



SPECIAL PERMIT NO. 3153

This Special Permit is issued pursuant to the terms of Section 71.6(a) of the "Regulations for the Transportation of Dangerous Commodities by Rail" to authorize the shipment of oxygen, compressed by rail in Canada in filament-wound reinforced plastic (FRP) (full composite) (FC) seamless, aluminum lined cylinders for use as equipment components aboard aircraft, under conditions prescribed herein, and does not relieve any shipper or carrier from compliance with any requirement of the said Regulations, except as specifically stated.

1. BASIS

Letter dated February 17, 1988 from E.F.I. Corp., 751 Charcot Avenue, San Jose, California, 95131, U.S.A.

2. Commodity Classification

Non flammable gas 2.2

3. Commodity Name

Oxygen, compressed

4. Identification Number

1072

5. Regulation Affected

73.302

6. Authorized Shipper

E.F.I. Corp. its agents or distributors or customers.

7. Packaging Description

- a) Non C.T.C. specification filament-wound reinforced plastic seamless, full composite, aluminum lined cylinders made of definitely prescribed materials.

- (1) Design and construction of the cylinder and liner must be in compliance with E.F.I. Corp.

Drawings 7005-001 and 6385-001 and additional design and performance data on file with the Director of Operation.

- b) In addition, the cylinders shall be in full compliance with DOT FRP-1 Standard Revision I dated March 15, 1982 (178.AA) except as follows:

- i) 178.AA-3 Inspection by whom and where.

Inspections and verifications must be performed by an approved Independent Inspection Agency.

- ii) 178.AA-4 Duties of Inspector.

- (a) ***
- (b) ***
- (c) ***
- (d) ***
- (e) ***
- (f) ***

- (g) Furnish complete inspector's report (178.AA-16) to the maker of the cylinder, to the Director of Operation and upon request, to the purchaser. (See 178.AA-17).

- iii) 178.AA-5 Authorized Material and Identification of Material

- (a) ***

- (b) Filament material must be Kevlar 49 in compliance with proposed aerospace materials specificatio (AMS) 3901. Filament must be tested in accordance with ASTM D 2343-67 for strand strength, and ASTM D 3317-74 for denier. The strength and denier must be as follows:

(1) Stand strength - 400,000 PSI minimum.

(2) Denier must be at least 90 percent of the nominal value specified in AMS 3901. Denier of roving may be certified by the filament manufacturer.

- (c) ***
- (d) ***
- (e) ***

- iv) 178.AA-6 Manufacture

- (a) Liner (Add to end of paragraph). Each cylinder liner must be of seamless construction with integrally formed heads and bottoms. Manufacture is by backward extruded shell with threaded end formed by spinning.

- v) 178.AA-10 Pressure relief devices and protection for valves, relief devices, and other connections.
 - (a) Pressure relief devices and protection for valves and other connections must be in compliance with 49 CFR 173.34(d), and 173.301(g), except that the adequacy of the pressure relieving devices for each design must be verified in accordance with 178.AA-18(g) notwithstanding the requirement in CGA Pamphlet C-14.

- vi) 178.AA-15 Marking
 - (a) ***
 - (b) Required markings are as follows:
 - (1) "CTC SP 3153" or "CTC/DOT-E 8391"
 - (2) A serial number and an identifying symbol (letters); location of number to be just below or immediately following the CTC mark; location of symbol to be just below or immediately following the number. The symbol and numbers must be those of the maker.
 - (3) ***
 - (4) ***
 - (c) ***

- vii) 178.AA-18 Design Qualification Tests.
 - (a) General - except as authorized in 178.AA-10(a), qualification tests as prescribed in this paragraph shall have been performed on representative cylinders of each specific design prior to the initial shipment. All cylinders used for design qualification tests must be fabricated on the same equipment and subjected to the same processes as is used to produce cylinders intended for charging and shipment. All tests must be witnessed by an independent inspector. Test reports must be kept on file by the cylinder maker and made available to the independent inspector and the Director of Operation upon request.
 - (b) Revoked.
 - (c) Revoked.
 - (d) ***
 - (e) ***
 - (f) ***
 - (g) ***

- (h) Qualification test results - a report of all tests for each design describing test setup, procedure and results must be submitted to the Director of Operation. This report must include at least the following basic information on each cylinder tested: ***

8. SPECIAL REQUIREMENTS

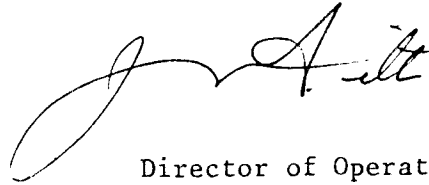
- a) Cylinder service life must not exceed 15 years.
- b) Use of these cylinders for underwater breathing is not authorized.
- c) Cylinders used in oxygen service must be in compliance with section 73.302(a)(5)(i) through (a)(5)(iv).
- d) Cylinder must be packaged in accordance with section 73.301(k).
- e) Each cylinder must be reinspected and hydrostatically retested every three years in accordance with section 73.34(e) as prescribed for CTC 3HT cylinders, except that the rejection elastic expansion criteria does not apply, permanent volumetric expansion must not exceed 5 percent of total volumetric expansion at test pressure and retest dates must be steel stamped on the outer exposed metallic surface of the cylinder neck, or marked on a label securely affixed to the cylinder and overcoated with epoxy. Reheat treatment or repair of rejected cylinders not authorized.
- f) A cylinder which has been subjected to the action of fire must not be returned to service.
- g) The Director of Operation shall be advised of any change in design of the cylinder.
- h) Cylinders are for use only as equipment components aboard aircraft and are authorized by Airworthiness Branch.

9. REPORTING REQUIREMENTS

The Director of Operation shall be advised of any incident involving loss of contents and shall be provided with a summary of experience before the expiration date of the Special Permit.

10. EXPIRY DATE

May 11, 1989

A handwritten signature in cursive script, appearing to read "J. A. Hill".

Director of Operation
Rail Safety Branch

Issued at Hull, Quebec
this 11th day of May 1988

Address all inquiries to:

Director of Operation
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National Transportation Agency
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K1A 0N9