



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

1059

[ 49 CFR Parts 173, 177, 178 ]

[ Docket No. HM-113; Notice No. 73-11 ]

MC 330 AND MC 331 CARGO TANKS  
Stress Corrosion Cracking

The Hazardous Materials Regulations Board is considering amendments to certain sections of the Department's Hazardous Materials Regulations, which pertain to shipments of anhydrous ammonia in MC 330 and MC 331 cargo tanks. These sections are: §§ 173.33, 173.315, 173.427, 177.817, 177.824, and 178.337.

In 1968 the Department first sought to prevent or reduce stress corrosion cracking in these tanks by amendments to regulations (IIM-5, 33 FR 2389, 7493). Required thereunder was immediate inspection of all MC 330 and MC 331 cargo tanks, in order to determine need for repair and to insure product retention integrity. When shipped in quenched and tempered tanks, anhydrous ammonia had to either be inhibited with 0.2% water by weight or be at least 99.995% pure. Any tank, new or used, which had been opened for inspection, test, or repair—or any tanks which had been used for other than ammonia—had to be of air before loading.

In 1971 the Department became concerned with indications that the stress corrosion cracking problem remained unsolved. On November 20, 1971, a Notice of Public Meeting was issued requesting participation by persons " . . . having knowledge concerning the existence or extent of stress corrosion cracking, and methods by which it can be prevented . . ." (36 FR 22192). The meeting was held on December 14, 1971. Considerable evidence substantiated that the cracking problem either remained or had reappeared. There was even evidence of instances where cracking was so extensive as to require that cargo tanks be scrapped.

The meeting produced varying opinions as to the cause of the cracking. Since then, the National Association of Corrosion Engineers (NACE) has studied the problem and has filed a petition for rule-making, seeking amendments to the rules designed: (1) To provide interim measures to reduce the probability of cracking; (2) to provide detection of and control over stress corrosion cracking occurring during the interim; and (3) to measure the effectiveness of the recommended requirements until the matter is further researched.

Believing that the NACE petition warrants prompt consideration of action, the Board issues this Notice. The rules proposed for the most part based upon information in the NACE petition.

The proposals would add certain tank inspection and test requirements; require notice to the Bureau of Motor Carrier Safety when a tank is removed from service; further restrict the use of MC 330 or MC 331 cargo tanks constructed from quenched and tempered steel by precluding their use for transporting anhydrous ammonia when a water inhibitor is not added; require that shippers monitor and periodically check the amount of water inhibitor added in order to assure close adherence to the 0.2% water-by-weight shipping requirement, when quenched and tempered tanks are used; specify the types of water to be added as an inhibitor; require shipping paper notations showing the more restricted use for tanks of quenched and tempered steel construction; specify certain requirements for MC 331 tanks regarding post-weld heat treatment; and require a carrier which offers to sell or lease a MC 330 or MC 331 cargo tank to provide a copy of the results of any required tests to each prospective purchaser or lessee.

If, after response to this Notice, the need for rulemaking is still indicated, the Board is ready to consider further action.

In consideration of the foregoing, it is proposed to amend 49 CFR, Parts 173, 177, and 178 as follows:

PART 173—SHIPPERS

1. In § 173.33, paragraph (e)(1) would be amended and paragraphs (e)(10) through (e)(13) would be added to read as follows:

§ 173.33 Cargo tank use authorization.  
\* \* \* \* \*  
(e) \* \* \*

(1) Each cargo tank must be tested and inspected at least once every 5 years in accordance with paragraph (e) (2), (3), (4), (10), (11), and (12) of this section. A cargo tank that has been in service more than 5 years since the last test or retest, must be tested and inspected according to the provisions of this paragraph by July 1, 1974. The tank and each safety relief valve of any cargo tank used for the transportation of chlorine must be retested at least once every 2 years.

(10) Each MC 330 and MC 331 cargo tank constructed of quenched and tempered steel or those constructed of other than quenched and tempered steel but without post-weld heat treatment, that has contained anhydrous ammonia, must be internally inspected by the wet fluorescent magnetic particle method immediately prior to and in conjunction with the performance of any hydrostatic retest prescribed in this section. The wet

fluorescent magnetic particle inspection must be in accordance with Section V of the ASME Code and CGA Technical Bulletin TB-2 (revision 12-21-72).

NOTE: A tank that has been wet fluorescent magnetic particle inspected, in the manner prescribed by paragraph (e)(10) of this section on or after January 1, 1971, and not thereafter subjected to weld repairs is deemed to have met the inspection requirements of paragraph (e)(10) except that this tank must be re-inspected in the manner prescribed by paragraph (e)(10) prior to January 1, 1978, and at least once every five years thereafter.

(11) All cracks and other defects found must be repaired in accordance with the repair procedures described in CGA Technical Bulletin TB-2 (revision 12-21-72) and Section VIII of the ASME Code under which the tank was built. Each tank having cracks and defects requiring welded repairs must meet all of the requirements of section 178.337-16 of this subchapter except that post-weld heat treatment after minor weld repairs is not required. When any repairs are made, including those by grinding, the tank must again be examined by the wet fluorescent magnetic particle method after hydrotest to assure that all defects have been removed.

(12) Reports required. (i) Each motor carrier, whether common, contract, or private, operating MC 330 or MC 331 tank vehicles shall make a written report in duplicate, concerning all such tanks inspected or tested in accordance with this section. The report must contain the following:

- (A) Carrier's name, address of principal office, and telephone number;
- (B) Complete name plate data required by specification MC 330 or MC 331, including data required by ASME Code;
- (C) Carrier's equipment number;
- (D) Statement indicating whether or not the tank was stress relieved after fabrication;
- (E) Name and address of the person performing the test and date of test;
- (F) A statement of the nature and severity of defects found, if any. In particular, information must be furnished to indicate location of defects detected, 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, the fact must be reported;
- (G) A statement of how repairs were made, by what method, by whom, and the date performed. Also, a statement of whether or not the tank was stress relieved after repairs and, if so, whether full or local stress relieving was performed;
- (H) A statement of the disposition of cargo tank; and

(I) A statement of whether the cargo tank is used for transportation of anhydrous ammonia, liquefied petroleum gas, or both. Also, where the cargo tank is used for anhydrous ammonia, a statement indicating whether the commodity was certified by the shipper as containing 0.2 percent water by weight or being 99.995 percent pure anhydrous ammonia.

(ii) *Filing of reports.* The report must be filed with the Director of the Bureau of Motor Carrier Safety, Federal Highway Administration, Washington, D.C. 20590, Attention: Regulations Division. A copy of the report must be retained by the carrier at its principal place of business during the period the tank is in the carrier's service and for 1 year thereafter. However, upon a written request to, and with the approval of, the Director, Regional Motor Carrier Safety Office, for the region in which a motor carrier has his principal place of business, the carrier may maintain the reports at a regional or terminal office.

(iii) *Supplying reports.* Each carrier offering a MC 330 or MC 331 cargo tank for sale or lease must provide a written copy of any reports made under this paragraph to each prospective purchaser or lessee.

(13) *Record of inspections.* (i) Each carrier shall prepare a record of inspections required by paragraphs (e) (10) and (e) (11) of this section. The inspection record shall be signed by the person conducting the inspections, and retained with the carrier's file copy of the report submitted under paragraph (e) (12) of this section. The inspection record must identify by cargo tank manufacturer's serial number each cargo tank inspected and also indicate the name of the inspecting agency and person, the nature of any defects or damage discovered, and must state how the defect or damage was corrected and by what method. If no defect or damage was discovered upon inspection this fact must also be reported.

(ii) The reports required of a carrier by paragraphs (e) (12) and (13) of this section may be combined in a single report.

2. In § 173.315 paragraph (a) (1), Note 14 would be amended to read as follows:

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

- (a) \* \* \*
- (1) \* \* \*

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 subchapter) are authorized for anhydrous ammonia having a minimum water content of 0.2 percent by weight. Any addition of water must be made using steam condensate, de-ionized, or distilled water. Any tank being placed in anhydrous ammonia service which has been in other service or has been opened for inspection, test, or repair, including a new tank, must be cleared of the previous product and must be purged of air before loading. See §§ 173.427(a) (3) and 177.817(a) (1) of this subchapter for special shipping paper requirements.

Any person offering for transportation anhydrous ammonia in a specification MC 330 or MC 331 cargo tank constructed of QT steel shall perform a periodic analysis for prescribed water content in the ammonia. The analysis must be performed at the time the cargo tanks are loaded. At least one load in each 10 loads or one load in every 24-hour period, whichever is less frequent, must be analyzed for prescribed water content. In those cases where water is added at the time of loading, quantitative provisions must be made to assure water injection equipment is operating. If the water injection equipment becomes inoperative, suitable corrective maintenance must be performed after which the first load must be analyzed for prescribed water content.

The analysis method to be used must be as prescribed in CGA Pamphlet G-2.2, Tentative Standard Method for Determining Minimum of 0.2% water in Anhydrous Ammonia, 1973 Edition.

Records indicating the results of the analysis taken, as required by this section, must be retained for 2 years and must be open to inspection by a duly authorized representative of the Department.

2. In § 173.427, paragraph (a) (3) would be amended to read as follows:

§ 173.427 Shipping papers.

(a) \* \* \*

(3) For shipments of anhydrous ammonia in specification MC 330 and MC 331 cargo tanks constructed of quenched and tempered steel, the shipper shall also show "(0.2 percent water by weight)" to indicate suitability for shipment in the tank as authorized by § 173.315(a) (1) Note 14. For shipments of anhydrous ammonia that do not contain 0.2 percent water by weight, the shipper must also show "(not to be loaded into Q and T cargo tanks)."

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

1. In § 177.817, paragraph (a) (1) would be amended, paragraph (a) (2) would be redesignated (a) (3), and a new paragraph (a) (2) would be added to read as follows:

§ 177.817 Shipping papers.

(a) \* \* \*

(1) A carrier may not accept for transportation nor transport anhydrous ammonia in specification MC 330 and MC 331 cargo tanks constructed of quenched and tempered steel, unless the shipping paper is marked "(0.2 percent water by weight)" to indicate suitability for shipment in such tanks as authorized by § 173.315(a) (1) Note 14 of this subchapter.

(2) A carrier may not accept for transportation or transport anhydrous ammonia that does not contain 0.2 percent water by weight in specification MC 330 and MC 331 cargo tanks constructed of quenched and tempered steel, nor may a carrier accept such shipment for transport in any "NQT" cargo tank unless the shipping paper is marked "(NOT TO BE LOADED INTO Q AND T CARGO TANKS)" as prescribed by § 173.315(a) (1) Note 14 of this subchapter.

(2) In § 177.824, paragraph (f) would be amended as follows:

**§ 177.824 Retesting and inspection of cargo tanks.**

(f) *Reporting requirements.* Each motor carrier shall file with the Director, Bureau of Motor Carrier Safety, Federal Highway Administration, Department of Transportation, Washington, D.C. 20590, a written listing of all MC 330 and all MC 331 cargo tanks he has in service. Each motor carrier, upon placing in service or withdrawing from service any MC 330 or MC 331 cargo tank (other than cargo tanks used in interchange service which are reported upon by another carrier), shall file a supplemental report with the Bureau.

(1) The initial listing and each subsequent report must include the following information:

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

(ii) One of the following statements, "Cargo tank placed in service" or "Cargo tank withdrawn from service," as appropriate, followed by the date of placement or removal;

(iii) The carrier's equipment number, manufacturer's name, manufacturer's serial number, specification MC 330 or MC 331, and "QT" (Quenched and tempered) or "NQT" (Not quenched and tempered).

(2) A copy of each report required by this paragraph must be retained by the carrier at its principal place of business during the period the tank is in the carrier's service and for 1 year thereafter. However, upon a written request to, and with the approval of, the Director, Regional Motor Carrier Safety Office, for the region in which a motor carrier has his principal place of business, the carrier may maintain the reports at a regional or terminal office.

**PART 178—SHIPPING CONTAINER SPECIFICATIONS**

In § 178.337-1, paragraph (f) would be amended by adding the following sentence to the end of the paragraph.

**§ 178.337 Specification MC 331; cargo tanks constructed of steel, primarily for transportation of compressed gases as defined in the Compressed Gas Section.**

**§ 178.337-1 General requirements.**

(f) . . . A tank used for anhydrous ammonia must be post-weld heat treated. The post-weld heat treatment must be as prescribed in the ASME Code, but in no event at less than 1050° F. tank metal temperature.

Interested persons are invited to give their views in writing on this proposal. Communications should identify the docket number and be submitted in duplicate to the Secretary, Hazardous Materials Regulations Board, Department of Transportation, Washington, D.C. 20590. Communication received on or before April 9, 1974 will be considered before final action is taken on these proposals. All comments received will be available for examination by interested persons at the Office of the Secretary, Hazardous Materials Regulations Board, Room 6215 Buzzard Point Building, Second and V Streets, SW., Washington, D.C. 20590, both before and after the closing date for comments.

(Sections 831-835 of title 18, United States Code, and Section 9 of the Department of Transportation Act (49 U.S.C. 1657).)

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Board Member for the  
Federal Highway Administration.

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