



AEROSPACE STANDARD

AS6848™

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Adapter, Closed-Circuit Fuel Servicing - Standardization

RATIONALE

This document is a new standard that defines the aircraft-mounted Adapter Receiver and installation conforming to closed circuit refueling (CCR) presently used by both civil and military aircraft manufacturers. The Adapter Receiver defined herein interfaces with the MIL-PRF-52747F, which identifies an Adapter Receiver that conforms to drawing 13219E0479 *Receiver, Adapter, Closed-Circuit Fuel Servicing*. High-flow pressure refueling equipment for aircraft is controlled by AS5877, MIL-A-25896, and MS24484. Many rotorcraft in the world use the lower-flow rate closed circuit approach. The nozzle is specified by MIL-PRF-52747F. This document defines the Adapter Receiver end as it interfaces with the nozzle. The means of attachment (e.g., via bulkhead-type fitting) to the air or ground vehicle of the supplier-provided unit is not defined in this document and is not the intent of this document.

1. SCOPE

1.1 Classification

The Adapter Receiver specified herein has no classification. No distinction is made between commercial or military use.

1.2 Field of Application

This specification is for the Adapter Receiver that is used for either commercial or military application where the aircraft system utilizes pressure fuel-servicing systems. The Adapter Receiver shall be compatible with and mate with the international aircraft nozzle in accordance to MIL-PRF-52747F.

1.3 Adapter Receiver Configuration

The Adapter Receiver shall conform to the design interface envelope of Figure 1 and Appendix A of this document. The envelope restrictions are mandatory to assure that air or ground vehicle fuel system manufacturers and Adapter Receiver manufacturers have a common interface with which to work. This will assure compatibility between the available nozzles and the air or ground vehicle refueling system Adapter Receivers.

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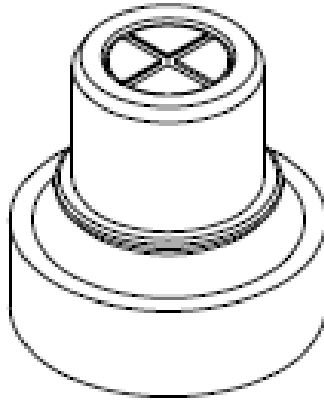


Figure 1 - Adapter Receiver definition reflecting drawing 13219E0479 (see Appendix A for dimensions)

2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 1-877-606-7323 (U.S. and Canada only) or 1-724-776-4970 (outside U.S. and Canada), www.sae.org.

ARP868	Method-Pressure Drop Tests for Fuel System Components
ARP4761	Guidelines for Conducting the Safety Assessment Process on Civil Aircraft, Systems, and Equipment
ARP5298	Aircraft Fueling Adapter Wear Limits
ARP8615	Fuel System Components: General Specification For
AS5877	Detailed Specification for Aircraft Pressure Refueling Nozzle

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9500, www.astm.org.

ASTM D910	Standard Specification for Aviation Gasolines
ASTM D1655	Standard Specification for Aviation Turbine Fuels (Jet A and Jet A-1)
ASTM D6227	Standard Specification for Grade 82 Unleaded Aviation Gasoline
ASTM D6615	Standard Specification for Jet B Wide-Cut Aviation Turbine Fuel

2.3 U.S. Government Publications

Copies of these documents are available online at <https://quicksearch.dla.mil>.

FED-STD-H28	Screw Thread Standards for Federal Services
MIL-A-25896	Adapter, Pressure Fuel Servicing, Nominal 2.5 Inch Diameter
MIL-DTL-5541	Chemical Conversion Coatings on Aluminum and Aluminum Alloys
MIL-DTL-5624	Turbine Fuel, Aviation, Grade JP-5 (NATO F-44).
MIL-DTL-83133	Turbine Fuel, Aviation, Kerosene Type, Grade JP-8 (NATO F-34) and Jet A-1 (NATO F-35)
MIL-PRF-7024	Calibrating Fluid, Aircraft Fuel System Components
MIL-PRF-52747F	Nozzle Assembly, Closed-Circuit Refueling, Standard and Arctic Service
MIL-STD-882	System Safety
MIL-STD-1629	Procedures for Performing a Failure Mode, Effects and Criticality Analysis (No S/S Document)
MS24484	Adapter, Pressure Fuel Servicing, Nominal 2.5 Inch Diameter

2.4 International Publications

MOD DEF STAN 91-91 (DERD 2494)	EN-Turbine, Kerosine Type Jet A-1 (NATO F-35); Joint Service Designation AVTUR
NATO STANAG 3105	Pressure Fuel Connections and Defueling for Aircraft - ED 7
NATO STANAG 3847	Helicopter In-Flight Refuelling (HIFR) Equipment

2.5 ISO Publications

Copies of these documents are available online at www.iso.org/store.

ISO 68	General Purpose Screw Threads
ISO 228-1	Pipe threads where pressure-tight joints are not made on the threads - Part 1: Dimensions, tolerances and designation

2.6 BSI Publications

Copies of these documents are available online at www.bsigroup.com.

BS1580	Specification for Unified Threads, Diameters ¼ inch and Larger
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3. REQUIREMENTS

3.1 Qualification

- 3.1.1 Adapter Receivers approved to this specification require qualification. Qualification testing shall consist of the tests specified in Section 4 and shall be performed in accordance with the provisions of 5.2.

3.1.2 Adapter Receivers for military applications approved to this specification shall be listed or approved for listing on the Qualified Products List (QPL) in accordance with the provisions of 5.2. Changes in product formulation, raw material, basic methods of manufacture, or design changes that affect form, fit, or function for Adapter Receiver listed or approved for listing on the QPL, without first notifying the responsible QPL agency, may result in the product being disqualified and removed from the QPL.

3.1.3 Adapter Receivers for commercial applications shall be approved in accordance with the particular user requirements on approval of equipment.

3.2 Materials

All materials used in the Adapter Receiver shall be chemically compatible with and not adversely affect the Adapter Receiver's operation or the quality of the fuel when used with the fuels specified in 3.3.10. The use of magnesium, manganese, copper, zinc, cadmium, or their alloys (alloys containing more than 5% of the subject materials) in parts wetted by fuel and subject to wear shall not be allowed. Corrosion-resistant metals should be used. Exterior surfaces susceptible to impact or contact with the airport apron or other surfaces shall be made of aluminum, stainless steel, plastic, or other material that will not cause a spark when contact is made. Unless suitably protected against electrolytic corrosion, dissimilar metals shall not be used in contact with each other. Materials subject to potential corrosion must be suitably coated with a process that will not contain any of the above restricted materials.

3.3 Design

3.3.1 Envelope and Interface

The Adapter Receiver shall interface with MIL-PRF-52747F Pressure Fueling Nozzle. The Adapter Receiver shall conform to dimensions as shown in Appendix A.

3.3.2 Flow Rate

The Adapter Receiver shall allow a flow rate of up to 150 U.S. GPM (567.8 l/min) with an operating pressure as specified in 3.3.12.1.

NOTE: Some applications (small airports) that require flow rates less than 150 U.S. GPM may be approved to this specification upon mutual agreement between the manufacturer and approving customer. All other requirements, except for the reduced flow rate, shall remain the same.

3.3.3 Operation

The Adapter Receiver shall accept a nozzle per MIL-PRF-52747F to allow fuel flow to or from the ground vehicle or aircraft. The operation of the nozzle lever will cause the Adapter Receiver sealing unit to open. This allows flow to or from the aircraft or other vehicle to which the nozzle is attached. Removal of the nozzle from the Adapter Receiver shall require the nozzle lever to be in the closed, no-flow position. It shall also be impossible to open the nozzle unless it is attached properly to a mating Adapter Receiver in good repair.

NOTE: Wear limits for the Adapter Receiver are similar to those defined in ARP5298 for MS24484 Adapters.

3.3.4 Interface Seal

The interface seal on the nozzle shall prevent leakage when the nozzle and Adapter Receiver are connected and open. The seal shall compensate for wear on the Adapter Receiver, wear on the nozzle, dimensional tolerances, side loading, and temperature changes.

3.3.5 Bonding Cable

A Bonding Cable is not used with the Adapter Receiver. Electrical bonding path to the airframe is provided via interface surface prepared for bonding in accordance with MIL-DTL-5541 chemical conversion coating on aluminum alloys.

3.3.6 Maintenance

Wherever possible, industry standard seals (packings or O-rings) shall be utilized provided they meet the requirements of this specification. The overhaul of the Adapter Receiver shall be possible by maintenance personnel with a minimum of training, tools, and equipment normally available commercially.

3.3.7 Protective Devices

A protective device such as a removable cap with a tether shall be provided for the Adapter Receiver to preclude FOD when the aircraft or ground vehicle is not being fueled. When the Adapter Receiver is connected to a nozzle, the dust cap shall hang free by the use of a sufficient tether/lanyard so that it shall not interfere with the refueling operation. The material of the cap shall be resistant to exposure to ultraviolet radiation, aviation fuels, and the combination of high humidity and temperature.

3.3.8 Dust Cap

A nonmetallic cap shall be provided to prevent dust and other foreign debris from entering the exit portion of the Adapter Receiver during handling and storage. The inlet shall use the removable cap to accomplish the same foreign debris protection.

3.3.9 Lubrication

The Adapter Receiver shall operate without the use of any lubrication.

3.3.10 Fuel Compatibility

The Adapter Receiver shall not malfunction when used with fuels conforming to MIL-DTL-5624, MIL-DTL-83133, MOD DEF STAN 91-91 (DERD 2494), ASTM D1655, ASTM D6227, ASTM D6615, and ASTM D910.

3.3.11 O-Rings, Packings, and Seals

O-rings or packings and associated seals shall be suitable for use in hydrocarbon fuels and meet the test requirements of this specification. Special shaped seals shall be kept to a minimum to minimize cost and facilitate servicing.

3.3.12 Pressures

3.3.12.1 System Operating Pressures

The Adapter Receiver shall be designed to refuel aircraft at a maximum operating pressure of 413.7 kPa (60 psig) with a surge pressure of up to 2068.5 kPa (300 psig).

3.3.12.2 Pressure Loss

The corrected gauge pressure loss across the Adapter Receiver and the mating nozzle (if used) shall be kept to a minimum. The testing shall be in accordance with ARP868.

3.3.12.3 Surge Pressure

See 3.3.12.1.

3.3.12.4 Proof Pressure

The Adapter Receiver, when connected to a test nozzle and opened, shall withstand pressures up to 2068.5 kPa (300 psig). The Adapter Receiver, when closed, shall withstand pressures up to 827.4 kPa (180 psig).

3.3.12.5 Burst Pressure

The Adapter Receiver, when connected to a test nozzle (refer to MIL-PRF-52747F) and opened, shall withstand pressures up to 2068.5 kPa (300 psig) without structural failure. The Adapter Receiver, when closed, shall withstand pressures up to 1654.8 kPa (240 psig) without structural failure. Seal leakage at this pressure shall not be considered a structural failure.

3.3.13 Strength

The Receiver Adapter shall withstand loads shown in AS5877 Figures 2 and 3 without leakage, distortion, or failure when tested in accordance with AS5877, 4.6.7.

NOTE: The Adapter Receiver may be connected to an adapter nozzle which is connected to an AS5877 Type I class D-1 Nozzle.

3.3.14 Electrical Continuity

Electrical continuity between the Adapter Receiver and nozzle shall be established through the attaching lug when the units are connected. The resistance from the Adapter Receiver and the nozzle shall be no greater than 10 Ω .

3.3.15 Construction

The Adapter Receiver shall withstand the qualification testing program outlined in Table 1. It should be understood that this testing program may not represent the normal daily operational requirements at many locations.

3.3.16 Interchangeability

All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable with the like part number regardless of the date of manufacture. Changes to detail parts of the Adapter Receiver shall be made only after such interchangeability has been proven. Possible requalification may be required if changes are made that affect interchangeability of a part(s) within the Adapter Receiver. A new manufacturer's model (part) number for the basic nozzle shall be created to control interchangeability with nozzles in service.

3.3.17 Parts Availability

Interchangeable parts or replacements for the Adapter Receiver shall be available for a minimum of 10 years after the last sale of a particular model Adapter Receiver.

3.3.18 Weight

The weight of the Adapter Receiver shall be kept to a practical minimum consistent with the anticipated required operation.

3.3.19 Threads

All fastener threads shall be in accordance with FED-STD-H28, BS1580, or ISO 68.

3.3.20 Locking of Threaded Parts

All threaded parts shall be locked to prevent loosening or detachment which would result in the part entering the system being fueled or cause failure to the Adapter Receiver. The use of locking compound shall be used only where it is necessary to facilitate overhaul or maintenance procedures in the field.

3.3.21 Quality Control System

The manufacturer shall operate under the manufacturer's approved quality control system.