DEPARTMENT OF TRANSPORTATION
HAZARDOUS MATERIALS REGULATIONS BOARD
WASHINGTON, D.C. 20590

Title 49--TRANSPORTATION

Chapter I—Department of Transportation

[Docket No. HM-5; Amdts. 173-1, 177-1]

PART 173—SHIPPERS

PART 177—SHIPMENTS MADE BY WAY OF COMMON, CONTRACT, OR PRIVATE CARRIERS BY PUBLIC HIGHWAY

Stress Corrosion in MC 330 and MC 331 Cargo Tanks

Transporters of anhydrous ammonia in MC 330 and MC 331 cargo tanks (constructed of quenched and tempered steels) have recently experienced numerous occurrences of a phenomenon known as stress corrosion cracking. Stress corrosion cracking is the spontaneous failure of a metal resulting from the combined effects of corrosion and stress. Fortunately, the stress corrosion cracking experienced in MC 330 and MC 331 cargo tanks to date has been such that only minor leaks have occurred with sufficient warning being provided to the operator to facilitate corrective action. However, stress corrosion cracking in the pressure vessels concerned could result in a much more drastic failure wherein an entire section of the vessel could fail and thereby permit a catastrophic escape of the vessel's contents.

Under § 173.315 of the hazardous materials regulations the MC 330 and MC 331 quenched and tempered steel cargo tanks concerned are authorized for the transportation of 23 different kinds of gas. All of these materials are transported under high pressure. Many of these commodities are toxic or flammable.

The purpose of this amendment is to require the immediate inspection of MC 330 and MC 331 quenched and tempered cargo tanks to determine the need for repair, and to insure the product retention integrity of the vessels involved. The priority of inspection is based on the commodities transported in the past and the existing or potential use of the vessel. Tests already conducted have resulted in the withdrawal from service of a large number of defective tanks.

Recognizing the potential hazard of anhydrous ammonia so far as it contributes to the stress corrosion cracking of quenched and tempered steel MC 330 and MC 331 cargo tanks this amendment simultaneously requires inhibiting and preventive measures to reduce the stress corrosion cracking in future operations. The introduction of a minimum of 0.2 percent water by weight to the anhydrous ammonia shipped after January 31, 1968, is being required to inhibit the corrosive action of anhydrous ammonia. Purging of cargo tanks before loading with anhydrous ammonia is being required to remove the air in the tank, since this procedure has also been proved to be an effective deterrent against stress corrosion cracking. (The presence of carbon dioxide and oxygen in the tanks under pressure have been shown to be contributory to the corrosion cracking.)

Research by the affected industries has also indicated that metallurgical grade anhydrous ammonia (i.e., at least 99.995 percent pure) will not cause stress corrosion cracking if the vessel has been properly purged of air. This amendment makes appropriate provisions for this special use.

This amendment is addressed to known stress corrosion conditions. There are still some important operating conditions involving potential stress corrosion cracking which may be uncovered during the required inspection. There is reason to suspect that the sulfides, which may be found in "sour" liquefied petroleum gas, are potential contributors to stress corrosion cracking.

Reference is made in the amendments to Part 177 to the "ASME Code, 1965 Edition." Copies of this code are available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, N.Y. 10017, for a nominal charge.

As a situation exists which demands immediate adoption of this regulation in the interests of public safety, it is found that notice and public procedure hereon are impractical and good cause exists for making this amendment effective without notice and in less than 30 days.

In accordance with the Federal Reports Act of 1942, the reporting and recording requirements contained in Amendment 177-1 have been approved by the Bureau of the Budget under Docket No. 4S68001.

In consideration of the foregoing, Parts 173, and 177 of the Hazardous Materials Regulations of the Department of Transportation (49 CFR, Parts 170-190) are hereby amended as follows, effective January 31, 1968. This amendment is made under the authority of sections 331-835 of title 18, United States Code, and section 9 of the Department of Transportation Act (49 U.S.C. 1657).

Issued in Washington, D.C., on January 26, 1968.

LOWELL K. BRIDWELL,
Administrator,
Federal Highway Administration.

I. By amending Part 173 as follows:

(A) Section 173.315(a)(1) Table is amended by adding the following Note 14 at the end thereof:

Kind of gas	Maximum permitted filling density		Specification container required	
	Percent by weight (see Note 1)	Percent by volume (see par. (f) of this section)	Type (see Note 2)	Minimum design pressure (p.s.i.g.)
(*Change*) Anhydrous ammonia (see Note 14).	56	82; see Note 6	ICC-51, MC-330, MC-331, see Note 12.	265.

Note 14: Specifications MC 330 and MC 331 cargo tanks constructed of other than quenched and tempered steel ("NQT") are authorized for all grades of anhydrous ammonia. Specifications MC 330 and MC 331 cargo tanks constructed of quenched and tempered steel ("QT") (see marking requirements of § 177.823(b)(5) of this chapter) are authorized for either anhydrous ammonia having a minimum water content of 0.2 percent by weight, or for metallurgical grade anhydrous ammonia (at least 99.995 percent pure). Any tanks going into anhydrous ammonia service which have either been in other service or have been opened for inspection, test, or repair—including new tanks—shall be cleaned of the previous product and shall be purged of air before loading. See §§ 173.427(a)(3) and 177.817(a)(1) of this chapter for special shipping paper requirements.

(B) Section 173.427(a) is amended by adding the following new subparagraph at the end thereof:

§ 173.427 Shipping papers.

(a) * * *

(3) For shipments of anhydrous ammonia in specifications MC 330 and MC 331 cargo tanks constructed of quenched and tempered steel, the shipper must also show "(0.2% water)" or "(99.995%)", as appropriate, to indicate suitability for shipment in such tanks as authorized by § 173.315(a)(1) Note 14.

II. By amending Part 177 as follows:

(A) Section 177.817(a) is amended by adding the following new subparagraph at the end thereof:

§ 177.817 Shipping papers.

(a) * * *

(1) Carriers must not accept for transportation nor transport anhydrous ammonia in specifications MC 330 and MC 331 cargo tanks constructed of quenched and tempered steel, unless the shipping paper is marked "(0.2% water)" or "(99.995%)" as appropriate, to indicate suitability for shipment in such tanks as authorized by § 173.315(a)(1) Note 14 of this chapter.

(2) * * *

§ 173.315 Compressed gases in cargo tanks and portable tank containers.

(a) * * *

(1) * * *

(B) Section 177.823(b) is amended by adding the following new subparagraph at the end thereof:

§ 177.823 Required exterior marking on motor vehicles and combinations.

(b) * * *

(5) Specifications MC 330 and MC 331 cargo tanks shall be durably marked in letters at least two inches high in the area immediately adjacent to the identification plate, "QT" to indicate construction of quenched and tempered steel or "NQT" to indicate construction of other than quenched and tempered steel.

(C) Section 177.824 is amended by amending paragraphs (a)(1), (e)(3)(ii), (f), (g), and (h), and by adding a new paragraph (i), to read as follows:

§ 177.824 Retesting and inspection of cargo tanks.

(a) * * *

(1) Every cargo tank, except specs. MC 330 and MC 331 cargo tanks, must comply with the testing and marking requirements prescribed in paragraphs (a), (b), (c), (d), and (h) of this section. In addition to the requirements contained in § 173.33(c) of this chapter, spec. MC 330 cargo tanks must comply with the testing and marking requirements prescribed in paragraphs (a), (e), (f), and (h) of this section; and spec. MC 331 cargo tanks must comply with the testing and marking requirements prescribed in paragraphs (f) and (h) of this section.

(e) * * *

(3) * * *

(ii) Except for the internal test, the test required by this subparagraph shall be made either by the magnetic particle method, the radiographic method, or the ultrasonic method. If the magnetic particle method is used, the test shall be conducted in accordance with appendix VI, section VIII, ASME Code, 1965 Edition, except that permanent magnets may not be used for this purpose. The ultrasonic method may be used only in full compliance with the provisions of Case Interpretation 1275N of the ASME Code, 1965 Edition. If the radiographic method is used, the test shall be conducted in accordance with the requirements of section VIII, of the ASME Code, 1965 Edition. The internal test shall be made by the wet fluorescent magnetic particle method in accordance with appendix VI, section VIII, of the ASME Code, 1965 Edition. If any failure to comply with the Code under which the tank was built, or if any defective plate or weldment is disclosed by the test, the defect shall be repaired in accordance with the provisions of the Code under which the tank was built before replacing the vehicle in service.

(f) *MC 330 and MC 331 cargo tanks.* (1) Every quenched and tempered steel cargo tank constructed in accordance with specification MC 330, except tanks not equipped with manways, or in accordance with MC 331, which have contained either anhydrous ammonia or liquefied petroleum gas shall be internally inspected by the wet fluorescent magnetic particle method. This test is in addition to any test which may be required in paragraph (e) of this section. This subparagraph does not apply to any cargo tank which was so tested and which has been used exclusively in transporting, since the date of that inspection, the materials described in Note 14 to § 173.315(a)(1) or subparagraph (4) of this paragraph.

(2) The inspection required by subparagraph (1) of this paragraph shall be conducted in accordance with applicable part of appendices VI or VIII, section VIII, of the ASME Code, 1965 Edition. An alternating current yoke shall be used in the fluorescent magnetic particle method. Internal inspection shall include: all internal welds; all areas extending at least 2 inches from such welds in all directions; all internal surfaces at least 2 inches in all directions from all exterior welds; entire internal surface of tank heads. If any cracks are found the entire interior surface of the tank shall be inspected.

(3) Schedule of testing for MC 330 and MC 331 quenched and tempered steel cargo tanks.

(i) Any cargo tank which has at any time been used to transport anhydrous ammonia shall not be used for the transportation of liquefied petroleum gas after March 31, 1968, and shall not be

used to transport any other flammable compressed gas or anhydrous ammonia after April 30, 1968, unless it has been tested in accordance with subparagraph (1) of this paragraph, and unless all use after that test has been in accordance with Note 14 to § 173.315(a)(1) of this chapter.

(ii) Any cargo tank which has never been in anhydrous ammonia service, and which has been used to transport liquefied petroleum gas shall not be used to transport any flammable compressed gas after December 1, 1968, unless it has been tested in accordance with subparagraph (1) of this paragraph, and unless all use after that test has been exclusively in the transportation of liquefied petroleum gases which meet specifications NGPA (National Gas Processors Association) 2140 (1962 Edition).

(4) Cargo tanks which have been used exclusively to transport at least 99.995 percent pure anhydrous ammonia are exempt from the testing requirements in this paragraph. Cargo tanks which have been used exclusively to transport liquefied petroleum gases which meet specifications NGPA 2140 (1962 Edition) are also exempt from those testing requirements. Any such exemptions shall be described in the report required by subparagraph (6) of this paragraph.

(5) All cracks and other defects found shall be repaired in accordance with the repair procedures described in section VIII, of the edition of the ASME Code under which the tank was built. Any tank requiring welded repairs shall meet all the requirements of § 178.337-16.

(6) Each motor carrier operating any MC 330 or MC 331 cargo tank of any type steel shall submit to the Director, Bureau of Motor Carrier Safety, Federal Highway Administration, Department of Transportation, Washington, D.C. 20591, an initial written report before May 1, 1968. This initial report shall include the following information:

(i) Carrier's name, address, and telephone number;

(ii) A list of all MC 330 and MC 331 cargo tanks in that carrier's service on the date of the report (other than cargo tanks used in interchange service which are reported by another carrier), including the following information:

(a) Carrier's equipment number;
(b) Manufacturer's name;
(c) Manufacturer's serial number;
(d) MC 330 and MC 331;
(e) "QT" (Quenched and tempered) or "NQT" (Not quenched and tempered);

(iii) A supplemental report shall be submitted for any such tank placed in service after the date of the initial report.

(7) Each motor carrier operating any MC 330 or MC 331 cargo tank of quenched and tempered steel shall submit to the Director, Bureau of Motor Carrier Safety, Federal Highway Administration, Department of Transportation, Washington, D.C. 20591, a written report of each inspection required by this paragraph, and any repairs required by that inspection, signed by a responsible officer of the carrier. Each report shall be submitted within 30 days after the inspection is made and shall contain the following information:

(i) Carrier's name, address, and telephone number;

(ii) Complete name plate data required by specification MC 330 or MC 331;

(iii) Carrier equipment number;

(iv) Vessel material specification number;

(v) Whether or not stress relieved after fabrication and after repair;

(vi) Name and address of the person performing the test;

(vii) Nature and severity of defects found, if any. Information should be furnished to indicate location of defects, such as in welds, heat-affected zone, liquid phase, vapor phase, around pads, head-to-shell seam, or other possible locations. If no defect or damage was discovered, that fact shall be reported;

(viii) How repairs were made, by what method, and by whom;

(ix) Disposition of the tank;

(x) Whether use for transportation of anhydrous ammonia, liquefied petroleum gas, or both.

(8) A copy of each report required by this paragraph shall be retained by the carrier during the period the tank is in the carrier's service and for 1 year thereafter.

(9) Each carrier offering an MC 330 or MC 331 cargo tank for sale or lease shall provide a copy of the results of any tests made under this paragraph for inspection by each prospective purchaser or lessee.

(g) *Special testing required by the Department.* Upon the showing of probable cause of the necessity for retest, the Department may require any cargo tank to be retested at any time in accordance with the requirements prescribed for its periodic retest.

(h) *Test date markings.* The date of the last test shall be durably marked on the tank in letters not less than 1¼ inches high, in legible colors near the metal certification plate. The date shall be followed by the letter "V" for visual (or magnetic particle, x-ray, etc.) test; or "H" for hydrostatic (or pneumatic) test.

(i) *Withdrawal of certification.* If, as the result of an accident or for any other reason the cargo tank ceases to comply with the applicable specification, the carrier shall remove the metal certification plate or otherwise make it illegible (see § 173.22(b) of this chapter). The details pertaining to action necessitating withdrawal of certification shall be recorded, dated, and signed on the written certificate and the vehicle owner shall retain the certificate for a period of at least 3 years after the date of withdrawal of the certificate.

[F.R. Doc. 68-1241; Filed, Jan. 30, 1968; 8:49 a.m.]