



SPECIAL PERMIT 2800 REVISION NO. 2

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 of non-CTC Specification high pressure cylinders by rail in Canada, 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 October 16, 1987 from NI Industries Inc.,
P.O. Box 7486, Longview, Texas, 75607

2. COMMODITY CLASSIFICATION

As appropriate from Section 72.5

3. COMMODITY NAME

As appropriate from Section 72.5. Commodities authorized are those gases compatible with and authorized by CFR 49 in DOT 3T cylinders except carbon monoxide and gases having any free hydrogen or sulphides.

4. IDENTIFICATION NUMBER

As appropriate from Section 72.5

5. REGULATION AFFECTED

73.34, 73.301(h), 73.302 and 73.304

6. AUTHORIZED SHIPPER

NI Industries Inc., its agents and customers.

7. PACKAGING DESCRIPTION

A non CTC specification seamless, steel cylinder. Design and construction must be in accordance with NI Industries, Inc. drawing Nos. CLA-1213 and CLA-1227 on file with the Director of Operaiton and U.S. DOT Specification 3T (CFR 49 Section 178.45) except for the following:

- (a) Inspections and verifications must be performed by an Independent Inspection Agency approved by the Commission .
- (b) The Inspector shall send a copy of the report to the Commission.

(c) 1. S178.45-2 type, size and service pressure

(a) Type - Each cylinder must be of seamless construction with the bottom convex to pressure.

(b) Size - The maximum water capacity is 120 pounds.

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2. S178.45-4 Duties of the inspector

(a) * * *

(b) * * *

(c) * * *

(7) Prior to initial production of any design or design change, verify that the design qualification tests prescribed in S178.45-6(f) have been performed with acceptable results.

3. S178.45-5 Material, steel

a. Only open hearth, basic oxygen, or electric furnace process steel of uniform quality is authorized. The steel analysis must conform to the following:

ANALYSES TOLERANCES

Element (percent)	Ladle analysis	Check analysis	
		Under	Over
Carbon	0.33 to 0.40	0.03	0.04
Manganese	0.60 to 1.05	0.04	0.04
Phosphorus (max)	0.015	0.01
Sulfur (max)	0.015	0.003
Silicon	0.15 to 0.35	0.02	0.03
Chromium	0.80 to 1.15	0.05	0.05
Molybdenum	0.15 to 0.25	0.02	0.02
*	*	*	*

4. S178.45-6 Manufacture

(a) thru (c) * * *

(d) Cylinder shells must be manufactured by the backward extrusion method.

(e) The thickness of the bottoms of cylinders is, under no condition, to be less than two times the minimum wall thickness of the cylindrical shell; such bottom thickness to be measured within an area bounded by a line representing the points of contact between the cylinder and floor when the cylinder is in a vertical position.

(f) Each new design and any significant change to any acceptable design must be qualified for production by subjecting at least three prototype samples to pressure cycling tests and burst tests as follows:

(1) Cycle Test. The cycle test must be performed on the completed cylinder after hydrostatic test by subjecting the cylinder to successive hydrostatic pressurizations from the lower cyclic pressure to the upper cyclic pressure at a rate not to exceed 10 cycles per minute. Adequate recording instrumentation shall be provided if equipment is to be left unattended for any period of time. Lower cyclic pressure must not exceed 10 percent of the upper cyclic pressure. Upper cyclic pressure must be at least equal to the minimum prescribed test pressure.

(2) Burst Pressure Test. The burst pressure test must be performed on the completed cylinder by hydrostatically pressurizing the cylinder to destruction. Rate of pressurization must not exceed 200 psi per second.

(g) In this specification "significant change" means a 10 percent or greater change in cylinder wall thickness, service pressure, or diameter; a 30 percent or greater change in water capacity or base thickness; any change in material; over 100 percent increase in size of openings; or any change in the number of openings.

(h) After all shell forming operations and prior to closing in, the cylindrical section of each shell must be examined in accordance with ASTM Standard A-388-80 using the angle beam technique. The equipment used must be calibrated to detect a notch equal to five percent of the design minimum wall thickness. Any discontinuity indication greater than that produced by the five percent notch shall be cause for rejection of the shell unless the discontinuity is repaired within the requirements of this specification.

5. S178.45-7 Wall thickness

(a) The minimum wall thickness must be such that the wall stress at the minimum specified test pressure does not exceed 67 percent of the minimum tensile strength of the steel as determined by the physical tests required in SS178.45-14 and 178.45-15. A wall stress of more than 90,500 psi is not permitted. In no case may wall thickness be less than .210 inch.

(b) * * *. Except P = minimum test pressure, at least $3/2$ service pressure.

(c) Does not apply.

6. S178.45-9 Openings

(a) Openings are permitted in cylinder head only.

(b) All openings must be threaded. Threads must be in compliance with the following:

(1) Each thread must be clean cut, even, without checks, and to gauge.

(2) Taper threads, when used, must be in compliance with one of the following:

(i) American Standard Pipe Thread (NPT) type must be in compliance with the requirements of Federal Standard H-28 (1978), Section 7.

(ii) National Gas Taper Thread (NGT) type must be in compliance with the requirements of Federal Standard H-28 (1978), Section 7 and 9.

(iii) Other tape threads in compliance with other standards may be used provided the length is not less than that specified for NPT threads.

(3) Straight threads when used must be in compliance with one of the following.

(i) National Gas Straight Thread (NGS) type must be in compliance with the requirements of Federal Standard H-28 (1978), Sections 7 and 9.

(ii) United Thread (UN) type must be in compliance with the requirements of Federal Standard H-28 (1978), Section 2.

(iii) Controlled Radius Root Thread (UNJ) type must be in compliance with the requirements of Federal Standard H-28 (1978) Section 4.

(iv) Other straight threads in compliance with other recognized standards may be used provided that the requirements in (4) below are met.

(4) All straight threads must have at least 6 engaged threads, a tight fit, and a factor of safety in shear of at least 10 at the test pressure of the cylinder. Shear stress must be calculated by using the appropriate thread shear area per Federal Standard H-28 (1978), Appendix A5, Section 3.

7 S178.45-10 Pressure relief devices and protection for valves and pressure relief devices.

(a) Must be as required by the applicable sections (See 73.34(d) and 73.301(g)).

(b) Pressure relief devices must be in compliance with section 73.302(c)(1).

8 S178.45-11 Hydrostatic test

* * * * *

(f) Each cylinder must be tested to at least 3/2 times its service pressure.

9. 178.45-13 Basic requirements for tension and Charpy impact tests.

(a) Two tension specimens and three Charpy impact specimens must be tested from one cylinder taken at random out of each lot of 200 or less.

(b) not applicable

(c) Each specimen for tension and Charpy impact tests must be taken from the side wall of the cylinder after heat treatment. The axis of the specimens must be parallel to the axis of the cylinder.

(d) The test cylinder need represent only one of the heats in a lot provided the other heats in the lot have been tested and have passed the tests.

(e) Test results must conform to the requirements specified in SS178.45-14 and 178.45-15.

(f) When the test results do not conform to the requirements specified, the cylinders represented by the tests may be reheat treated and the tests repeated. Paragraph (e) of this section applies to any retesting.

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10. S178.45-15 Acceptable results of tests.

(a) * * *

(1) * * *

(2) * * *

(3) * * *

(4) * * *

(5) Cylinders subjected to design qualification cycling tests must withstand at least 10,000 cyclic pressurizations without distortion or failure. At least one cylinder must be cycled using water as the pressurizing medium.

(6) Cylinders subjected to design qualification burst tests must withstand a pressure of at least 2.25 times the service pressure without failure. Failure must initiate in the sidewall in a longitudinal direction, and the cylinder must remain in one piece.

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11. S178.45-17 Markings

(a) * * *

(b) Required markings are as follows:

(1) "CTC SP 2800" or "CTC/DOT-E 9370" followed by the service pressure.

(2) The serial number

(3) Inspector's official mark near the serial number.

(4) The date of the test (for example "5-72" for May 1972), so placed that dates of subsequent tests may be easily added.

(5) Rejection elastic expansion (REE) in cubic centimeters (cc) near the date of test.

(c) Markings must be at least 1/4 inch high

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8. SPECIAL REQUIREMENTS

(a) Prior to the initial shipment of cylinders made to any specific design, a report of test results specified in 178.45-6(f) must be submitted to the Director of Operation, RTC.

(b) These cylinders may not be used for carriage of gases that would cause hydrogen embrittlement of the steel.

(c) Filling limits specified in 49 CFR 173.302(c) are not authorized. Under no circumstances are these cylinders to be filled to a pressure exceeding the marked service pressure at 70°F.

(d) Each cylinder shall be retested at least every five years as prescribed in section 73.34(e) for 3AA cylinder except that the minimum test pressure shall be 1.5 times the service pressure.

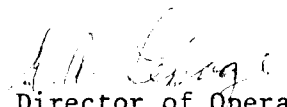
(e) Cylinder manufactured prior to the issuance date of this permit and bearing serial No.'s 221201 through 221500 inclusive and 221751 through 222050 inclusive for which a certified report is on file with the Director of Operations may also be marked in accordance with Clause 7(c)(ii).

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

October 26, 1988


Director of Operation
Railway Transport Committee

Issued at Hull, Quebec
this 26th day of October, 1987

Address all inquiries to:

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