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Refrigerant Rule Revisions: Is Your Facility Prepared?

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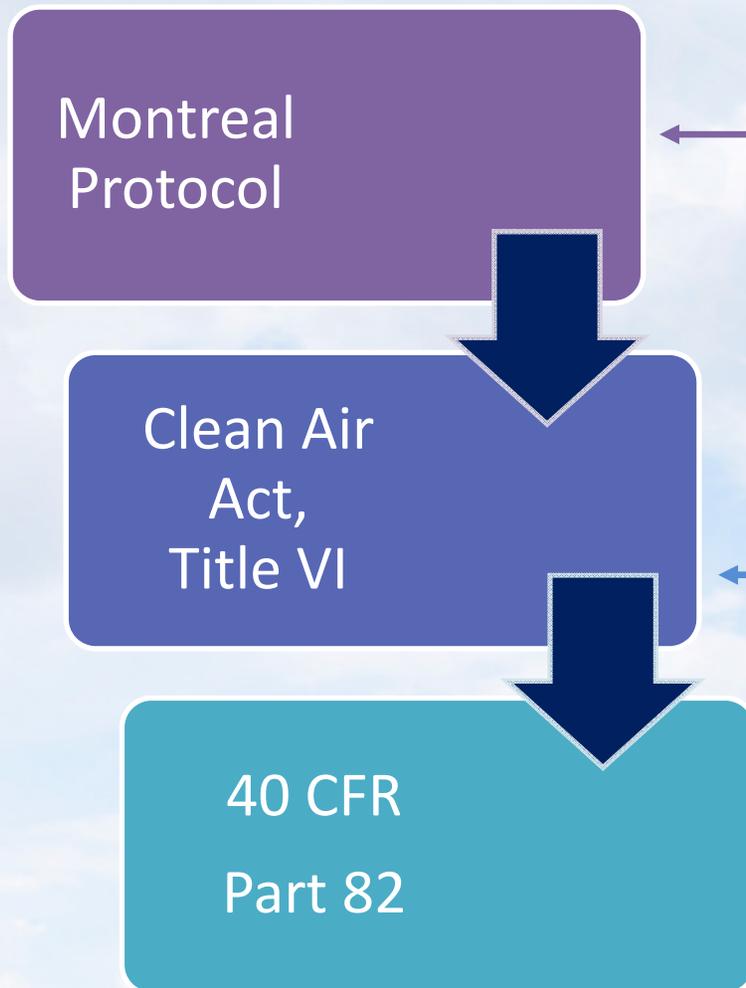
Agenda

- > Refrigerant phase out or phase down
 - ❖ Montreal Protocol
 - ❖ EPA's Significant New Alternatives Policy (SNAP) Program
- > Appliance servicing requirements
 - ❖ EPA's 11/18/2016 rule revisions
- > Tips for facilities and HVAC/R contractors
- > Q&A

Acronyms & Basic Refrigerant Types

- > HVAC/R - heating, ventilation, air conditioning / refrigeration
- > ODP - ozone depletion potential
- > ODS - ozone depleting substance
- > MVAC - motor vehicle air conditioner
- > SNAP - Significant New Alternatives Policy
- > 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

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 ODS, including CFCs and HCFCs
 - Amended several times using “worst first” approach; recently amended to target HFCs
- U.S. law or statute - gives EPA authority to develop rules to implement requirements in Montreal Protocol
- EPA rule - what you have to comply with on day-to-day basis

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

1. Phase Out of Specific Refrigerants (Subparts A, C, G, & I)

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

2. Required Practices When Working on AC Units (Subparts B & F)

- > Technician certifications
- > Evacuation & recovery (no venting)
- > Disposal requirements
- > Sales restrictions
- > Leak repair provisions for units with full charge \geq 50 lbs
- > Promotes recovery, recycling, & reclamation

1. Developments in Refrigerant Phase Out Schedules

HCFC Phase Out is Here

- > HCFC production phase out schedule
 - ❖ 2015 = 90%
 - ❖ 2020 = 99.5% overall and 100% for R-22 & R-142b
 - ❖ 2030 = 100%

- > R-22 quandary.... EPA production allocations:
 - ◆ 13 million pounds (2017)
 - ◆ 9 million pounds (2018)
 - ◆ 4 million pounds (2019)
 - ❖ EPA estimates recycle/reclamation < 10 million pounds/year in 2016
 - ❖ Represent only a fraction of the estimated 200 million pound/year service need in the U.S.

- > Costs for R-22 have already risen 10x since 2006
 - ❖ 2006 - 30 lb cylinder ≈ \$70
 - ❖ 2016 - 30 lb cylinder ≈ \$700+
 - ❖ 2018 and beyond - 30 lb cylinder ≈ \$????

HFCs - SNAP Program

- > HFCs (e.g., R-134a, R410A), which are the most common replacement for HCFCs, are the new target since they are potent GHGs
- > Focus on HFCs stems from former President Obama's Climate Action Plan, 6/2013
 - ❖ Obtained private sector commitments to reduce reliance on HFCs from HFC producers, appliance manufacturers, and other end-users
 - ❖ Avoids >700MM metric tons of CO₂e emissions
- > EPA removed SNAP approval of several HFCs in specific end-uses
 - ❖ SNAP Rules 20 (2015) and 21 (2016)
 - ❖ Recent news - Court vacated Rule 20 on 8/8/2017 (appeal has been filed)

Kigali Amendment to Montreal Protocol

- > HFC phase down within Kigali Amendment to Montreal Protocol, 10/15/2016
 - ❖ 10% (2019), 40% (2024), 70% (2029), 80% (2034), & 85% (2036)
 - ❖ Relative to 2011-2013 HFC baseline + 15% of HCFC/CFC baseline
- > Trump Administration expected to ratify since has HFC industry backing.

How Should Facilities Prepare for Impending Refrigerant Phase Outs?

- > Facility managers must develop inventory of appliances (age, size, refrigerant type) to quantify exposure to expected rise in refrigerant costs
- > Watch for availability of next generation refrigerants (e.g., HCs, HFOs, HFO/HFC blends)
 - ❖ Obtain input from appliance manufacturers and HVAC/R contractors
- > Analyze new AC unit installations and retrofits based on available cost data and unit lifetimes
 - ❖ If R-410A is facing an impending phase down, does it make sense to switch your R-22 unit to R-410A?

2. Developments in Required Work Practices when Servicing Refrigerant Containing Appliances

Subpart F Matrix by Appliance & Refrigerant Type (prior to rule revision)

Category	Venting Prohibition	Sales Restrictions	Evacuation Req's	Technician Certs	Disposal Req's	Leak Rate Provisions
Appliances w/ Non-ODS Substitutes	Yes (unless listed as exempt)	No	No	No	No	No
Small Appliances (≤ 5 lbs ODS)	Yes	Yes	Yes (specific)	Yes	Yes (specific)	No
Medium Appliances (> 5 lbs & < 50 lbs ODS)	Yes	Yes	Yes	Yes	Yes (no explicit records)	No
Large Appliances (≥ 50 lbs ODS)	Yes	Yes	Yes	Yes	Yes	Yes

Refrigerant Servicing Rule Revisions

- > Rule represents overhaul of 40 CFR 82, Subpart F
- > Finalized on 11/18/2016 (81 FR 82272)
- > Includes 3 primary categories of changes
 - ❖ Extension to non-ODS containing substitutes
 - ❖ Revised appliance disposal requirements
 - ❖ Revised leak repair provisions for appliances with full charge \geq 50 lbs
- > **Staggered compliance dates of 01/01/2017, 01/01/2018, & 01/01/2019**

Leak Rate Provisions for Comfort Cooling Appliances - Overview (prior to rule revision)

- > Applicable to units with full charge \geq 50 lbs ODS-containing refrigerant
 - ❖ Applicability determined on a circuit-by-circuit basis
- > If the leak rate is above the applicable “trigger rate” (15% for comfort cooling appliances)
 - ❖ 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)
- > *One option to extend repair window - mothballing (evacuation & shutdown)
- > Leak rate calculation projects how much refrigerant would leak out in year if left unrepaired
- > Servicing records required
 - ❖ Date & type of service
 - ❖ Amount of refrigerant added
 - ❖ Date & amount of refrigerant purchased (if add own refrigerant)

Extension to Non-ODS Substitutes, 1/1/2017

- > Substitutes are defined as refrigerants, with the following subcategories:
 - ❖ Non-exempt substitutes - subject to all provisions of rule, including sales restrictions, evacuation, recovery/recycling equipment, technician certification, leak repair, and reclamation provisions
 - ❖ Exempt substitutes - exempt from all provisions of rule when used in approved applications

Extension to Non-ODS Substitutes - Highlights

- > Newly manufactured recovery/recycling equipment must be certified, **1/1/2017** (82.158)
- > Restriction on sale of refrigerant, **1/1/2017 & 1/1/2018** [82.154(c)-(d)]
- > Technicians must be certified, **1/1/2018** [82.161(a)]
- > Evacuation requirements for disposal or opening of appliances, **1/1/2018** [82.155 & 82.156(a)-(d)]
- > Leak repair provisions as they apply to appliances with full charge \geq 50 lbs refrigerant, **1/1/2019** (82.157)

Extension to Non-ODS Substitutes - Late Breaking News

- > 8/10/2017 letter from EPA to industry groups indicates EPA may revisit:
 - ❖ extension to non-ODS substitutes
 - ❖ feasibility of 1/1/2018 compliance date
- > **January 2018 Trinity Call to EPA**
 - ❖ Proposed rule update being drafted, targeting 12/2018 final rule
 - ❖ Revision will focus on the 2016 extension to non-ODS substitutes
 - ❖ Changes to requirements with 1/1/2018 compliance dates are unlikely

Key Revisions to Leak Repair Provisions ≥ 50 lb Units as of 1/1/2019

(1 of 2)

- > Lowers allowable leak (or repair “trigger”) rates [82.157(c)(2)]
 - ❖ Comfort cooling & other units 15% to 10%
 - ❖ Commercial refrigeration 35% to 20%
 - ❖ Industrial process refrigeration 35% to 30%
- > Standard list of extensions to 30-day repair window for all appliance types
 - ❖ Mothballing, industrial process shutdown (IPS) required, necessary parts unavailable, radiological contamination issues, & other rules make repair within window impossible

Key Revisions to Leak Repair Provisions ≥ 50 lb Units as of 1/1/2019

(2 of 2)

- > Initial and follow-up verification testing
 - ❖ Now required for all appliance types, including comfort cooling and commercial refrigeration (was only req'd for industrial units previously)
 - ❖ Shortens window for performing follow-up test from 30 days to 10 days of initial test or of the appliance achieving normal operating conditions

Revisions to Leak Repair Provisions for ≥ 50 lb Units - Highlights, 1/1/2019

- > NEW - Establishes leak inspection requirements if exceed allowable leak rates [82.157(g)]
 - ❖ Commercial/industrial process refrigeration ≥ 500 lbs - quarterly, until 4 consecutive quarters w/ no leaks above allowable leak rate
 - ❖ All other units ≥ 50 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
- > NEW - Reporting required for appliances ≥ 50 lbs that leak more than 125% of their full charge in calendar year [82.157(j)]
 - ❖ “Chronic leaker” provision
 - ❖ Calculation = amount added / full charge (do not use standard leak rate calculation methods for this purpose)
 - ❖ Due 3/1 of following year

Revisions to Leak Repair Provisions for ≥ 50 lb Units - Recordkeeping [82.157(l)], 1/1/2019

- > Expanded 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 service, amount and type of refrigerant added to or removed, full charge, leak rate, leak rate method used)
- > Expanded full charge records (full charge, method used, revisions, and date of revisions) for all full charge methods
- > Expanded verification test records (location of repairs tested, date, type, and results)
- > Adds explicit records for mothballing (date and return to service)
- > Adds explicit records for seasonal variance (dates of removal and corresponding addition)
- > Adds records of leak inspections (date, method used, leak locations, and certification that all visible parts inspected)
- > Adds 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

Red = New

Revisions to Leak Repair Provisions for ≥ 50 lb Units - Clarifies Who is Responsible for Records [82.157(l)(2)], 1/1/2019

(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) and verification testing (l)(5) recordkeeping provisions

Revisions to Leak Repair Provisions - Notifications & Reporting

- > Eliminates one-time notification of acquisition of certified recovery/recycling equipment
(**effective date = 1/1/2017**)
- > Requires notifications/reports to be submitted electronically to 608reports@epa.gov [82.157(m)]
(**effective date = 1/1/2019**)
 - ❖ E.g., repair window extension requests, chronic leaker reports
 - ❖ Can use now per EPA

Revised Small Appliance Disposal Requirements

- > Two options for those that take final step in disposing of small (≤ 5 lb) appliances, MVACs, and MVAC-like appliances
 - ❖ Option 1 - evacuate and recover refrigerant
 - ❖ Option 2 - verify that refrigerant has been evacuated previously via signed statements or contract
- > 2016 rule
 - ❖ Relocates these provisions from 82.156(f) & 82.166(i) to 82.155
 - ❖ Adds requirement to obtain signed statement in the event that all refrigerant in an appliance has “leaked out” prior to delivery due to unavoidable occurrences - **effective date = 1/1/2017 for ODS-containing refrigerants and 1/1/2018 for non-exempt substitutes**

New Medium Appliance Disposal Requirements, 1/1/2018

- > 2016 rule adds explicit recordkeeping requirements for disposal of appliances with full charge > 5 lbs and < 50 lbs [82.156(a)(3)]
 - ❖ Company name
 - ❖ Location of the appliance
 - ❖ Date of recovery
 - ❖ Type of refrigerant recovered for each appliance
 - ❖ The quantity of refrigerant, by type, recovered from all disposed appliances in each calendar month
 - ❖ The quantity of refrigerant, by type, transferred for reclamation and/or destruction
 - ❖ The person to whom it was transferred
 - ❖ The date of transfer

Subpart F Matrix

by Appliance & Refrigerant Type (after rule revision)

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 <u>Applies to Non-Exempt Subs on:</u> 1/1/17 – Used Ref 1/1/17 – Appliances 1/1/18 – New Ref	Yes (specific) <u>Applies to Non-Exempt Subs on:</u> 1/1/18	Yes <u>Applies to Non-Exempt Subs on:</u> 1/1/18	Yes (specific) <u>“Leaked out” Records Req'd on:</u> 1/1/17 – ODS 1/1/18 – Non-Exempt Subs	No
Medium Appliances (> 5 lbs & < 50 lbs ODS or Non-Exempt Substitute)	Yes	Yes <u>Applies to Non-Exempt Subs on:</u> 1/1/17 – Used Ref 1/1/17 – Appliances 1/1/18 – New Ref	Yes <u>Applies to Non-Exempt Subs on:</u> 1/1/18	Yes <u>Applies to Non-Exempt Subs on:</u> 1/1/18	Yes <u>Explicit Records Req'd on:</u> 1/1/18 – ODS 1/1/18 – Non-Exempt Subs	No
Large Appliances (≥ 50 lbs ODS or Non-Exempt Substitute)	Yes	Yes <u>Applies to Non-Exempt Subs on:</u> 1/1/17 – Used Ref 1/1/17 – Appliances 1/1/18 – New Ref	Yes <u>Applies to Non-Exempt Subs on:</u> 1/1/18	Yes <u>Applies to Non-Exempt Subs on:</u> 1/1/18	Yes <u>Applies to Non-Exempt Subs on:</u> 1/1/18	Yes <u>82.156(i) Applies thru:</u> 12/31/18 – ODS <u>82.157 Applies starting:</u> 1/1/19 – ODS 1/1/19 – Non-Exempt Subs

How Should Facilities Prepare for Subpart F 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
- > Implement changes to appliance disposal recordkeeping system
 - ❖ Test drive now
- > Prepare for new leak repair provisions on ≥ 50 lb units
 - ❖ Conduct initial and follow-up verification testing for all leaks
 - ❖ Implement system to maintain new records
 - ❖ Test drive in 2018

Summary of Changes by Effective Date (1 of 3)

Effective Date	Rule Provision/Citation
01/01/2017	Sales restriction on used non-exempt substitutes, 82.154(d)
01/01/2017	Sales restriction on appliances with non-exempt substitutes (servicing aperture/process stub), 82.154(e)
01/01/2017	Certification of new manufactured/imported recovery/recycling equipment for use with non-exempt substitutes, 82.158
01/01/2017	Non-exempt substitute reclaimer certification, 82.164
01/01/2017	Elimination of one-time notification of acquisition of certified recovery/recycling equipment, 82.162 of old rule
01/01/2017	New definition of <i>comfort cooling</i> , 82.152
01/01/2017	Modified definition of <i>disposal</i> to cover vandalism and intentional cutting of refrigerant lines, 82.152
01/01/2017	Approved equipment testing organizations must publish online list of certified recovery/recycling equipment, 82.160(e)(1)

Summary of Changes by Effective Date (2 of 3)

Effective Date	Rule Provision/Citation
01/01/2017	Signed statement requirement in event all ODS-containing refrigerant leaked out prior to delivery of small appliances, MVACs, and MVAC-like appliances for disposal, 82.155
01/01/2018	Signed statement requirement in event all non-exempt substitutes leaked out prior to delivery of small appliances, MVACs, and MVAC-like appliances for disposal, 82.155
01/01/2018	Sales restriction on new non-exempt substitutes, 82.154(c)(1)
01/01/2018	Small (≤ 2 lb) cans of non-exempt substitutes for MVACs must be equipped with self-sealing valves, 82.154(c)(2)
01/01/2018	Technicians must be certified to maintain, service, repair, or dispose* of appliances containing non-exempt substitutes, 82.161(a)
01/01/2018	Approved technician certification programs must publish online list of technicians they have certified on or after 01/01/2017, 82.161(b)(6)

*Consistent with previous rule, technicians do not have to be certified to dispose of small appliances, MVACs, and MVAC-like appliances.

Summary of Changes by Effective Date (3 of 3)

Effective Date	Rule Provision/Citation
01/01/2018	Evacuation requirements for disposal and/or opening of appliances containing non-exempt substitutes, 82.155 & 82.156(a)-(d)
01/01/2018	Recordkeeping requirements for disposal of appliances with full charge > 5 lbs and < 50 lbs, 82.156(a)(3)
01/01/2019	Revised leak rate provisions for appliances with full charge \geq 50 lbs refrigerant, 82.157

Questions?

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Complete summary table in PDF format provided at:

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