



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject: FUEL TANK ACCESS COVERS

Date: 7/29/92
Initiated by: ANM-110

AC No: 25.963-1
Change:

1. PURPOSE. This advisory circular (AC) sets forth a means of compliance with the provisions of Part 25 of the Federal Aviation Regulations (FAR) dealing with the certification requirements for fuel tank access covers on turbine powered transport category airplanes. Guidance information is provided for showing compliance with the impact and fire resistance requirements of § 25.963(e).

2. RELATED FAR SECTIONS. The contents of this AC are considered by the FAA in determining compliance of the fuel tank access covers with § 25.963(e). Section 121.316 also requires each turbine-powered transport category airplane operated in air carrier or commercial service after October 30, 1991, to meet the standards of § 25.963(e).

3. BACKGROUND. Fuel tank access covers have failed in service due to impact with high speed objects such as failed tire tread material and engine debris following engine failures. Failure of an access cover on a wing fuel tank may result in the loss of hazardous quantities of fuel which could subsequently ignite.

4. IMPACT RESISTANCE.

a. All fuel tank access covers must be designed to minimize penetration and deformation by tire fragments, low energy engine debris, or other likely debris, unless the covers are located in an area where service experience indicates a strike is not likely. The rule does not specify rigid standards for impact resistance because of the wide range of likely debris which could impact the covers. The applicant should, however, choose to "minimize penetration and deformation" by testing covers using debris of a type, size, trajectory, and velocity that represents conditions anticipated in actual service for the airplane model involved. There should be no hazardous quantity of fuel leakage after impact. The access covers, however, need not be more impact resistant than the contiguous tank structure.

b. In the absence of a more rational method, the following criteria should be used for evaluating access covers for impact resistance.

(1) Covers located within 30 degrees inboard and outboard of the tire plane of rotation, measured from center of tire rotation with oleo strut in the nominal position, should be evaluated. The evaluation should be based on the results of impact tests using tire tread segments equal to 1 percent of the tire mass traveling at airplane rotation speed (V_R), and distributed over an impact area equal to 1 1/2 percent of the total tread area.

(2) For turbine powered airplanes, covers located within 15 degrees forward of the front engine compressor or fan plane measured from center of rotation to 15 degrees aft of the rearmost engine turbine plane measured from center of rotation, should be evaluated for impact from small fragments (shrapnel) with energies referred to in AC 20-128, Design Considerations for Minimizing Hazards Caused by Uncontained Turbine Engine and Auxiliary Power Unit Rotor and Fan Blade Failure, issued 3/9/88. The covers need not be designed to withstand impact from high energy engine fragments such as engine rotor segments or propeller blade fragments.

5. FIRE RESISTANCE.

a. All fuel tank access covers must be fire resistant. The definition of fire resistant, as given in Part 1 of the FAR, means the capacity to withstand the heat associated with fire at least as well as aluminum alloy in dimensions appropriate for the purpose for which they are used. For the purpose of complying with this requirement, the access cover is assumed to be subjected to fire from outside the fuel tank. The fuel tank access covers need not be more fire resistant than the contiguous tank structure.

b. Access covers, not as fire resistant as contiguous tank structures, should be tested for five minutes using a burner producing a 2000° F. flame. The test burner and procedures for instrumentation and calibration should be as defined in AC 20-135, Powerplant Installation and Propulsion System Component Fire Protection Test Methods, Standards, and Criteria, issued 2/6/90. The test cover should be installed in a test fixture representative of the actual installation in the airplane. Credit may be allowed for fuel as a heat sink if covers will be protected by fuel during all likely conditions. The maximum amount of fuel that should be allowed during this test is the amount associated with reserve fuel. Also, the static fuel pressure head should be accounted for during the burn test. There should be no burn-through or fuel leakage at the end of the tests; although damage to the cover and seal is permissible.



DARRELL M. PEDERSON
Acting Manager, Transport Airplane Directorate,
Aircraft Certification Service, ANM-100

2

Par 4

U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

**FORWARDING AND RETURN
POSTAGE GUARANTEED**

Official Business
Penalty for Private Use \$300

BULK MAIL POSTAGE & FEES PAID FEDERAL AVIATION ADMINISTRATION PERMIT NO. G-44
--