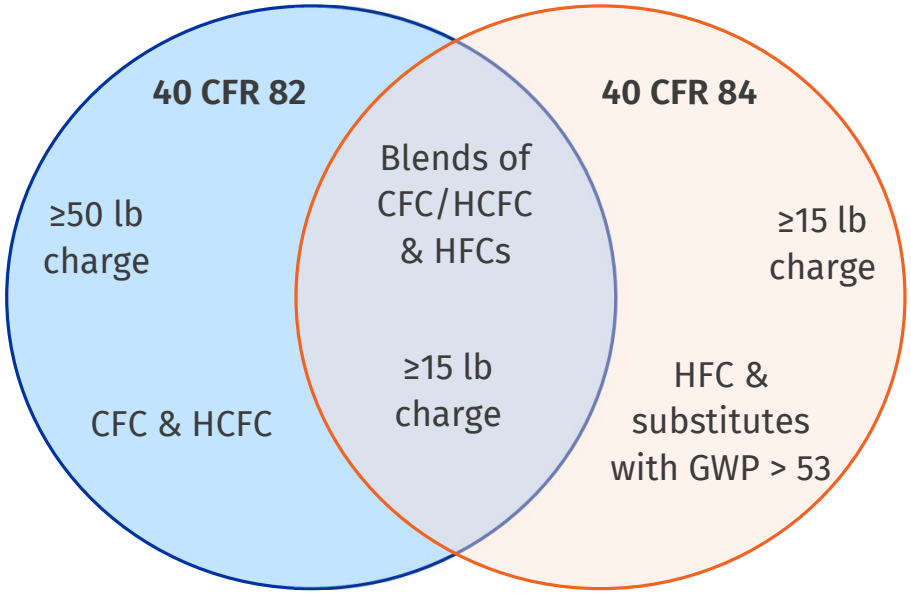
The Regulatory Visual

40 CFR 82 – Protection of the Stratospheric Ozone

- Leak repair requirements for appliances containing 50 lb or more of an ODS (CFCs & HCFCs)

40 CFR 84 – Phasedown of Hydrofluorocarbons (HFCs)

- Leak repair requirements for appliances containing 15 lb or more of an HFC or substitute with GWP > 53



Note: Each circuit in a multi-circuit unit is considered to be a unique appliance. Applicability is based on the charge of the individual circuit.

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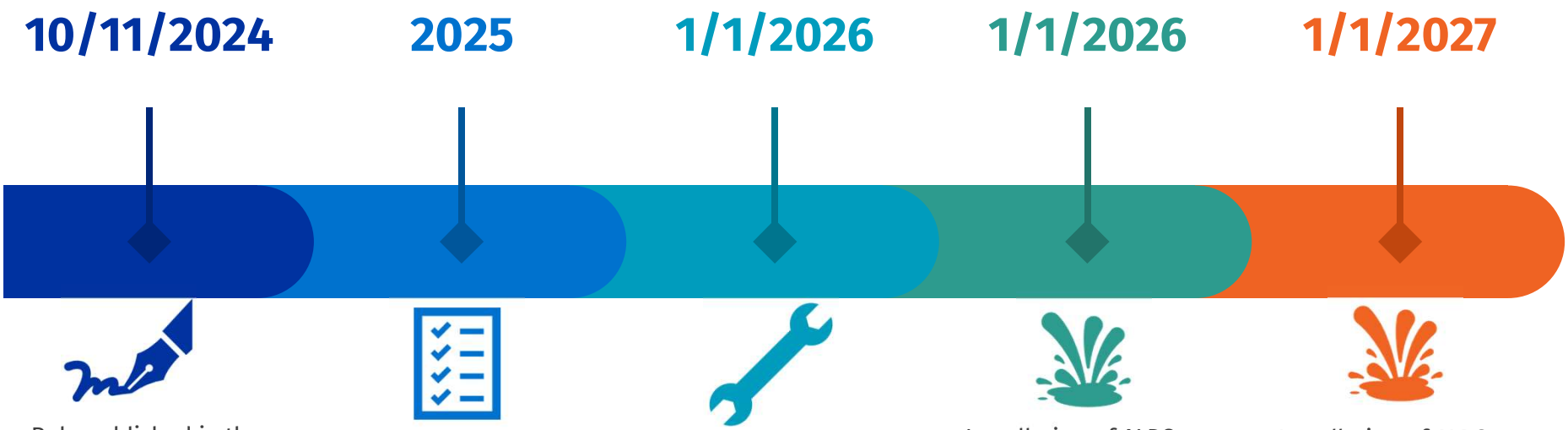
Compliance Dates for HFC Management Rule



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02
Leak Repair Requirements for Appliances

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Residential and Light Commercial Air Conditioning and Heat Pumps

Exempt from leak repair requirements per 84.106(a)(3)(ii); includes window units, packaged terminal air conditioners (PTAC) and heat pumps (PTHP), and portable air conditioners, central air conditioners, non-ducted systems, water-source and ground-source heat pumps, but **excludes chillers**

01

Residential Occupancy

- Dormitories
- Hotels
- Multiunit apartments
- Private residences

02

Commercial Occupancy

A premise or that portion of a premise where people transact business, receive personal service, or purchase food and other goods (ASHRAE 15-2022 definition). May include:

- Office and professional buildings
- Markets (but not *large mercantile occupancies*)
- Other work or storage areas that do not qualify as *industrial occupancies*

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CCA Definition

Comfort Cooling

Air-conditioning appliances used to provide cooling in order to control heat and/or humidity in occupied facilities including but not limited to residential, office, and commercial buildings. Category includes, but is not limited to:

- Chillers
- Commercial split systems
- Dual-function heat pumps
- Packaged roof-top units

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CRA Definition

Commercial Refrigeration

Appliances utilized in the retail food and cold storage warehouse sectors

- Retail food includes the refrigeration equipment found in supermarkets, convenience stores, restaurants, and other food service establishments
- Cold storage includes the equipment used to store meat, produce, dairy products, and other perishable goods

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Leak Repair Requirements

If the leak rate of a covered appliance is above a certain "trigger" rate, 1 of 3 things must be done:

1. The leak should be repaired within 30 days (or 120 days for industrial process shutdown)
2. The system should be retrofitted within 1 year
3. The system should be retired from service within 1 year

Can attempt to repair leak as many times as necessary within the applicable repair window!

Comfort Cooling Appliances

- Air-conditioning appliances used to provide cooling in occupied areas
- Trigger rate: 10%

Commercial Refrigeration Appliances

- Refrigeration appliances used in the retail food and cold storage warehouse sectors
- Trigger rate: 20%

Industrial Process Refrigeration Appliances

- Complex customized appliances used in chemical, pharmaceutical, petrochemical, and manufacturing industries
- Trigger rate: 30%

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Leak Rate Calculation

- **Leak Rate** - the rate at which an appliance is losing refrigerant, measured between refrigerant charges
- Expressed as the % of the appliance's full charge that would be lost over a 12-month period if the current rate of loss were to continue

Method 1 (Annualizing)

$$Leak\ Rate\ (\%\ per\ year) = \frac{refrigerant\ added\ (lb)}{full\ charge\ of\ refrigerant\ (lb)} \times \frac{365\ days/year}{days\ since\ refrigerant\ last\ added\ or\ 365\ days} \times 100\%$$

Method 2 (Rolling Average Method)

$$Leak\ Rate\ (\%\ per\ year) = \frac{refrigerant\ added\ over\ past\ 365\ days\ (or\ since\ last\ successful\ follow-up\ verification\ test)(lb)}{full\ charge\ of\ refrigerant\ (lb)} \times 100\%$$

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Repair Verification Testing Requirements, 82.157(e) or 84.106(e)

For leaks that trigger mandatory repair window, must:

01

Perform Initial Verification Test (IVT) upon completion of repairs but prior to adding refrigerant (e.g., soap bubble test)

02

Perform Follow-Up Verification (FVT) test within 10 days of IVT or within 10 days of reaching normal operating conditions

- If unsafe to be present or otherwise impossible to conduct FVT when operating at normal operating conditions, conduct FVT, where practicable, prior to returning to normal operating conditions

Not effective for non-exempt substitutes from 4/10/2020 to 1/1/2026.

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Recurring Leak Inspection Requirements , 82.157(g) or 84.106(g)

If exceed allowable leak rate, must conduct recurring leak inspections as follows:

01

CRAs & IPRAs ≥ 500 lb

- Quarterly (every 3 months), until 4 consecutive quarters with no leaks above allowable leak rate

02

All other units ≥ 50 lb or ≥ 15 lb (Part 84)

- Once per calendar year, until 1 year with no leaks above allowable leak rate

03

Certified Technicians

- Must be performed by certified technicians

04

ALDS

- Not required if equipped with automatic leak detection system

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Automatic Leak Detection System (ALDS) Requirements, 82.157(g)(4) or 84.106(g)(4)

- Avoid recurring leak inspections if employ ALDS
- Directly detects refrigerant in air, monitor its surrounding in another manner, or monitor appliance conditions
- Audited or calibrated annually
- Installed in accordance with manufacturer instructions (Part 84)
- If detect refrigerant in air:
  - Appliance must be located indoors
  - Have 10 ppm accuracy
  - Have 100 ppm alert level
- Other systems must alert when lose 50 lb or 10% of full charge, whichever is less
- If only used to monitor a portion of appliance, then leak inspections apply to the remainder

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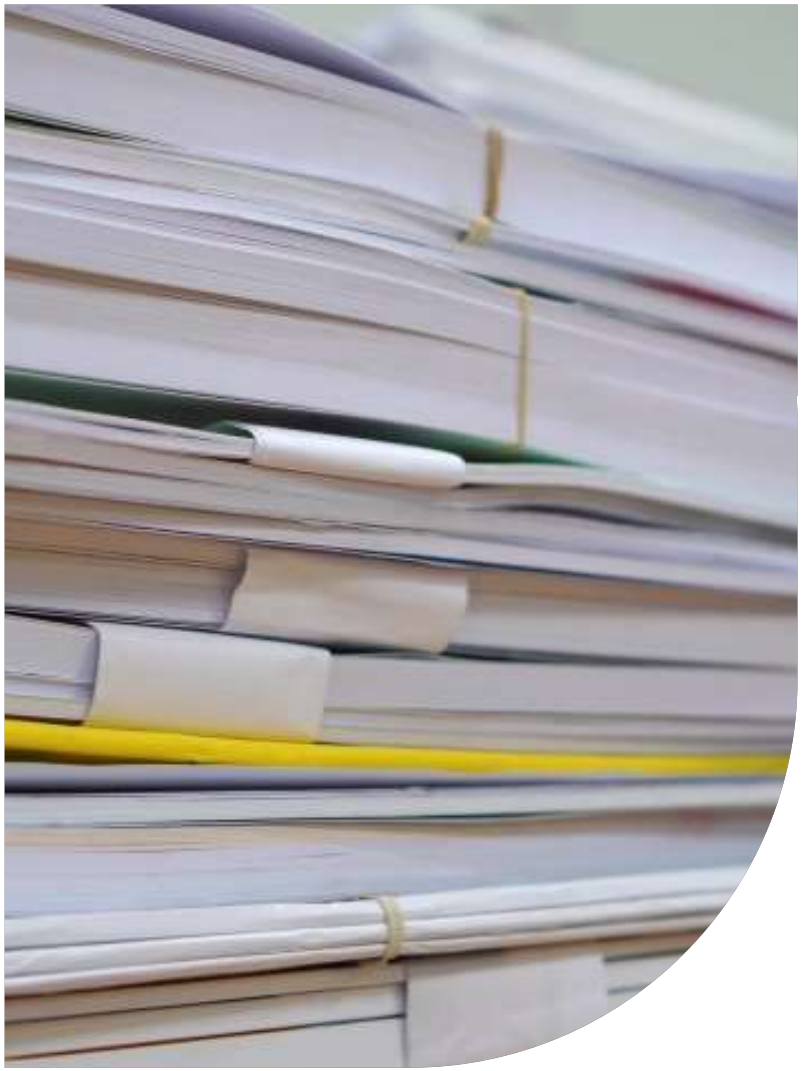
03

Recordkeeping and Reporting



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Inventory & Full Charge Records, 82.157(l)(1) or 84.106(l)(1)

- The identification of the owner/operator of the appliance
- The address where the appliance is located
- The full charge of the appliance
- The method for how the full charge was determined
- Any revisions of the full charge, how they were determined, and the dates such revisions occurred
- If using method 4 (using an established range) for determining full charge, records must include the range for the full charge of the appliance, its midpoint, and how the range was determined
- **The date of installation (Part 84 only)**

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Service/Disposal Records, 82.157(l)(2) or 84.106(l)(2)

- The identity and location of the appliance
- The date of the installation, maintenance, service, repair, or disposal performed
- The part(s) of the appliance being installed, maintained, serviced, repaired, or disposed
- The type of installation, maintenance, service, repair, or disposal performed for each part
- The name of the person performing the installation, maintenance, service, repair, or disposal
- The amount and type of refrigerant added to, or in the case of disposal removed from, the appliance
- The full charge of the appliance
- The leak rate and the method used to determine the leak rate
  - Not applicable when disposing of the appliance, following a retrofit, installing a new appliance, or if the refrigerant addition qualifies as a seasonal variance

Note: Installation is for Part 84 only and maintenance is for Part 82 only.

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Who is Responsible for Records Retention?

Multiple recordkeeping sections refer to records that "owners or operators must" maintain

(2) Owners or operators must maintain a record including the following information for each time an appliance with a full charge of 50 or more pounds is maintained, serviced, repaired, or disposed of, when applicable. If the maintenance, service, repair, or disposal is done by someone other than the owner or operator, that person must provide a record containing the following information, with the exception of (l)(2)(vii) and (viii) of this section, to the owner or operator:

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Other Key Records

IVT & FVT test records, 82.157(l)(5) or 84.106(l)(7)

- Location of appliance
- Date(s) of each test
- Location(s) of all repaired leaks that were tested
- The types of tests used
- The results of the tests

Recurring leak inspection records, 82.157(l)(3) or 84.106(l)(5)

- Date of inspection
- The method(s) used to conduct the leak inspection
- A list of the location of each leak that was identified, and
- A certification that all visible and accessible parts of the appliance were inspected

Must maintain records in electronic or paper format for 3 years

If site has a Title V operating permit, maintain records for 5 years

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Chronic Leakers, 82.157(j) or 84.106(j)

- If an appliance (≥50 lb ODS charge, or ≥15 lb HFC/substitute charge) is found to leak 125% or more of its full charge of refrigerant, it is considered a chronic leaker.
- The leak rate calculations we discussed previously are **not** used in this context

$$Leak\ \% = \frac{amount\ of\ refrigerant\ added\ in\ calendar\ year\ (lb)}{full\ charge\ (lb)} \times 100\%$$

- Owners/operators of chronic leakers must submit a report to the EPA by March 1 of the following year. Reports for appliances with ≥15 lb HFC/substitute charge will be required starting 3/1/2027 for CY2026.
- Notifications/reports must be submitted electronically to 608reports@epa.gov (Part 82) or electronically, using CDX-HAWK/HFC-ODS-R (Part 84) [HAWK allows submittal of ODS reports as well].

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04

Summary

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Matrix by Appliance & Refrigerant Type (40 CFR 82, Subpart F and 40 CFR 84, Subpart C)

Category	Appliances w/ Exempt Substitutes	Small Appliances (≤ 5 lb ODS or Non-Exempt Substitute)	Medium Appliances (> 5 lb & < 50 lb ODS or Non-Exempt Substitute)	Large Appliances (≥ 50 lb ODS or ≥ 15 lb HFC or Substitute with GWP > 53)
Venting Prohibition	No	Yes	Yes	Yes
Sales Restrictions	No	Yes	Yes	Yes
Evacuation Req's	No	Yes (specific)	Yes	Yes
Technician Certs	No	Yes	Yes	Yes
Disposal Req's	No	Yes (specific)	Yes	Yes
Leak Repair Provisions	No	No	No	Yes (1/1/2026 for HFCs)

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How Should Facilities Implement the Subpart C (HFC) Management Rule Requirements?

[Fact Sheet: American Innovation and Manufacturing Act: Leak Repair Requirements for Appliances Containing Hydrofluorocarbons and Certain Substitutes]

Continue to use EPA required work practices on non-ODS substitutes

- Certified technicians
- Certified recovery/ recycling equipment
- Required refrigerant evacuation levels

Get prepared!

Implement changes to comply with leak repair provisions on ≥ 15 lb units with high GWP substitutes:

- Conduct initial and follow-up verification testing for all leaks
- Implement system to maintain records
- Determine whether ALDS will be required

Develop an inventory of all refrigeration appliances with charges of 15 lb or more

Read the final rule [89 FR 82682 or 40 CFR 84, Subpart C] or the fact sheet!

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Thank you

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Trinity's Refrigerant Page

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