

**VOLUME 3 GENERAL TECHNICAL ADMINISTRATION****CHAPTER 57 MAINTENANCE REQUIREMENTS FOR HIGH-PRESSURE CYLINDERS INSTALLED IN U.S.-REGISTERED AIRCRAFT CERTIFICATED IN ANY CATEGORY****Section 1 Maintenance Requirements for High-Pressure Cylinders****3-4544 PROGRAM TRACKING AND REPORTING SUBSYSTEM (PTRS) AND AIR TRANSPORTATION OVERSIGHT SYSTEM (ATOS) ACTIVITY CODES.**

**A. Maintenance:** 3330, 3341, 3351.

**B. Avionics:** 5330, 5341, 5351.

**C. ATOS:** Inspectors will document observations in the appropriate/assigned Design or Performance Assessment (PA), Dynamic Observation Report (DOR), or Random Dynamic Observation Report.

**3-4545 OBJECTIVE.** This section provides guidance for evaluating the maintenance requirements of high-pressure cylinders contained in a operator/applicant's Continuous Airworthiness Maintenance Program (CAMP) subject to Title 14 of the Code of Federal Regulations (14 CFR) part 121 or 135, or a fractional program manager (hereafter referred to as the program manager) under 14 CFR part 91 subpart K (part 91K).

**3-4546 GENERAL.** An operator's CAMP must include the continued maintenance and inspection requirements for high-pressure cylinders. The regulatory requirements to maintain, store, and handle aircraft high-pressure cylinders that contain hazardous materials (hazmat) have been a source of misunderstanding within the Federal Aviation Administration (FAA) community. This section will provide information and guidance for the maintenance requirements of high-pressure cylinders installed in U.S.-registered aircraft. This section will also explain the applicability of cylinder requalification requirements for high-pressure cylinders contained in the Hazardous Material Regulations (HMR) of Title 49 of the Code of Federal Regulations (49 CFR), subtitle B, chapter 1, subchapter C.

**A. Requirements.** There are four points to consider in the FAA maintenance requirements related to high-pressure cylinders when they are installed in an aircraft, and the different Department of Transportation (DOT) maintenance requirements when cylinders are not installed in an aircraft. Each of these points applies to all U.S.-registered aircraft certificated in any category.

1) Each high-pressure cylinder installed in a U.S.-registered aircraft must be a cylinder that is manufactured and approved under the requirements of 49 CFR, or under a "special permit" issued by Pipeline and Hazardous Materials Safety Administration (PHMSA) under 49 CFR part 107. There are no exceptions.

2) Each high-pressure cylinder installed on a U.S.-registered aircraft is considered to be an aircraft part and is regulated under the maintenance requirements of 14 CFR appropriate to the type of aircraft and type of operation. In this case, cylinder maintenance under 14 CFR is restricted to inspections, servicing, and replacement. Cylinder repairs and requalification must be accomplished under 49 CFR by a person authorized to do so under 49 CFR.

3) Each high-pressure cylinder that has been removed from a U.S.-registered aircraft is not considered to be an aircraft part for the purpose of overhaul and testing of the cylinder, such as hydrostatic testing. The continued serviceability requirement is regulated under Title 29 of the Code of Federal Regulations (29 CFR) and 49 CFR, not 14 CFR.

NOTE: Title 14 CFR provides for the continued airworthiness of the high-pressure cylinders through the maintenance instructions provided by the manufacturer of the aircraft. Those instructions will often reference an accessory, instrument, or equipment manufacturer as the source of this information if the applicant shows that the item has an exceptionally high degree of complexity requiring specialized maintenance techniques, test equipment, or expertise. See 14 CFR part 25 appendix H.

4) Each high-pressure cylinder installed in a U.S.-registered aircraft may remain installed past the time when its 49 CFR-required requalification comes due, provided the cylinder is not serviced. A cylinder that is past the date when its 49 CFR-required requalification is due may not be serviced or refilled until it has been requalified under the appropriate provisions of 49 CFR by a person authorized to do so under 49 CFR.

**B. Focus of the HMR.** The HMR is the safe transportation of hazmat in all modes of transportation, not aircraft maintenance. The HMR does not have provisions for maintenance of aircraft parts.

**C. Hazmat List.** A list of materials classified as hazmat is identified in 49 CFR part 172.

### 3-4547 BACKGROUND.

**A. Recent Events.** There have been events involving high-pressure oxygen cylinders. Most of these events have not involved the structural integrity of the cylinders, but have involved fires attributed to servicing the pressure cylinder while the cylinder is still installed aboard the aircraft. There have also been instances where cylinders that have not been approved under 49 CFR have been installed in U.S.-registered aircraft. Many of these events have been attributed to the absence of scheduled maintenance requirements and adequate maintenance procedures.

**B. Regulatory Requirements.** High-pressure cylinders containing hazmat and used as aircraft equipment are subject to regulations in four different areas of the CFR that are administered by four separate regulatory agencies. These areas are as follows:

1) As discussed above, the HMR is codified in 49 CFR. The HMR is broad in scope and covers all of the elements related to the safe transport of hazmat by any means, including the

qualification, maintenance, and use of hazmat packaging or containers. Hazmat sent using commercial transportation must comply with the HMR. These regulations apply to those who offer, accept, or carry hazmat to, from, within, and across the United States. PHMSA promulgates and administers these regulations.

a) PHMSA has delegated administration, surveillance, and enforcement of those specific parts of the HMR related to the transportation of hazmat by air to the FAA's Office of Security and Hazardous Materials (ASH). For more information see [http://www.faa.gov/about/office\\_org/headquarters\\_offices/ash/ash\\_offices](http://www.faa.gov/about/office_org/headquarters_offices/ash/ash_offices).

b) PHMSA has retained administration, surveillance, and enforcement of those parts of the HMR related to the qualification, requalification, maintenance, and use of high-pressure cylinders.

2) Title 29 CFR codifies other regulations regarding the safe handling of hazmat when it is not being offered, accepted, or carried with the intention of transporting hazmat. For example, when the cylinder is removed from an aircraft and is being held in the shop, hangar, or stores. The Occupational Safety and Health Administration (OSHA) promulgates and administers these regulations.

3) Title 14 CFR contains regulations specific to hazmat training, which relate to the transportation of hazmat by air. There are no specific 14 CFR regulations that deal with the maintenance of pressure cylinders that contain hazmat.

4) The Environmental Protection Agency (EPA) is another agency that becomes involved if the hazmat receives a waste classification. The EPA promulgates and enforces regulations related to mitigating or eliminating the effects of hazmat on the environment. Title 40 of the Code of Federal Regulations (40 CFR) contains these regulations. A few examples of aircraft hazardous waste are expended or expired chemical oxygen generators, oils, fuels, and/or other fluids.

### **3-4548 HIGH-PRESSURE CYLINDER MAINTENANCE.**

**A. Installed Pressure Cylinder Maintenance.** Pressure cylinders installed on a U.S.-registered aircraft are regulated by 14 CFR maintenance requirements appropriate to the type of aircraft and operation. In any case, the maintenance that may be accomplished while the cylinder is installed is restricted to the replacement, servicing, or inspection of those cylinders. This is consistent with the meaning of the term "maintenance" in 14 CFR part 1, § 1.1. Consistent with 49 CFR part 175, § 175.8, pressure cylinders that are installed in a U.S.-registered aircraft are not subject to the HMR. This exception only applies when the cylinder is installed on an aircraft.

#### **B. Removed Pressure Cylinder Maintenance.**

1) Pressure cylinders removed from U.S.-registered aircraft and which are being stored, handled, or otherwise moved without the intention of transport come under the

appropriate requirements of 29 CFR (OSHA). Refer to 29 CFR part 29, § 29.1910 for additional information.

2) Pressure cylinders removed from U.S.-registered aircraft are regulated under 49 CFR and are required to be approved and manufactured under the requirements of 49 CFR. Title 49 CFR requires these cylinders to be requalified on a calendar-time basis. You can find the requirements specific to a cylinder in 49 CFR part 108, §§ 180.3, 180.205, 180.209, and other CFRs. The 49 CFR cylinder requalification process contains specific requirements, including a hydrostatic test. However, a hydrostatic test, alone, does not satisfy the 49 CFR cylinder requalification requirements.

3) Cylinders that are not approved, qualified, or requalified under 49 CFR may not be installed in a U.S.-registered aircraft certificated in any category.

### **3-4549 PROCEDURES.**

**A. High-Pressure Cylinders' Maintenance Program Requirement.** Each operator of a U.S.-registered aircraft shall have maintenance and recordkeeping procedures consistent with their particular regulatory requirements for each high-pressure cylinder installed on the aircraft.

NOTE: Title 14 CFR provides for the continued airworthiness of the high-pressure cylinders through the maintenance instructions provided by the manufacturer of the aircraft. Those instructions will often refer to an accessory, instrument, or equipment manufacturer as the source of this information if the applicant shows that the item has an exceptionally high degree of complexity requiring specialized maintenance techniques, test equipment, or expertise. See part 25 appendix H,

- Procedures should be developed to ensure that these cylinders are not filled or serviced once they have reached the time when the 49 CFR requalification requirements become due. This should reflect that no servicing shall occur within 1 month of cylinder requalification and/or expiration of service life.
- The maintenance program shall include pre-installation instructions to inspect the cylinders prior to aircraft installation for serviceability. Damaged cylinders shall be rejected for installation per 49 CFR, as this affects cylinder integrity to retain high-pressure, which would impose a hazard.
- Title 49 CFR § 180.205(c) provides that a cylinder may be requalified at any time during or before the month and year that the requalification becomes due.
- A cylinder filled before the requalification becomes due may remain in service until the cylinder is emptied. A cylinder with a specified service life may not be refilled and offered for transportation after its authorized service life has expired.

**B. High-Pressure Cylinders Installed in U.S.-Registered Aircraft that are not DOT Cylinders Qualified Under 49 CFR.** All high-pressure cylinders shall meet the requirements and certification standards of 49 CFR and be a part called for by the aircraft Type Certificate

Data Sheet (TCDS). Those cylinders not meeting those standards must not be installed on aircraft and be replaced if installed.

**C. High-Pressure Cylinders Installed in U.S.-Registered Aircraft that are not DOT Cylinders Qualified Under 49 CFR and Operator Noncompliance.**

- Since AFS does not enforce the HMR, contact the enforcement section of the PHMSA Regional Office (RO) that covers the location.
- The Internet link for PHMSA RO: <http://www.phmsa.dot.gov/hazmat/about/org>.

**3-4550 FUTURE ACTIVITIES.** None.

**RESERVED.** Paragraphs 3-4552 through 3-4563.