FORT HOOD Ozone-Depleting Substances COMPLIANCE STANDARD OPERATING PROCEDURE

Prepared with support from Whitetail Environmental LLC, under contract with the Fort Hood Directorate of Public Works Environmental Division.

Contract No.W912BV-18-D-007
Task Order No. W912BV19F0123

Revised March 2020

Summary List of Changes

Amended Regulatory Requirement: Effective 10 April 2020
Appliances with 50 or more pounds of substitute refrigerants will no longer be subject to the requirements at 40 CFR 82.157, including:

- Repairing appliances that leak above a certain level and conducting verification tests on repairs.
- Periodically inspecting for leaks.
- Reporting chronically leaking appliances to the EPA.
- Retrofitting or retiring appliances that are not repaired.
- Maintaining related records.

4.7.3 Retrofit Plans: *40 CFR, 82, Subpart F, 82.157*
The EPA may permit one additional 12-month period if the unit is being Custom-built and will not be delivered, per quote from the manufacturer, until after 30 weeks from when the order was placed.

4.8.5 Leak Rates: *40 CFR, 82, Subpart F, 82.157*
If the leaks are greater than or equal to 125% of the appliance's full charge in one calendar year, the DPW Environmental Division must submit a report the EPA. The report must describe the efforts to identify the leaks, repair the leaks, and must be submitted by March 1st of the following year. Applies to Class I & II ODS containing appliances.

4.9 Recordkeeping: *40 CFR, 82, Subpart F, 82.166*
Monthly inventory verification of the refrigerant cylinders completed by DPW Environmental Division.

4.9.4 Recordkeeping: *40 CFR, 82, Subpart F, 82.166*
The inventory report provided by the DPW Environmental Division, shall be kept on file in the shop office along with equipment leak service logs. As of January 1, 2019, these records must be maintained for three years.

Summary List of Changes (cont.)

4.9 Equipment Leak Service Logs: *40 CFR, 82, Subpart F, 82.157*
For each piece of equipment identified in the shop equipment inventory the following information must be recorded by the service technician whenever service is performed to repair a leak, recover refrigerant, or add refrigerant:
Date of service and service technician name.
Description of service and repair performed including part(s).
Location of leak(s).
Amount of refrigerant recovered and new (makeup) refrigerant added. For recovered refrigerant, also indicate if it was re-used or turned into the CU Yard for disposal only.
Recovery unit ID or serial number and vacuum achieved (inches).
Initial leak verification test method and result [Is the leak repaired? (Yes/No)].
Follow-up test method, date and result [Is the leak repaired? (Yes/No)].

The follow-up test
Must be completed within 10 days after a successful initial leak verification test to ensure the leak has been repaired.
A copy of the Fort Hood Refrigerant Cylinder Tracking Form and Fort Hood Refrigerant Equipment Service Log (50 pounds or more), which includes all the above required information is given in Appendix E.
Fort Hood service personnel shall use this log when servicing equipment charged with more than 50-lbs of refrigerant (Class I and Class II ODS). The equipment leak service logs need to be kept along with the equipment inventory in the shop office. As of January 1, 2019, these records must be maintained for three years.

4.10 Recordkeeping: *40 CFR, 82, Subpart F, 82.166*
As of January 1, 2019, records must be maintained for three years. When equipment is decommissioned, DPW Environmental Division will decommission the unit in APIMS, as well.

TABLE OF CONTENTS

LIST OF APPENDICES

Appendix

LIST OF COMMONLY USED ACRONYMS & ABBREVIATIONS

AC&R	air condition and refrigeration
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ARI	Air Conditioning and Refrigeration Institute
°C	degrees Celsius
CAA	Clean Air Act
CAS No.	Chemical Abstract Number
CFC	chlorofluorocarbon
CFR	Code of Federal Regulations
CU	Classification Unit
DoD	U.S. Department of Defense
DOT	U.S. Department of Transportation
DPW	Directorate of Public Works
DRMO	Defense Reutilization and Marketing Office
EPA	U.S. Environmental Protection Agency
HCFC	hydrochloroflurocarbon
HFC	hydrofluorocarbons
Hg	mercury
HVAC	heating, ventilation, and air conditioning
lbs	pounds
MEC	mechanical
mm	millimeter
MVAC	motor vehicle air conditioners
ODS	ozone-depleting substances
ODP	ozone-depleting potential
OMB	Office of Management and Budget
oz	ounce
PFC	perfluorocarbon
psig	pounds per square inch gauge
SAE	Society of Automotive Engineers
SNAP	Significant New Alternatives Policy
SOP	standard operating procedure
UL	Underwriters Laboratories

1.0 INTRODUCTION

In 2018 Fort Hood sponsored an effort to prepare an Ozone Depleting Substances (ODS) Standard Operating Procedure (SOP). The focus of that SOP was how to handle the U.S. Environmental Protection Agency's (EPA) new mandated phase-out of ODSs. During the course of preparing the ODS Management Plan cursory observations were made regarding maintenance organizations and individuals responsible for handling ODSs and repairing ODS containing equipment. These organizations and technicians must follow EPA requirements to minimize releases of ODSs to the environment in order to protect the stratospheric ozone layer.

Due to updated EPA regulations, Fort Hood's current ODS Standard Operating Procedure became outdated. This SOP has been updated by Jason Vanzant, Whitetail Environmental LLC. This update was completed under USACE Tulsa District contract no: W912BV18D0007, Task 5.2.

This document outlines U.S. Environmental Protection Agency (EPA) requirements for the Protection of Stratospheric Ozone and Fort Hood's program and standard operating procedures to ensure regulatory compliance. For any organization that handles refrigerants, and in particular refrigerants that are classified as ODSs, it is essential that EPA regulations and requirements be integrated into the organization's existing work processes.

The document also provides some review on refrigerants, chlorofluorocarbons, hydrofluorocarbons and Federal rules and regulations to ensure all users have enough background to implement the compliance and operating procedures discussed, and to be aware of their importance and need. Also included are checklists that will assist Fort Hood personnel with internal compliance audits and EPA inspections.

2.0 REFRIGERANT AND REGULATORY OVERVIEW

A refrigerant is the fluid used for heat transfer in a refrigeration system. The refrigerant absorbs heat during evaporation at low temperature and pressure, and releases heat during condensation at a higher temperature and pressure. Refrigerants can absorb heat by undergoing a change of state (for example from liquid to vapor), or they can absorb heat without undergoing a change of state (for example they may absorb heat as a liquid and remain a liquid, albeit a hotter one).

Fluorocarbon compounds have a demonstrated ability to effectively absorb/remove heat and thus they have commonly been used as refrigerants. It has also been determined that fluorocarbon compounds that contain chlorine are harmful to the stratospheric ozone layer and thus they are also known as ODSs. Based on their potential to deplete ozone ODSs have been classified as either a Class I or Class II ODS and are regulated by Title VI of the Clean Air Act (Sections 601 through 618). Section 608 (National Recycling and Emissions Reduction Program) and Section 609 (Servicing of Motor Vehicle Air Conditioning) are the parts that most directly address day-to-day refrigerant handling practices related to the service of air conditioning and refrigeration (AC&R) equipment.

Section 608 requires a reduction in ODS use and emissions to the lowest achievable level, and maximization of ODS recapture and recycling. Section 609 regulates the service of motor vehicle air conditioners (MVACs). Rules promulgated to meet Title VI mandates given in Sections 608 and 609 are published in 40 Code of Federal Regulations (CFR) Part 82.

In addition to the EPA rules that govern the use of ODSs, the United States follows the international mandate (known as the Montreal Protocol) to phase out the production of both Class I and Class II ODSs. For Class I ODSs the production phase out in the U.S. is already complete. The phase out of Class II ODSs will occur in stages up through 2030.

Class I ODSs include chlorinated solvents (carbon tetrachloride and methyl chloroform), compounds that contain fluorine, chlorine and carbon (CFCs), methyl bromide, and halons (compounds consisting of bromine, fluorine and carbon). Class II ODSs are compounds consisting of hydrogen, chlorine, fluorine, and carbon and are known as HCFCs. Both classes have been rated based on their ozone depletion potential (ODP). Class I ODSs have ODPs of 0.2 or higher. Class II substances have an ODP of less than 0.2. Within the Class I substances halons have the highest ODPs because they contain bromine. Bromine is many times more effective at destroying ozone than chlorine.

HCFCs are one class of chemicals that have been used to replace the Class I CFCs. Since they do contain some chlorine they do deplete stratospheric ozone, but to a much lesser extent than CFCs. Thus their phase out is on a much longer timeline then what was required for Class I ODSs. Another class of fluorocarbon compounds that do not contain chlorine, and thus don't destroy ozone (ODP is equal to zero), is hydrofluorocarbons (HFCs). This makes them a viable replacement for both CFC and HCFCs. Perfluorocarbon (PFC), a compound consisting of carbon and fluorine, also does not deplete ozone but has the disadvantage of being a very significant contributor to global warming. HCFCs and HFCs also contribute to global warming to varying extents. Also note, even though phase out requirements don't apply to HFC and PFC refrigerant/ODS substitutes, recent changes to EPA rules that regulate the use of ODSs have extended some of the provisions to HFCs and PFCs.

U.S. Action to Meet the Montreal Protocol Phase-out Schedule

Year to Be Implemented	Implementation of HCFC Phase-out through Clean Air Act Regulations	Year to Be Implemented	Percent Reduction in HCFC Consumption and Production from Baseline
2003	No production or import of HCFC-141b	2004	35.0%
2010	No production or import of HCFC-142b and HCFC-22, except for use in equipment manufactured before January 1, 2010	2010	75.0%
2015	No production or import of any other HCFCs, except as refrigerants in equipment manufactured before January 1, 2020	2015	90.0%
2020	No production or import of HCFC-142b and HCFC-22	2020	99.5%
2030	No production or import of any HCFCs	2030	100.0%

With the large quantities of ODSs present, it is critical that all personnel that repair refrigeration and air conditioning systems or otherwise handle refrigerants on Fort Hood are aware of and follow EPA refrigerant rules and procedures.

The regulations in 40 CFR Part 82 are covered in separate subparts. Based on the type of ODSs and refrigerants found on Fort Hood and the type of activities conducted the subparts most relevant to ODS and refrigerant related day-to-day handling on Fort Hood are the following.

- Subpart B - Servicing of Motor Vehicle Air Conditioners
- Subpart D – Federal Procurement
- Subpart F - Recycling and Emission Reductions
- Subpart G - Significant New Alternatives Policy (SNAP) Program Subpart H – Halon Emissions Reduction
- Subpart I – Ban on Refrigeration and Air-Conditioning Appliances Containing HCFC’s

3.0 PENALTIES FOR ODS/REFRIGERANT RULE NON-COMPLIANCE

The enforcement tools available to the EPA to deal with ODS/refrigerant rule violations include civil injunctions, civil penalties, imprisonment, and criminal fines. Failure to comply can result in fines up to $44,539 per day/per violation. Intentional violations can result in criminal penalties of up to five years imprisonment. Submitting false or misleading information or failure to submit required records also could incur criminal penalties, including prison terms of up to two years. To determine noncompliance the EPA conducts surprise inspections.

When assessing penalties the seriousness of the violation plays an important role. The seriousness of a specific violation is determined by examining the potential environmental harm, the risk of (or actual) refrigerant loss, the extent of deviation from the regulations, and the duration of the deviation. Also, factors not directly related to the violation can affect the penalty assessment. These include good faith efforts to comply; previous violation history, and payment of any previously assessed penalties for earlier violations.

In addition there are several factors the EPA may consider that may lead them to reduce or eliminate penalties. These include, but are not limited to, the following:

- The voluntary and complete disclosure by the violator of such violation in a timely fashion after discovery of the noncompliance;
- Full and prompt cooperation by the violator following disclosure of the violation including, when appropriate, entering into a legally enforceable commitment to undertake compliance and remedial actions;
- The existence and scope of a comprehensive environmental compliance program.

In terms of the potential of a violation to do serious harm the EPA generally views non-compliance in terms of the following schemes. Discussions of specific requirements referenced below are discussed in later portions of the document.

<u>Major</u> (substantial adverse effect)

- Knowingly venting a regulated substance.
- Not using recycling/recovery equipment.
- Not repairing leaks (for equipment 50 lbs. charge and over).
- Accepting signed statement pursuant to 40 CFR § 82.156(f) (2) if the person knew or had reason to know that such a signed statement is false.
- Failure to follow required practices in 40 CFR §82.156.

Moderate (significant adverse effect)

- Technicians not properly trained and certified.
- Recovery/Recycling equipment not properly maintained/does not pull specified vacuum.
- Not using equipment certified for the type of appliance.
- Altering design of certified refrigerant recycling or recovery equipment.
- Sale and distribution of refrigerants to persons who are not certified technicians.

Minor (minor adverse effect)

- Recordkeeping requirements not properly followed.
- Training certificate not available on request.
- Sale of un-reclaimed refrigerant.
- Sale of refrigerant reclaimed by uncertified re-claimer.
- Failure of owner or re-claimer to certify.

Examples of several enforcement actions taken for ODS/refrigerant rule non-compliance are given below.

1. **November 16, 2017: U.S. Seafoods takes action to prevent further releases of ozone-depleting substances in Alaska**

   U.S. Seafoods of Seattle will implement enhanced leak detection practices and replace freezer equipment to address violations of the Clean Air Act resulting from releases of ozone-depleting substances from two of its fish processing vessels in Alaska. EPA investigators discovered that in 2012 the freezers on two vessels owned by U.S. Seafoods -- the F/V Seafreeze Alaska and the F/V Alliance -- were leaking an ozone-depleting refrigerant called R-22. EPA found that the vessel owners and operators failed to repair the leaks in a timely manner and failed to confirm that the freezers were not leaking when finally repaired. U.S. Seafoods will pay a $135,000 penalty, replace some or all of its current R-22 freezers with units that use ammonia, and retire those not replaced. The company will also implement enhanced leak detection and repair practices.

2. **October 12, 2016: Crosby LP and Ramsey Properties LP (formerly known as KMCO LTD. and KMCO Properties, Inc.) pleaded guilty to two counts of violating 42.7413(c)(1), Knowing Violation of a Clean Air Act Title V Permit.**

   The court ordered the companies to pay a total of $3.3 million in criminal fines. In addition, the companies made a $200,000 community service payment to the Southern Environmental Enforcement Network (SEEN). The payment will be used by SEEN for hazardous air release prevention and emergency response training to state and local environmental and law enforcement agencies. (This sentence runs concurrent with sentence imposed on the October 12, 2016, conviction of KTX Limited and KTX Properties Inc., formerly known as KMCO LTD. and KMCO Properties, Inc.). The information charges Crosby LP and Ramsey Properties LP, (formerly known as KMCO LTD. and KMCO Properties,

Inc.) with failing to monitor leaks of ground-level ozone (smog) producing air pollutants at their chemical processing facility in Crosby, Texas, from 2008 until 2012. Pursuant to the factual basis, the defendants also admitted that they falsified records and reports for these Title V permit requirements to EPA and the TCEQ certifying the facility was complying with the permit requirements. The case was investigated by EPA's Criminal Investigation Division and TCEQ Environmental Crimes Unit, assisted by the Texas Parks and Wildlife Department, and the Occupational Safety and Health Administration.

3. May 6, 2015: Navy Settles Environmental Violations at Naval Station Norfolk

A settlement between the U.S. Environmental Protection Agency and U.S. Navy will help reduce potentially harmful discharges of ozone-depleting substances and ensure the safe storage and disposal of hazardous waste at the Naval Station Norfolk in Virginia, where EPA alleges environmental violations occurred. Under the settlement, the Navy will pay an $83,900 penalty for violations of the Clean Air Act and the Resource Conservation and Recovery Act (RCRA). The Clean Air Act violations pertained to regulations designed to reduce discharges of ozone-depleting substances used as coolants in air conditioning units. EPA alleged that the facility did not perform leak rate calculations when it serviced the units. The Navy has implemented improved training and recordkeeping to help ensure proper servicing of equipment. In addition, EPA alleged that the facility violated emissions limits on an industrial device used for abrasive blasting and also had recordkeeping violations. The Navy has addressed both issues. The RCRA violations pertained to regulations that require the safe, environmentally-sound storage and disposal of hazardous waste. The Navy took prompt action to address the hazardous waste violations, which will help ensure that those wastes are managed properly.

4.0 ODS AND REFRIGERANT REQUIREMENTS, AND COMPLIANCE PROCEDURES

This portion of the document addresses specific requirements found in 40 CFR Part 82, and the procedures Fort Hood personnel involved in the handling of ODSs and ODS alternatives (refrigerant substitutes) need to follow. Note, the requirements and procedures discussed do not cover all Part 82 requirements. Covered are the requirements that are most applicable to the types of refrigerant related handling activities conducted on Fort Hood. Discussed are the procedures that need to be followed when; purchasing/obtaining refrigerants, servicing of air conditioning and refrigerant (AC&R) containing equipment/appliances, disposal of AC&R equipment, recordkeeping and tracking, and for otherwise handling refrigerants in an equipment service/repair type environment.

All Fort Hood government AC&R service personnel including technicians/mechanics that service motor vehicles are required to follow the procedures outlined in the sections below. Contractors to Fort Hood who also use/handle refrigerants or refrigerant containing equipment on Fort Hood also have responsibilities under this document (see Section 4.2 Responsibilities).

4.1 Refrigerant Policy Overview

All personnel who handle refrigerants must be aware of and comply with the following:

1. Anyone faced with a situation that involves the use or handling of an ODS or refrigerant substitute that is not discussed in this document is still responsible for determining if EPA requirements apply. In such cases notify your DPW Environmental Air Quality Team or refrigerant coordinator (if applicable) and don't proceed until you have determined it is legal to do so after consulting at least one of the following resources.

    - Fort Hood Environmental Division, Phone: 254-287-6499
    - Fort Hood Environmental Division Air Quality Program Manager (preferred action), Phone: 254-287-8714
    - Fort Hood Environmental Division Air Quality Support, Phone: 254-288-7976

2. Immediately report any and all violations of EPA rules to your supervisor and the Directorate of Public Works Environmental Division. Document all details of the violation or suspected violation and include your name, date, time, and description of observed or suspected violation. Be sure to indicate the type of equipment (make, model, serial number) and type of refrigerant involved if applicable.

Note: Keep in mind the EPA will consider voluntary disclosure and cooperation when assessing penalties. In some cases the result can greatly reduce fines or result in no fines at all (see Section 3.0 Penalties for ODS/Refrigerant Rule Non-Compliance).

3. All refrigerant leaks are to be repaired upon discovery. The Environmental Division shall be notified of any substantial venting or inability to repair leaks immediately.

4. All refrigerant removed from Fort Hood AC&R equipment by DPW Maintenance and/or military units and not re-used in the same system will be recovered and turned into the Directorate of Public Works Classification Unit for disposal. Contractors with construction related projects are responsible for the disposal of equipment and refrigerant. More detailed information is located in Fort Hood Regulation 200-1 and Division 1 Specs.

5. All maintenance personnel (contractor or government) shall complete an EPA approved training course before servicing CFC/HCFC refrigerant systems or MVACs, as required by 40 CFR Part 82, Subpart F or Subpart B respectively.

6. Only certified refrigeration technicians shall recover refrigerants from AC&R equipment. Service technicians shall only conduct servicing efforts in accordance with their level of certification.

7. If an accidental refrigerant release occurs such as human caused accidental damage to a refrigerant line, service valve or cylinder, the incident shall be documented. Documentation shall include the type and amount of refrigerant released, the cause of the release, equipment involved, and the release date. Appendix A provides an example of the form that should be used to document an accidental release.

8. Venting of 1) all Class I and Class II ozone-depleting substances (CFCs, and HCFCs), and 2) all substitute refrigerants consisting of a Class I or Class II ozone-depleting substances (ODS) and any hydrofluorocarbon (HFC) and / or a perfluorocarbon (PFC) refrigerant is prohibited. Fort Hood by virtue of this document is setting policy in writing that shows it intends to comply with this prohibition.

9. No refrigerant will be recovered from AC&R and motor vehicle air conditioners (MVACs) or MVAV-like appliances without the use of properly certified recovery or recycling service for approved refrigerant recovery and recycling units.

10. All new employees (non-military entities) will receive training before being allowed to handle ODSs. Update/refresher training will be provided annually to all ODS handlers by DPW Environmental Air Quality Team.

4.2 Responsibilities

Refrigerant Coordinator

Each DPW shop and other organization that services AC&R equipment shall designate a refrigerant coordinator. For DPW shops, the refrigerant coordinator should be a refrigerant technician or shop supervisor. The refrigerant coordinator shall be familiar with this document and will be responsible for the following:

- Ensures all employees have received and reviewed copy of the Compliance Guide and Standard Operating Procedures (SOP).
- Identifies equipment and services required to comply with EPA regulations.
- Ensures all maintenance personnel (contractor or government) have completed an EPA approved training course before servicing CFC/HCFC AC&R equipment.
- Ensures that service technicians conduct recycling, recovery, and reuse operations correctly, in accordance with their level of training and pursuant to the manufacturer instructions for the recycling and recovery equipment.
- Maintains logs of refrigerant usage and disposal. These include DPW equipment leak service logs and maintenance report logs.
- Maintains an inventory of facility CFC/HCFC AC&R equipment and servicing records.
- **Submit new AC&R equipment and replacements to DPW Environmental Air Quality Team.**
- Conducts compliance site audits and as necessary and if needed arranges for or conducts an annual refresher training session for in-house technicians to cover safety issues, alternative refrigerants, servicing procedures, federal, state and local regulations.
- Coordinates with the DPW Environmental Division regarding refrigerant compliance issues and requirements for civilian and contractors. This includes submittal of heating, ventilation, and air conditioning (HVAC) service/maintenance report logs for equipment containing 50 pounds or more of an ODS **weekly** and less than 50 pounds of an ODS **monthly**, and notification regarding leaking equipment that can't be repaired within 30-days, or has failed its initial or follow up verification test.
- Submittal of a roll-up report for heating, ventilation, and air conditioning (HVAC) service/maintenance logs for equipment containing less than 50 pounds of an ODS **monthly.** Civilian and contractors that perform maintenance on ODS equipment over 50 pounds and over shall submit the appropriate refrigerant service logs weekly to the DPW Environmental Division-Air Quality Team. For ODS equipment less than 50 pounds, civilian and contractors shall submit logs on a monthly basis no later than the 5th of the following month. Military units shall send ODS (refrigerant) usage logs to DPW-Environmental quarterly (April 5th, July 5th, October 5th, and January 5th).

Refrigerant Service Technician

Each technician is responsible for becoming familiar and complying with EPA requirements and the Fort Hood Refrigerant Compliance Guide and SOP. The following lists technician responsibilities.

- Complete required service logs for AC&R repair jobs and equipment disposal projects.
- Maintain correct level of certifications for job requirements.
- Maintain, leak test, and document recovery unit maintenance per manufacturer's recommendations.
- Follow procedures to eliminate refrigerant contamination and mixing.

Technicians should be able to answer possible EPA inspector questions such as:

- Can you recite the recovery vacuum levels for the refrigerants used in this location?
- Can you demonstrate the use of a recovery system?
- What are the acceptable follow up leak check methods?
- Are refrigerant recovery and recycling equipment registered with the DPW Environmental Air Quality Team?

DPW Environmental Division

- Oversee the implementation of the Fort Hood Ozone Depleting Substances Management Plan.
- Oversee and implement policies that address compliance with 40 CFR Part 82.
- Track refrigerant usage for all AC&R equipment.
- Calculate refrigerant leak rates for AC&R equipment that contains 50-lbs or more of an ODC and maintain records of such.
- Report leak rate exceedance to EPA via CDX
- Notify shop supervisor of any AC&R equipment that exceeds its' leak rate threshold.
- Coordinate with the EPA requests for extensions and or waivers for AC&R equipment that cannot be repaired or retrofitted/replaced within EPA timelines specified in 40 CFR Part 82.
- Maintain the refrigerant compliance database.
- Maintain a back-up copy of all service technician certification cards for all AC&R related work involving refrigerants or their substitutes, equipment registrations with Fort Hood DPW Environmental and service logs of equipment with 50-lbs or more of refrigerant.

Contractors

Contractors shall be responsible and accountable for compliance with the EPA Clean Air Act (CAA) Section 608, 40 CFR Part 82 related work. Specific responsibilities are listed below.

- Contractor shall ensure that all contractor employees are made aware of the content of 40 CFR Part 82 prior to beginning work on AC&R equipment.
- Contractor shall provide only proper level EPA certified technicians using Fort Hood DPW Environmental certified and registered recovery/recycle units to perform work on Fort Hood AC&R equipment.
- Contractor shall maintain and submit on request: 1) documents with the information to confirm Fort Hood DPW Environmental Certification of all service technicians (Copies of EPA Certification Cards are acceptable), and 2) a list of recovery/recycling units to be used and a statement from contractor that recovery units are operating to EPA standards and that units are registered with the DPW Environmental Air Quality Team.
- Contractor shall cover and hold harmless Fort Hood from all regulatory action as a result of their failure to perform service that meets all requirements of federal regulations.
- Contractor shall maintain and provide upon request all service order data for AC&R equipment including equipment ID number and/or serial number, equipment manufacturer and model number, location of equipment, refrigerant type, date of service, and service, repair or disposal description.

4.3 New AC&R Equipment and ODS Refrigerant Substitutes

1. The use of new refrigerants (refrigerant substitutes) as alternatives to ozone depleting chemicals must have been tested in specific applications or equipment, and approved for use in that application or equipment by the EPA. The EPA has established a Significant New Alternatives Program (SNAP) in which they evaluate applications for use with substitute chemicals (refrigerants) that are not ODSs. Only approved alternatives found on the SNAP list shall be used for CFC or HCFC retrofit/conversion or replacement projects on Fort Hood. If the EPA places a substance on the SNAP unacceptable list it becomes unlawful to use it as a substitute for an ODS.

   A current copy of the SNAP list can be obtained from the EPA web site http://www.epa.gov/ozone/snap/refrigerants/reflist.pdf

2. Any retrofit/conversion or replacement of CFC or HCFC equipment shall result in properly sized mechanical systems to satisfy mission requirements. Activities shall ensure load calculations are used to decide proper unit sizing, and all components of HVAC systems are properly sized and configured to meet user needs.

4.4 Technician Requirements

Who Must Be Certified

The EPA has established a technician certification program for persons ("technicians") who in the course of maintenance, service, or repair of an appliance (except MVACs) could be reasonably expected to violate the integrity of the refrigerant circuit and therefore release refrigerants into the environment. Technician also means any person who in the course of disposal of an appliance (except small appliances, MVACs, and MVAC-like appliances) could be reasonably expected to violate the integrity of the refrigerant circuit and therefore release refrigerants from the appliances into the environment.

Included:

- Attaching and detaching hoses and gauges to and from the appliance to measure pressure within the appliance.
- Adding refrigerant to or removing refrigerant from the appliance.
- Cutting the refrigerant line
- Any other activity that violates the integrity of the refrigerant circuit while there is refrigerant in the appliance.

Excluded:

- Activities that are not reasonably expected to violate the integrity of the refrigerant circuit, such as painting the appliance, re-wiring an external electrical circuit, replacing insulation on a length of pipe, or tightening nuts and bolts on the appliance.
- Maintenance, service, repair, or disposal of appliances that have already been evacuated in accordance with EPA requirements, unless the maintenance consists of adding refrigerant to the appliance.
- Servicing motor vehicle air conditioners (MVACs), which are subject to the certification requirements of the MVAC refrigerant recycling rule.
- Disposing of MVACs, MVAC-like appliances, and small appliances.

Apprentices are exempt from certification requirements provided the apprentice is closely and continually supervised by a certified technician. In order for someone to be considered an apprentice they must be currently registered as an apprentice in service, maintenance, repair, or disposal of appliances with the U.S. Department of Labor's Bureau of Apprenticeship and Training (or a State Apprenticeship Council recognized by the Bureau of Apprenticeship and Training). If more than two years have elapsed since the person first registered as an apprentice the person will no longer be considered an apprentice.

Types of Certification

The EPA has developed four types of certification:

- Type I - Maintain, service, or repair small appliances with 5 pounds or less of refrigerant.

- Type II - Maintain, service, repair, or dispose of high- or very high-pressure appliances (an appliance using a refrigerant with a boiling point between – 50° and 10°C); typically comfort cooling appliances with greater than 50 pounds of refrigerant charge. Type II technicians can also maintain, service, or repair MVAC-like appliances.

- Type III - Maintain, service, repair, or dispose of low-pressure appliances (an appliance using a refrigerant with a boiling point above 10°C at atmospheric pressure); typically industrial cooling systems such as large building chillers.

- Type IV (Universal Technicians) - Maintain, service, repair, or dispose of low and high-pressure equipment must be certified as Universal Technicians.

  Note: Personnel that service MVAC appliances must receive a separate certification under the requirements in 40 CFR Part 82 Subpart B (see Section 4.13 MVAC and MVAC-Like Appliances).

Technicians are required to pass an EPA-approved test given by an EPA-approved certifying organization to become certified under the mandatory program. The Stratospheric Ozone Hotline distributes lists of approved testing organizations.

Certification Review Procedure

1. All Fort Hood service technicians must have received refrigerant handling certification from an approved program. If the technicians' card was issued from any of the institutions in the following list that technicians' card may not be valid and must be re-certified. Copies of the certification cards shall be provided to DPW Environmental Air Quality Team.

2. It is the technicians' responsibility to make sure their card has a level indicated from the list above, has the following statement: "as required by 40 CFR, Part 82, Subpart F", and has not been issued outside the dates from a non-approved program listed below. If these requirements are not met the technicians' refrigerant handling card is not valid, and the technician must get re-certified by an approved program. Service technicians may not work on AC&R equipment located on Fort Hood without the correct refrigerant handling classification.

3. It is the technicians' responsibility to ensure his/her certifying program is as an EPA –Approved program. However, DPW Environmental Air Quality Team will periodically scan all supplied certificates provided by all Fort Hood organizations and

will notify if any are on the non-approved list, see list below.

4. DPW Environmental Air Quality Team has qualified proctors to initiate an exam through ESCO Institute. Below are the requirements needed:
   - 608 certification is $35
   - Credit Card online order only – proctor login to ESCO Institute for payment
   - Practice exams can be found at http://www.escoinst.com/PracticeExams.aspx
   - Other certifications such as 609 or R410-A on request
   - Contact the DPW Air Quality Team to schedule (can proctor up to 20 personnel at same time)

Listed Organizations that are EPA-Approved/Non-Approve Section 608 Technician Certification Program

Programs No Longer Approved by the EPA

- ACI Environmental Safety Training Institute: March 22, 2002 until February 2016
- AcuPro Refrigerant Recovery: May 31, 1994 until June 11, 1996
- Alpha Mechanical Services: December 5, 2005 until May 2006
- Associated Technical Institute: December 28, 1993 until December 31, 2000
- California Career Center: November 23, 2015 until February 2016
- Center for Employment Training: February 25, 2000 until January 2002
- Center for Training and Employment: August 1, 2000 until January 2002
- Center for Safety & Environmental Management (CSEM): October 20, 1994 until October 20, 1998
- County Trade School: April 28, 1994 until June 11, 1996
- Delaware County Community College : November 4, 1993 until February 2016
- Delaware Skills Center Building Maintenance: May 10, 1996 until February 2016
- Delaware Technical & Community College: April 28, 1994 until February 2016
- Dundalk Community College: June 29, 1994 until June 11, 1996
- Education Dynamics Institute: August 17, 1994 until August 19, 1998
- Educational Services: June 29, 1994 until February 2016
- Exelon, LLC (Formerly Commonwealth Edison College): April 29, 1994 until August 11, 2003
- Geneva Steel: April 29, 1994 until August 11, 2003
- Hartsog HVAC Training Institute: March 30, 1994 until May 31, 1999
- HVAC/R Training, Inc.: May 8, 2000 until February 2016
- HVAC Tech Inc.: March 30, 1994 until December 12, 2005
- InSolution: October 3, 2012 until February 2016
- Jenkins Professionals, Inc.: October 20, 1994 until April 8, 1996
- Johnson Controls: January 26, 1994 until August 19, 1998

- Marine Safety Consultants: June 1995 until August 11, 2003
- National Training Center: March 24, 1995 until June 11, 1996
- National Training Fund: February 23, 1994 until June 11, 1996
- Niagara County Community College: December 12, 1995 until February 2016
- Northeast Institute: January 26, 1994 until June 11, 1996
- Nugent Associates: November 3, 2000 until February 2016
- Progressive Training Solutions: August 26, 1996 until August 31, 2000
- Refrigerant Certification Services: March 30, 1994 until February 13, 1997
- San Diego City College: April 29, 1994 until December 31, 2007
- San Jose City College (SJCC): February 23, 1994 until February 2018
- Southern Technical College: October 20, 2008 until February 2016
- Training Specialists: June 4, 1997 until August 11, 2003
- Unified Industries Incorporated (UII): May 13, 1998 until February 2016
- Vatterrott College: December 15, 1997 until February 2016
- Vidal Enterprises: July 22, 1994 until June 5, 2006

Programs Voluntarily Withdrawn

- ADC Limited: August 17, 1994 until October 1, 1998
- Advanced Technical Training: June 29, 1994 until August 19, 1998
- Air Conditioning and Refrigeration Institute (ARI) : September 30, 1993 until December 2, 2015
- Association of Energy Engineers: January 26, 1994 until December 30, 1999
- Babcock & Wilcox (formerly, PowerSafety International): January 26, 1994 until January 31, 2001
- CDTA, Inc. (formerly Central Delaware Training Academy): October 20, 1994 until December 2, 2015
- CFC Reclamation and Recycling Service, Inc.: December 28, 1993 until December 31, 2001
- Climate Control Institute: February 23, 1994 until January 1999
- Delta College: May 31, 1994 until June 21, 2010
- Department of Veterans Affairs Employee: February 23, 1994, to March 31, 2008
- Education System Little Rock Center
- Environmental Support Solutions: March 5, 2001 until June 1, 2012
- Environmental Training Group, Inc.: September 30, 1993 until June 30, 1999
- Experior Assessments LLC (formerly, NAI/Block & Associates): November 4, 1993 until October 2005
- F&J Air Conditioning: February 23, 1996 until October 2005
- Gables Residential: August 17, 1994 until August 31, 2000
- General Services Administration (GSA): September 30, 1993 until June 30, 2001
- I.M./Thrifty Distribution, Inc.: January 26, 1994 until August 19, 1998
- Insignia University (formerly, Insignia Management Group): July 6, 1995
- Joliet Junior College: September 30, 1994 until September 13, 2012

- Kellogg Community College: February 23, 1994 until December 2, 2015
- Lincoln Land Community College: March 27, 1993 until August 11, 2003
- Milwaukee County Transit System: August 17, 1994 until December 31, 1996
- Motorcoach Training Specialist: May 1, 1995 until July 20, 2011
- National Aeronautics and Space Administration (NASA): June 29, 1994 until December 18, 2015
- National Association of Plumbing-Heating-Cooling Contractors: October 13, 1993 until November 30, 1999
- Norfolk Naval Shipyard: May 31, 1994 until January 31, 2000
- Oklahoma State University/Okmulgee: Until April 21, 2006
- Sequoia Institute: October 13, 1993 until October 2005
- State of Wisconsin, Dept. of Commerce: January 1995 until May 31, 1999
- State University New York- Maritime: May 31, 1994 until June 21, 2010
- Tactical Power Generation, LLC: January 27, 2006 until September 5, 2011
- Technical Seminars: December 28, 1993 until July 6, 1999
- Telemedia, Inc.: December 10, 1997 until June 30, 1999
- Texas Engineering Extension Service (TEEX): November 4, 1993 until February 2018
- Texas State Technical College at Waco: March 30, 1994 until September 1, 2016
- United States Coast Guard: February 13, 2002 until October 3, 2008
- Universal Technical Institute (Omaha): September 30, 1993 until March 7, 2007
- West Virginia University Extension Service: August 17, 1994 until December 31, 2015
- Wyoming Technical Institute: October 13, 2003 until October 2005
- WyoTech: July 21, 2001 until May 31, 2015
- Y-12 National Security Complex (BWXT-12 formerly Lockheed Martin; originally Martin Marietta): March 30, 1994 until August 11, 2003
- York International Corp.: March 30, 1994 until January 31, 2001

4.5 Refrigerant Recovery Equipment Requirements

Certification by Owners of Recycling and Recovery Equipment

Fort Hood DPW Environmental requires that persons servicing or disposing of air-conditioning and refrigeration equipment certify to the Air Quality Team that they have acquired recovery or recycling equipment and that they are complying with the applicable requirements of this rule. This certification is to be made on Fort Hood DPW Environmental Refrigerant Recovery or Recycling Device Acquisition Certification Form and must be signed by the owner of the equipment or another responsible officer and sent to DPW Environmental Air Quality Control Team.

1. The DPW Environmental Division Air Quality Team shall ensure that a Fort Hood DPW Environmental Refrigerant Recovery or Recycling Device Acquisition Certification Form has been filed on site at Bldg 4622 for each recovery unit used.

2. Shop supervisor or designated refrigerant coordinator shall notify the DPW Environmental Division whenever a new refrigerant recovery unit has been obtained or if a shop enters into the service of MVACs. Shops that service MVACs have a separate certification program as described in Section 4.13 MVAC and MVAC-like Appliances.

Equipment Certification

The EPA has established a certification program for recovery and recycling equipment. Under the program, the EPA requires that equipment manufactured on or after November 15, 1993, be tested by an EPA-approved testing organization to ensure that it meets recovery efficiency standards. The standards (evacuation levels expressed in terms of inches of mercury) vary depending on the size and type of air-conditioning or refrigeration equipment being serviced.

The approved testing agencies are the Air Conditioning and Refrigeration Institute (ARI) and Underwriters Laboratories (UL). This list of approved equipment is available at: https://www.epa.gov/section608/refrigerant-recovery-and-recycling-equipment-certification

Approved equipment should have a label that is similar to the following:

"This equipment has been certified by AHRI/UL to meet EPA's minimum requirements for recycling and/ or recovery equipment intended for use with [appropriate category of appliance]."

Units manufactured before November 15, 1993 may be considered grandfathered and may not have the ARI or UL label if they meet the standards (evacuation levels) for units manufactured before November 15, 1993.

The EPA evacuation levels are given in Appendix B and in the following table.

EPA Evacuation Level Chart (inches of vacuum)*

Type of Appliance**	Recovery Units Manufactured Date	
	Before Nov. 15, 1993 ***Grandfathered Unit***	**After Nov. 15, 1993 ARI/UL Unit**
R-22, R-402A/B, R-407A/B/C appliance, or isolated component of such appliance, normally containing less than 200 pounds of refrigerant.	0	0*
R-22, R-402A/B, R-407A/B/C appliance, or isolated component of such appliance, normally containing 200 pounds or more of refrigerant.	4	10
Very High Pressure Appliance **R-410A/B, R-13, R-23, R-503**	0	0
Other high-pressure appliance, or isolated component of such appliance, normally containing less than 200 pounds of refrigerant. **R-114, R-134a, R-401A/B/C, R-500, R-502**	4	10
Other high-pressure appliance, or isolated component of such appliance, normally containing more than 200 pounds of refrigerant. **R-114, R-134a, R-401A/B/C, R-500, R-502)**	4	15
Low-Pressure Appliance **R-11, R-113, R-123**	25 mm Hg absolute	25 mm Hg absolute

*: Inches of Hg vacuum relative to standard atmospheric pressure of 29.9 inches of Hg, except where noted.

**: Evacuation levels do not apply to small appliances, MVACs and MVAC-like appliances

For small appliances (less than 5 pounds), evacuation levels are as follows:

- For "grandfathered" recovery equipment, recover 80 percent.
- For new recovery equipment when the compressor is working, recover 90 percent.
- For new recovery equipment when the compressor is not working, recover 80 percent.
- For all small appliances, evacuate to four inches of mercury vacuum.

Recovery Equipment Maintenance

1. The care and maintenance of this equipment will be the responsibility of service technicians. If a unit does not function properly, the service technician shall notify their shop supervisor/refrigerant coordinator and replace the non-functioning recovery unit with one that functions before proceeding with the service.

2. Technicians and contractors shall service and maintain recovery/recycling equipment per manufacturer's specifications and keep records of services performed. Leak testing of recovery units shall be performed as recommended in manufacturer's documentation. If required, leak testing results shall be documented and kept in the

shop office. The following should be used when determining when to change filters/dryers.

- Change according to manufactures recommendations.
- Change after 200 lbs. of recovered refrigerant.
- Change after refrigerant is recovered from a compressor burn-out.
- Change when switching to a different refrigerant type.

Note: As described earlier, Fort Hood DPW Environmental must certify that they will properly use recovery/recycling equipment. Proper maintenance of such equipment should be considered part of proper equipment use. Documentation of maintenance performed will provide one means to demonstrate to the DPW Environmental Air Quality Team that equipment is being properly used. Also, under 40 CFR§ 82.161(f) the EPA may require technicians to demonstrate proper use of the recovery/recycling equipment. Failure to do so may result in revocation of the technician's certification.

3. Military only equipment that is non-functional needs to be routed through their next higher maintenance shops. If the equipment cannot be repaired, it should be turned-in through proper supply channels and a new machine accrued as needed.

4. Non-military technicians will be responsible for their own maintenance and accrual of their equipment. .

Recordkeeping

Each shop that utilizes or owns refrigerant recovery equipment shall maintain written inventory of such equipment that includes a record of its maintenance history. The form provided in Appendix C should be used for this purpose.

4.6 Refrigerant Recovery Practices

1. Verify refrigerant recovery equipment has been properly maintained (see Section 4.5 Recovery Equipment Maintenance) in the past six months.

2. Follow the manufacturer's operating procedures for the equipment being used. Make sure that copies of the operating and maintenance procedures are attached to the equipment. Original operating instructions should be maintained in a file in the shop office.

3. Evacuate refrigerant to the levels indicated in the EPA Evacuation Level Chart and record levels achieved. All AC&R equipment must be evacuated to EPA-required vacuum level prior to opening. The EPA Evacuation Level Chart is provided above in the (Section 4.5 Refrigerant Recovery Equipment Requirements Section).

   EPA Exceptions

   If, due to equipment leaks, the evacuation levels in the chart are not attainable or would substantially contaminate the refrigerant being recovered, persons opening the appliance must:

   - isolate leaking from non-leaking components wherever possible;
   - evacuate non-leaking components to the levels in the EPA Evacuation Level Chart; and
   - evacuate leaking components to the lowest level that can be attained without substantially contaminating the refrigerant. This level cannot exceed 0 psig.

   If evacuation of the equipment to the environment is not to be performed when repairs are complete, and if the repair is not major, then the appliance must:

   - be evacuated to at least 0 psig before it is opened if it is a high- or very high-pressure appliance; or

4. Recovered refrigerants shall not be mixed. A separate, clean, evacuated, labeled vessel/cylinder will be used for each refrigerant type recovered. Only approved containment vessels/cylinders shall be used.

5. Refrigerant recovered shall be weighed using a digital scale. When recovering large amounts of refrigerant, use a drum or hanging scale. Record the weight of the recovered refrigerant to satisfy recordkeeping requirements.

6. Refrigerant recovered can be returned to the same system. EPA rules also allow re-use in other systems owned by the same owner without restriction. However, if refrigerant changes ownership, that refrigerant must be reclaimed. All refrigerant that is recovered from Fort Hood equipment and is not returned into the AC&R equipment for re-use must be turned into the DPW Classification Unit, building 1348, 254-288-7627.

4.7 Refrigerant Leaks*

Owners or operators must take corrective action when an appliance with a full charge of 50 or more pounds is discovered to be leaking ozone depleting refrigerant at a rate that exceeds the applicable trigger rate.

For all AC&R equipment that has a refrigerant charge of more than 50 pounds, the following leak rates for a 12-month period are applicable:

Appliance Type	Current Leak Rate	Leak Rate Effective 1/1/2019
Industrial process refrigeration*	35%	30%
Commercial refrigeration	35%	20%
Comfort cooling	15%	10%
All other appliances	15%	10%

*: Applies to Class I & II ODSs.

1. If refrigerant is leaking at a rate that would exceed the applicable trigger rate then corrective action must be taken. If commercial or industrial refrigeration equipment is leaking at a rate that would cause it to release 125 percent or more of its charge over a year, it must be repaired within 30 days of leak discovery. The same 30-day repair requirement applies to comfort cooling equipment that is leaking at a rate that would cause it to release 15 percent of its charge over a year. **Thus, the trigger for repair requirements is the current leak rate rather than the total quantity of refrigerant lost.**

2. Additional leak repair time beyond the 30 days may be permitted if it has been determined that the leak repair cannot be made within 30 days. Fort Hood may apply for the extension to the 30-day repair requirement if they document all repair efforts undertaken to date and then notify the EPA of their inability to comply. In cases where an industrial process shutdown is required, a repair period of 120 days is substituted for the normal 30-day repair period.

3. If Fort Hood chooses to retrofit or retire appliances, a retrofit or retirement plan must be developed within 30 days of detecting a leak rate that exceeds the trigger rates. A copy of the plan must be kept on site. The original plan must be made available to EPA upon request. Activities under the plan must be completed within 12 months (from the date of the plan). If a request is made within 6 months from the expiration of the initial 30-day period, additional time beyond the 12-month period is available for owners of industrial process refrigeration equipment and federally-

owned chillers (commercial and comfort) if the delay is caused by other applicable federal, state, or local regulations; or if SNAP replacement refrigerant is not available. The EPA may permit one additional 12-month period if the unit is being custom-built and will not be delivered, per quote from the manufacturer, until after 30 weeks from when the order was placed.

Leak Rate Determination and Notification Procedures

1. If a service technician needs to add additional refrigerant to return a system to its' normal operating charge, that equipment shall be treated as leaking. If the equipment normal operating charge is greater than **50-lbs** and the refrigerant used is an Class I or Class II ODS, then a leak rate determination is required.
2. The DPW Environmental Division will conduct the leak rate determination, but it is the responsibility of the service technician to repair any leak as soon as it is discovered or as quickly as possible. **Do not wait for the DPW** Environmental Division **leak rate determination to begin repairs**. If it is a recurring leak the technician should stop adding refrigerant to the equipment until the leak is repaired. Make sure to follow proper EPA approved procedures for verification and record keeping when repairing the leak.

3. The type and amount of refrigerant added to equipment to bring it back to a full charge shall be entered into the shop's HVAC service/maintenance report log (described under Section 4.9 Recordkeeping Requirements) no later than the close of business on the day refrigerant was added.

4. Copies of the shops' HVAC refrigerant equipment service log (for 50 pounds or more equipment) shall be turned into the shop supervisor immediately and submitted to DPW Environmental Air Quality Team. DPW Environmental Air Quality Team will use this data to determine if refrigerant leak rates are being exceeded. It is very important to provide the refrigerant usage to the DPW Environmental Division **weekly**. This will allow for timely calculation of leak rates and the maximum amount of time to complete any required repairs.

5. The DPW Environmental Division will notify the shop supervisor regarding equipment that exceeds their leak rate limits. If the identified equipment has not already been repaired, **it must now be repaired within 30 days from the date that the leak was discovered (**40 CFR Part 82 Subpart F §82.156 Proper evacuation of refrigerant from appliances, 3.i.1.i**).** If the leak cannot be repaired within 30 days, the shop supervisor must notify the DPW Environmental Division immediately and develop, within 30 days, a plan to retrofit or retire the appliance and complete the actions under that plan within 1 year. . The DPW Environmental Division will then coordinate the proper follow-up action (request for extensions, etc) with the Regional EPA office.

Leak Rate Calculations

EPA has adopted two methods to determine leak rates (annualizing and rolling total based). Fort Hood will use the annualizing method to perform leak rate calculations. **It is not acceptable to switch between the two methods.**

Annualizing Method

1) Take the number of pounds of refrigerant added to return the system to a *full charge* and divide it by the number of pounds of refrigerant in the normal *full charge* for the system.

$$\frac{\text{\#lbs. refrigerant added}}{\text{\#lbs. refrigerant in normal } \textit{full charge}}$$

2) Take the number of days that have passed between charges (that is, how many days between the last time refrigerant was added and this time refrigerant was added) and divide by 365 (the number of days in a year).

$$\frac{\text{\#days since refrigerant last added}}{\text{365 days}}$$

3) Take the number you determined in step 1 and divide it by the number you determined in step 2.

4) Multiply the number you determined in step 3 by 100 (to calculate a percentage).

The following equation illustrates this calculation:

$$\text{LEAK RATE \%} = \left[\frac{\text{pounds of refrigerant added}}{\text{pounds of } \textit{Full charge}}\right] \div \left[\frac{\text{\# days since refrigerant last added}}{\text{365 days}}\right] \text{x100}$$

4.8 Leak Testing

For industrial process refrigeration equipment EPA requires an initial and follow-up verification test for any leak repairs completed in relation to a leak that exceeds the trigger rate for industrial equipment. Fort Hood at the current time does not appear to have any equipment that meets the definition industrial process equipment (definition given in the note below) thus the mandatory testing requirements don't apply at this time. **However, it is strongly recommended by EPA as best management practice to perform both the initial and follow-up verification test for all leak repairs performed regardless of equipment type.** Fort Hood technicians should follow this recommendation for all leak repairs on equipment with more than 50 lbs of charge. The tests will ensure that leaks have been completely repaired and will provide a source of evidence to the EPA that Fort Hood complies with the requirements for leaking equipment.

Note: Industrial process refrigeration is defined as complex, customized systems used in the chemical, pharmaceutical, petrochemical, and manufacturing industries. These systems are directly linked to the industrial process. This sector also includes industrial ice machines, appliances used directly in the generation of electricity, and ice rinks. The amendments refer to "appliances" and "equipment," but this guidance refers to "systems"- the term more commonly used in the industry.

If at least 50 percent of an appliance's capacity is being used in an industrial process refrigeration application, the appliance is considered an industrial process.

Leak testing procedures to follow are given below.

1. As of January 1, 2019 the new requirements on performing an **initial verification test** (for example, a soap bubble test) after performing one or more repairs to ensure that the repairs have been successfully completed. This test must be performed within 30 days of an appliance exceeding the applicable leak rate in section 4.7. **This test shall be performed before adding refrigerant to the system**. Do not bring the system back on-line until you verify the leak has been fixed.

2. Schedule and conduct **follow-up verification leak tests** for the repaired system. As of January 1, 2019 this test must be completed within 10 days after a successful initial leak verification test was completed. **The follow-up verification test must be conducted with the unit operating at normal operating characteristics and conditions (normal load). The purpose of this test is to ensure that all repairs continue to hold under normal operation.**

3. Document the results of both the initial verification test and the follow-up test (see Section 4.9 Recordkeeping).

4. If the follow-up verification test failed notify the DPW Environmental Division immediately. The DPW Environmental Division will notify the EPA of the failed test if industrial process refrigeration equipment was involved, and coordinate a proper response that may include equipment retirement or retrofit, or request for an extension to repair the system. If the failed test involved equipment other than industrial process equipment, follow-up action with the EPA may still be required as the failed follow-up verification test is an indicator that the original leak was not (or cannot) be repaired and thus proper follow- up actions, such as request for extension to the 30-day repair period need to take.

5. If the leaks are greater than or equal to 125% of the appliance's full charge in one calendar year, the DPW Environmental Division must submit a report the EPA. The report must describe the efforts to identify the leaks, repair the leaks, and must be submitted by March 1st of the following year.

Acceptable Leak Testing Methods

Initial and follow-up verification tests may use any method that meets sound professional judgment. Test examples include, but are not limited to:

- Electronic Leak detector
- Ultrasonic Leak detector
- Pressurizing system to 10 psig with HCFC-22 then increasing pressure to safe level with dry nitrogen.
- Soap bubbles
- Halide torch detector
- Deep Vacuum - Low-pressure chiller (pull to 1mm hg. Ok if rise is < 2.5 mm hg in 12 hours)
- Hydrostatic Tube test kit - Low pressure chiller water tubes

Safety notice: Never use oxygen, high-pressure air or a flammable gas for leak checking. Oxygen and oil form an extremely explosive mixture.

4.9 Recordkeeping Requirements

The U.S. EPA has established record-keeping requirements for owners and operators of air conditioning and refrigeration equipment containing Class I & II ODSs (CFCs and HCFCs). Fort Hood requires that records be kept to comply with the laws, and to establish data for management of refrigerant assets.

Equipment 50 pounds or more & 50 pounds or less
Fort Hood recordkeeping for equipment with 50 pounds or more of refrigerant charge consists of three steps.

- Verification and update of the equipment inventory (inventory provided by the DPW Environmental Division).

- Generation of equipment leak service logs (prepared by shop service technician at time of equipment service/maintenance).

- Weekly and monthly update of shop HVAC service/maintenance report log and turn in to the DPW Environmental Division (updated by service technicians).

- Monthly inventory verification of the refrigerant cylinders completed by DPW Environmental Division.

Shop Equipment Inventory

1. The DPW Environmental Division will maintain an inventory of all AC&R equipment that contains 50 pounds or more of a refrigerant that is either ODS or ODS alternative that consists in part of an ODS.

2. The DPW Environmental Division will provide each shop with a copy the inventory report for the AC&R equipment under their control. It will be the responsibility of each shop supervisor to verify that the inventory is correct. The shop supervisor will notify the DPW Environmental Division immediately with regard to any changes or updates (for example the addition of new equipment, retrofits, etc.) to the inventory.

3. The refrigerant equipment inventory input form given in Appendix D shall be completed and submitted to the DPW Environmental Division for each **new** AC&R equipment installation or for any equipment omitted from the DPW Environmental Division provided list. The equipment inventory maintained by the DPW Environmental Division shall consist of the following information:

    - Building number and location within the building (MEC room, roof top, etc.).
    - Equipment manufacturer, model number, serial number, and ID if applicable.
    - Refrigerant type and normal (full) operating charge per circuit.*
    - Date that full charge amount was determined.
    - Equipment duty type (comfort cooling, commercial refrigeration, industrial

process refrigeration, other application).
- Applicable leak rate limit.

*: If the operating charge is unknown (split system, not listed on nameplate, etc.) then it must be calculated. Consult manufacturer data sheets, measure piping length, component capacity and detail calculations. An alternate method is to establish a charge by total circuit or system tonnage times a value of 1.5 pounds per ton.

4. The inventory report provided by the DPW Environmental Division shall be kept on file in the shop office along with equipment leak service logs. As of January 1, 2019, these records must be maintained for three years

Equipment Leak Service Logs

1. For each piece of equipment identified in the shop equipment inventory (see above) the following information must be recorded by the service technician whenever service is performed to repair a leak, recover refrigerant, or add refrigerant

   - Date of service and service technician name.
   - Description of service and repair performed including part(s).
   - Location of leak(s).
   - Amount of refrigerant recovered and new (makeup) refrigerant added. For recovered refrigerant, also indicate if it was re-used or turned into the CU Yard for disposal only.
   - Recovery unit ID or serial number and vacuum achieved (inches).
   - Initial leak verification test method and result [Is the leak repaired? (Yes/No)].
   - Follow-up test method, date and result [Is the leak repaired? (Yes/No)]. The follow-up test must be completed within 10 days after a successful initial leak verification test to ensure the leak has been repaired.

   A copy of the Fort Hood Refrigerant Cylinder Tracking Form and Fort Hood Refrigerant Equipment Service Log (50 pounds or more), which includes all the above required information is given in Appendix E.

2. Fort Hood service personnel shall use this log when servicing equipment charged with more than 50-lbs of refrigerant (Class I and Class II ODSs).

   - The equipment leak service logs need to be kept along with the equipment inventory in the shop office. As of January 1, 2019, these records must be maintained for three years.

HVAC Service/Maintenance Report Log

3. Whenever new or additional refrigerant has been added to AC&R equipment (as recorded on the shop leak service log) the amount and type that was added must be recorded onto the HVAC service/maintenance report log given in Appendix F.

4. Copies of these logs are to be turned into the DPW Environmental Division by the close of business each Friday for equipment which contains 50-lbs or more of refrigerant and a monthly usage log for all others equipment (logs may be faxed to 254-287-3591). The 50-lbs or more service logs are used to calculate equipment leak rates and thus, must be turned in promptly. Also, see the Refrigerant Leaks section for procedures related to leaking equipment.

Certifications

1. Copies of technician certifications will be kept on file at the DPW Environmental Division office. Technicians however should carry their certification card with them at all times.

2. The shop supervisor must promptly provide copies of certifications for new personnel to the Environmental Division office.

3. The DPW Environmental Division will maintain copies of EPA Recovery Unit Acquisition Certification Form certifying that Fort Hood has purchased and uses certified recovery equipment. As of January 1, 2019, these records must be maintained for three years

Disposal

When AC&R equipment is removed refrigerant and oil must be removed. Records that describe the disposal process must be maintained and used oil should be turned into the DPW CU Yard. See AC&R Equipment Disposal Section for a summary of the recordkeeping requirements.

ODS Management Binder

All required shop records related to ODS handling shall be kept (in a binder labeled ODS/Refrigerant Management Book) by the supervisor for each shop.

4.10 AC&R Equipment Disposal

Under 40 CFR Part 82 the EPA has established rules for AC&R equipment that will be permanently retired, dismantled or otherwise disposed of. Requirements exist for small appliances (hermetically sealed units that contains < 5 pounds refrigerant) and AC&R equipment that contain over 5-pounds of refrigerant.

Charge > 5 Pounds

1. For any AC&R equipment that is to be dismantled, demolished or disposed of, the refrigerant shall be recovered in accordance with the EPA's evacuation requirements as specified in the EPA Evacuation Level Charge (40 CFR Part 82.156, Table 1) and shown under Refrigerant Recovery Equipment Requirements in this document.

2. No equipment with more than 5 pounds of charge will be disposed of until the refrigerant has been recovered.

3. Service technicians recovering refrigerant shall prepare a refrigerant removal statement for the equipment after all refrigerant has been removed. This statement shall be signed by the servicing technician and shall be presented to the owner or operator of the landfill or salvage operation where final disposal will occur. Without this signed statement the landfill or salvage operation may refuse the equipment.

   Appendix G provides the refrigerant removal statement that should be used.

Charge < 5 Pounds

For small appliances EPA rules allow you to either 1) send the units to an EPA approved scrap/recycling/salvage company that has refrigerant removal capability, or 2) recover refrigerant on-site by capturing 90% of the refrigerant in the appliance when the compressor in the appliance is operating, or capture 80% of the refrigerant in the appliance when the compressor in the appliance is not operating; or evacuate the small appliance to four inches of mercury vacuum. To ensure that they are recovering the correct level of refrigerant, technicians must use the recovery equipment according to the directions of its manufacturer.

1. If Fort Hood technicians remove the refrigerant from the small appliance they need to provide documentation of such to the final person in the waste stream (i.e. scrap metal recycler, landfill owner). The documentation should clearly state that the refrigerant has been recovered and that all other appropriate materials (including oils) have been properly removed.

2. If the charge is to be left intact, the final person in the disposal chain (i.e. scrap metal recycler or landfill owner) is responsible for ensuring that the refrigerant is removed before final disposal. In such cases only a salvage yard/recycler or landfill that has certified to the EPA that recover refrigerant prior to disposal shall be used.

Recordkeeping

As of January 1, 2018 the following records must be maintained for equipment being demolished or disposed.

- Refrigerant type and amount recovered, and oil amount removed.
- Date of recovery and technician name.
- Model number, serial number and ID number (if applicable) of the equipment that container the refrigerant and oil.
- Recovery unit used (model, serial number) and vacuum level achieved.
- Equipment disposal method (dumpster, scrap, etc.).
- For small appliances (5 lbs. or less of refrigerant) that have been sent to an EPA approved scrap/salvage company record the salvager's name and point of contact, the date of the transaction, unit model and serial numbers, and refrigerant type for all units sent.
- Keep invoices, receipts and any other document that records the transfer of ODSs and contaminated lubricants to disposal locations.

The form given in Appendix H should be used when disposing of refrigerant containing AC&R equipment. As of January 1, 2019, these records must be maintained for three years.

When equipment is decommissioned, DPW Environmental Division will decommission the unit in APIMS, as well.

Disposal Notes

- After the refrigerant has been recovered, properly remove the oil, filters, capacitors and any mercury switches.
- Refrigerant removed must be stored in approved, labeled containers and turned into the DPW CU Yard. Tag the equipment disposed indicating the refrigerant status.
- If refrigerants are recycled or reclaimed, they are not considered hazardous waste. In addition, used oils contaminated with CFCs are not hazardous waste if:

    - The oils are not mixed with other waste;
    - The oils are subjected to CFC recycling or reclamation; and
    - The oils are not mixed with used oils from other sources.

4.11 Refrigerant Supply and Turn-In

1. DPW Maintenance and Military units that recover refrigerant that are not re-used will turn the refrigerant into the DPW CU Yard. Contractors with construction related projects are responsible for the disposal of equipment and refrigerant. More detail about information is located in Fort Hood Regulations 200-1.

2. Refrigerant will be purchased through approved supply channels. If Fort Hood units and/or directorates need to local purchase, please contact the Fort Hood DPW Environmental Division at 254-287-8714 prior.

3. Refrigerant can only be issued to technicians that have valid technician certification as per 40 CFR Subpart F or 40 CFR Subpart B.

Note, technicians certified under 40 CFR Subpart B for service of MVACs shall not be issued small cans (containers with less than 20 pounds of refrigerant) of EPA-approved MVAC substitutes containing an ozone-depleting substance.

4.12 Handling Refrigerant Cylinders

1. Fill only containers that are currently D.O.T approved for fluorocarbon refrigerants. Make certain that the pressure rating of the cylinder is adequate for the refrigerant type being filled.

2. Each refrigerant cylinder shall be labeled and marked in accordance with the ARI Guidelines K and N, and EPA and D.O.T regulations.

3. When recovering refrigerant, use only cylinders designed and marked for refrigerant recovery service. Do not re-use cylinders intended for virgin refrigerant service. Use only DOT CFR Title 49 or UL approved storage containers for recycled refrigerant. Always make certain the cylinder is charged only with the refrigerant for which it is designated and labeled. **Do not mix different refrigerants in the same cylinder.**

   Note: If refrigerants are mixed they shall be considered unusable and treated as hazardous waste.

4. Inspect cylinder to be used for signs of damage, such as dents, gouges, and corrosion. Also check the valve for damage. Do not fill damaged cylinders.

5. Verify that recovery cylinders have a current hydrostatic test date. Do not fill if the present date is more than 5 years passed the test date that is stamped on the shoulder of the cylinder. Testing for Recovery cylinders will be the responsibility of the owners/operators.

6. Refrigerant cylinders should not be filled in excess of 80% of the fluid capacity. More than 80% would be considered overfilling and may result in serious safety issues.

7. To prevent cylinder overturning while be transported and to comply with 49 CFR transportation requirements all refrigerant cylinders shall be lashed in an upright position; loaded into racks securely attached to the motor vehicle; or packed in boxes or crates of such dimensions as to prevent their overturning. Also, never transport a gas cylinder without its valve protection cap firmly in place.

Disposable Cylinders

- All disposable cylinders shall be returned to the DPW CU Yard for proper disposal.
- Disposable cylinders should never be re-used.

4.13 MVAC and MVAC-like Appliances

40 CFR Part 82 Subpart B describes the requirements for motor vehicle air conditioners (MVACs) and MVAC like-appliances*. Any person on Fort Hood that services motor vehicle conditioners shall comply with the following.

*: Some air conditioners are identical to motor vehicle air conditioners (MVACs), but they are not covered by the MVAC refrigerant recycling rule (40 CFR Part 82, Subpart B) because they are used in vehicles that are not defined as "motor vehicles." These air conditioners include many systems used in construction equipment, and aircraft. The EPA is defining these air conditioners as "MVAC-like appliances" and is applying the MVAC rule's requirements for the certification and use of recycling and recovery equipment to them.

Technician Certification

An EPA-accredited training program must certify all personnel who service MVAC appliances. The training program must address the standards related to the recommended service procedures for the containment of refrigerant, extraction equipment, extraction and recycle equipment, and the standard of purity for refrigerant in motor vehicle air conditioners. Among other items that must be addressed are the anticipated future technological developments, such as the introduction of ODS alternatives in new motor vehicle air conditioners.

Universal or Type I, II, or III technicians (certified under 40 CFR Subpart F for the service of stationary AC&R equipment) cannot service MVAC appliances unless they have completed the proper (approved) training and certification program for MVAC appliances. However, technicians who maintain, service, or repair MVAC-like appliances can do so if they have been properly certified as a Type II or universal technician under 40 CFR Subpart F.

The EPA maintains a list of approved technician certification programs. A current list can be obtained by calling the EPA Stratospheric Ozone hotline at 800-296-1996 or from the EPA website at https://www.epa.gov/section608/section-608-technician-certification-programs.Also, a complete list of approved technician certification programs in Technician Requirements Section 4.4.

Recovery/Recycling Equipment

Only refrigerant recovery and recycling equipment the EPA approved and certified by Underwriters Laboratory (UL) and Intertek/ETL Testing Laboratories, Inc shall be used during the performance of repairs or service to MVAC refrigerant systems. **Ensure that all MVAC refrigerant handling equipment purchased after December 31, 2007 meet the new Society of Automotive Engineers (SAE) standard J2788.** Approved equipment that can be used falls into two categories, 1) equipment that can both recover and recycle refrigerant (recover/recycle) and 2) equipment that can recover refrigerant but not recycle it (recover-only).

The equipment must be capable of ensuring removal of refrigerant from the system being serviced by reducing the system pressure to a minimum of 102 mm (4 in) of mercury below atmospheric pressure (*i.e.*, to a vacuum).

The complete standards set for recycling/recovery equipment are set forth in Appendices A through F of 40 CFR Part 82 Subpart B. The list of approved certified equipment can be found at http://www.epa.gov/ozone/title6/609/technicians/appequip.html. Some air conditioners are identical to motor vehicle air conditioners (MVACs), but they are not covered by the MVAC refrigerant recycling rule (40 CFR Part 82, Subpart B) because they are used in vehicles that are not defined as "motor vehicles." These air conditioners include many systems used in construction equipment, and aircraft. The EPA is defining these air conditioners as "MVAC-like appliances" and is applying the MVAC rule's requirements for the certification and use of recycling and recovery equipment to them.

Equipment Certification Statement to the EPA

Shops that service MVACs (to include aviation assets) must certify to the DPW Environmental Air Quality Team that they have acquired and are properly using approved refrigerant recovery equipment and that each individual authorized to use the equipment is properly trained and certified. **This certification is a one-time requirement**. If a shop purchased a piece of CFC-12 or HFC-134a recycling equipment in the past, and submitted the certification to the EPA, the shop does not need to send a second certification to the EPA when it purchases a second piece of equipment.* This is the case regardless of the type of refrigerant the equipment is designed to handle. The certification form for MVAC shops is shown in Appendix J.

*: Regardless of past equipment certification to the EPA the DPW Environmental Division must be notified of all new purchases of recovery/recycling equipment.

Practices and Recordkeeping

Any Fort Hood personnel that service MVAC appliances shall follow the following practices.

1. Do not use refrigerant blends or other refrigerant substitutes that have been disapproved by the EPA (Consult SNAP List).

2. Recover all refrigerants used in MVAC systems prior to beginning work on the system.

3. Follow EPA guidance when retrofitting MVAC appliances from R-22 to R-134a. This guidance can be found at http://www.epa.gov/ozone/title6/609/technicians/retrguid.html.

4. Technicians are prohibited from changing fittings on the same recovery or recycling unit back and forth so that the same unit is recovering or recycling

different types of refrigerant.

5. Equipment that is converted for use with a new refrigerant must be able to meet the applicable equipment standards set forth in the regulations.

6. Properly manage compressor oil recovered from MVAC systems.

7. Maintain name and address of any facility to which refrigerant is sent. All recovered refrigerants shall be sent to the DPW CU Yard.

8. The Fort Hood DPW Environmental Division will maintain copies of certifications for all personnel that service MVACs.

4.14 Internal Audit Checklist and EPA Inspection Checklist

When an inspector comes to your facility, there are certain things he will check to see if you are in compliance. It is good practice to perform a "self-audit" and catch and correct problems before they result in penalties. The EPA conducts surprise inspections to determine noncompliance. Failure to comply can result in fines up to $32,500 per day per violation. Submission of false or misleading information may result in criminal penalties, including imprisonment.

An internal compliance audit should be conducted once every year for each department or shop that handles refrigerants and AC&R equipment. Any deficiencies need to be recorded, addressed and re-checked within 30 days. Any deficiency that has created a condition of EPA rule non-compliance needs to be reported to the environmental compliance office if it can't be rectified within 30 days or if it is major in nature.

Self-Audit Check-Lists

The following checklists should be used as the basis for the self-audit. *(Note: that the self-audit checklists provided do not cover all possible compliance issues and topics. They address the most common topics and significant issues against which the EPA makes compliance determinations).*

GENERAL RECORD KEEPING TOPICS	Yes	No	N/A	Comments
Are copies of technician EPA certification cards on file? Ref: *40 CFR, 82, Subpart F, 82.161(a)(4)(i)*				
Are technician EPA cards maintained on file for 3 years after technician no longer operates as a technician? Ref: *40 CFR, 82, Subpart F, 82.161(a)(4)(ii)*				
Are technicians accurately documenting on the Fort Hood Refrigerant Equipment Service Log (50lbs or more) and Refrigerant Cylinder Log? Ref: *Fort Hood ODS Compliance SOP, Appendix E*				
Are records being maintained for 3 years? Ref: *Title V, Air Operating Permit # O-01659 Fort Hood, TX*				
Are technicians documenting the identity and location of the refrigerant equipment? Ref: *40 CFR, 82, Subpart F, 82.157, (l)(2)(i)*				
Are technicians documenting the date of maintenance/service/repair/disposal performed? Ref: *40 CFR, 82, Subpart F, 82.157, (l)(2)(ii)*				
Are technicians documenting the part(s) of the equipment being maintained/serviced/repaired/disposed? Ref: *40 CFR, 82, Subpart F, 82.157, (l)(2)(iii)*				
Are technicians documenting the type of maintenance performed for each part? (service/repair/disposal). Ref: *40 CFR, 82, Subpart F, 82.157, (l)(2)(iv)*				
Is the technician who performs the maintenance/service/repair/disposal annotating their name on the equipment service log? Ref: *40 CFR, 82, Subpart F, 82.157, (l)(2)(v)*				
Are technicians documenting the amount and type of refrigerant added to, or recovered/recycled from the equipment? Ref: *40 CFR, 82, Subpart F, 82.157, (l)(2)(vi)*				
Are technicians documenting the full charge of the equipment? Ref: *40 CFR, 82, Subpart F, 82.157, (l)(2)(vii)*				
Are technicians documenting the location(s) of each leak identified? Ref: *40 CFR, 82, Subpart F, 82.157, (l)(3)*				
Are technicians documenting the initial leak verification, the method used for verification and the results of those tests? Ref: *40 CFR, 82, Subpart F, 82.157, (l)(2)(viii)*				
Are technicians documenting the follow-up leak verification, the method used for verification and the results those test? Ref: *40 CFR, 82, Subpart F, 82.157, (l)(5)*				
Have retrofit /replacement plans been written for equipment not repaired with 30 days? Ref: *40 CFR, 82, Subpart F, 82.157, (h)(i,ii,iii)*				
Are technicians calculating leak rates and documenting the results? Ref: *40 CFR, 82, Subpart F, 82.157, (b)*				
When leaks exceed annual leak rates is there documentation that proves they were repaired within 30 days? Ref: *40 CFR, 82, Subpart F, 82.157, (d)*				
Are initial verification test(s) being conducted & documented within 30 days of equipment exceeding the annual leak rate? Ref: *40 CFR, 82, Subpart F, 82.157, (c)(i,iii)*				

Are follow-up leak verification tests being conducted & documented, within 10 days of a successful initial test, for units (circuits) which contain refrigerant of 50 pounds or greater? *Note: perform for all > 50 pound units.* Ref: *40 CFR, 82, Subpart F, 82.157, (e)(2)*				
Are technicians reaching the required vacuum levels for correct recovery and documenting information? Ref: *40 CFR, 82, Subpart F, 82.156, (a)(3)*				
Are technicians documenting accidental refrigerant release incidents? (non-mechanical) Ref: *Fort Hood ODS Compliance SOP, (Appendix a)*				
Are all recovery/recycle units registered with DPW Environmental Air Program? Ref: *Fort Hood ODS Compliance SOP, (section 4.5)*				

SERVICE TECHNICIAN TOPICS	Yes	No	N/A	Comments
Are all technicians EPA certified to proper level? Ref: *40 CFR, 82, Subpart F, 82.161(a)(1)*				
Are any technicians EPA cards from programs decertified by the EPA? Ref: *https://www.epa.gov/section608/organizations-are-no-longer-epa-approved-section-608-technician-certification-programs*				
Can technicians quote the EPA >50 lbs. equipment types and their leak trigger rates? Ref: *40 CFR, 82, Subpart F, 82.157, (2)(i,ii,iii)*				
Are charging scales accurate; calibrated? Ref: *40 CFR, 82, Subpart F, Appendix E, (11.2)*				
Can technicians demonstrate proper use of recovery units? Ref: *40 CFR, 82, Subpart F, 82.161, (a)(3)*				
Can technicians quote the EPA required recovery vacuum levels? Ref: *40 CFR, 82, Subpart F, 82.158, (d)(table 2)*				
Can the technician describe and demonstrate the method used to calculate leak rate? *Ref: 40 CFR, 82, Subpart F, 82.156, (j)*				
Is the Shop HVAC service/maintenance report log being updated and submitted weekly/monthly to the Fort Hood DPW Environmental Division? Ref: *Fort Hood ODS Compliance SOP, (section 4.2)*				
Is all recovered refrigerant turned into the proper agency? Ref: *Fort Hood ODS Compliance SOP, (section 4.10)*				
Have personnel servicing MVAC and MVAC like appliances been properly trained and certified by an approved MVAC certification program? Ref: *40 CFR, 82, Subpart B, 82.40(a)*				

RECOVERY UNIT TOPICS	Yes	No	N/A	Comments
Is each piece of equipment labeled with the following: *This piece or equipment has been certified by (approved testing organization) to meet EPAs minimum requirements for recycling or recovery equipment intended for use with (appropriate appliance)?* Ref: *40 CFR, 82, Subpart F, 82.158, (h)(1)*				
Does the label include date of manufacture and serial number of the equipment and in a readily visible or accessible location? Ref: *40 CFR, 82, Subpart F, 82.158, (h)(2)*				
Has equipment been retested at least once every three years?				

Ref: *40 CFR, 82, Subpart F, 82.158, (i)*				
Are recovery unit filters being changed as required? Ref: *40 CFR, 82, Subpart F, Appendix B3, (4.2)*				
Have periodic leak/vacuum checks of recovery units been conducted and documented? Ref: *40 CFR, 82, Subpart F, 82.158, (i)(2)*				
Are manufacture instructions on file and are service technicians following manufacturer procedures to operate the recovery unit? Ref: *40 CFR, 82, Subpart F, Appendix B3, (4.1)*				
Are automotive (MVAC) Section 609 recovery units being used for Section 608 stationary equipment? Ref: *40 CFR, 82, Subpart F, 82.156(c)*				
Are only approved MVAC recovery units being used in the service of MVACs? Ref: *40 CFR, 82, Subpart B, 82.36*				

REFRIGERANT MANAGEMENT TOPICS	Yes	No	N/A	Comments
Is the Fort Hood ODS Management Plan being utilized? Ref: *Fort Hood ODS Compliance SOP, (section 4.2)*				
Is the Fort Hood Refrigerant Compliance Guide and SOP being utilized? Ref: *Fort Hood ODS Compliance SOP, (section 4.2)*				
Are Environmental Safety Notices being placed on all AC&R equipment that have had refrigerant removed prior to equipment disposal? Ref: *40 CFR, 82, Subpart E, 82.106, (a)*				
Do you have an inventory for all AC&R equipment that contains more than 50 pounds of a Class I or Class II refrigerant? Ref: *Fort Hood ODS Compliance SOP, (section 4.2)*				
For each piece of equipment in the inventory above, can you identify whether it is commercial refrigeration equipment, industrial process equipment or comfort cooling or other type of equipment? *40 CFR, 82, Subpart F, 82.152*				
For each piece of equipment in the >50 lbs inventory, can you state the amount of full charge, the type of refrigerant used, and when the full charge was determined. Ref: *Fort Hood ODS Compliance SOP, (section 4.2)*				
For each piece of equipment in the >50 lbs inventory, can you provide a description of its location, along with its serial number or other identifier? Ref: *Fort Hood ODS Compliance SOP, (section 4.2)*				
If there are any retrofit or retirement plans for leaking AC&R equipment, can you provide a dated copy of each? Ref: *40 CFR, 82, Subpart F, 82.157, (h)*				

REFRIGERANT CYLINDERS	Yes	No	N/A	Comments
Are DOT 39 (disposable) cylinders being evacuated to 4 psig and punctured before disposal? Ref: *Fort Hood ODS Compliance SOP, (section 4.12)*				
Do you have an accurate inventory of all recovery and virgin refrigerant cylinders? Ref: *Fort Hood ODS Compliance SOP, (section 4.12)*				

Are recovery cylinders correctly color-coded to ARI-K (gray with yellow top)? Ref: *Fort Hood ODS Compliance SOP, (section 4.12)*				
Are all recovery cylinders current with the 10-year re-testing date? Ref: *Fort Hood ODS Compliance SOP, (section 4.12)*				
Are all cylinders properly labeled with a refrigerant specific and non-flammable gas tag/label attached? Ref: *Fort Hood ODS Compliance SOP, (section 4.12)*				

GENERAL SAFETY ISSUES AND CONTRACTORS	Yes	No	N/A	Comments
Do technicians have access to refrigerant MSDS? Ref: *29 CFR, Subpart Z, 1910.1200, (g)(9)*				
Do technicians have access to appropriate Personal Protective Equipment for the type of work they do? Ref: *29 CFR, Subpart I, 1910.132*				
Can you state which AC&R equipment that contains a Class I or Class II refrigerant is contracted out for service? Ref: *Fort Hood ODS Compliance SOP, (section 4.2)*				
Can you provide the name, address, and telephone number for all contractors that are used to service AC&R equipment of Fort Hood? Ref: *Fort Hood ODS Compliance SOP, (section 4.2)*				
For each contractor identified in the item above can you confirm that that they follow all required work practices and comply with all certification procedures for equipment and personnel? Ref: *Fort Hood ODS Compliance SOP, (section 4.2)*				
For each piece of equipment serviced by a contractor that contains more than 50 pounds of a Class I or Class II refrigerant can you obtain and provide copies of all logs that document services performed? Ref: *40 CFR, 82, Subpart F, 82.166, (k)*				

EPA Inspections

EPA Inspections may be unannounced or scheduled. If Fort Hood adheres to the self-audit policy above and corrects deficiencies when identified, all shops should be well prepared for unannounced inspections. If an inspection is scheduled or anticipated, try to determine beforehand the purpose, scope and specific objectives of the inspection. One area that has been a common source of EPA rule violations are the leak rate provisions. The EPA is fully aware of the compliance problems related to these requirements and has continued to pursue significant enforcement actions on a wide variety of companies. During an inspection the EPA will conduct staff interviews, a facility tour and a records review.

After the inspections, inspectors may conduct an exit meeting to review their findings. Make note of the findings, and if possible, offer to make on-the-spot corrections. Try to settle all questions with the inspectors at this time. If there's a disagreement with a finding, challenge the finding, not the inspector or the regulation.

Confirm any deadlines set by the inspector for correcting deficiencies. Expect a follow-up visit if there were any deficiencies to be corrected.

Example of Actual EPA Inspection Data Requests

The list below is a sample of the compliance related data that the EPA sought during an inspection of a federal facility.

1. State whether or not the facility has engaged in the servicing, maintenance, repair and/or disposal of any appliance containing a refrigerant.

2. Provide the name, address, and phone number of any contractor contracted by the facility to service, maintain, repair and/or dispose of any appliance containing a refrigerant.

3. Identify each contractor that maintains at least one technician at the facility full time to maintain, service, or repair appliances that contain and use a Class I, Class II, or substitute substance as a refrigerant.

4. Provide the names of all technicians employed by the facility who maintain, service, or repair appliances that contain and use a Class I, Class II, or substitute substance as a refrigerant.

5. Provide the name of each technician employed by the facility that is certified by an EPA approved technician certification program in accordance with 40 CFR § 82.161(a)

6. Provide the date of certification for each technician referenced in number 5 above, the level of certification, and a copy of each technician’s certificate.

7. State whether or not the facility owns equipment to recover or recycle the refrigerants during the service, maintenance, repair and/or disposal of such appliances.

8. If the facility owns equipment to recover or recycle refrigerants, provide a copy of any invoice or other record documenting the purchase of such equipment, as well as the type of equipment, the manufacturer's name, the equipment model number, year manufactured, and any serial number.

9. Provide a copy of the facility's equipment certification to the EPA that the facility has acquired, and is properly using, approved refrigerant recovery or recycling equipment.

10. State the total number of appliances located at the facility that contain and use Class I, Class II, HFC and/or substitute refrigerant in amounts greater than 50 pounds.

11. For each appliance referenced in number 10 above, provide a description of its location at the facility, along with its name, serial number, or other method of identification utilized by the facility or contractor.

12. For each appliance referenced in number 10 and 11 above, identify whether it is a commercial refrigeration appliance, industrial process refrigeration appliance, comfort cooler, or other type refrigeration appliance in accordance with the definitions found in 40 CFR § 82.152.

13. For each appliance referenced in number 10 and 11 above, state the amount of the full charge of refrigerant, the type of refrigerant used, and the date full charge was determined.

14. For each individual appliance referenced in number 10 and 11 above, provide copies of any and all work logs, service tickets, invoices and any other documents maintained by the facility or contractor relating to the following:
    a. Date any and all service was performed;
    b. Date each leak was discovered;
    c. Complete detailed description of all repair work done (if repairs were not conducted, state the reasons);
    d. Date each repair was conducted;
    e. Amount of refrigerant added at the completion of each repair; and
    f. Name of the technician who performed the work.

15. For each individual industrial process refrigeration equipment/appliance where repairs were conducted, state whether an **initial verification test** was conducted, provide the date of said test, and the specific procedures employed to conduct the test. Provide documentation maintained by the facility or contractor of said test.

16. For each individual industrial process refrigeration equipment/appliance where repairs were conducted, state whether a **follow up verification test** was conducted, provide the date of said test, and the specific procedures employed to conduct the test. Provide documentation maintained by the facility or contractor of said test.

17. For each appliance referenced in number 10 and 11 above, provide records that estimate the annual leak rate.

18. State if the facility or contractor has developed, or is aware of, any retrofit or retirement plan for leaking equipment. If so, provide a dated copy of each plan.

19. State whether the facility or contractor is aware of any mothballed appliance during the above referenced time frame and the reasons therefore. A mothballed appliance is temporarily shut down and brought down to atmospheric pressure while evacuating the refrigerant from the appliance or the affected isolated section. If a system is mothballed, records documenting when the system was mothballed and when it was brought back online must be maintained.

APPENDIX A

ACCIDENTAL OR UNINTENTIONAL VENTING REPORT

Use for accidental (unintentional) releases such as human caused accidental damage to a refrigerant line, service valve or cylinder.

Note: *Do* ***not*** *record leaks related to mechanical failures of equipment on this form.*

Accidental or Unintentional Venting Report

Date: _____

Location _____

Refrigeration Unit / Source of venting _____

Type of Refrigerant Vented/Released _____
Approx. How Many Pounds Were Vented/Released _____

Description of Venting Incident _____

_____

_____

_____

What was the Cause of the release? _____

_____

What Precautions Have Been Taken to Prevent This from Happening Again?

_____

_____

_____

Technician Name and Rank/Grade _____

Certification Number _____

Supervisor Signature _____ Date _____

Supervisor Name and Rank/Grade _____

APPENDIX B

EPA EVACUATION LEVEL CHART

EPA Evacuation Level Chart (inches of vacuum)*

Type of Appliance**	Recovery Units Manufactured Date	
	Before Nov. 15, 1993 ***Grandfathered Unit***	**After Nov. 15, 1993 ARI/UL Unit**
R-22, R-402A/B, R-407A/B/C appliance, or isolated component of such appliance, normally containing less than 200 pounds of refrigerant.	0	0*
R-22, R-402A/B, R-407A/B/C appliance, or isolated component of such appliance, normally containing 200 pounds or more of refrigerant.	4	10
Very High Pressure Appliance **R-410A/B, R-13, R-23, R-503**	0	0
Other high-pressure appliance, or isolated component of such appliance, normally containing less than 200 pounds of refrigerant. **R-114, R-134a, R-401A/B/C, R-500, R-502**	4	10
Other high-pressure appliance, or isolated component of such appliance, normally containing more than 200 pounds of refrigerant. **R-114, R-134a, R-401A/B/C, R-500, R-502)**	4	15
Low-Pressure Appliance **R-11, R-113, R-123**	25 mm Hg absolute	25 mm Hg absolute

*: Inches of Hg vacuum relative to standard atmospheric pressure of 29.9 inches of Hg, except where noted.

**: Evacuation levels do not apply to small appliances, MVACs and MVAC-like appliances

EPA Required Level of Evacuation of Appliances

This table lists levels of evacuation for various types of refrigeration and air conditioning equipment manufactured either before or after November 15, 1993.

Type of Appliance	**Inches of Hg vacuum (relative to standard atmospheric pressure of 29.9 inches Hg)**	
	Using pre-1993 equipment	Using post-1993 equipment
Very high-pressure appliance	0	0
High-pressure appliance, or isolated component of such appliance, with a full charge of less than 200 pounds of refrigerant	0	0
High-pressure appliance, or isolated component of such appliance, with a full charge of 200 pounds or more of refrigerant	4	10
Medium-pressure appliance, or isolated component of such appliance, with a full charge of less than 200 pounds of refrigerant	4	10
Medium-pressure appliance, or isolated component of such appliance, with a full charge of 200 pounds or more of refrigerant	4	10
Low-pressure appliance	25 mm Hg absolute	25 mm Hg absolute

https://www.epa.gov/section608/required-level-evacuation-appliances

APPENDIX C

RECOVERY/RECYCLING UNIT FORM

Complete for each refrigerant recovery and recycling unit

Recovery/Recycling Unit Form

Shop: _____ **Unit ID:** _____ **Manufacturer:** _____

Model: _____ **Serial Number:** _____ **Date Purchased:** _____

Unit Type: **Active** **Passive** **Other**

Vacuum Level: _____ Inches Microns

Type of Filter: _____

Equipment Assigned to: **Shop** **Technician** **Service Vehicle**

Other **Description** _____

Maintenance History:

Leak Test			Filter Change		
Test Date	**Results/ Comments**	**Performed by**	**Change Date**	**Comments**	**Serviced by**

General Maintenance		
Maintenance Date	**Details of Maintenance**	**Serviced by**

APPENDIX D

AC&R EQUIPMENT INVENTORY INPUT FORM

Complete for each piece of new equipment or equipment that is missing from current inventory

AC&R Equipment Inventory Input Form

Building:_____ **Refrigerant Type:** _____

Equipment ID:_____ **Refrigerant Charge:**_____**lbs**_____**Oz**

Location:_____ **Method to Determine Charge:**_____

Service Department/Area Shop:_____ **Date Full Charge Determined:**_____

Multiple circuits? If yes, please provide charge of each circuit. (1)_____**(2)**_____**(3)**_____**(4)**_____

Equipment Type: _____

Manufacturer:_____

Model No. :_____

Serial No.:_____

Date Installed:_____

Capacity:_____ ☐ **BTUH** ☐ **Tons**

Duty Type: ☐ **Comfort Cooling** ☐ **Industrial Process**
☐ **Commercial** ☐ **Other**

Leak Rate Limit: _____

Additional Notes:

.....

.....

.....

.....

.....

.....

.....

.....

.....

APPENDIX E

EQUIPMENT LEAK SERVICE LOG

Complete for each service of AC&R equipment with more than 50 lbs of refrigerant

Fort Hood Refrigerant Equipment Service Log

DPW Maintenance Shop #_____

Certified Technician Name	
Building Number or Location	
Date Leak Discovered / Unit Serviced	
Does serviced unit contain more than 50 lbs. refrigerant? Yes / No	

Equipment Duty Type?

☐ **Comfort Cooling** ☐ **Commercial** ☐ **Industrial/Process**

Service Order Number (SO#)	

Equipment Removal/Disposal

Compressor Serial Number	
Make	
Model Number	
Serial Number	
Refrigerant Type	
Vacuum Level Achieved (inches Hg)	
Amount of Refrigerant Added	
Amount of Refrigerant Recovered	
Cylinder #	

Notes:

New Equipment Installation

Make				
Model Number				
Serial Number				
Refrigerant Type				
Amount of Refrigerant Added				
Amount of Refrigerant Recovered				
Refrigerant Charge per Circuit	1	2	3	4
Cylinder #				

Notes:

Equipment Maintenance/Service/Repair

Make				
Model Number				
Serial Number				
Refrigerant Type				
Location of Leak on Equipment				
Unit Refrigerant Full Charge	Per Circuit	1	2	3
Refrigerant Recovered (lbs.oz)	Per Circuit	1	2	3
Recovered Refrigerant was:	Re-used		Taken to C.U.	
Recovery Cylinder #				
Vacuum Level Achieved (In Hg)				
Refrigerant Added (lbs.oz)	Per Circuit	1	2	3
Refrigerant Added Cylinder #				

Detailed Description of Repairs:

Initial Leak Verification (Conducted after repair but before charging)

Leak repaired ?	Yes / No	Date/Time:
Method used for verification		
If no, what action taken		

Follow-up Leak Verification (Conducted at normal operating capacity)

Initial Leak repair effective ?	Yes / No	Date/Time:
Method used for verification		
If no, what action taken		

In compliance with the requirements of the Clean Air Act, Section 608, I certify that the refrigerant has been handled in accordance with U.S. EPA regulations at 40 CFR 82.156.

Printed Name: Certified Technician	Signature of Certified Technician
Printed Name: Supervisor/Reviewer	Signature of Supervisor/Reviewer

Revised: 10 April 2017

Appendix E

APPENDIX F

HVAC SERVICE/MAINTENANCE REPORT LOG

Complete each week and submit to the DPW Environmental Division
(Enter data from for Non-DPW < 50 Refrigerant Service Log
and DPW Refrigerant Cylinder Service Log)

DPW SHOP _____ REFRIGERANT TRACKING LOG

REFRIGERANT TYPE: _____ **CYLINDER SERIAL #:** _____ **DATE ISSUED:** _____

ISSUED TO: _____ **ISSUED BY:** _____ **CERTIFICATE TYPE:** _____

RECOVERY / VIRGIN (CIRCLE ONE) **ISSUED WEIGHT:** _____

Date	Building Number	DMO #	Total Refrigerant Charge Per Circuit	Amount Refrigerant Recovery	Amount Refrigerant Added	START WEIGHT	END WEIGHT	Description of Repairs and/or Equipment Service

This form is to be used to track refrigerant usage per cylinder. Fill this form out completely each time a certified technician conducts a service repair. If circuit total charge is more than 50lbs, complete the DPW equipmet service log form. For any questions contact DPW Environmental Air Program at 254-288-7976 or 254-287-8714.

REFRIGERANT TRACKING FORM

This form is to be used to track refrigerant usage in equipment with less than 50 lbs. charge. Fill this form out completely each time a certified technician conducts services/repair. If you service equipment with 50 lbs. or more charge, please fill out Refrigerant Equipment Service Log.

Please contact DPW Air Program for questions or concerns at 254-288-7976 or 254-287-8714.

Date	Bldg #	Technician	Tech Certifaction Type	Refrigerant Type	Total Refrigerant Charge Per Circuit	Equipment Service (HVAC, Chiller, ect.)	Amount Refrigerant Recovered	Amount Refrigerant Added	Descripition of Repairs

APPENDIX G

REFRIGERANT REMOVAL STATEMENT

Completed form must accompany equipment turned over to salvage company or landfill for disposal

REFRIGERANT REMOVAL STATEMENT

(Prescribing Authority: DoD 4160.21M)

IN COMPLIANCE WITH THE REQUIREMENTS OF THE CLEAN AIR ACT AMMENDMENTS 0F 1990, SECTION 608, I CERTIFY THAT THE REFRIGERANT HAS BEEN RECOVERED FROM THIS ITEM IN ACCORDANCE WITH THE U.S. EPA REGULATION AT 40 CFR 82.156 (f), (g), and (h).

NAME

(Required by regulation) (Certified Technician recovering the refrigerant)

ADDRESS

(Required by regulation) (Service Organization or Company)

CITY	STATE	ZIP CODE
(Required by regulation)		

DATE REFRIGERANT REMOVED

(Required by regulation)

SIGNATURE OF TECHNICIAN

(Required by regulation)

GENERATOR/DRMO

(Add information to match the certificate to the equipment to demonstrate compliance during regulatory inspections)

ITEM DESCRIPTION OR NOUN NAME/SERIAL NO.

TURN-IN DOCUMENT NO. (DTID)

APPENDIX H

EQUIPMENT DISPOSAL FORM

Complete for piece of AC&R (>5 lb refrigerant charge) equipment being disposed

Equipment Disposal Form

Date of recovery/disposal	
Technicians Name	
Department	
Equipment ID or serial #	
Refrigerant Type	
Lbs. of Refrigerant removed	
Recovery Equipment ID	
Vacuum level achieved	
Was refrigerant reclaimed?	Yes/ No
If yes what department or company?	
Is equipment being scrapped	Yes /No
Organization receiving equipment	

I hereby affirm that the equipment identified above has been disposed of in accordance with Section 608 of the Clean Air Act.

Technicians Signature _____

APPENDIX I

HVAC & MVAC RECOVERY/RECYCLE OR RECOVERY EQUIPMENT CERTIFICATION FORM

Complete once for each shop that services MVACs

FORT HOOD DPW ENVIRONMENTAL DIVISION

CERTIFICATION OF ACQUISTION MVAC RECOVERY, RECOVERY/RECYCLE OR RECOVERY/RECYCLE/RECHARGE EQUIPMENT CERTIFICATION FORM

1 _____
NAME OF ESTABLISHMENT

_____
STREET

_____
CITY, STATE, ZIP CODE

_____
TELEPHONE NUMBER

2 _____
NAME OF EQUIPMENT MANUFACTURER & MODEL NUM

_____
SERIAL NUMBER(S) YEAR

3 I certify that I have approved recovery, recovery/recycle, or recovery/recycle/recharge equipment under Section 609 of the Clean Air Act. I certify that only properly trained and certified technicians operate the equipment and that the information given above is true and correct.

_____
SIGNATURE OF OWNER/OPERATOR DATE

_____
NAME (PRINT) TITLE

ALL RECOVERY EQUIPMENT MUST BE CERTIFIED BY THE AIR CONDITIONING HEATING AND REFRIGERANT INSTITUTE (AHRI) OR THE UNDERWRITERS LABORATORY (UL) TO MEET THE EPA STANDARDS AND HAVE A PERMANENT LABLE THAT STATES IT MEETS EPA CERTIFICATION STANDARDS (40 CFR 82.158).

MVAC RECOVERY, RECOVERY/RECYCLE OR RECOVERY/RECYCLE/RECHARGE EQUIPMENT CERTIFICATION FORM INSTRUCTIONS

Motor vehicle refrigerant recovery, recovery/recycle, or recovery, recycle, recharge equipment must be certified to through DPW Environmental Division. To certify your equipment, please complete the above form according to the following instructions, present a copy to DPW Environmental Air Quality Team and keep a copy for your records.

1 Please provide the name, address, and telephone number of the establishment where the equipment is located.

2 Please provide the name brand, model number, year and serial number(s) of the equipment acquired for use at the above establishment

3 The certification statement must be signed by the person who has acquired the equipment (the person may be the owner of the establishment or another responsible officer). The person who signs is certifying that they have acquired the equipment, that each individual authorized to use the equipment is properly trained and certified, and that the information provided is true and correct.

FORT HOOD DPW ENVIRONMENTAL

REFRIGERANT RECOVERY OR RECYCLING DEVICE ACQUISITION CERTIFICATION FORM

Fort Hood DPW Environmental Division - Air Quality Team require establishments that service or dispose of refrigeration or air conditioning equipment to certify that they have acquired recovery or recycling devices that meet the EPA standards for such devices. To certify that you have acquired equipment, please complete this form, send a copy to DPW Environmental Air Quality Team and keep a copy of the certification for the activities records.

PART 1: ESTABLISHMENT INFORMATION

Name of Establishment

Street

(Area Code) Telephone Number

City State Zip Code

Number of Service Equipment Based at Establishment

Country

PART 2: REGULATORY CLASSIFICATION

Identify the type of work performed by the establishment. **Check all boxes that apply.**

- ☐ Type A - Service small appliances
- ☐ Type B - Service refrigeration or air-conditioning equipment other that small appliances
- ☐ Type C- Dispose of small appliances
- ☐ Type D - Dispose of refrigeration or air-conditioning equipment other than small appliances

PART 3: DEVICE IDENTIFICATION

	Name of Device(s) Manufacturer	Model Number	Year	Serial Number (if any)	Check Box if Self-Contained
1.					☐
2.					☐
3.					☐
4.					☐
5.					☐

PART 4: CERTIFICATION SIGNATURE

I certify that the establishment in Part 1 has acquired the refrigerant recovery or recycling device(s) listed in Part 2, that the establishment is complying with Section 608 regulations, and that the information gives is true and correct.

Signature of Owner/Responsible Officer Date Name (Please Print) Title

Title 49: Transportation
PART 180—CONTINUING QUALIFICATION AND MAINTENANCE OF PACKAGINGS
Subpart C—Qualification, Maintenance and Use of Cylinders

§180.209 Requirements for requalification of specification cylinders.

(a) *Periodic qualification of cylinders.* Each specification cylinder that becomes due for periodic requalification, as specified in the following table, must be requalified and marked in conformance with the requirements of this subpart. Requalification records must be maintained in accordance with §180.215. Table 1 follows:

TABLE 1—REQUALIFICATION OF CYLINDERS[1]

Specification under which cylinder was made	Minimum test pressure (psig)[2]	Requalification period (years)
DOT 3	3000 psig	5.
DOT 3A, 3AA	5/3 times service pressure, except noncorrosive service (*see* §180.209(g))	5, 10, or 12 (*see*§180.209(b), (e), (f), (h), and (j).
DOT 3AL	5/3 times service pressure	5, 10 or 12 (*see* §180.209(e), (j) and §180.209(m)[3]).
DOT 3AX, 3AAX	5/3 times service pressure	5, 10 (*see* §180.209(e).
3B, 3BN	2 times service pressure (*see* §180.209(g))	5 or 10 (*see* §180.209(e), (f)).
3E	Test not required.	
3HT	5/3 times service pressure	3 (*see* §§180.209(k) and 180.213(c)).
3T	5/3 times service pressure	5.
4AA480	2 times service pressure (*see* §180.209(g))	5 or 10 (*see* §180.209(e) or (h)).

4B, 4BA, 4BW, 4B-240ET	2 times service pressure, except non-corrosive service (*see* §180.209(g))	5, 10, or 12 (*see*§180.209(e), (f), and (j)).
4D, 4DA, 4DS	2 times service	5.
DOT 4E	2 times service pressure, except non-corrosive (*see* §180.209(g))	5 or 10 (*see* §180.209(e)).
4L	Test not required.	
8, 8AL		10 or 20 (*see* §180.209(i)).
Exemption or special permit cylinder	See current exemption or special permit	See current exemption or special permit.
Foreign cylinder (*see* §173.301(j) of this subchapter for restrictions on use)	As marked on cylinder, but not less than 5/3 of any service or working pressure marking	5 (*see* §§180.209(l) and 180.213(d)(2)).

[1]Any cylinder not exceeding 2 inches outside diameter and less than 2 feet in length is excepted from volumetric expansion test.

[2]For cylinders not marked with a service pressure, see §173.301a(b) of this subchapter.

[3]This provision does not apply to cylinders used for carbon dioxide, fire extinguisher or other industrial gas service.

(b) *DOT 3A or 3AA cylinders.* (1) A cylinder conforming to specification DOT 3A or 3AA with a water capacity of 56.7 kg (125 lbs) or less that is removed from any cluster, bank, group, rack, or vehicle each time it is filled, may be requalified every ten years instead of every five years, provided the cylinder conforms to all of the following conditions:

(i) The cylinder was manufactured after December 31, 1945.

(ii) The cylinder is used exclusively for air; argon; cyclopropane; ethylene; helium; hydrogen; krypton; neon; nitrogen; nitrous oxide; oxygen; sulfur hexafluoride; xenon; chlorinated hydrocarbons, fluorinated hydrocarbons, liquefied hydrocarbons, and mixtures thereof that are commercially free from corroding components; permitted mixtures of these gases (*see* §173.301(d) of this subchapter); and permitted mixtures of these gases with up to 30 percent by volume of carbon dioxide, provided the gas has a dew point at or below minus (52 °F) at 1 atmosphere.

(iii) Before each refill, the cylinder is removed from any cluster, bank, group, rack or vehicle and passes the hammer test specified in CGA Pamphlet C-6 (IBR, see §171.7 of this subchapter).

(iv) The cylinder is dried immediately after hydrostatic testing to remove all traces of water.

(v) The cylinder is not used for underwater breathing.

(vi) Each cylinder is stamped with a five-pointed star at least one-fourth of an inch high immediately following the test date.

(2) If, since the last required requalification, a cylinder has not been used exclusively for the gases specifically identified in paragraph (b)(1)(ii) of this section, but currently conforms with all other provisions of paragraph (b)(1) of this section, it may be requalified every 10 years instead of every five years, provided it is first requalified and examined as prescribed by §173.302a(b) (2), (3) and (4) of this subchapter.

(3) Except as specified in paragraph (b)(2) of this section, if a cylinder, marked with a star, is filled with a compressed gas other than as specified in paragraph (b)(1)(ii) of this section, the star following the most recent test date must be obliterated. The cylinder must be requalified five years from the marked test date, or prior to the first filling with a compressed gas, if the required five-year requalification period has passed.

(c) *DOT 4-series cylinders.* A DOT 4-series cylinder, except a 4L cylinder, that at any time shows evidence of a leak or of internal or external corrosion, denting, bulging or rough usage to the extent that it is likely to be weakened appreciably, or that has lost five percent or more of its official tare weight must be requalified before being refilled and offered for transportation. (Refer to CGA Pamphlet C-6 or C-6.3, as applicable, regarding cylinder weakening.) After testing, the actual tare weight must be recorded as the new tare weight.

(d) *Cylinders 5.44 kg (12 lbs) or less with service pressures of 300 psig or less.* A cylinder of 5.44 (12 lb) or less water capacity authorized for service pressure of 300 psig or less must be given a complete external visual inspection at the time periodic requalification becomes due. External visual inspection must be in accordance with CGA Pamphlet C-6 or C-6.1 (IBR, see §171.7 of this subchapter). The cylinder may be proof pressure tested. The test is successful if the cylinder, when examined under test pressure, does not display a defect described in §180.205(i)(1) (ii) or (iii). Upon successful completion of the test and inspection, the cylinder must be marked in accordance with §180.213.

(e) *Proof pressure test.* A cylinder made in conformance with DOT Specifications 4B, 4BA, 4BW, or 4E protected externally by a suitable corrosion-resistant coating and used exclusively for non-corrosive gas that is commercially free from corroding components may be requalified by volumetric expansion testing or proof pressure testing every 10 years instead of every 5 years. When subjected to a proof pressure test, the cylinder must be carefully examined under test pressure and removed from service if a leak or defect is found.

(f) *Poisonous materials.* A cylinder conforming to specification DOT 3A, 3AA, 3B, 4BA, or 4BW having a service pressure of 300 psig or less and used exclusively for methyl bromide, liquid; mixtures of methyl bromide and ethylene dibromide, liquid; mixtures of methyl bromide and chloropicrin, liquid; mixtures of methyl bromide and petroleum solvents, liquid; or methyl bromide and nonflammable, non-liquefied compressed gas mixtures, liquid; commercially free of corroding components, and protected externally by a suitable corrosion resistant coating (such as galvanizing or painting) and internally by a suitable corrosion resistant lining (such as galvanizing) may be tested every 10 years instead of every five years, provided a visual internal and external examination of the cylinder is conducted every five years in accordance with CGA Pamphlet C-6. The cylinder must be examined at each filling, and rejected if a dent, corroded area, leak or other condition indicates possible weakness.

(g) *Visual inspections.* A cylinder conforming to a specification listed in the table in this paragraph and used exclusively in the service indicated may, instead of a periodic hydrostatic test, be given a complete external visual inspection at the time periodic requalification becomes due. External visual inspection must be in accordance with CGA Pamphlet C-6 or C-6.3, as applicable (IBR, see §171.7 of this subchapter). When this inspection is used instead of hydrostatic pressure testing, subsequent inspections are required at five-year intervals after the first inspection. After May 31, 2004, inspections must be made only by persons holding a current RIN and the results recorded and maintained in accordance with §180.215. Records must include: date of inspection (month and year); DOT specification number; cylinder identification (registered symbol and serial number, date of manufacture, and owner); type of cylinder protective coating (including statement as to need of refinishing or recoating); conditions checked (e.g., leakage, corrosion, gouges, dents or digs in shell or heads, broken or damaged footring or protective ring or fire damage); disposition of cylinder (returned to service, returned to cylinder manufacturer for repairs or condemned). A cylinder passing requalification by the external visual inspection must be marked in accordance with §180.213. Specification cylinders must be in exclusive service as shown in the following table:

Cylinders conforming to—	Used exclusively for—
DOT 3A, DOT 3AA, DOT 3A480X, DOT 4AA480	Anhydrous ammonia of at least 99.95% purity.
DOT 3A, DOT 3AA, DOT 3A480X, DOT 3B, DOT 4B, DOT 4BA, DOT 4BW	Butadiene, inhibited, that is commercially free from corroding components.
DOT 3A, DOT 3A480X, DOT 3AA, DOT 3B, DOT 4AA480, DOT 4B, DOT 4BA, DOT 4BW	Cyclopropane that is commercially free from corroding components.
DOT 3A, DOT 3AA, DOT 3A480X, DOT 4B, DOT 4BA, DOT 4BW, DOT 4E	Chlorinated hydrocarbons and mixtures thereof that are commercially free from corroding components.
DOT 3A, DOT 3AA, DOT 3A480X, DOT 4B, DOT 4BA, DOT 4BW, DOT 4E	Fluorinated hydrocarbons and mixtures thereof that are commercially free from corroding components.
DOT 3A, DOT 3AA, DOT 3A480X, DOT 3B, DOT 4B, DOT 4BA, DOT 4BW, DOT 4E	Liquefied hydrocarbon gas that is commercially free from corroding components.
DOT 3A, DOT 3AA, DOT 3A480X, DOT 3B, DOT 4B, DOT 4BA, DOT 4BW, DOT 4E	Liquefied petroleum gas that meets the detail requirements limits in Table 1 of ASTM 1835, Standard Specification for Liquefied Petroleum (LP) Gases (incorporated by reference; see §171.7 of this subchapter) or an equivalent standard containing the same limits.
DOT 3A, DOT 3AA, DOT 3B, DOT 4B, DOT 4BA, DOT 4BW, DOT 4E	Methylacetylene-propadiene, stabilized, that is commercially free from corroding components.
DOT 3A, DOT 3AA, DOT 3B, DOT 4B, DOT 4BA, DOT 4BW	Anhydrous mono, di,trimethylamines that are commercially free from corroding components.
DOT 4B240, DOT 4BW240	Ethyleneimine, stabilized.
DOT 4BW	Alkali metal alloys, liquid, n.o.s., Alkali metal dispersions or Alkaline earth metal dispersions, Potassium, Potassium Sodium alloys and Sodium that are commercially free of corroding components.

(h) *Cylinders containing anhydrous ammonia.* A cylinder conforming to specification DOT 3A, 3A480X, or 4AA480 used exclusively for anhydrous ammonia, commercially free from corroding components, and protected externally by a suitable corrosion-resistant coating (such as paint) may be requalified every 10 years instead of every five years.

(i) *Requalification of DOT-8 series cylinders.* (1) Each owner of a DOT-8 series cylinder used to transport acetylene must have the cylinder shell and the porous filler requalified in accordance with CGA Pamphlet C-13 (IBR, see §171.7 of this subchapter). Requalification must be performed in accordance with the following schedule:

Date of cylinder manufacture	Shell (visual inspection) requalification		Porous filler requalification	
	Initial	Subsequent	Initial	Subsequent
Before January 1, 1991	Before January 1, 2001	10 years	Before January 1, 2011	Not required.
On or after January 1, 1991	10 years[1]	10 years	5 to 20 years[2]	Not required.

[1]Years from the date of cylinder manufacture.

[2]No sooner than 5 years, and no later than 20 years from the date of manufacture.

(2) Unless requalified and marked in accordance with CGA Pamphlet C-13 before October 1, 1994, an acetylene cylinder must be requalified by a person who holds a current RIN.

(3) If a cylinder valve is replaced, a cylinder valve of the same weight must be used or the tare weight of the cylinder must be adjusted to compensate for valve weight differential.

(4) The person performing a visual inspection or requalification must record the results as specified in §180.215.

(5) The person performing a visual inspection or requalification must mark the cylinder as specified in §180.213.

(j) *Cylinder used as a fire extinguisher.* Only a DOT specification cylinder used as a fire extinguisher and meeting the requirements of §173.309(a) of this subchapter may be requalified in accordance with this paragraph (j).

(1) A DOT 4B, 4BA, 4B240ET or 4BW cylinder may be tested as follows:

(i) For a cylinder with a water capacity of 5.44 kg (12 lbs) or less, by volumetric expansion test using the water jacket method or by proof pressure test. A requalification must be performed by the end of 12 years after the original test date and at 12-year intervals thereafter.

(ii) For a cylinder having a water capacity over 5.44 kg (12 lbs)—

(A) *By proof pressure test.* A requalification must be performed by the end of 12 years after the original test date and at 7-year intervals; or

(B) *By volumetric expansion test using the water jacket method.* A requalification must be performed 12 years after the original test date and at 12-year intervals thereafter.

(2) A DOT 3A, 3AA, or 3AL cylinder must be requalified by volumetric expansion test using the water jacket method. A requalification must be performed 12 years after the original test date and at 12-year intervals thereafter.

(k) *3HT cylinders.* In addition to the other requirements of this section, a cylinder marked DOT-3HT must be requalified in accordance with CGA C-8 (IBR, see §171.7 of this subchapter).

(l) *Requalification of foreign cylinders filled for export.* A cylinder manufactured outside the United States, other than as provided in §§171.12(a) and 171.23(a) of this subchapter, that has not been manufactured, inspected, tested and marked in accordance with part 178 of this subchapter may be filled with compressed gas

in the United States, and shipped solely for export if it meets the following requirements, in addition to other requirements of this subchapter:

(1) It has been inspected, tested and marked (with only the month and year of test) in conformance with the procedures and requirements of this subpart or the Associate Administrator has authorized the filling company to fill foreign cylinders under an alternative method of qualification; and

(2) It is offered for transportation in conformance with the requirements of §171.12(a)(4) or §171.23(a)(4) of this subchapter.

(m) *DOT-3AL cylinders manufactured of 6351-T6 aluminum alloy.* In addition to the periodic requalification and marking described in §180.205, each cylinder manufactured of aluminum alloy 6351-T6 used in self-contained underwater breathing apparatus (SCUBA), self-contained breathing apparatus (SCBA), or oxygen service must be requalified and inspected for sustained load cracking in accordance with the non-destructive examination method described in the following table. Each cylinder with sustained load cracking that has expanded into the neck threads must be condemned in accordance with §180.205(i). This provision does not apply to cylinders used for carbon dioxide, fire extinguisher or other industrial gas service.

REQUALIFICATION AND INSPECTION OF DOT-3AL CYLINDERS MADE OF ALUMINUM ALLOY 6351-T6

Requalification requirement	Examination procedure[1]	Sustained Load Cracking Condemnation Criteria[2]	Requalification period (years)
Eddy current examination combined with visual inspection	Eddy current—In accordance with Appendix C of this part Visual inspection—In accordance with CGA Pamphlet C-6.1 (IBR; see §171.7 of this subchapter)	Any crack in the neck or shoulder of 2 thread lengths or more	5

[1]The requalifier performing eddy current must be familiar with the eddy current equipment and must standardize (calibrate) the system in accordance with the requirements provided in Appendix C to this part.

[2]The eddy current must be applied from the inside of the cylinder's neck to detect any sustained load cracking that has expanded into the neck threads.

[67 FR 51660, Aug. 8, 2002, as amended at 68 FR 24662, May 8, 2003; 68 FR 55544, Sept. 26, 2003; 68 FR 48572, Aug. 14, 2003; 68 FR 75764, Dec. 31, 2003; 70 FR 73166, Dec. 9, 2005; 71 FR 51128, Aug. 29, 2005; 72 FR 55696, Oct. 1, 2007; 74 FR 53189, Oct. 16, 2009; 81 FR 3685, Jan. 21, 2016; 81 FR 35545, June 2, 2016]

EDITORIAL NOTE: At 71 FR 54397, Sept. 14, 2006, §180.209 was amended in (a)(1) table 1; however, because of the inaccurate amendatory language, the amendment could not be incorporated.