



HFC Refrigerant Requirements (40 CFR 82 and 40 CFR 84)

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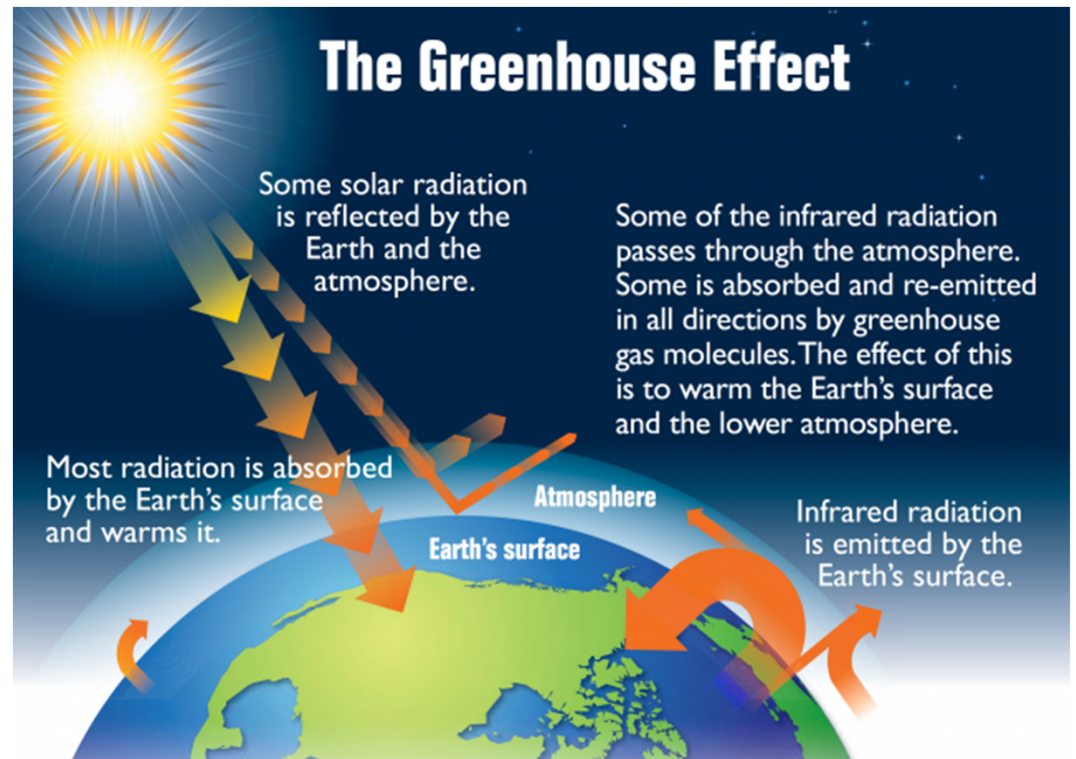


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Overview, Regulatory Framework, & Phase-Out

Global Warming

- ▶ Greenhouse gases hold onto the heat and act as a blanket warming the earth.
- ▶ Many refrigerants are potent greenhouse gases with high Global Warming Potentials (GWP).



Basic Refrigerant Types

- ▶ **CFCs – chlorofluorocarbons** (e.g., R-11, R-12)
 - 1st generation; Class I ODS with ODP > 0.2
 - Production phased out since 1996
- ▶ **HCFCs – hydrochlorofluorocarbons** (e.g., R-22, R-141b, R-142b)
 - 2nd generation; Class II ODS with ODP < 0.2
 - Production being phased out by 2020 (R-22 phase out started in 2010)
- ▶ **HFCs – hydrofluorocarbons** (e.g., R-134a, R-407C, R-410A)
 - 3rd generation; non-ODS, but several have high global warming potential (GWP)
 - Production targeted for future phase down
- ▶ **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

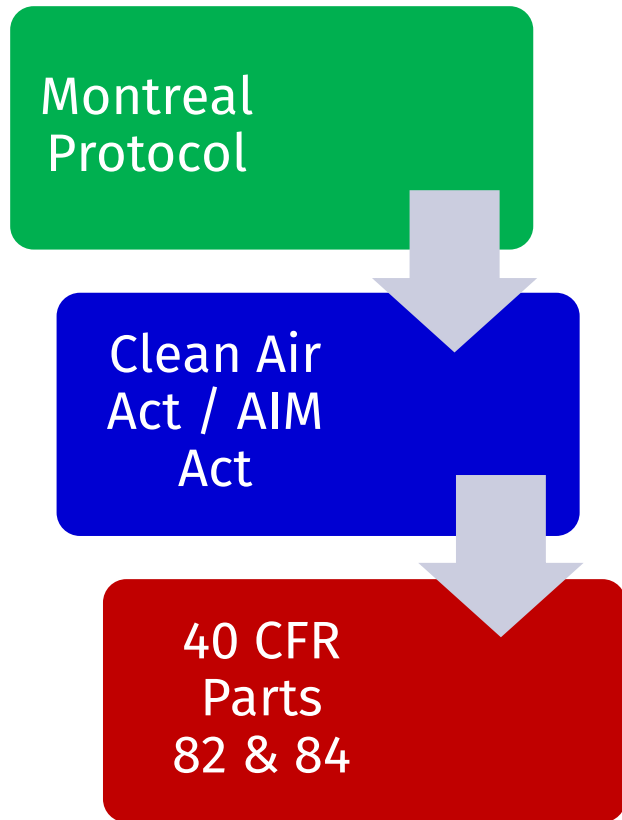
Comparison of GWPs and ODPs for ODS and substitutes

Gas	Atmospheric Lifetime (years)	Global Emissions in 2020 (kt/yr) ^a	Ozone Depletion Potential (ODP) ^b	Global Warming Potential (GWP) ^b
Halogen Source Gases				
<i>Chlorine Gases</i>				
CFC-11 (CCl ₃ F)	52	36 – 58	1	6410
Carbon tetrachloride (CCl ₄)	30	27 – 60	0.87	2150
CFC-113 (CCl ₂ FCClF ₂)	93	1 – 13	0.82	6530
CFC-12 (CCl ₂ F ₂)	102	3 – 48	0.75	12,500
Methyl chloroform (CH ₃ CCl ₃)	5.0	1 – 3	0.12	164
HCFC-141b (CH ₃ CCl ₂ F)	8.8	48 – 67	0.102	808
HCFC-142b (CH ₃ CClF ₂)	17	15 – 23	0.057	2190
HCFC-22 (CHF ₂ Cl)	12	284 – 403	0.038	1910
Methyl chloride (CH ₃ Cl)	0.9	3759 – 5677	0.015	6
<i>Bromine Gases</i>				
Halon-1301 (CBrF ₃)	72	1 – 2	17	7430
Halon-1211 (CBrClF ₂)	16	1 – 5	7.1	1990
Methyl bromide (CH ₃ Br)	0.8	111 – 154	0.57	2
Hydrofluorocarbons (HFCs)				
HFC-23 (CHF ₃)	228	16 – 18	0	14,700
HFC-143a (CH ₃ CF ₃)	52	27 – 33	0	5900
HFC-125 (CHF ₂ CF ₃)	31	78 – 98	0	3820
HFC-134a (CH ₂ FCF ₃)	14	216 – 275	0	1470
HFC-32 (CH ₂ F ₂)	5.3	56 – 77	0	749
HFC-152a (CH ₂ CHF ₂)	1.5	41 – 63	0	153
HFO-1234yf (CF ₃ CFCH ₂)	0.03	not available	0	less than 1

^a Includes both human activities (production and banks) and natural sources. Emissions are in units of kilotonnes per year (1 kilotonne = 1000 metric tons = 1 gigagram = 10⁹ grams). These emission estimates are based on analysis of atmospheric observations. The range of values for each emission estimate reflects the uncertainty in estimating emissions from atmospheric observations.

^b 100-year GWP. ODPs and GWPs are discussed in Q17. Values are calculated for emissions of an equal mass of each gas. ODPs given here reflect current scientific values and in some cases differ from those used in the Montreal Protocol.

Introduction to Environmental Requirements for Refrigerants



- ← **International treaty** – established in 1987 in response to hole in ozone layer that forms over Antarctica each year
 - Targets ozone depleting substances (ODS), including **CFCs and HCFCs**
 - Amended several times using “worst first” approach; **recently amended to target HFCs**
- ← **U.S. laws or statutes** – give EPA authority to develop rules to implement requirements in Montreal Protocol
- ← **EPA rules** – what you have to comply with on day-to-day basis

CAA Provisions

▶ Title VI of Clean Air Act – Stratospheric Ozone Protection

- Added as part of 1990 Clean Air Act Amendments
- Based on Montreal Protocol

▶ 40 CFR 82 – Implementing regulations

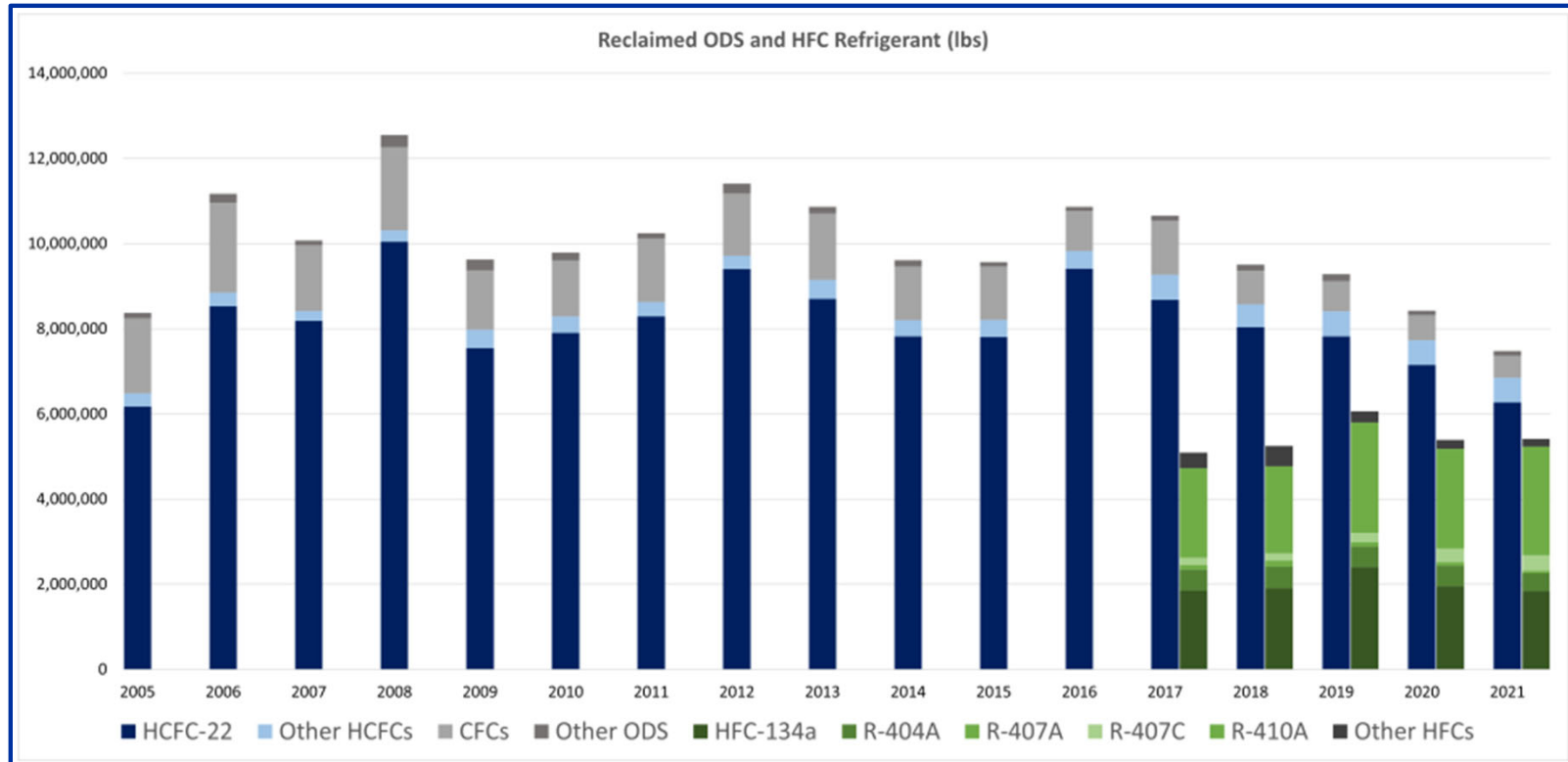
- Subpart A – Production and consumption controls
- Subpart B – Servicing of MVACs
- Subpart C – Ban on nonessential products
- Subpart D – Federal procurement
- Subpart E – Product labeling
- **Subpart F – Recycling and emissions reduction**
- Subpart G – Significant New Alternatives Policy (SNAP)
- Subpart H – Halon emissions reduction
- Subpart I – Ban on refrigeration and air-conditioning appliances containing HCFCs

AIM Act Provisions

- ▶ American Innovation and Manufacturing (AIM) Act of 2020

- ▶ 40 CFR 84 – Implementing Regulations
 - Subpart A – Production and Consumption Controls
 - Subpart B – Phasedown of Hydrofluorocarbons (finalized 10/24/2023)
 - Subpart C – Management of Regulated Substances (proposed 10/19/2023)

EPA Refrigerant Reclamation Trends



Reference: <https://www.epa.gov/section608/summary-refrigerant-reclamation-trends>

HFCs are the New Target

- ▶ HFCs (e.g., R-134a, R-410A), which are the most common replacement for HCFCs, are the new target since they are potent GHGs
- ▶ **HFC targeting mechanisms**
 - EPA's SNAP Program
 - Kigali Amendment to Montreal Protocol
 - Expansion of 40 CFR 82, Subpart F (i.e., CAA Section 608) provisions to non-ODS substitutes
 - AIM Act of 2020 and 40 CFR 84 – Final Technology Transition Rule published 10/24/2023 and proposed HFC Management Rule published 10/19/2023
 - State level initiatives

SNAP Program

- ▶ **3 methods to revise list of ODS alternatives**
 - Producer notification of new substitute
 - Petition to add/delete substances
 - EPA revisions based on new data
- ▶ **Industry sectors**
 - Refrigeration/air conditioning, foam blowing agents, solvents, fire suppression, aerosols, sterilants, tobacco expansion, & adhesives/coatings/inks
- ▶ Current lists provided at <http://www.epa.gov/snap/substitutes-sector>
 - 2014-2017 SNAP approvals for several climate-friendly refrigerants

SNAP Home

Overview of SNAP

SNAP Regulations

SNAP Substitutes by Sector

Substitutes in Refrigeration and Air Conditioning

Substitutes in Foam Blowing Agents

Substitutes in Cleaning Solvents

Substitutes in Fire Suppression and Explosion Protection

Substitutes in Aerosol Solvents and Propellants

Substitutes in Sterilants

Substitutes in Tobacco Expansion

Substitutes in Adhesives, Coatings, and Inks

Submit a SNAP Substitute

SNAP Substitutes by Sector

EPA's decision on the acceptability of new substitutes is based on its understanding of the overall risk to the environmental and human health impacts posed by the substitutes as compared with other substitutes available for a particular end-use. For more information about EPA's evaluation of each substitute in an end-use, see the [Overview of SNAP](#).

Substitutes by Industrial Sector



[Refrigeration and Air Conditioning](#)

End-uses in this sector typically use a refrigerant in a vapor compression cycle to cool and/or dehumidify a substance or space, like a refrigerator cabinet, room, office building, or warehouse.



[Foam Blowing Agents](#)

Foam blowing agents are used in a wide variety of applications including refrigerators, buildings, automobiles, furniture, packaging, and many more. The blowing agent is used to propel liquid plastic resin, and in the case of foam used for insulation it functions as an insulating component of the foam.



[Cleaning Solvents](#)

Cleaning solvents are used to remove oil, grease, solder flux, and other contaminants.



[Fire Suppression and Explosion Protection](#)

Chemical agents in this sector are used in various fire protection applications to extinguish a fire, including those in the military, aviation, electronics, oil, and gas sectors. These agents are often required to meet specific requirements such as being electrically non-conductive, dissipating rapidly without residue, safe for limited human exposure, and extremely efficient in extinguishing most types of fires.

Expansion of Montreal Protocol – HFCs are the New Target

- ▶ **Kigali Amendment**, 10/15/2016 – phase-down of hydrofluorocarbons (HFCs), which are non-ODS substitutes that are potent greenhouse gases
 - Started with 2014 U.S. led proposal in Paris
 - HFC reduction requirements for developed countries = 2019 (10%), 2024 (40%), 2029 (70%), 2034 (80%), & 2036 (85%) over 2011-2013 HFC baseline + 15% of HCFC/CFC baseline
- ▶ **Senate ratified** 09/21/2022 with a 69-27 vote
 - President Biden signed 10/26/2022
- ▶ EPA now working to amend 40 CFR 84 to implement the phase down of HFCs (in conjunction with the AIM Act)

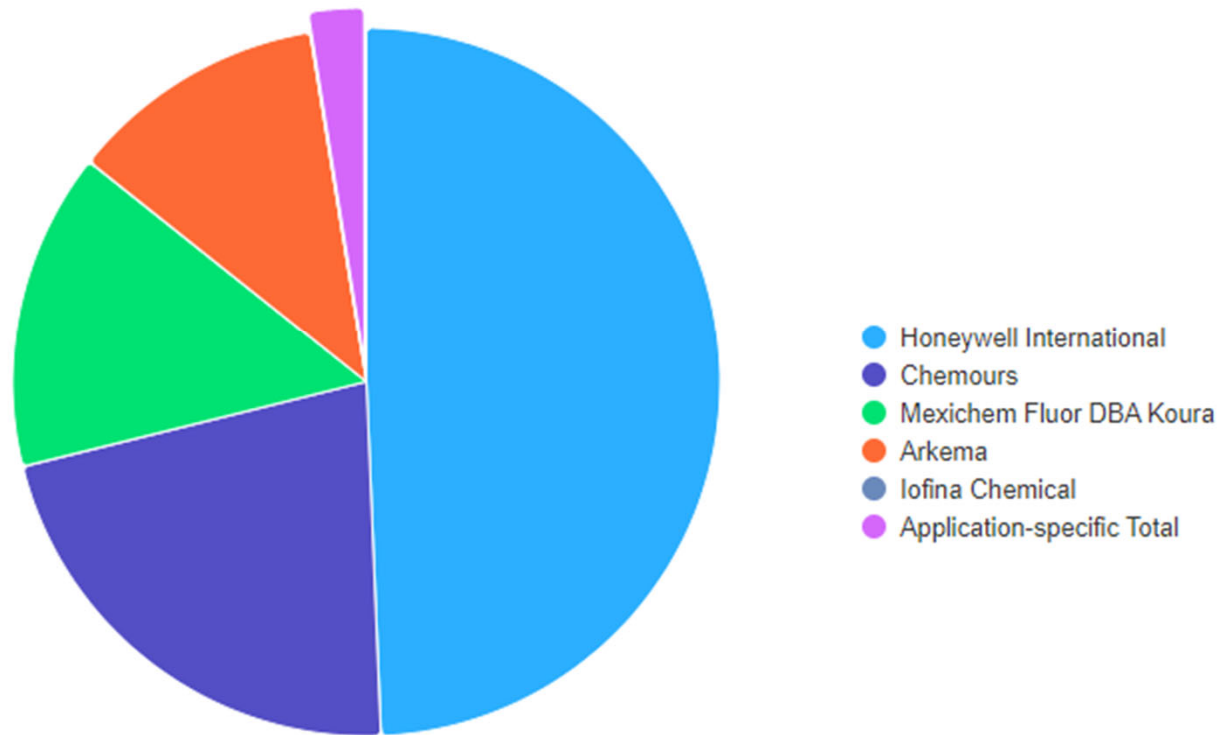
HFCs are the New Target – AIM Act

- ▶ The "**American Innovation and Manufacturing Act of 2020**" outlines production/consumption HFC reductions
- ▶ EPA established allowance for producers of HFCs, 10/5/21 (86 FR 55116)
 - Contained in 40 CFR 84
 - Mirrors Kigali Amendment
- ▶ Allowances issued for 2024 on October 19, 2023
- ▶ Technology transitions final rule, published 10/24/2023
 - Similar to SNAP Program
 - EPA has 2 years to issue rules (2021 and 2022 petitions included)

Date	Percentage of Production Baseline	Percentage of Consumption Baseline
2020–2023	90 percent	90 percent
2024–2028	60 percent	60 percent
2029–2033	30 percent	30 percent
2034–2035	20 percent	20 percent
2036 and thereafter	15 percent	15 percent

HFCs are the New Target – AIM Act

Distribution of HFC Production Allowances for 2024



Reference: [HFC Allowances | US EPA](#).

Technology Transitions Rule

- ▶ Final rule published in Federal Register 10/24/2023
- ▶ Establishes restrictions on the use of regulated substances in sectors or subsectors with dates of 01/01/2025, 01/01/2026, 01/01/2027, and 01/01/2028:
 - Includes aerosol products, foam products, and refrigeration, air conditioning, and heat pump systems/products
- ▶ Does not restrict the continued use of any existing products or systems, but defines distinction between maintenance and installation of new system
- ▶ Requires labeling of all new products and components using HFCs
- ▶ Includes reporting, import, and export provisions

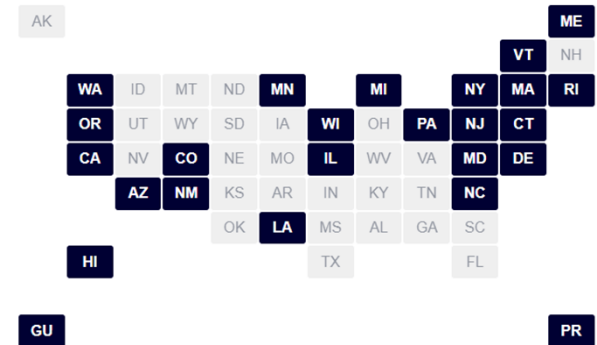
<https://www.epa.gov/climate-hfcs-reduction/regulatory-actions-technology-transitions>

Compliance Dates for Technology Transitions [40 CFR 84.54]

- ▶ Manufacture or import of products in specified sectors or subsectors is prohibited based on the dates in the rule [a].
- ▶ Sale and distribution or export of products is prohibited three years after the dates in (a) [b].
- ▶ Installation of any system in specified sectors or subsectors is prohibited based on the dates in the rule [c].
- ▶ Installation of a system in paragraph (c) for some applications is extended one year beyond the specified compliance date when an approved building permit issued prior to October 5, 2023, specifies the use of a restricted regulated substance, or blend containing a regulated substance, in a system detailed in that permit.
- ▶ Labeling of products and specified components is required upon the effective dates listed in (a) and (c).

HFCs Are the New Target – State Initiatives

- ▶ 23 states (w/PR and Guam) covered under United States Climate Alliance have or are in the process of enacting laws/rules to phase out HFCs
- ▶ Formed after President Trump announced withdrawal from Paris Agreement
- ▶ Most states are initially adopting EPA SNAP Rules 20 and 21 as originally intended
 - Some states expected to abandon efforts now that EPA taking back the lead role (e.g., PA)
- ▶ Many of the laws establish general framework for additional, more stringent rules
 - CA has finalized phase 2 rules that limit GWP of refrigerants used in large (≥ 50 lb) appliances in the retail food/commercial refrigeration, industrial process refrigeration, and cold storage end-use categories
 - NJ has finalized a registration/reporting rule for large refrigeration appliances with refrigerants that have $GWP \geq 150$



Stationary Refrigeration System Requirements

How Do EPA's Refrigerant Rules Impact Facility Managers and HVAC/R Technicians/Contractors?

1. Phase Out of Specific Refrigerants

- ▶ CFCs phased out of production in 1996 (e.g., R-11, R-12)
- ▶ HCFCs phased out of production (e.g., R-22) by 2020
- ▶ HFCs now targeted for phase down
- ▶ SNAP/AIM Program approves & disapproves substitutes
- ▶ Reduces supply and increases cost

2. Required Practices When Working on AC/R Units

- ▶ Technician certifications
- ▶ Evacuation & recovery (no venting)
- ▶ Disposal requirements
- ▶ Sales restrictions
- ▶ Leak repair provisions for units with full charge ≥ 50 lb (or 15 lb)
- ▶ Promotes recovery, recycling, & reclamation

Servicing of Stationary Systems

- ▶ Section 608 of the CAA
- ▶ 40 CFR 82, Subpart F and **proposed HFC Management Rule in 40 CFR 84, Subpart C (published 10/19/2023)**
 - Applies to anyone that services or disposes of appliances
 - Also applies to reclaimers, technicians, owners, operators, and manufacturers
 - Most companies use contractors to comply with technical requirements to some degree

Servicing of Stationary Systems

► Types of requirements

- Venting and release prohibition
- Sales restrictions
- Technician certification requirements
- Evacuation/recovery equipment provisions
- Safe disposal requirements
- Leak rate provisions

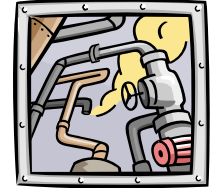
Key Definitions

- ▶ **Refrigerant** – Any substance, including blends and mixtures, consisting in part or whole of a class I or class II ODS or substitute that is used for heat transfer purposes and provides a cooling effect. [Regulated substances listed in Appendix A of 40 CFR 84 or substitutes]
- ▶ **Substitute** – Any chemical or product, whether existing or new, that is used as a refrigerant to replace a class I or class II ODS
 - Exempt substitutes refers to certain substitutes when used in certain end-uses that are specified in 82.154(a)(1) as exempt from the venting prohibition and the requirements of Subpart F
 - Non-exempt substitutes refers to all other substitutes and end-uses not so specified in 82.154(a)(1)

Key Definitions

- ▶ **Appliance** – Any device which contains/uses a refrigerant and is used for household/commercial purposes, including any air conditioner, refrigerator, chiller, or freezer. For a system with multiple circuits, each independent circuit is considered a separate appliance.
- ▶ **Small Appliance** – Any appliance that is fully manufactured, charged, and hermetically sealed in a factory with ≤ 5 pounds of refrigerant
 - Includes, but not limited to, refrigerators, freezers, room air conditioners, dehumidifiers, vending machines, and drinking water coolers

Venting and Releases



- ▶ Venting prohibition, 82.154(a)(1)
 - Cannot knowingly vent or otherwise release any refrigerant from appliances
 - Certain listed substitutes in specified end-uses are exempt from prohibition and remainder of Subpart F
- ▶ *De minimis* releases associated with good faith attempts to recycle or recover refrigerant are not a violation per 40 CFR 82.154(a)(2), if:
 - The required evacuation practices are utilized,
 - Certified recovery equipment is utilized, and
 - Certified technicians are utilized

Sales Restrictions

- ▶ Cannot sell, distribute, or offer refrigerants for sale or distribution under 40 CFR 82.154(c), **unless**:
 - Buyer is certified or employs at least 1 technician who has the appropriate certification
 - Refrigerant charged into an appliance by certified technician or apprentice during maintenance, service, or repair
 - Sold for eventual resale to certified technicians/appliance manufacturers (wholesalers)
 - Sold to appliance manufacturer
 - Contained within appliance with fully assembled refrigerant circuit

Sales-Related Recordkeeping

- ▶ All persons who sell or distribute any refrigerant must retain invoices that indicate per 40 CFR 82.154(c)(3)(i):
 - Name of the purchaser
 - Date of sale, and
 - Quantity of refrigerant purchased
- ▶ Buyers of refrigerant who employ certified technicians must provide evidence of employment to sellers
 - **Sellers must keep this documentation**



Sales Restrictions

- ▶ Cannot sell, distribute, or offer used refrigerants for sale or distribution under 40 CFR 82.154(d), **unless**:
 - It has been reclaimed by certified reclaimer
 - It was used in an MVAC or MVAC-like appliance and will be recycled and used in an MVAC or MVAC-like appliance
 - It is contained within the appliance that it will be sold with
 - It is transferred between/among a parent company and its subsidiaries

EPA Refrigerant Reclamation

EPA-Certified Refrigerant Reclaimers

Contact information for EPA-certified refrigerant reclaimers is provided in the table below. The following links exit the site

Additional Information

- [EPA's Refrigerant Reclamation Requirements](#)
- [Checklist for EPA Approval of Refrigerant Reclaimers](#)
- [Organizations that Are No Longer EPA-Certified Refrigerant Reclaimers](#)

Clean Air Refrigerant Recovery and Reclaiming, Inc. EXIT 6513 Warren Dr. Norcross, GA 30093	J. Kent Price (800) 561-2915	TN, LA, MI, AL, NC, SC, GA, FL	Yes
RMS of Georgia LLC 610 McFarland 400 Dr. Alpharetta, GA 30004	Ken Ponder (770) 777-0597	U.S.	Yes

Reference: <https://www.epa.gov/section608/epa-certified-refrigerant-reclaimers>.

Certified Technicians

- ▶ Any person who could be reasonably expected to violate the integrity of a refrigerant circuit during maintenance, service, repair, or disposal of appliances must be certified
 - Apprentices do not need to be certified – provided they are closely and continually supervised by a certified technician
 - Persons who dispose of small appliances, MVACs, & MVAC-like appliances are not required to be certified
- ▶ Technicians must keep copy of their certificate at their place of business, 82.161(a)(4)(i)
 - Must maintain for 3 years after no longer operating as technician
- ▶ Approved certification programs are provided at <http://www.epa.gov/section608/section-608-technician-certification-programs>
 - Programs must publish online list of technicians certified on or after 01/01/2017 (technicians can opt out of being included)

Recovery Equipment Requirements

- ▶ Per 40 CFR 82.158(d) & (h), all newer (**manufactured/imported on or after 11/15/1993**) recovery/recycling equipment must:
 - **Be certified;**
 - Be equipped with low-loss fittings on all hoses;
 - Not release > 3% of recycled refrigerant via noncondensables purging (if applicable);
 - Have its liquid & vapor recovery rates measured under the specified conditions; and
 - Have **manufacturer's "certification" label affixed.**
- ▶ List of actively certified equipment located at Air-Conditioning, Heating, & Refrigeration Institute (AHRI) and Underwriters Laboratories (UL) websites
 - AHRI – <https://www.ahridirectory.org/Search/SearchHome?ReturnUrl=%2F>
 - UL - <https://iq.ulprospector.com/en/?p=10005,10048,10006,10047&qm=q:refrigerant%20recovery>
 - Starting 01/01/2017, testing orgs must publish online list of certified equipment



Disposal Requirements

- ▶ Must evacuate & recover refrigerant prior to disposal:
 - Appliances (except small appliances, MVACs, & MVAC-like appliances) - according to Table 1 of 40 CFR 82.156(a)
 - Small appliances, MVACs, & MVAC-like appliances - special disposal requirements in 82.155
- ▶ **Disposal** has broad definition that includes:
 - Discard to land or water;
 - Vandalism resulting in refrigerant release;
 - Disassembly for reuse of its component parts; and
 - Recycling for scrap
- ▶ Required records vary by appliance size

Leak Repair Requirements for Large (≥ 50 lb or ≥ 15 lb) Appliances



Leak Rate Provisions

- ▶ Applicable to appliances with “full charge” ≥ 50 lbs Class I or Class II refrigerant or blends per 40 CFR 82.157(a) [≥ 15 lbs regulated substance or substitute with GWP > 53 per 40 CFR 84.106(a)]
 - Applicability determined on a circuit-by-circuit basis
 - ◆ An appliance containing a total of 80 lbs of R-12 but within two separate circuits of 40 lbs each would not be subject
- ▶ If the leak rate is above the applicable leak repair “trigger” rate (which varies by appliance type)
 - The leak should be repaired (within 30 days)*, or
 - The system should be retrofitted (within 1 year)**, or
 - The system should be retired from service (within 1 year)**

*Several options to extend repair window available.

**One “off-ramp” to avoid implementation of retrofit/retirement plan. There are also several options to extend implementation of retrofit/retirement plan beyond 1 year.

Proposed Compliance Dates for Leak Repair under 40 CFR 84.106

- ▶ ≥ 50 lb appliances – within 60 days of final rule promulgation
- ▶ ≥ 15 lb to 50 lb appliances – within 1 year of final rule promulgation



Leak Repair “Trigger” Rates

- ▶ Allowable leak (or repair “trigger”) rates, 82.157(c)(2) [84.106(c)]
 - Comfort cooling appliances (CCAs) and other appliances – 10%
 - Commercial refrigeration appliances (CRAs) – 20%
 - Industrial process refrigeration appliances (IPRAs) – 30%

How Do I Calculate Leak Rates?

- ▶ Two methods:
 - Annualizing method
 - Rolling average method
 - Only one method can be used per facility or per unit?
 - ◆ “The rate is calculated using **only one** of the following methods for **all appliances** located at an operating facility.”

Leak Repair Timeline

- ▶ If leak rate exceeds applicable leak repair “trigger” rate, then:
 - Repair within 30 days of when refrigerant added to appliance per 40 CFR 82.157(d) [40 CFR 84.106(d)]
 - Not to 0% leak rate, but must be less than trigger rate
- ▶ Several options to extend repair window within 40 CFR 82.157(f) [40 CFR 84.106(f)]
- ▶ If cannot repair in a timely fashion, must retrofit or retire appliance within 1 year, 40 CFR 82.157(h) [40 CFR 84.106(h)]

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

Repair Verification Testing Requirements, 82.157(e) [84.106(e)]

- ▶ For leaks that trigger mandatory repair window, must:
 - Perform Initial Verification Test (IVT) upon completion of repairs but prior to adding refrigerant (e.g., soap bubble test)
 - 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 after 04/10/2020, but will be effective once 40 CFR 84, Subpart C rule finalized

Recurring Leak Inspection Requirements, 82.157(g) [84.106(g)]

- ▶ If exceed allowable leak rate, must conduct recurring leak inspections as follows:
 - CRAs & IPRA's ≥ 500 lbs – quarterly, until 4 consecutive quarters w/ no leaks above allowable leak rate
 - All other units ≥ 50 lbs (≥ 15 lbs) – once per calendar year, until 1 year w/ no leaks above allowable leak rate
 - Must be performed by certified technicians
 - Not required if equipped with automatic leak detection system

Not effective for non-exempt substitutes after 04/10/2020, but will be effective once 40 CFR 84, Subpart C rule finalized

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

- ▶ Can avoid recurring leak inspections if employ ALDS
- ▶ Can directly detect refrigerant in air, monitor its surrounding in another manner, or monitor appliance conditions
- ▶ Must be audited or calibrated annually
- ▶ 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 lbs or 10% of full charge, whichever is less
- ▶ If only used to monitor portion of appliance, then inspections apply to remainder

Not effective for non-exempt substitutes after 04/10/2020, but will be effective once 40 CFR 84, Subpart C rule finalized

Automatic Leak Detection System (ALDS) Requirements, 84.108

- ▶ IPRA and Commercial Appliances with a full charge of $\geq 1,500$ lbs with GWP > 53
 - New systems installed on or after 60 days after final rule published must install ALDS within 30 days of appliance installation
 - Existing systems installed before 60 days after final rule published must install ALDS by 1 year after final rule published
- ▶ Same requirements as 82.157(g)(4) on previous slide
- ▶ Following alarm:
 - Leak rate must be calculated within 30 days (or 120 days for IPS) and perform repairs if over trigger rate
 - Preemptively repair leaks before adding refrigerant and calculate leak rate within 30 days (or 120 days for IPS)

Leak Repair Recordkeeping, 82.157(l) [84.106(l)]

- ▶ Servicing records (ID/location of appliance, date of service, parts of appliance serviced, and type of service made to each part; name of person performing the activity, amount and type of refrigerant added to or removed, full charge, leak rate, leak rate method used)
- ▶ Full charge records (full charge, method used, revisions, date of revisions, **date of installation**) for all full charge methods
- ▶ Verification test records (location of repairs tested, date, type, and results)
- ▶ Explicit records for mothballing (date and return to service)
- ▶ Explicit records for seasonal variance (dates of removal and corresponding addition)
- ▶ Records of leak inspections (date, method used, leak locations, and certification that all visible parts inspected)
- ▶ Records for automatic leak detection systems (installation, annual audit and calibration, and date/location of leaks detected)
- ▶ Purged refrigerant records (when exempting from leak rate calculations)
- ▶ Copies of reports and requests submitted to EPA
- ▶ Copies of retrofit/retirement plans
- ▶ Technicians not employed by owner/operator must provide all required information

Not effective for non-exempt substitutes after 04/10/2020, but will be effective once 40 CFR 84, Subpart C rule finalized

Clarifies Who is Responsible for Records, 82.157(l)(2) [84.106(l)(2)]

(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:

- ▶ Similar language in leak inspection (l)(3) [(l)(4)] and verification testing (l)(5) [(l)(6)] recordkeeping provisions

Chronic Leak Reporting, 82.157(j) [84.106(j)]

- ▶ Reporting required for appliances ≥ 50 lbs [≥ 15 lbs] that leak more than 125% of their full charge in calendar year
 - Calculation = amount added / full charge
(do not use standard leak rate calculation methods for this purpose)
 - Due 03/01 of following year –
CY2023 report due on 03/01/2024



Not effective for non-exempt substitutes after 04/10/2020, but will be effective once 40 CFR 84, Subpart C rule finalized

Content of Chronic Leaker Reports, 82.157(j) [84.106(j) and (m)(4)]

- ▶ Describe efforts to identify leaks and repair the appliance
- ▶ Basic identification information
- ▶ Refrigerant-containing appliance type
- ▶ Refrigerant type
- ▶ Full charge of appliance
- ▶ Annual percent refrigerant loss
- ▶ Dates of refrigerant addition and amounts of refrigerant added
- ▶ Date of last successful FVT
- ▶ Explanation of cause of refrigerant losses
- ▶ Description of repair actions taken
- ▶ Whether a retrofit/retirement plan has been developed and anticipated date of retrofit/retirement

Leak Repair Reporting Summary, 82.157(m) [84.106(m)]

- ▶ Notifications/reports must be submitted electronically to 608reports@epa.gov or in the manner specified by EPA
- ▶ Required reports:
 - Repair window extension requests
 - Retrofit/retirement off-ramp requests
 - Retrofit/retirement extension requests
 - Chronic leaker reports

Not effective for non-exempt substitutes after 04/10/2020, but will be effective once 40 CFR 84, Subpart C rule finalized

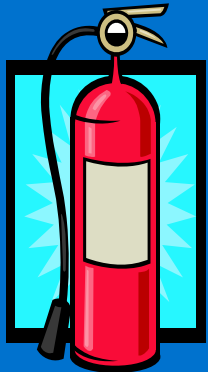
Subpart F Matrix by Appliance & Refrigerant Type

Category	Venting Prohibition	Sales Restrictions	Evacuation Req's	Technician Certs	Disposal Req's	Leak Repair Provisions
Appliances w/ Exempt Substitutes	No	No	No	No	No	No
Small Appliances (≤ 5 lbs ODS or Non-Exempt Substitute)	Yes	Yes	Yes (specific)	Yes	Yes (specific)	No
Medium Appliances (> 5 lbs & < 50 lbs ODS or > 5 lbs & < 15 lbs Non-Exempt Substitute)	Yes	Yes	Yes	Yes	Yes	No
Large Appliances (≥ 50 lbs ODS or ≥ 15 lbs Non-Exempt Substitute)	Yes	Yes	Yes	Yes	Yes	Yes <small>84.106 Proposed: 2025 Non-Exempt Subs</small>

**Proposed
40 CFR 84,
Subpart C
October 19,
2023.**

How Should Facilities Implement the Subpart C (HFC) Revisions?

- ▶ Use EPA required work practices previously reserved for ODS-containing refrigerants (e.g., R-12, R-22) on non-ODS substitutes (e.g., R-134a, R-410A)
 - Certified technicians
 - Certified recovery/recycling equipment
 - Required refrigerant evacuation levels
- ▶ Develop an inventory of all refrigeration appliances with charges of 15 lb or more
- ▶ Read the proposed rule!
- ▶ 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 new records



Fire Suppression System Requirements

HFC Fire Suppression System Requirements [40 CFR 84.110]

- ▶ Use recycled HFCs in initial charging of systems starting 01/01/2025
 - Understood by EPA to conform to NFPA 2001 or NFPA 10 or appropriate ASTM standards per preamble, but not specified in rule
- ▶ Perform one-time fire suppression technician training (if employing) by 01/01/2025
- ▶ Recycle HFCs prior to disposal through a fire suppressant recycler or reclaimer (40 CFR 82.164) or by arranging for destruction (40 CFR 84.29)
- ▶ Recordkeeping and reporting:
 - First fill
 - Service/recharge and/or recycling entities
 - Report annually by 02/14 for prior year's activities

Halon and HFC Recommendations

- ▶ Develop inventory of halon and HFC-containing fire suppression systems
- ▶ Frequent communication between maintenance (or safety) and environmental organization
 - Establish single points of contact
- ▶ Utilize NFPA inspections to satisfy “general duty” to properly maintain systems
 - Maintain records of these inspections?
- ▶ Tighten contract language for fire suppression contractors
- ▶ Audit/review contractor practices

Labeling Requirements

HFC Disposable Cylinder & Labeling Requirements

- ▶ Governed by 40 CFR 84, Subpart A
- ▶ **Disposable cylinders [40 CFR 84.5(h)]**
 - As of July 1, 2025, no person may import or domestically fill a regulated substance in a non-refillable cylinder.
 - As of January 1, 2027, no person may sell or distribute, or offer for sale or distribution regulated substances contained in a non-refillable cylinder.
 - Small cans containing less than two pounds of regulated substances that have a self-sealing valve that meets the requirements in 40 CFR 82.154(c)(2) are not subject to this restriction.
- ▶ **Labeling of cylinders [40 CFR 84.5(i)(1)]**
 - As of January 1, 2022, no person may sell or distribute, offer for sale or distribution, or import containers containing a regulated substance that lacks a label or other permanent markings **stating the common name(s), chemical name(s), or ASHRAE designation of the regulated substance(s) or blend contained within, and the percentages of the regulated substances if a blend.**

HFC Certification Identification Generation and Tracking

- ▶ Governed by 40 CFR 84, Subpart A
- ▶ Scope and applicability. Certification identifications may only be generated by a person that produces, imports, reclaims, recycles for fire suppression use, repackages, or blends regulated substance for distribution or sale in bulk and reports to EPA consistent with paragraph (d) of this section. All containers of bulk regulated substance, with the limited exceptions described in paragraph (b)(4) of this section, must be associated with certification identifications on the following schedule: [40 CFR 84.23(a)]
 - (1) **As of January 1, 2025**, all containers of bulk regulated substances imported and all containers sold or distributed by producers and importers must have a **QR code**.
 - (2) **As of January 1, 2026**, all containers of bulk regulated substances filled and all containers sold or distributed by all other repackagers and cylinder fillers in the United States not included in paragraph (a)(1) of this section, including reclaimers and fire suppressant recyclers must have a **QR code**.
 - (3) **As of January 1, 2027**, every container of bulk regulated substances sold or distributed, offered for sale or distribution, purchased or received, or attempted to be purchased or received must have a **QR code**.

HFC Disposable Cylinder Returns and Reporting

- ▶ Governed by 40 CFR 84, Subpart C
- ▶ Staggered compliance dates from 01/01/2025 to 01/01/2027
- ▶ Disposable cylinders must be transported to reclaimer or fire suppressant recycler as of 01/01/2025 for heel recovery
- ▶ Sellers and distributors must register with EPA prior to the first time an update would be required in the tracking system
 - Final purchasers not required to register
- ▶ Used cylinders sent back rescanned and updated by final processors starting 01/01/2026
- ▶ Small cans of refrigerant would not be required to be returned

Questions?



EPA Resources

EPA's ODS website:

<http://www.epa.gov/ozone-layer-protection>

Comments/Questions website:

<http://www.epa.gov/section608/forms/contact-us-about-stationary-refrigeration-and-air-conditioning>

EPA's HFC website:

<https://www.epa.gov/climate-hfcs-reduction>



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