



Title	ES-301-2.02A Management of Refrigerant in Stationary Equipment
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## **1) Activity Description: Management of Refrigerant in Stationary Equipment**

The Department of Aviation operates a large heating, ventilation, and air conditioning (HVAC) system from the airport's Central Plant, located at 26920 E. 86<sup>th</sup> Avenue. The purpose of the Central Plant is to provide the terminal building and concourses with hot and cold water and heated and air-conditioned air. The Central Plant includes one Bryan boiler, three IBW boilers, an HCFC-based chilled water system, and a cooling tower. The four boilers can burn either natural gas or Jet A fuel. The Central Plant is operated by the airport's Facilities Maintenance HVAC staff. There are several refrigeration and air conditioning systems within the City and County of Denver's DEN operations that contain regulated refrigerant charges and require registration and/or maintenance recordkeeping, such as leak rate calculations.

Various DEN tenants also operate HVAC systems whose refrigerants may be regulated by the federal and state regulations.

## **2) Potential Environmental Risks**

- A. The following environmental concerns are associated with these activities:
  - i) Air pollution – emissions of ozone depleting substances (ODS) and greenhouse gasses (GHG). Chlorofluorocarbons (CFC) and hydrochlorofluorocarbons (HCFCs) are refrigerants that are ozone depleting substances (ODSs). Hydrofluorocarbons (HFCs) are refrigerants that were originally developed to replace CFCs and HCFCs. CFCs, HCFCs and HFCs are greenhouse gases
  - ii) Improper management of used refrigerant
- B. Potential consequences from performing the activity incorrectly:
  - i) Damage to the environment
  - ii) Regulatory and judicial enforcement actions and related [financial and non-financial] penalties

## **3) Critical Operating Requirements**

- A. Prohibited Activities
  - i) Operating equipment without applicable permits.
  - ii) Intentional venting of refrigerant to the atmosphere
- B. General Considerations
  - i) Each airport tenant, contractor, and operator managing refrigerant in stationary equipment is responsible for understanding the applicable regulations and managing their activities accordingly; this Environmental Guideline is meant as guidance and does not supersede any regulations.
  - ii) Technicians who install or remove refrigerant or maintain or repair stationary equipment with refrigerant, must have the proper training certification.
  - iii) Stationary equipment with refrigerant must be considered for CDPHE registration if over 100 compressor horsepower, and leak rate calculations and maintenance records must be kept for units with more than 50 pounds of ODS refrigerant capacity.

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- iv) Records must be kept on site for three years for maintenance activities on regulated equipment and refrigerant consumption.
- v) Leak rate calculations must be performed for regulated stationary equipment each time refrigerant is added to the equipment charge.
- vi) Equipment losses of refrigerant above regulatory thresholds trigger leak repairs that must be performed within the applicable regulatory timetable.

C. Training Requirements

- i) Technicians who repair or service equipment with refrigerant (CFC-12 and HFC 134a) must be trained and certified (referred to as Section 608 technician certification) by an EPA - approved organization. Training programs must include information on the proper use of equipment, the regulatory requirements, the importance of refrigerant recovery, and the effects of ozone depletion. A test is required.

D. Storage and Materials Management Requirements

- i) Owners and operators of stationary equipment with refrigerant should evaluate their systems for possible regulation under federal and state regulations.
- ii) Refrigerant should be stored to prevent releases and emissions.
- iii) Equipment operators should manage new and used refrigerant in accordance with federal and state regulations.
- iv) Used oils should be evaluated for halogenated contaminants and handled according to appropriate federal and state regulations. Process knowledge is recognized as a potential basis for this determination.

**4) Planning Requirements**

- A. Properly select equipment and systems that will utilize lower emissions impact refrigerants and that will reduce leakage by design. Equipment and systems should allow addition and removal of refrigerant while minimizing loss.
- B. Emphasize the recovery, recycling, and reuse of refrigerant. The operator should institute management systems that will emphasize recovery of refrigeration fluids that become contaminated. This includes using agents who in turn use self-certified equipment for refrigerant recovery that comply with USEPA standards pursuant to 40 CFR Part 82.
- C. Provide capability to measure refrigerant weights as added and removed from refrigeration systems. Perform leak rate calculations as required.
- D. Record training completion certificates for each technician and institute measures to ensure these are the only personnel who work on applicable systems (i.e., stationary and MVAC and MVAC-like systems).
- E. A recordkeeping system should be instituted to organize and maintain applicable records.
- F. Currently, there is no halon-based fire extinguishing equipment owned by DEN. If halon-based equipment is contemplated, DEN Life Safety and DEN Environmental Services should be contacted.

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## 5) Critical Tasks

- A. The operator will conduct stationary equipment refrigerant operations, monitoring, and recordkeeping in accordance with the state Air Quality O&M Plan and federal and state ODS and GHG regulations.
- B. The operator will operate and maintain the equipment to assure compliance with any applicable laws, regulations, guidance, and permits.
- C. Registration with CDPHE of equipment over 100 horsepower. Facilities that service mobile and stationary air conditioning and refrigeration equipment are also required to notify CDPHE of their refrigerant management activities.
- D. Demonstrate compliance with technician training and certification requirements prior to conducting maintenance or repair activities on stationary or mobile equipment containing regulated refrigerants.
- E. Demonstrate compliance with leak rate calculation requirements each time refrigerants are added to regulated stationary equipment or systems.
- F. Demonstrate compliance with leak repair timetable when leak rate thresholds are exceeded for regulated stationary equipment.
- G. Demonstrate compliance with pre-disposal refrigerant removal/recovery and related documentation requirements prior to disposal of regulated refrigerant containing equipment.
- H. Store refrigeration fluid containers in such a manner as to prevent or minimize the possibility of leaks (e.g., cylinders should have plugs in their outlets to back up valves).

## 6) Emergency Response

- A. If a spill occurs, refer to Environmental Guideline ES-301-5.02 Spill Response. Call DEN Communications Center immediately at 303-342-4200 for all spills.
- B. There are no specific emergency response requirements associated with the release of refrigerants. However, there is a requirement to repair systems with more than 50 pounds of CFC and HCFC refrigerant capacity and that are determined to have lost a significant percentage of their charge (15% for comfort cooling and 35% for industrial applications) over a prorated annual rate since the last refrigerant addition or one year, whichever is shorter. Leaking equipment should be shut down for repairs or maintenance as soon as possible to reduce the leakage rate below the applicable threshold level. If the leak cannot be repaired within 30 days of discovery, the equipment should be permanently taken out of service until it can be either repaired or replaced.
- C. There is the possibility that the release of refrigerant materials in a closed area can reduce oxygen levels. This is a safety issue and should be reported to the DEN Communications Center.

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- D. An R-12 (CAS No. 75-71-8) release at or above certain thresholds (RQ ≥ 5,000 pounds) is reportable pursuant to the EPA List of Lists. There are no reportable quantities for R-22, R-414, or R-134a.

**7) Inspection and Maintenance Requirements**

- A. Owner/operator will conduct equipment inspections and maintenance in accordance with the state Air Quality O&M Plan, and federal and state ODC regulations.

**8) Expected Records and Outputs**

- A. Air permit records
  - i) Operator files
- B. Training, management and maintenance records
  - i) Operator files
- C. Any records for used oil generation
  - i) Operator files
- D. POTW discharge records
  - i) Operator files
- E. Training records for all operators/technicians
  - i) Operator files

**9) References**

- A. Phone Numbers
  - i) DEN Communications Center (for spill reporting) (303) 342-4200
  - ii) DEN Maintenance Control Center (for malfunctions) (303) 342-2800
  - iii) DEN Environmental Services (Main Line) (303) 342-2730
  - iv) Kim Ohlson (DEN Environmental Services) (303) 342-2637
- B. Guidance Materials (list is not limited to the following)
  - i) Owner/Operator operating and maintenance (O&M) manual for all boilers.
  - ii) Manufacturer's operating and maintenance (O&M) manual for all refrigeration systems and associated cooling water systems.
- C. Training Materials (list is not limited to the following)
  - i) Plans and records for operators to comply with all applicable constraints.
- D. Related Environmental Documents (list is not limited to the following)
  - i) ES-301-2.02B Management of Refrigerant in Motor Vehicle Air Conditioning (MVAC) Systems

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- ii) ES-308-1.02A Management of Refrigerant in Stationary Equipment Work Instruction
  - iii) ES -308-1.02B Management of Refrigerant in Motor Vehicle Air Conditioning Systems (MVAC) Work Instruction
- E. Applicable Regulations (list is not limited to the following)
- i) Federal air quality regulations for boilers (40 CFR Part 60, Subpart Dc)
  - ii) Federal air quality regulations for refrigerants in stationary equipment. Section 608 of the Clean Air Act (40 CFR Part 82, Subpart F)
  - iii) State air quality regulations (5 CCR 1001-2, -3, -5, -8, -9, -19, and -22)
  - iv) State air quality Operating and Maintenance (O&M) Plan as applicable
  - v) Local air quality ordinances (D.R.M.C. Title II, Chapter 4, Article III)
  - vi) Federal used oil regulations (40 CFR Part 279, Subpart C)
  - vii) State used oil regulations (6 CCR 1007-3, Part 279, Subpart C)
  - viii) DEN rules and regulations
- F. Other Documents (list is not limited to the following)
- i) None

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