



SPECIAL PERMIT 1465 REVISION NO. 4

This Special Permit is issued pursuant to the terms of Section 71.6(a) of the Canadian Transport Commission's "Regulations for the Transportation of Dangerous Commodities by Rail" to authorize the shipment by railway in Canada certain Flammable and Nonflammable gases in Filament wound reinforced plastic (FRP)(HW) seamless, aluminum lined compressed gas cylinders under conditions prescribed herein and does not relieve any shipper or carrier from compliance with any requirement of the Commission's Regulations, except as specifically stated.

1. BASIS

Letter dated July 6, 1984 from CNG Cylinder Corporation, 2275 Cherry Industrial Circle, Long Beach, California, 90805.

2. COMMODITY CLASSIFICATION

Flammable gas 2.1  
Nonflammable gas 2.2

3. COMMODITY NAME

Authorized commodities are those gases and mixtures of gases which are approved by the Code of Federal Regulations (CFR 49) for use with Specification DOT 3AL aluminum cylinders. Proper shipping name shall be as appropriate from Section 72.5 of the CTC Regulations for the Transportation of Dangerous Commodities by Rail.

4. IDENTIFICATION NUMBER

As appropriate from Section 72.5 of the CTC Regulations for the Transportation of Dangerous Commodities by Rail.

5. REGULATION AFFECTED

73.302.

6. AUTHORIZED SHIPPER

CNG Cylinder Corporation, its agents or distributors or customers.

7. PACKAGING DESCRIPTION

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

a(1) Design and construction must be in compliance with NCF Industries drawing A-SK-CP-0101 dated November 20, 1981, and CNG models 1042, 1330, 1342, 1035, 1050, 1335, 1350, 1032, 1140, 1360 and 1372 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-2 Standard dated January 15, 1982 (178.BB) except as follows:
- i) 178.BB-2 Type size and service pressure. Type 3HW cylinder consisting of resin impregnated continuous filament windings in the circumferential direction only over a seamless aluminum liner made in compliance with 178.BB-6(a) of this special permit; not over 1,000 pounds water capacity. The service pressure of the hoop wrapped cylinder shall not exceed 4500 psig.
  - ii) 178.BB-3 Inspection by whom and where  
Inspections and verifications must be performed by approved Independent Inspection Agency, Authorized Testing Inc., Riverside, California.
  - iii) 178.BB-4 Duties of the Inspector
    - (a) \*\*\*
    - (b) Verify compliance of aluminum liner with 178.BB-6(a) of this special permit. Verify compliance of filament and resin system components with the requirements specified in 178.BB-5 of this special permit.
    - (c) \*\*\*
    - (d) \*\*\*
    - (e) \*\*\*
    - (f) \*\*\*
    - (g) Furnish complete inspector's report (178.BB-16) to the maker of the cylinder, to the Director of Operation and upon request, to the purchaser. (See 178.BB-17).
  - iv) 178.BB-5 Authorized materials and identification of material
    - (a) \*\*\*
    - (b) Filament material must be commercial Type S or commercial Type E fiberglass. Filament must be tested in accordance with ASTM D-2343-79 or D-2290-79 and have a minimum strand strength as follows:
      - (1) Type S glass - 400,000 psi.
      - (2) Type E glass - 200,000 psi.
    - (c) Resin system must be flexible isophthalic polyester type with at least 15 percent, elongation. Resin system shall be tested on a sample coupon representative of the composite overwrap in accordance with ASTM D-638-80 for tensile

properties of plastics, and have a minimum tensile and shear strength of 2,000 psi. The shear strength shall be tested in accordance with ASTM D 2344.76.

v) 178.BB-6 Manufacture

a) \*\*\*

(1) \*\*\*

(2) \*\*\*

(3) Cylinder shell must be made from seamless tubing formed by the die and mandrel method. Spun closures are not authorized. Each end to be provided with a threaded closure. End contour to be hemispherical or ellipsoidal with a ratio of major to minor axis not exceeding two to one and with concave side to pressure.

(4) Samples for mechanical properties and bend test shall be taken for each batch of cylinders loaded in the solution heat treatment furnace. At least one cylinder shall be cut for such sampling for each lot of 200 or less liners produced. When two or more loads of cylinders at the heat treatment furnace are required to produce a lot of 200 or less liners the additional samples may be taken from a test ring subjected to the same heat treatment as the liners. The test ring arrangement shall be as described in CNG submission dated September 6, 1984 to this Commission. In addition the test ring shall be of the identical material code chemical composition as those of the production cylinders in the heat treated lot.

(5) Instead of the test prescribed in 49 CFR 178.46-12 a bend test using a mandrel diameter sized to produce a minimum of 9 percent strain in the outer surface of the specimen is authorized. Calculation of the mandrel diameter must be made by the formula contained in CNG Cylinder Corporation's application dated September 6, 1984.

vi) (a) \*\*\*

(b) Required markings are as follows:

(1) "CTC SP 1465" or "CTC/DOT E-8725"

(2) A serial number and an identifying symbol (letters);- location of number to be just below or immediately following the number. The symbol and numbers must be those of the maker.

(3) The Inspector's official mark must be placed near the serial number.

(4) Date of test (month and year).

(c) Size of marks to be at least 1/4" high if space permits.

(d) Additional markings are permitted in the composite, or may be stamped in low stress areas of the aluminum liner, other than the sidewall, provided the markings are not of a size and depth that will create harmful stress concentrations.

(e) Retest dates may be stamped in low stress areas of the top head.

vii) 178.BB-18 Design qualification tests

(a) General - Except as authorized in 178.BB-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 describing test setup, procedure and results must be submitted by Authorized Testing to the Director of Operation. This report must include at least the following basic information on each cylinder tested: \*\*\*

8. SPECIAL REQUIREMENTS

(a) For cylinders charged with oxygen, the following applies:

- i) Pressure in the container must not exceed 3,000 psig at 70°F.
  - ii) Cylinder threads must be straight threads. Tpered threads are not authorized.
  - iii) Brass valves only are authorized.
  - iv) Each cylinder must be cleaned in compliance with requirements of Federal Specification R.R.-c-901b dated August 1, 1967, Paragraph 3.7.2, 3.8.2, and 4.4.2.3 one cylinder selected at random from each lot of 200 or less must be tested as prescribed in R.R.-c-901b, Paragraph 4.4.2.3. and meet the standard of cleanliness specified.
- b) Cylinder life must not exceed 15 years.
  - c) Use of these cylinders for underwater breathing is not authorized
  - 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 imbedded in the epoxy coating in a permanent manner other than stamping. Retest dates may be steel stamped on the shoulder of the top head in accordance with 178.BB-15(d). 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) Prior to first shipment Authorized Testing will provide all prototype testing and submit report to this office before revisions can be considered.
  - h) The check analysis of the liner material shall include a verification of the lead and bismuth content of the material. The results of this analysis shall be included in the inspector's report of manufacture.

## 9. REPORTING REQUIREMENTS

Any incidents involving loss of contents of the package must be reported to the Director of Operation as soon as possible and a summary of shipping experience shall be rendered to this office before revisions can be considered.

10. EXPIRY DATE

October 4, 1986



Director of Operation  
Railway Transport Committee

Issued at Hull, Quebec  
this 4th day of October 1985

Address all inquiries to:

Director of Operation, RTC  
Canadian Transport Commission  
25 Eddy Street, 14th Floor  
Hull, P.Q.  
K1A 0N9