HM 183
183A

Friday
September 7, 1990

federal register

Part III

Department of Transportation

Research and Special Programs Administration

49 CFR Part 107 et al.

Requirements for Cargo Tanks; Revisions, Response to Petitions for Reconsideration; Final Rule

DEPARTMENT OF TRANSPORTATION

Research and Special Programs Administration

49 CFR Parts 107, 171, 172, 173, 176, 177, 178 and 180

[Docket Nos. HM-183, 183A; Amdt. Nos. 107-20, 171-100, 172-115, 173-212, 176-27, 177-71, 178-89, 180-2]

RIN 2137-AA42

Requirements for Cargo Tanks; Revisions, Response to Petitions for Reconsideration

AGENCY: Research and Special Programs Administration (DOT).

ACTION: Final rule, delay of effective date, response to petitions for reconsideration and revisions.

SUMMARY: This amendment makes additional revisions to a final rule published in the **Federal Register** under Docket Nos. HM-183, 183A (54 FR 24982, June 12, 1989). The final rule amended requirements in the Hazardous Materials Regulations (HMR) pertaining to the manufacture, qualification, maintenance, and use of cargo tank motor vehicles. The amendments contained in this document are primarily in reponse to petitions for reconsideration received to the final rule. The effective date is delayed from September 1, 1990, to December 31, 1990, to allow sufficient time for distribution of this amendment to persons affected by the final rule.

The intended effect of the final rules published under HM-183/183A is to improve safety in the transportation of bulk quantities of hazardous materials in cargo tank motor vehicles.

DATES: *Effective:* Effective August 31, 1990. The effective date for the final rule published under Docket HM-183/183A on June 12, 1989 (54 FR 24982), the amendments published on May 22, 1990 (55 FR 21035), and those adopted herein, are effective on December 31, 1990. *Compliance:* However, compliance with the regulations is authorized from October 1, 1990.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION:

Background

On June 12, 1989, the Research and Special Programs Administration (RSPA) published a final rule (Docket HM-183/183A; 54 FR 24982) establishing new standards pertaining to the manufacture, qualification, maintenance, and use of cargo tank motor vehicles. Because of the complexity and impact of issues addressed in the final rule, RSPA extended the period for receiving petitions for reconsideration from the usual 30 days to 150 days to allow persons affected by the final rule sufficient time to review the rules and submit their petitions (September 15, 1989, 54 FR 38233). Similarly, RSPA found it necessary to extend to the effective date of the final rule to allow RSPA and the Federal Highway Administration's Office of Motor Carriers (FHWA) time to evaluate the merits of the petitions received (September 15, 1989, 54 FR 38233; December 6, 1989, 54 FR 50382).

RSPA received over 1,000 petitions for reconsideration in response to the final rule. These petitions were from trade associations, shippers, motor carriers, state government agencies, and manufacturers of cargo tanks, cargo tank parts and equipment. All petitions have been given full consideration by RSPA and FHWA. FHWA has participated in the development of the Notice of Proposed Rulemaking (NPRM) (September 17, 1985, 50 FR 37766; December 5, 1985, 50 FR 49866), the final rule and the amendments issued under Docket HM-183/183A. In the interest of brevity, "we" is used hereinafter to refer to "RSPA and FHWA".

Because of delay in resolving certain issues raised in the petitions, on May 22, 1990, RSPA published an amendment to HM-183/183A (55 FR 21035) which further extended the effective date of the final rule to September 1, 1990. In the May 22 amendment, we specified the compliance dates for various inspections, tests and certain other provisions contained in the final rule, and responded to certain issues raised by petitioners. This amendment contains a review of those compliance dates and discussions, and contains additional revisions to HM-183/183A. Among the more significant changes included in this amendment are revisions—

1. To allow work experience as an alternative to educational experience for certain persons currently performing the prescribed functions of a Registered Inspector or a Design Certifying Engineer;

2. To expand the types of hazardous material authorized for retention in external unprotected piping during transportation (wet lines);

3. To clarify the requirements on pressure relief systems and outlets on new and existing cargo tank motor vehicles;

4. To exclude low pressure cargo tanks from additional portions of the ASME Code;

5. To clarify parameters used in structural integrity calculations for cargo tank motor vehicles;

6. To relax and clarify certain provisions relating to continuing qualification, inspection, and testing of cargo tank motor vehicles.

Several petitions raised issues which were not a part of this rulemaking proceeding. These petitions are discussed in this amendment, and may be made the subject of a separate rulemaking action. Except as adopted herein, all petitions for reconsideration received by RSPA concerning matters covered by the final rule published on June 12, 1989, are hereby denied. Any subsequent submission concerning issues relating to this rulemaking must be filed as petitions for rulemaking in conformance with 49 CFR 106.31.

I. Qualifications of Registered Inspectors and Design Certifying Engineers

To ensure that DOT specification cargo tanks are designed, constructed and maintained in accordance with the applicable specification, the June 12 final rule requires each person who certifies cargo tank motor vehicle design, construction, repair, and testing to meet certain minimum qualifications. These qualification standards are based on the particular function to be performed. Among the most critical functions are those performed by the Design Certifying Engineer and the Registered Inspector. The use of a Design Certifying Engineer is required for certification of each cargo tank motor vehicle design type and the design of a stretched cargo tank motor vehicle. As defined in § 171.8 of the final rule, a "Design Certifying Engineer":

> means a person registered with the Department in accordance with Part 107, Subpart F of this chapter who is an Authorized Inspector and has the knowledge and ability to determine if a cargo tank design meets the applicable DOT specification, or a person other than an Authorized Inspector who has this ability, at least one year of work experience in structural or mechanical design and an engineering degree (such as a professional engineer registered by the appropriate

authority of a State of the United States or a Province of Canada).

Several petitioners took exception to this definition. The National Propane Gas Association (NPGA) and other petitioners argued that (1) not all professional engineers have an engineering degree, (2) both professional engineers and graduate engineers include fields and disciplines of study that are only marginally related to cargo tank motor vehicle design, (3) some Authorized Inspectors are not qualified to make the kinds of judgments required of Design Certifying Engineers, and some are not graduate engineers, and (4) many persons currently performing these functions have no degree and are proficient in cargo tank stress analysis, design, and construction and should be allowed to continue performing these functions. The Truck Trailer Manufacturers Association (TTMA) stated that up to one-quarter of the present cargo tank motor vehicle manufacturers' Chief Engineers would not qualify under the definition as a Design Certifying Engineer. Petitioners requested that RSPA amend the definition to require that a Design Certifying Engineer be a registered professional engineer, a graduate engineer with one year of experience in structural or mechanical design, or a person with five years of relevant work experience and who, in any case, has performed stress analysis for cargo tanks and has the knowledge and ability to determine if a cargo tank design meets the applicable DOT specification. One petitioner pointed out that, in the preamble of the final rule, RSPA stated that a Design Certifying Engineer "must have knowledge and skills in areas such as stress analysis, welding, metallurgy, and recognized good design and quality control practices" but RSPA did not adopt these qualifications into the regulations.

We agree with these petitioners that an Authorized Inspector must have the knowledge and ability to perform stress analysis if that person is to be a Design Certifying Engineer. We agree that work experience in cargo tank motor vehicle design is essential and that there are persons performing these functions who are qualified to do so but do not hold an engineering degree. However, as we stated in the final rule, we believe that a combination of work experience in cargo tank motor vehicle design and education is necessary to ensure that the individual performing the functions of a Design Certifying Engineer has the appropriate knowledge and skills. Therefore, as revised in this amendment, "Design Certifying Engineer" means a person registered with DOT" who has the knowledge and ability to perform stress analysis of pressure vessels and otherwise determine if a cargo tank motor vehicle design and construction meets the applicable DOT specification, and has an engineering degree and one year of work experience in structural or mechanical design." However, at § 107.502, we are permitting persons who do not meet the minimum educational requirements but who have at least three years of work experience in performing design certifying functions before September 1, 1991, to register as a "Design Certifying Engineer" with DOT. Such registration statements must be submitted to DOT before December 31, 1991.

The use of a Registered Inspector is required for certification of specification cargo tank motor vehicle construction, assembly or repair. As defined in § 171.8 of the final rule, a "Registered Inspector":

> means a person registered with the Department in accordance with Part 107, Subpart F of this chapter who is an Authorized Inspector who has the knowledge and ability to determine if a cargo tank conforms with the applicable DOT specification, or a person other than an Authorized Inspector who has this ability and, at a minimum, the following work experience, in cargo tank construction or repair, and education: one year of work experience and an engineering degree, two years of work experience and an associate degree in engineering or three years of work experience and a high school diploma.

Several petitioners also took exception to this definition. NPGA pointed out an inconsistency in that the definition requires a lower level of education and work experience for an Authorized Inspector functioning as a Registered Inspector than is required for a person other than an Authorized Inspector, and recommended that the same level of skills be required in both cases. The National Tank Truck Carriers, Inc. (NTTC) stated "work experience and employee-demonstrated competence" should be the only qualifying criteria for those persons performing testing, inspection, repair and maintenance tasks. Both NTTC and TTMA suggested that an adequate qualification for a Registered Inspector would be five years of relevant work experience with no requirement for a high school diploma. Both petitioners stated that many persons are unable to provide a copy of their high school diplomas. NTTC also requested that, should RSPA deny their request to discontinue the requirement for a high school diploma, a General Equivalency Diploma (GED) be accepted as equivalent to a high school diploma. Finally, several petitioners requested that we accept "inspection" as qualifying work experience for a "Registered Inspector." The petitioners stated that many persons perform no "cargo tank construction or repair" but are otherwise highly qualified to perform the "inspector" functions in § 180.407.

We agree with petitioners that an Authorized Inspector functioning as a Registered Inspector should have the same level of skills as other persons who perform those functions. Unfortunately, this concept was not appropriately conveyed in the regulations adopted in the final rule; this amendment corrects that problem.

With respect to the educational qualifications of a Registered Inspector, we believe that these persons must meet the minimum education qualifications. However, we recognize that many qualified persons who have performed the prescribed functions for many years may not meet these minimum requirements. Therefore, in the final rule, we are allowing persons who do not meet the minimum educational requirements but who have at least three years of work experience in performing the Registered Inspector's functions before September 1, 1991, to register as a "Registered Inspector" with DOT. Such registration statements must be submitted to DOT before December 31, 1991. In addition, we have revised the definition of a "Registered Inspector" to include work experience in cargo tank inspection and to recognize a GED as being equivalent to a high school diploma.

II. Retention of hazardous materials in piping and hoses (wet lines)

RSPA received over 900 petitions from representatives of the propane gas industry who objected to the provisions contained in § 173.33(e) of the final rule. Section 173.33(e) grants a limited exception from the requirement for bottom damage protection devices on cargo tanks transporting fuel metered for road fuel tax purposes. Most petitioners understood § 173.33(e) as prohibiting the retention of all other hazardous materials lading in product piping during transportation.

In the May 22 amendment (55 FR 21036), in responding to petitioners from the propane gas industry, RSPA stated:

> It was intended, in both the proposed rule and the final rule, that this provision apply only to DOT specification cargo tanks used to transport liquid hazardous materials. The current requirements, at 49 CFR 178.337-9 and 178.337-10, require that piping be

protected from accidental damage in all cases and RSPA has no data indicating additional controls are needed. RSPA has informed the National Propane Gas Association of this position in a letter dated March 7, 1990.

Also, the wet line provision in § 173.33(e) does not apply to the transportation of hazardous materials having relatively low hazards which are authorized to be transported in nonspecification cargo tanks, even if a DOT specification cargo tank may be used. For example, § 173.33(e) does not apply to cargo tanks used to transport materials under §§ 173.118a (combustible liquids) and 173.131 (road asphalt, or tar, liquid).

Many petitioners, including the American Petroleum Institute (API), asked that RSPA broaden the exception granted to "fuels metered for road fuel tax purposes" to include other materials. These petitioners stated that many materials are metered for other than tax purposes, and the use of a tax as a criteria for providing exceptions is inappropriate, with no safety basis. Petitioners also pointed out that many other petroleum products are not taxed, and are considered "less hazardous" than gasoline. Finally, petitioners stated that a large percentage of cargo tank motor vehicles, currently transporting materials which are permitted, under the exception, to be retained in the piping, exceed the specified maximum piping volume limitation. These petitioners urged RSPA to grandfather existing cargo tanks transporting gasoline in "wet lines" which exceed the 50 gallon volume limit.

The comments expressed by petitioners asking that the exception in § 173.33(e) be broadened raised new information which was not brought to our attention during the comment period for the NPRM, or during any of the subsequent hearings or public meetings. We now realize that the retention of hazardous materials product in piping during transportation is more prevalent than was indicated earlier during development of the final rule. These petitions are under consideration and will be addressed further in the subsequent document. However, RSPA anticipates certain revisions will be made to the final rule.

RSPA received numerous other objections to § 173.33(e) from representatives of various other industries. Representatives from the crude oil gathering and oil field servicing industry urged RSPA to provide an exception from the prohibition against retention of product in piping for their equipment. They contended that this equipment is operated for the most part in remote locations which are equipped with loading/unloading equipment which could be converted to accommodate top loading. These petitioners also requested that the exception permit a piping diameter of up to 6½ inches, which is the standard for the industry.

We now recognize the substantial burden that a prohibition of wet lines in all services would place on the petroleum industry. It is apparent additional time is needed by the industry to implement design and operational changes before a prohibition against unprotected "wet lines" can be adopted. We believe that any hazardous material product retained in unprotected piping and hoses presents a potential safety hazard during transportation. However, we recognize the inherent difficulties in removing all product from the lines and in maintaining an accurate metering system. The problem of maintaining an accurate metering system lies mainly with the petroleum (flammable liquid) industry. For other hazardous materials, transportation in external unprotected piping is less common and thus the prohibition of such transportation will have a much lower cost impact. Therefore, § 173.33(e) is revised to require accident damage protection devices for piping that may retain poisons, skin corrosives, organic peroxides, or oxidizer liquids during transportation. However, we strongly encourage the petroleum industry to consider the risk it accepts in operating cargo tank motor vehicles over the highway with hazardous materials retained in the piping and that the hazardous materials industry consider and recommend possible alternatives to eliminate this risk in the most cost-effective manner.

III. Pressure relief systems and outlets on existing cargo tank motor vehicles

Numerous petitioners expressed their concerns with certain provisions contained in the part 173 commodity provisions as related to transportation of hazardous materials in cargo tank motor vehicles. Petitioners objected to requirements, contained in many commodity sections, that MC specification cargo tank motor vehicles be equipped with a pressure relief system conforming to that of a DOT 406 or DOT 407 cargo tank, as prescribed in § 178.346–10 or § 178.347–10, respectively. The petitioners stated that many existing MC specification cargo tank motor vehicles would have to be retrofitted because of the different requirements for relief valve set pressures, reclosing pressures, maximum allowable tank pressures, etc. For similar reasons, petitioners objected to other requirements in certain commodity sections that, except for MC 330 and MC 331 cargo tanks, all MC specification cargo tanks with bottom outlets must have the outlets equipped with internal self-closing stop valves meeting the requirements in § 178.345–11. It was not our intention to require existing cargo tanks to be retrofitted with pressure relief devices and outlets meeting the requirements of the new cargo tank motor vehicle specfications. We have clarified the requirements for pressure relief systems in § 173.33(d), which permit the use of a non-reclosing pressure relief device under certain conditions. We also have revised § 173.33(d)(3) to clarify that cargo tank motor vehicles may have pressure relief devices and outlets conforming to the original specification to which the cargo tank motor vehicle was manufactured or be modified to the listed corresponding specification.

IV. Application of the ASME Code to low pressure cargo tank motor vehicles

TTM submitted a list of paragraphs in the ASME Code which they believe should not apply to DOT 406, 407, and 412 cargo tank motor vehicles that are constructed but not certified in accordance with the ASME Code. These paragraphs are as follows: UG–11 (miscellaneous pressure parts), UG–22(g) (impact reactions, UG–23(b) (maximum allowable stress), UG–32(e) (torispherical heads), UG–35 (other types of closures), UG–44 (flanges and pipe fittings), UG–76 (cutting of plates and other stock), UG–79 (forming shell sections and heads), UG–82 (lugs and fitting attachments, UG–83 (tolerance for formed heads), UG–97 (inspection during fabrication), UG–99 (standard hydrostatic test), UG–100 (pneumatic test), UG–116 (required marking), UG–118 (stamping), UG–120 (data reports), UG–125 through UG–136 (pressure relief devices), UW–12 (joined efficiency), and UW–13.1(f) (intermediate head installation).

We have reviewed these paragraphs and agree that certain additional exceptions should be provided for units designed and built to the new DOT specifications but not certified to the ASME Code. We find paragraphs UG–11, UG–22(g), UG–32(e), UG–35, UG–44, UG–76, UG–97 and UW–13.1(f) are not appropriate and have waived compliance with these paragraphs for all DOT 406 cargo tank motor vehicles, and for DOT 407 and 412 cargo tank motor vehicles constructed but not certified in accordance with the ASME Code.

TTMA claimed that paragraph UG–79(a) would require stress relief after forming flanges on carbon or mild steel heads and, therefore, should be excepted in the DOT specifications. We believe the intent of this paragraph is to assure the fabrication process does not unduly impair the physical properties of the materal selected at the thickness employed. In cases where material strength is adversely affected because of the fabrication process, stress relieving

can restore the strength properties to the original levels. If a cargo tank manufacturer can establish that material properties after fabrication are not significantly different from those used in design calculations, the requirements of paragraph UG–79(a) would be satisfied. Therefore, no exception to this paragraph is warranted.

TTMA stated that complying with paragraph UG–79(b) is not practical for cargo tanks with non-circular cross sections. This paragraph requires rolling of shell sections to a preliminary curvature to prevent flat spots along completed joints. An exception to this requirement was included for DOT Specification 406 and 412 cargo tank motor vehicles in the final rule (see §§ 178.346–1 and 178.348–1).

Paragraph UG–23(b) calls for using reduced allowable compressive stress when designing cylindrical shells for a combined longitudinal stress. TTMA claimed the shell thickness of DOT Specification 407 cargo tanks would have to be increased from 0.135 to 0.165 inches, if relief from UG–23(b) is not granted. During the design of a cargo tank motor vehicle, paragraph UG–23(b) must be applied to evaluate compressive stress "at any point" in the cargo tank wall. Any thickness increase resulting from the application of this paragraph is limited to the specific regions of the cargo tank wall where the net longitudinal compressive stress is higher than that given in Appendix 5 of the ASME Code. In typical cargo tanks, any increase in thickness would likely be limited to top and bottom regions near the center section only. Moreover, current cargo tank specifications (see § 178.340–4(a)) stipulate a 5:1 design safety factor for non-ASME Code cargo tank construction, but the final rule provides for a 4:1 safety factor. This 20 percent reduction should offset any thickness and weight penalty due to paragraph UG–23(b). For these reasons, TTMA's request is denied.

TTMA stated that weld joint efficiency factors for DOT 406 and DOT 407 cargo tank motor vehicles should be the same as they presently are for MC 306 and non-ASME Code MC 307 cargo tanks and requested a specific exception to paragraph UW–12. Currently, § 178.340–5 requires a minimum joint efficiency of 85 percent. One of the principal objectives of this rulemaking project was to require all manufacturers of cargo tank motor vehicles to be ASME Code shops and to follow approved quality control procedures. The ASME Code prescribes weld joint efficiency factors based on weld geometry and the degree of weld inspection and provides the level of manufacturing quality control we sought.

While the present method for determining weld joint efficiency (§ 178.340–5(d)) has not resulted in weld failures, we believe that it is not appropriate and that the reduction in required design safety factor from 5:1 to 4:1 produces a greater concern about weld performance. Additionally, TTMA has provided us no data to show that paragraph UW–12 would have any negative impact on the design of DOT specification cargo tank motor vehicles. For these reasons, TTMA's request is denied.

We do not believe that specific exception must be provided for the remaining paragraphs of the ASME Code requested by TTMA for non-code stamped cargo tank motor vehicles. These paragraphs refer either to good engineering practices or general loading and testing requirements, which are specifically prescribed for the DOT cargo tank motor vehicles.

Paragraphs UG–82 and UG–83 contain practices intended to reduce fabrication-related flaws such as alignment and fit, and weld discontinuities. Such conditions can be sources of initiation and propagation of cracks. We believe satisfying these requirements not only is essential but also will help reduce inspection costs. We also believe that the workmanship practices followed by most cargo tank manufacturers will satisfy the requirements of these paragraphs. For these reasons, we have granted no exception to this paragraph.

Because DOT specifications supercede ASME Code requirements in the areas of pressure testing, pressure relief devices, marking, certification, data reports, and nameplates, it is not necessary to grant an exception to paragraphs UG–99, UG–100, UG–116, UG–118, UG–120, and UG–125 through UG–136. The requirements for these areas are found in §§ 178.345–10, 178.345–13, 178.345–14 and the applicable individual specifications.

V. Structural Integrity

We received numerous petitions on the structural integrity requirements prescribed in the final rule for MC 331, MC 338, and DOT 400 series cargo tank motor vehicles. These petitions for reconsideration of various aspects of the requirements indicate considerable confusion in interpreting the structural integrity analysis specified in §§ 178.337–3, 178.338–3 and 178.345–3.

In paragraph (a) in these sections, the statement "stresses due to internal pressure and vertical loadings must be considered in all cases" appears to have caused confusion about the overall stress analysis requirement. Some petitioners wanted to know if ASME design calculations must consider, in addition to internal pressure, all loadings, including dynamic loadings, as opposed to considering structural and lading weight. A petitioner contended that the requirement in this section for determining structural integrity for MC 331 cargo tank is "in reality a trial and error process of finding a shell thickness and diameter combination". The same petitioner suggested that we provide "sample calculations for basic types of MC 331 cargo tanks to bring the cargo tank design to a common and generally accepted basis" for clarification.

We agree the structural integrity analysis requirements, as written in the final rule, may be ambiguous. In addition, we believe the design acceptance and loading requirements need clarification. We do not agree with the petitioner's suggestion that we provide sample calculations because such sample calculations may not cover all aspects of various types of cargo tank designs used to transport hazardous materials. To alleviate confusion and any ambiguity, we have reorganized and revised §§ 178.337–3, 178.338–3, and 178.345–3. In response to various petitioners' arguments about the applicability and severity of various requirements in the final rule, we have adopted certain changes which are discussed later in the section-by-section review in this preamble.

In §§ 178.337–3, 178.338–3, and 178.345–3 of this amendment, paragraph (a)(1) prescribes the overall requirements for the structural integrity calculations and the maximum allowable stresses. Paragraph (a)(2) provides for determining the maximum allowable stresses based on tested properties of materials used, with the restriction that the measured tensile strength used in design shall not exceed 120 percent of the minimum values specified in the ASME Code or the ASTM standard to which the material is manufactured. We have accepted TTMA's request that finite element analysis be permitted for DOT 400 series cargo tanks. We have applied the same provision to the MC 331 and MC 338 cargo tank specifications. Paragraph (a)(3) provides for alternate analytical or test methods to establish stresses at any point in the cargo tank wall provided such methods are accurate and verifiable.

Paragraph (b) specifies the requirements for the basic ASME design calculation to determine the overall geometry and shell and head

thicknesses of the cargo tank. Paragraphs (c) and (d) prescribe various dynamic loadings, and a pressure surge due to sudden deceleration that must be considered in the structural integrity analysis. It must be noted that the dynamic loading conditions for MC 331 and MC 338 cargo tanks have not been changed from those in the final rule. We have not specifically identified the most severe combination of various static and dynamic loadings, as suggested by some petitioners, because the scope of the final rule was limited to correcting the effective stress formula found in the current regulations. Furthermore, the petitioners did not substantiate their suggested combinations of dynamic loading either by providing data, or by means of an industry accepted standard. Based on the petitions received, various changes have been made to the dynamic loading requirements for DOT 406, 407, and 412 cargo tank motor vehicles. These changes are briefly discussed in detail in the section-by-section review later in this preamble.

A petitioner argued that, in paragraph (d), the longitudinal design stress should be the "lesser of the yield strength or 75 percent of the ultimate tensile strength of the materials used," there can be a significant thickness increase in the shell and heads of a cargo tank. This argument is valid particularly for cargo tanks constructed of stainless steels. Therefore, we have relaxed the maximum allowable stress requirement for MC 331, MC 338 and DOT 400 series cargo tank motor vehicles cosntructed of stainless steels.

We have accepted TTMA's suggestion that the "g" loadings specifed in § 178.345–3(d) of the final rule should be reduced for cargo tanks designed with baffles. The suggested reduction of 0.25 "g" for each baffle assembly up to a maximum of 1.0 "g" is reasonable and, therefore, is adopted in § 178.345–3(d).

Paragraph (e) in these sections of this amendment prescribes minimum thickness requirements for cargo tank shell and heads. We have reorganized these requirements and made certain editorial changes.

The structural integrity sections are reorganized and revised in this amendment. Details of these changes are discussed in the section-by-section review of this preamble.

Review by Section

Sections 107.501–107.503

Several revisions have been made to the registration requirements based on the merits of petitions received. Revisions to § 107.501 clarify that the registration requirements apply to persons who assemble a cargo tank to a motor vehicle or to a motor vehicle suspension component. A new paragraph (b) alerts persons engaged in continuing qualification and maintenance of cargo tank motor vehicles that they must be familiar with the requirements set forth in part 180, subpart E.

Section 107.502 is rearranged for clarity. A definition of "assembly" is added in § 107.502(a)(1). In addition, in new paragraph (f), we are allowing persons who have at least three years of experience in performing the functions of a Registered Inspector or Design Certifying Engineer but who do not meet the minimum education requirements to register with DOT. Such registration statements must be submitted to DOT before December 31, 1991. See earlier discussion in this preamble under the heading "Qualification of Registered Inspectors and Design Certifying Engineers." A petitioner requested that § 107.502(d) be revised to stipulate that the Department will send registrants, within 30 days, a letter confirming receipt of the registration application and assigning a registration number. The petitioner cited RSPA's delay in processing registration statements as the reason for the change. RSPA delayed processing the registration statements, pending the disposition of several petitions requesting revisions to the registration requirements. The issues raised in the petitions have been resolved and all registration statements are being processed in a timely manner. We have not adopted the petitioner's suggestion because we believe it is unnecessary.

RSPA has received numerous registration statements that do not contain all the information required by § 107.503. Many of these registration statements do not list the specific functions to be performed as required by paragraph (a)(4), do not contain all required information for each facility for which a registration number is requested, or do not contain an acceptable certification as required by paragraph (a)(3). Section 107.503(a)(3) is revised to reference the limited exception in § 107.502(f) relating to Registered Inspectors and Design Certifying Engineers, and to provide an example of an acceptable certification statement. Applicants are reminded that the certification must be signed by the person who has oversight for ensuring compliance with the applicable requirements.

In paragraph (a)(4), "equipment manufacture" is added to the specific functions for which registration is required. Section 178.320(a)(2) of the final rule requires equipment manufacturers to register under subpart F, part 107. The definition of "manufacture" in § 178.320 is revised in this amendment to clarify which cargo tank equipment manufacturers must register with RSPA.

The May 22 amendment specified a compliance date of December 31, 1991, for repairers to submit a copy of their National Board Certificate of Authorization to RSPA. This same date applies to manufacturers of MC-series cargo tanks which are non-ASME. Paragraphs (b) and (c) are revised to reflect these dates.

A sentence is added in § 107.504(c) to advise that any person registered under § 107.502(f) who is in good standing is eligible for renewal. We have also emphasized that the provisions in subpart F, part 107, cover a registration, not an approval, program. The issuance of a registration number is not an endorsement by the Department of the qualifications of any person to perform the specified functions. Therefore, persons may not represent their operation as being "DOT-approved," as stated in new § 107.504(f) of this amendment. However, we have no objection to persons representing their operation as being "registered" with DOT.

Section 171.8

The definition of "cargo tank" is revised to recognize that these packagings are intended "primarily" for the carriage of liquids or gases, but may be used for carriage of solids. It also clarifies that appurtenances, reinforcements, fittings and closures are included as elements of a cargo tank.

The definitions of "Design Certifying Engineer" and "Registered Inspector" are revised as discussed earlier in this preamble under the heading "Qualifications of Registered Inspectors and Design Certifying Engineers."

Section 172.101

The entry for "Ammonium nitrate solution," is corrected to remove a reference to § 173.154(a)(18). Paragraph (a)(18) was removed under the final rule. Based on a petition for rule change (P–1089), this entry is also revised to reflect that ammonium nitrate solutions with 35% less water do not meet the definition of an oxidizer.

Section 172.203

Paragraph (h)(1)(i) is corrected to reference "§ 173.315(a), Note 14" instead of "§ 173.315(a), Note 15."

Section 173.22

Two petitioners requested that the provisions in paragraph (a)(2), relating to a shipper's responsibility for determining whether a cargo tank is an authorized packaging for a particular hazardous material, be removed from this section and be placed in part 177. One petitioner stated that a person offering a hazardous material for transportation in a cargo tank motor vehicle supplied by a motor carrier is not in a position to validate that the material would not have an adverse effect on the integrity of the cargo tank, or the cargo tank motor vehicle meets the applicable requirements with respect to its design, maintenance and repair. As an example, the petitioner stated a shipper would be unable to validate that a cargo tank presented for transportation of a corrosive material meets the corrosion protection requirements in § 178.345–2(c). The petitioner stated that, in many cases, a shipper provides the carrier with a Material Safety Data Sheet (MSDS) which can be used by the carrier to determine if the particular cargo tank motor vehicle is authorized for that material.

We disagree with these petitioners. We believe that both the shipper and the carrier have certain knowledge concerning the hazardous material and the cargo tank motor vehicle, and that each has responsibility for determining whether a hazardous material is suitable for carriage in the cargo tank motor vehicle. However, paragraph (a)(2) is revised to limit its application to the special commodity requirements in Part 173 and not to the continuing qualification requirements contained in part 180.

Section 173.33

In responding to the provisions in paragraph (a)(2), a petitioner stated:

> It is our belief that RSPA misconstrued the CMA [Chemical Manufacturers Association] comment on the proposed rulemaking. Our interpretation of that comment is that a shipper, when confronted with a compartmented cargo tank tendered at its facility which already contains in one of the compartments a material loaded by another shipper, is often not in a position to know the identity, much less the properties, of the materials loaded by the other shipper. Hence, there is no basis for the second shipper to make a determination as to the compatibility of the material to be loaded with the materials already loaded. We believe that CMA's comment intended to point out that the carrier should be responsible for making the determination as to compatibility in these circumstances. The shipper's responsibility is to ensure that incompatible materials are not loaded in the same cargo tank when all compartments are loaded at the same shipper's facility. This, we believe, was the intent in CMA's comment. We agree with this interpretation and believe that 173.33(a)(2) should be amended to reflect this distinction.

After reviewing the preamble discussion of the final rule, it is apparent we were in error in stating that we agreed collectively with the "commenters." However, the fact remains that, in a case where a motor carrier receives hazardous materials from different shippers, we believe the responsibility for ensuring an unsafe condition is not generated should be a shared responsibility and not the exclusive responsibility of the shipper or the carrier.

As suggested by a petitioner, paragraph (a)(3) is reviewed to clarify that the inspection and retest requirements in part 180 apply only to specification cargo tanks. Also for consistency with § 177.824, we have added a provision stating that the prohibition on offering a cargo tank motor vehicle for transportation after expiration of the retest date does not apply if the cargo tank was filled prior to the retest or inspection due date.

Several petitioners pointed out that paragraph (b)(3) could prohibit the practice of allowing atmospheric air pressure to replace flammable liquid vapors evacuated from cargo tanks during loading and unloading. We agree with the petitioners and have revised the paragraph accordingly.

Paragraph (c)(1), containing requirements linking the maximum lading pressure of liquid hazardous materials to the cargo tank maximum allowable working pressure (MAWP), is revised to clarify that these requirements apply only to materials requiring the use of a specification cargo tank. They do not apply to hazardous materials that are authorized to be transported in a nonspecification cargo tank, even if a DOT specification cargo tank is used.

A petitioner requested that the wording in paragraph (c)(1)(vi) be revised for consistency with § 173.33(b)(4). The petitioner stated that paragraph (c)(1)(vi) limits the loading/unloading pressure to not exceed the MAWP, but paragraph (b)(4) allows the pressure in the tank during loading/unloading up to 130 percent of the MAWP for certain cargo tanks. We disagree wtih the petitioner. Paragraph (c)(1)(vi) relates to pressure within a cargo tank during normal loading or unloading. In contrast, paragraph (b)(4) relates to the maximum surge pressure that may be applied to a tank as the result of an overfill or overpressurization during a loading or unloading accident. There is no inconsistency between these requirements, but we have revised the wording of paragraph (b)(4) to clarify its relation to an accident condition.

Two petitioners stated that, in paragraph (c)(2), the reference to § 178.345–1(k) voids the exception granted in paragraph (c)(1)(iii) for gasoline, and that the requirements in § 173.33(c)(1) are adequate for determining the proper MAWP. We agree with the petitioners and have revised paragraph (c)(2). This reference was also removed from paragraph (c)(3). For this same reason, we also revised paragraph (c)(2) to reference the applicable provision in "paragraph (c)(1)," instead of "paragraph (c)," and revised paragraph (c)(3) to remove another reference to "§ 178.345–1(k)".

With regard to paragraphs (c)(2) and (c)(4), NTTC and the Hazardous Waste Association of California (HWAOC) expressed a concern that their members may incur liabilities as a result of changing the manufacturer's "design" or "test pressure" marked on a cargo tank. Both petitioners stated that we may be forcing a carrier to make a representation to the public for which no technical or design basis may exist. As a result, the carrier may be misleading the public by "certifying" that these cargo tanks meet design criteria which may not be the original criteria by which the cargo tanks were designed. NTTC also claimed that its members do not have sufficient tank trailer design or construction experience to mark or remark trailers.

It is our position that these cargo tanks were required to be tested to at least 3 psig as a condition of the specification under which they were constructed. Cargo tanks marked with a design or test pressure of "none," "0," or "zero" have been tested to at least 3 psig. Although we normally would not allow an owner of a cargo tank to mark a specification plate, we are allowing it in this case. If these cargo tanks are not remarked, they are prohibited by § 173.33(c) from being used for transportation of hazardous materials. Therefore, the requirement that an owner mark these cargo tank motor vehicles is retained in paragraph (c)(3). However, we have revised the provision in paragraph (c)(2) to allow these cargo tanks to be marked with a MAWP or design pressure of 3 psig.

A minor editorial change is made to paragraph (c)(5).

Paragraph (d)(1) is revised, as suggested by a petitioner, to clarify that an existing cargo tank fitted with non-reclosing devices, may continue to be

used in hazardous materials service for which the cargo tank was authorized with those devices.

Paragraphs (d)(1) and (d)(2) are revised to clarify that the pressure relief systems on MC 330, MC 331 and MC 338 cargo tank motor vehicles are not required to conform with the requirements in these paragraphs. Paragraph (d)(3) is revised to clarify that existing cargo tank motor vehicles may have pressure relief devices and outlets conforming to the original specification under which they were constructed or may be modified to conform to a corresponding specification listed in the table in paragraph (d)(3).

Paragraph (e), as revised, requires accident damage protection devices for piping that may retain poisons, skin corrosive, organic peroxide, or oxidizer liquids during transportation. See earlier discussion in this preamble under the heading "Retention of hazardous materials in piping and hoses (wet lines)."

Sections 173.119–173.374

It was not our intention to require retrofit of pressure relief device systems and bottom outlets on all existing cargo tanks. Therefore, various commodity sections are revised to clarify the pressure relief system and outlet requirements on existing cargo tanks. See earlier preamble discussion under the heading "Pressure relief systems and outlets on existing cargo tank motor vehicles".

A petitioner stated that requiring bottom outlets equipped with self-closing stop-valves capable of functioning in the event of a fire or hose rupture (§ 178.345–11(a)) is inappropriate for cargo tanks limited to corrosive liquid service and that an exception to that effect should be included in Part 178. We agree with the petitioner and have revised § 178.345–11.

We wish to alert cargo tank owners and users that certan cargo tanks currently authorized for materials meeting the definition of a material which is toxic by inhalation may no longer be authorized for those materials if a final rule is adopted under Docket HM–181, consistent with the proposals published on May 5, 1987, and November 6, 1987 (52 FR 16482, 52 FR 42773).

Section 173.131

NTTC and TTMA requested that we permit the use of hat shaped or open channel stiffening rings on carbon steel tanks used to transport road asphalt or tar. The petitioners stated that this has been the practice for many years and there have been no problems with corrosion under the hat shaped or open channel rings. The elevated temperatures at which cargo tank motor vehicles in this service operate prevent the accumulation of moisture which can cause corrosion under hat shaped or open channel stiffening rings. We agree with the petitioners and have revised paragraph (a)(2) to provide an exception to the requirements contained in § 178.345–7(d)(5).

TTMA also stated, in part:

> The design stress limits at elevated temperatures as specified in the ASME Code are not applicable to aluminum cargo tanks which transport road asphalt or tar because the ASME design stress limits for aluminum assume continuous operation at the maximum rated temperature for many years. Asphalt tanks are only occasionally operated at their maximum temperature and then only for a few hours.
>
> Application of the ASME design stress limits would reduce the design stress limit for an aluminum tank from 5500 psi to 3000 psi which would result in a severe cost and weight increase.

TTMA further suggested that the following two sentences be added to § 173.131(a)(2):

> Also, the design stress limits at elevated temperatures per the ASME Code are not applicable. The design stress limits shall not exceed 25 percent of the stress limit provided by the Aluminum Association for 0 temper.

We agree with the petitioners that hat shaped or open channel stiffening rings should be allowed on cargo tank motor vehicles used to transport road asphalt or tar. Paragraph (a)(2) is revised to provide an exception to the requirements contained in § 178.345–7(d)(5).

We agree with TTMA that the tensile properties of aluminum contained in the ASME Code differ from those listed in the Aluminum Association Inc. publication entitled "Aluminum Standards and Data". Because aluminum cargo tank motor vehicles used to transport asphalt operate at the maximum design temperature for only a limited period of time, it is reasonable to use the tensile properties listed in the Aluminum Association Inc. at the maximum design temperature of the cargo tank. Therefore, revised paragraph (a)(2) also allows the use of the tensile properties found in this publication.

Section 173.154

Paragraph (a)(4)(i)(C) is corrected by removing the words "transportation by vessel." The requirements covering the carriage of cargo tanks by vessel are contained in paragraph (a)(4)(iv). Additionally, based on a petition for rulechange (P–1089), paragraphs (a)(4) and (a)(17) are revised to reflect that ammonium nitrate solutions with 35% or less water do not meet the definition of an oxidizer.

Section 173.206

Two petitioners pointed out that the provision, in § 173.206(c)(3)(v), requiring pressure relief devices to meet the requirements in § 178.337–9 for metallic sodium, is unnecessary since the material is required to be shipped in a solid state. One petitioner also stated that since sodium is shipped under a nitrogen pad, the pressure relief devices should be sized for the padding gas at its charge pressure. We agree with the petitioners and have revised § 173.206(c)(3)(v) accordingly. The revised wording is consistent with that currently found in 49 CFR 173.206(c)(3).

Section 173.252

Paragraph (a)(4)(ii) is amended by removing the word "cladding" because it may be used to satisfy the minimum thickness requirements.

Section 173.266

The current regulations require, for cargo tanks used in hydrogen peroxide service, that the tank metal identification plate be marked "DOT MC 310–H_2O_2," "DOT MC 312–AL–H_2O_2," or "DOT MC 312–SS–H_2O_2," as appropriate, and that the cargo tank be marked "FOR HYDROGEN PEROXIDE ONLY". The final rule provided for the tank specification plate to be marked with a general statement indicating the tank is in hydrogen peroxide service and for the cargo tank to be marked "FOR HYDROGEN PEROXIDE SERVICE ONLY." Two petitioners questioned the need to revised the currently prescribed marking and requested that the current markings be retained. We agree and have revised paragraph (f)(2)(v) accordingly.

Section 173.272

An editorial correction is made in paragraphs (d), (e), (f), and (g) to include a reference to paragraph (i)(30).

Section 173.276

Authorization for use of the MC 330 and MC 331 cargo tanks was inadvertently omitted in the introductory text to paragraph (a)(6). This amendment corrects this oversight.

Section 173.292

In response to a petition, the description "hexamethylene diamine, is corrected to read "hexamethylenediamine" in the section heading and the introductory text in paragraph (a) for consistency with the

proper shipping name shown in the § 172.101 Table.

Sections 173.315 and 173.318

Sections 173.315(i)(1)(ii) and 173.318(b)(2)(i)(C) and (b)(2)(ii) require that the flow capacity and rating of pressure relief devices be verified and certified by the manufacturer of the device. CGA requested that these devices be rated, tested, and marked in accordance with CGA Pamphlet S–1.2. We have reviewed CGA Pamphlet S–1.2 and have found those provisions to be consistent with those of the final rule. Therefore, these paragraphs are revised as requested by CGA.

Section 173.346

Authorization for use of the MC 330 and MC 331 cargo tanks was inadvertently omitted in the introductory text to paragraph (a)(12). This amendment corrects this oversight.

Section 177.824

This section is revised to clarify that a motor carrier may not operate a specification cargo tank motor vehicle containing a hazardous material unless the cargo tank conforms to be retest and inspection requirements in Part 180.

Section 178.320

Definitions of "cargo tank," "cargo tank motor vehicle," and "cargo tank wall" are added in paragraph (a). The definitions of "cargo tank" and "cargo tank motor vehicle" are the same definitions adopted in § 171.8, and appear in this section as a convenience to users. A definition of "cargo tank wall" was added because the term is used in § 107.503 and in various sections in parts 178 and 180. Because of these additional definitions, paragraph (a) is reorganized for clarity.

A petitioner asked that the definition of "design type" be revised so that minor variations in piping which do not affect the lading retention capabilities of the cargo tank are not considered changes in the "design type." We agree with the petitioner that recertification of the cargo tank motor vehicle by a Design Certifying Engineer should not be required if such variations are made to piping, and have revised the definition of "design type" accordingly.

Another petitioner objected to the limitation of a "design type" to a specific diameter and length, stating that tanks with a larger diameter or shorter length are "stronger tanks." The petitioner also recommended that the definition of "design type" refer to a radius or radii instead of a diameter, to account for non-circular cargo tanks. We do not agree with the petitioner that tanks with a larger diameter or shorter length will always be stronger tanks. We cannot foresee all possible changes to a cargo tank motor vehicle, and how each of these changes will affect the structural integrity of the modified cargo tank motor vehicle. The Design Certifying Engineer must be used to ensure the structural integrity of each different cargo tank motor vehicle design. However, we have modified the definition of "design type" to specify that the cargo tank is made to the same "cross section dimensions" instead of diameter, to account for non-circular cargo tanks.

A number of petitioners asked for clarification regarding which cargo tank equipment manufacturers must register with DOT. The definition of "manufacturer" is revised to clarify that the term applies to persons who manufacture cargo tank equipment which forms part of the cargo tank wall. Therefore, persons who manufacture equipment such as hoses, pumps, placard holders, etc. which have no lading retention capability during transit are not required to register under part 107, subpart F.

A petitioner suggested that paragraph (b)(2) be revised so that the Design Certifying Engineer would furnish a certificate to the assembler and ultimate end user in addition to the manufacturer. The petitioner also suggested that paragraph (b)(3) be revised to require the final assembler and ultimate end user to retain the design certificate. We believe it is unnecessary to revise paragraphs (b)(2) and (b)(3) as suggested. The cargo tank specifications contain certification provisions requiring each manufacturer in a multi-stage manufacture to transfer certificates and drawings to each subsequent manufacturer. Those certification provisions require the manufacturer to supply a certificate to the end user. The issue of whether drawings and calculations must be supplied to the end user is addressed in this amendment in the discussion of § 178.345–15. However, paragraphs (b)(2) and (b)(3) are revised to clarify the requirements for the inclusion of sketches, drawings, and calculations with the certificate. These changes were believed necessary because in many cases, the Design Certifying Engineer is not supplying sketches, drawings, and calculations, but rather is reviewing those supplied by the cargo tank manufacturer.

Sections 178.337–3 and 178.338–3

As discussed earlier in this preamble under the heading "Structural Integrity", we have reorganized these sections for clarity. In the following discussion the paragraph numbers used in the amendment are identical for both §§ 178.337–3 and 178.338–3.

Paragraphs (a), (a)(1), and (a)(2) in the final rule are reorganized into four paragraphs. In §§ 178.337–3(a)(1) and 178.338–3(a)(1) of this amendment, the maximum allowable stresses are the same as those specified in the final rule. We disagree with petitioners who suggested that the maximum allowable stress be 25 percent of the ultimate tensile strength rather than "the lesser of the maximum design stress value specified in the ASME code or 25 percent of the minimum specified tensile strength". We believe the ASME calculations are such that a margin of safety is provided by the maximum allowable stresses specified. If the petitioner's suggestion is adopted, the design stress can be close to yield strength for some pressure vessel steels if those steels have a significant difference between yield and ultimate tensile strengths. However, we have provided a relaxed requirement in paragraph (a)(2), to permit the properties of an authorized material to be established by testing.

To remove any confusion as to the stress analysis required for different loading conditions, we have clarified, in paragraph (a)(3), specific loading requirements that must be considered "separately". We recognize in some cases a more detailed analysis may be necessary to accurately establish the maximum effective stresses. Therefore, we are authorizing the use of other analytical and test methods, provided such methods are accurate and verifiable. We believe this relaxation will help the designer when the ASME calculation procedures are not directly applicable or when additional information is necessary. Several petitioners requested clarification on whether corrosion allowance material is included in the design thickness. We have clarified in paragraph (a)(4) that corrosion allowance material may not be included in design stress calculations.

The requirements in paragraph (b) pertain to the ASME design calculations that must be performed to establish the basic structural integrity of a cargo tank. These requirements are essentially the same as prescribed in paragraph (a)(2) of the final rule.

The intent of paragraph (c) in the final rule is to determine the maximum effective stress (i.e., maximum principal stress) at any point in the cargo tank resulting from various dynamic loadings, or from a combination of loadings. The

effective stress calculation determines additional thickness requirements, if any, at points where the effective stresses are high or at areas prone to fatigue or environmental degradation. A petitioner suggested that the "+/−" sign in the effective stress equation should be only "+". This equation is used to calculate the maximum normal stresses in a material when subjected to any system of loading. The "+" and the "−" signs are used separately to determine the magnitude of the two principal stresses. The requirement for using the effective stress equation is necessary because the designer must calculate both the effective stresses and design for the worst case. The petitioner's suggestion, therefore, is not accepted. A petitioner suggested that the loadings at the fifth wheel for MC 338 cargo tanks be changed for consistency with those specified for MC 331 cargo tanks, because both are expected to be subjected to the same loadings. We disagree with the petitioner. The MC 338 cargo tank design, construction and service requirements are different from those of MC 331 cargo tanks. MC 338 cargo tanks can be single walled or vacuum insulated and can be high pressure or cryogenic cargo tanks. Section 178.338–13 (b) and (c) in the current regulations prescribe different loading conditions for each of these cargo tanks. We believe such a difference in loading requirements is necessary. Therefore, except for correction of a provision in paragraph (c), in which the loading requirements in § 178.338–13 (b) and (c) for calculation of shear stresses for MC 338 cargo tanks are referenced, we have not revised the requirements in the final rule. This correction makes the loading requirements for shear stresses consistent with the loading requirements for calculation of tensile and compressive stresses.

Paragraph (d) is reorganized for clarity and to relax provisions concerning the maximum allowable stress for cargo tanks constructed of stainless steel. For a cargo tank constructed of stainless steel, the calculated longitudinal stress resulting from a 2 "g" decelerative force and the MAWP, shall not be greater than 75 percent of the ultimate tensile strength, rather than the "lesser of the yield strength or 75 percent of the ultimate tensile strength."

The minimum metal thickness requirements for shell and heads for MC 331 and MC 338 specification cargo tanks are found in paragraph (e). These requirements have not been changed from those prescribed in the final rule. Except for editorial changes and minor reorganization, paragraph (g) of the amendment pertaining to the design, construction and installation of any appurtenance to the shell and heads of a cargo tank contains the same requirements that were prescribed in §§ 178.337–3(f) and 178.338–3(e) of the final rule.

Section 178.337–9

A petitioner requested that paragraph (b)(6) be revised to allow all piping, valves, hose, and fittings to be tested for leaks at 80 percent of the design pressure instead of at 100 percent of the design pressure. The petitioner stated the 100 percent test pressure would require removal of the pressure relief valves before testing; whereas, testing at 80 percent would allow these valves to remain in place. Another petitioner requested that a hydrostatic test using a suitable test fluid be recognized as an alternative to a pneumatic test using gas or air pressure. This petitioner stated that water and diesel fuel are two commonly used test fluids for the quinquennial requalification for continued service.

We agree that leakage testing at 80 percent of design pressure can be as effective as testing at 100 percent of design pressure and that conducting the test with hydrostatic pressure should be allowed. We have revised paragraph (b)(6) accordingly.

Section 178.337–18

Paragraph (a) is revised to clarify the respective functions of the Design Certifying Engineer and the Registered Inspector.

Section 178.338–3

Refer to preamble discussion to § 178.337–3.

Section 178.338–17

CGA requested that we revise paragraph (b) to allow the installation of anodized aluminum parts on cargo tanks used to transport oxygen, cryogenic liquid, for consistency with § 173.318. We agree and have revised the paragraph accordingly.

Section 178.338–19

Paragraphs (a) and (b) are revised to clarify the respective functions of the Design Certifying Engineer and the Registered Inspector. These revisions were inadvertently omitted from the final rule.

Section 178.345–1

Petitioners requested revisions to several definitions appearing in this section. In the definition of "flange," several petitioners requested that the following sentence be removed: "For size and shape, see ANSI B16.5." The petitioners stated that the size and shape of a flange should not be constrained by ANSI B16.5. We agree and have revised this definition.

The definition of "internal self-closing stop-valve" is revised to permit location of the valve seat inside the tank, as requested by petitioners.

A petitioner pointed out that a "nozzle" can be a pipe or a tubular section and that the ASME Code does not require a nozzle to be attached to a flange, as represented in the definition. We have revised the definition as suggested by the petitioner.

The definition of "outlet" is revised to exclude a threaded opening securely closed during transportation with a threaded cap, as suggested by a petitioner.

A petitioner stated that a "pipe coupling" has internal, and not external, threads as stated in the definition. We have amended the definition by removing the wording "or external".

In the final rule, "shell" was defined as "the circumferential portion of a tank defined by the basic design radius excluding the closing heads. The definition is revised based on the merit of a petition stating that an oval tank may have too or more radii.

Petitioners' requests to revise the definitions of "constructed in accordance with the ASME Code," "maximum allowable working pressure," "rear bumper," and "sacrificial device" either lack merit or are unnecessary. Therefore, these definitions have not been changed.

Section 178.345–2

Paragraph (a) of the final rule requires a manufacturer to ensure that the materials used to construct the cargo tank wall, bulkheads and baffles are compatible with the lading intended for transportation in the cargo tank. TTMA stated a manufacturer would not always know the intended lading. We agree with TTMA and have revised the requirement. Any design requirements which depend upon the special characteristics of a hazardous material lading are specified in the commodity sections in part 173.

TTMA stated that ASTM 676 steel listed in paragraph (a)(1) should be ASTM 656. In addition, both TTMA and NTTC requested that ASTM A 569 (carbon steel), 570 (carbon steel with properties), 572 (HSLA plate) and 607 (HSLA sheet) steels be authorized for cargo tanks "constructed in accordance with the ASME Code." We agree that

ASTM 569, 570 and 572 steels should be authorized. However, we believe the ultimate to yield strength for ASTM A 607 is too low. Therefore, we have not accepted these steels. The reference to ASTM A 676 steel in the final rule is corrected to read ASTM A 656.

In relation to paragraph (b), NTTC asked if a minimum thickness is required at locations of high stress. Stress at any point on a cargo tank must be calculated as specified in § 178.345–3. We have made an editorial correction to reference "§ 178.345–3" instead of "§ 178.345–3(a), (b), (c), or (d)."

TTMA stated that corrosion and abrasion protection should be covered in Parts 172 and 173 rather than § 178.345–2(c). We intended paragraph (c) to be used only as a guide to manufacturers; therefore, it is revised. We recognize that a cargo tank need only meet the minimum thickness requirement to be in full compliance with the applicable specification. However, if the cargo tank is thinned by corrosion or abrasion below the required minimum thickness, it will no longer be suitable for its intended service. Therefore, this paragraph is retained as written.

Section 178.345–3 (Structural Integrity)

Petitions received addressing this section reflected considerable confusion regarding the structural integrity analysis, and the applicability and exceptions of various design requirements in the ASME Code. Therefore, as in the case of the MC 331 and MC 338 cargo tank specifications, these requirements are reorganized and revised.

Paragraphs (a), (a)(1), and (a)(2) in the final rule are reorganized into four paragraphs in this amendment. Revised paragraph (a)(1) prescribes the general requirements and acceptance criteria. This paragraph requires that the maximum calculated design stress value may not exceed the lesser of the maximum allowable stress value prescribed in Section VIII of the ASME Code, or 25 percent of the tensile strength of the material used. For clarity, the wording "lesser of" is added, as suggested by a petitioner.

In paragraph (a)(2), we have provided for the use of tested properties of the materials so that the Design Certifying Engineer has flexibility to use materials efficiently. We have clarified in paragraph (a)(3) specific loading requirements that must be considered separately to remove confusion regarding the stress analysis. As discussed earlier in this preamble under the heading "Structural Integrity," we are permitting the use of other analytical and test methods provided such methods are accurate and verifiable, as suggested by TTMA. We have clarified, in paragraph (a)(4), that corrosion allowable material may not be included in design calculations, as suggested by several petitioners.

The effective stress calculation requirements prescribed in paragraph (b) of the final rule are revised and appear as paragraph (c) in this amendment. The ASME design calculations prescribed in paragraph (a)(2) of the final rule, have been moved to paragraph (b) in this amendment.

TTMA pointed out that the various dynamic loadings prescribed in paragraph (b) of the final rule must be based on reaction forces rather than the static weight of the fully loaded cargo tank motor vehicle. We generally agree with TTMA, and have incorporated appropriate changes in paragraph (c) of this amendment. Paragraph (c) of this amendment provides a method for determining the maximum effective stress at any point in the cargo tank wall resulting from various dynamic loadings and combinations thereof. These calculations determine thickness requirements if the effective stresses are high at any point, or an area of the cargo tank is prone to fatigue or environmental degradation. However, we do not agree that the horizontal accelerative force to be applied at the pivot (fifth wheel) or the turn table must be 0.75 times the vertical reaction caused by fully loaded cargo tank motor vehicle. TTMA provided no data to support their position and, therefore, the requirement has not been changed. As discussed earlier in this preamble under the heading "Structural Integrity," TTMA's suggestion to revise the "g" loadings for cargo tanks with one or more baffle assemblies is adopted. We have authorized a reduction in the "g" loadings up to a maximum of 1 "g" at a rate of 0.25 "g" per baffle assembly, in paragraph (d).

Provisions contained in paragraph (d) of the final rule concerning calculation of effective stress for a cargo tank supported by a vehicle frame or other form of structural support are revised and moved to paragraph (f) of this amendment. In the revised provisions, we have clarified that, when considering the loading in paragraph (c), the stress analysis may include the contribution of the frame or the integral structural support.

Section 178.345–7 (Circumferential Refinforcements)

Several petitioners pointed out various editorial errors appearing in this section. We have corrected these errors and have made several editorial clarifications. We have removed the first sentence in paragraph (d)(5) to clarify that hat shaped or open channel rings which can be visually inspected are authorized on cargo tank motor vehicles constructed of carbon steel.

Section 178.345–8 (Accident Damage Protection)

Several petitioners objected to the wording in paragraph (a). TTMA stated that requiring a Design Certifying Engineer state that the "cargo tank is designed to minimize loss of lading in an accident taking into account of potential puncture, abrasion, etc. is an impossible liability to assume." We agree the requirement as written is open-ended and have revised it to better state our intention.

A petitioner stated that the loads specified for the design of rollover protection devices are artifically high and that the bending stresses in the tank wall can be as high as three times the maximum allowable stress value. An analysis submitted as part of the petition was based on a somewhat simplified model and consequently appears to result in more severe local stresses. It is clear that concentrated loads must be distributed broadly over the cargo tank wall. This distribution of loads can be accomplished by doubler pads, circumferential rings and other means without undue penalty in weight or fabrication complexity.

Several petitioners stated that the impact load specified in paragraph (d) for rear-end protection devices was excessive and subject to misinterpretation. Some petitioners objected to use of the inboard surface of the device as a dimensional reference point. The impact load is roughly equivalent to backing into a loading dock at five miles per hour. Many DOT specification cargo tank motor vehicles currently have rear structural features capable of withstanding such an impact. We consider this to be a reasonable requirement and have included it in this amendment. The need to refer to a safety factor has been eliminated by specifying design stress level in terms of one-half the ultimate strength of the material. We concur with the views expressed by petitioners concerning the "inboard surface of the device" and that the general wording in the final rule allows more than one interpretation. We have revised paragraphs (d)(1) and (d)(3) for clarity.

Section 178.345–9

Petitioners requested reconsideration of the requirement that only "automatic

means of closure" be used to protect tanks from overpressurization. TTMA stated that a pump equipped with an automatic bypass or pressure relief system designed to prevent pressurization of the cargo tank above its MAWP may be just as effective as "closure" of the line between the pump and the cargo tank. We agree and have revised the requirement to allow other means which are equally effective, such as pressure relief devices and overpressure bypass systems.

In paragraph (b) of the final rule, we required that the designed bursting pressure of a hose coupling be to 120% of the bursting pressure of the hose. Many petitioners objected to the over-designed couplings that would be required on a low pressure cargo tank if the hose used had a large bursting pressure. We agree and have changed the design constraint for the coupling to be a function of the tank MAWP rather than the hose bursting pressure. This requirement has been moved to new paragraph (c) in this amendment.

Several petitioners, including TTMA, noted paragraph (c) of the final rule does not allow slip joints in the design of these cargo tanks. The petitioners argued that slip joints should not be allowed in lines that would retain lading during transportation due to possible leakage of hazardous materials. However, slip joints should be allowed in lines which do not retain lading. We agree with the petitioners and have added the phrase "in lading retention piping." These provisions appear in paragraph (d).

For consistency in the use of nomenclature, in paragraph (h), the term "product retention system" is revised to read "lading retention system."

Section 178.345–10

Numerous petitioners addressed the final rule provisions for pressure relief systems on DOT 400 series cargo tank motor vehicles. These provisions are intended to cover all vacuum and pressure relief functions normally associated with use in cargo tanks and, in addition, to prevent loss of lading through the pressure relief system in the event of vehicle overturn or accident. This requirement for lading retention is to be accomplished in a two-step plan. As set forth in the final rule, these steps were:

1. Within 1.5 years of the effective date, pressure relief valves must reclose after experiencing pressure surges typically encountered in upsets, and leakage must be less than one gallon, and

2. Within 4.5 years of the effective date, pressure relief systems must withstand such pressure surges without leakage regardless of vehicle orientation.

In both stages, the characteristic dynamic pressure surge was defined as being "50 psig applied for at least 300 milliseconds." TTMA Recommended Practice, RP No. 81—"Performance of Spring-Loaded Pressure Relief Valves on MC 306, MC 307, and MC 312 Tanks" was cited as a testing procedure for demonstrating the ability to withstand the characteristic surge. This document describes an Australian test utilizing a drop test device.

Several petitioners suggested revisions in the characterization of the dynamic pressure surge and stated that it would be applied to individual specification units, e.g., only to DOT 406 systems. Generally, their recommendations were based upon studies of overturn events conducted on MC 306 units, or on simulators, reported in 1980 by Dynamic Science and the Highway Safety Research Institute, and upon experience with test equipment similar to the Australian drop-testing devices. All petitioners suggested shortening the 300 millisecond period of surge duration, and generally reducing the magnitude of the pressure surge. We developed the following revision based on data generated by the overturn research cited above and which has been proven to be obtainable with existing drop test equipment:

Each pressure relief system must be designed to prevent loss of liquid lading due to pressure surges caused by overturn or other accident. This requirement is satisfied by a pressure relief system designed to withstand with no loss of lading a dynamic pressure surge reaching 30 psig above the designed set pressure of the relief system and sustained above the set pressure for at least 60 milliseconds.

The two-step plan for introducing these requirements is retained. Because valve manufacturers presented persuasive evidence that 18 months was insufficient time for development and initial production of a reseating valve, this period has been changed to 2 years. An additional period of 3 years is allowed for the development and production of a valve that meets the "no leakage in any orientation" requirement.

Several petitioners strongly objected to references to TTMA RP 81 on the basis that the wording seemed to imply that only TTMA's method of proof testing would be acceptable. As revised in paragraph (b)(3)(i)(A), the procedures in TTMA RP 81 may be used as one acceptable approach for satisfying the requirement.

A number of petitions were received to the effect that no manufacturer could supply relief valves capable of withstanding the pressure surges described in the final rule. While the final rule characterization of pressure surges was somewhat higher and much longer than surges to be expected typically in overturn accidents, at least one manufacturer can supply valves which satisfy the requirements contained in the final rule.

Several petitioners recommended that non-reclosing frangible devices be allowed on cargo tanks used in certain hazardous materials services, notably on vacuum-loaded cargo tank motor vehicles used in hazardous waste services. We disagree because frangible devices installed singly (i.e., not in series with a reclosing pressure relief valve) may not retain lading in the event of vehicle overturn. Other petitioners stated that the requirement in paragraph (c) that pressure relief devices be located in the center of the cargo tank should not be applied to vacuum-loaded cargo tank motor vehicles which are designed to slope rearward to facilitate unloading. We agree with these petitioners and have revised paragraph (c) accordingly.

Several petitioners pointed out that the controls on relief valve functions, in paragraph (d), are excessive and redundant. We agree and have revised paragraph (d) to eliminate unnecessary controls on performance, and to express opening and closing points as percentages of the MAWP.

In response to several petitions, we have revised paragraph (e) to clarify that the venting capacity of pressure relief system limit the tank internal pressure to not more than the cargo tank test pressure.

Questions raised by petitioners on the pressure relief system requirement found at § 180.405(h) have suggested the need for clarification of our intent. For this reason, and also in order to reflect the changes effected in § 178.345–10, we have revised § 180.405(h).

Section 178.345–11

Paragraph (a) of the final rule requires that all loading/unloading outlets be located as near as possible to the cargo tank wall, and that the remotely activated means of closure for the self-closing system "be more than 10 feet away from the stop-valve." TTMA and several other petitioners strongly objected to requiring external self-closing stop valves on loading/unloading outlets of vacuum-loaded cargo tanks. They argued that many hazardous wastes carried in these cargo tanks contain suspended solids or debris which make it impossible to ensure that

a self-closing stop valve will achieve a leak-tight seal when actuated.

It is our position that loading/unloading outlets must be equipped with internal self-closing stop valves or with external stop-valves which are part of a self-closing system. When an external stop-valve is used, the self-closing system need not be the only means by which the outlets may be closed. During normal operation, the stop-valve can be manually operated but, in the event of an emergency, it must be possible to remotely close the outlet. We agree with the petitioners that, where debris or solids are present, the actuation of a self-closing system may not result in a perfect closure, but lading loss in an emergency will be significantly reduced. We have reorganized this section and adopted use of the term "self-closing system" to further clarify our intention.

A petitioner requested that the requirement for a self-closing system on loading/unloading outlets apply to bottom outlets because no risk of lading exists with top outlets. We believe that, in the case of pressurized unloading of top outlets, there is a significant risk of lading loss in an emergency. Therefore, this paragraph applies to both top and bottom loading/unloading outlets.

Several petitioners expressed concern over use of the phrase "as close as possible to the cargo tank shell" to describe the required location of external stop valves. They requested the word "possible" be replaced with the phrase "practicable, taking into account accident damage protection, durability, lading characteristics and maintenance". API stated that the final rule may be requiring the placement of the valves in a position which is ultimately unsafe. On vacuum loaded cargo tanks, the stop valve is positioned to avoid debris packing in the bonnet, which could cause premature valve failure. Such valves are protected by accident damage devices and/or by the vehicle frame. API stated that they believe self-closing stop valves can be installed in a safe and practical position without being "as close as possible to the cargo tank shell." TTMA suggested we simply use the term "practicable" in place of "possible". We believe the use of the term "praticable" will allow the external self-valves to be placed in safer and more practical positions while maintaining our intent to minimize the distance between the cargo tank wall and the stop-valves. Therefore, we have adopted TTMA's suggested change.

With regard to the provision that the remotely activated means of closure for the self-closing system "be more than 10 feet away from the stop-valve," several petitioners requested that provisions be made for shorter tanks where this minimum distance cannot be achieved. We agree with their position and have provided that the remote activating system can be placed on the end of the tank farthest away from the loading/unloading connection. Several petitioners requested that the remote means of closure be located on the front, driver side of the cargo tank. They stated that this already is common practice in the industry and would provide for uniformity, which may enhance safety in emergency situations. We will not require this location but have no objections to this industry practice.

Paragraph (a)(1) of the final rule required that, in case of fire, "each stop valve" must be activated for closure by thermal means. TTMA suggested that this should apply only to "self-closing" stop valves. It was our intention that this paragraph apply only to self-closing systems. We have added a new paragraph (a)(4)(i) in this amendment to better reflect our intent.

Paragraph (b) of the final rule requires each tank outlet which is not a loading/unloading outlet to be equipped with a stop valve or other leak tight closure, and any extension beyond this closure to be fitted with another stop valve. We did not intend to limit the closure on the extension to a "stop valve" and, therefore, have revised the wording to "stop valve or other leak tight closure", as suggested by TTMA.

Section 178.345–12 (Gauging Devices)

Several petitioners stated that the requirement pertaining to the accuracy of gauging devices that indicate the maximum liquid level was confusing. They suggested that since the intent of the gauge is to prevent overfilling, there is no need for accuracy of the gauging device throughout its range. Two petitioners argued that, because of the diversity of hazardous materials products handled, selection of a gauge for vacuum loaded cargo tanks with an accuracy within 0.5 percent is difficult, but some mechanical gauges are accurate enough to prevent overfilling. The petitioners requested that vacuum-loaded hazardous waste tanks be excepted from this section. We have revised the provisions to reflect our intention that the gauging device need not have the stated accuracy throughout the filling range, but it must be capable of indicating maximum fill level within 0.5 percent of the fill capacity, either by volume or liquid level. Any device, including mechanical gauges meeting this requirement, may be used. Also, we wish to point out that § 178.345–12 applies to all cargo tanks, including vacuum loaded hazardous waste cargo tanks. Therefore, the petitioners' request to exclude waste tanks is denied.

Section 178.345–13 (Pressure and Leakage Tests)

TTMA requested that, in paragraph (b)(2), we limit the pneumatic testing pressure to 6 psig, because pneumatic testing at higher pressures is "not safe".

We agree with the petitioner that pneumatic testing has an inherently higher risk than hydrostatic testing because of the stored energy. However, we do not agree that a psi limit should be established for the test pressure. We believe that if the prescribed test procedure is followed, and adequate safeguards are established, pneumatic testing can be safely performed. When a pneumatic test is performed, the tester should fully consider the potential risks, and take steps to ensure safety to personnel and facilities. Paragraph (b)(2) is revised to emphasize the need for adequate safeguards. Two petitioners questioned the need for applying the leakage test to the entire tank surface, as prescribed in paragraph (b)(2) of the final rule. They suggested that the leak testing by soap solution or other methods be limited to "each joint and crevice". Upon further consideration, we agree with the petitioners and have limited the leakage test to joints.

We intended to permit the use of "air" or an "inert" gas for pressure and leakage tests. Therefore, in paragraph (b)(2), the wording "other similar gases" is revised to read "an inert gas".

Section 178.345–14 (Marking)

TTMA stated that there is no need to braze or weld around the marking plates and requested that the words "around the plate perimeter" be removed. We disagree with TTMA. These plates are required to be "permanently" affixed to the tank or integral supporting structure. This permanency is best achieved by brazing or welding around the entire perimeter of the plate.

TTMA also requested a number of revisions to the required markings on these plates. Most of these suggested changes were to condense the prescribed wording and abbreviations, for example, "water cap." would be "wc" and "Min. thick.-head" would be "Min.H." We believe the wording and abbreviations should not be condensed to a point where a person is unable to readily decipher the information. Therefore, only certain markings are revised.

Section 178.345–15 (Certification)

In the NPRM, design drawings were required as part of the certification provided to the purchaser, but in response to comments this requirement was deleted in the final rule. The final rule required only that the "final manufacturer shall furnish the owner with all certificates, excluding sketches and drawings." A petitioner stated that, unless design drawings are furnished to the owner, a subsequent purchaser of the unit would have no access to significant design information in the event that the original manufacturer has gone out of business. We believe the petitioner raises a valid point, but we believe this matter can be resolved by contractual arrangements between the manufacturer and the purchaser rather than through a requirement in the regulations. We strongly recommend that purchasers obtain documentation, such as sketches, drawings and specifications on dimensions and features, piping, and pressure relief system sufficient to define the configuration of the cargo tank motor vehicle. In the event of subsequent structural modifications, such data can be of essential value to a Design Certifying Engineer in evaluating whether the cargo tank meets the applicable specification.

Section 178.346–1 (General Requirements)

TTMA requested that we establish a MAWP of 3.3 psig for all DOT Specification 406 cargo tanks. TTMA claims that this would accommodate a static head of gasoline of 85 inches, which is typical for tanks carrying gasoline. We have not made this change to § 178.345–1(b) because DOT Specification 406 cargo tanks are authorized for many commodities other than gasoline and may have a static head of less than 85 inches. However, we would have no objection to the industry standardizing the design of all gasoline cargo tanks. As requested by several petitioners, paragraphs (d)(3) and (d)(8) are revised for clarity. See the earlier preamble discussion of "Application of the ASME Code to low pressure cargo tank motor vehicles" for our response to TTMA's request for exemption from additional paragraphs of the ASME Code.

Section 178.346–2

Several editorial changes are made.

Section 178.346–10 (Pressure Relief)

In response to several petitions, we have corrected the reference in § 178.346–10(b)(2) to read § 173.33(c)(1)(iii). Additionally, paragraphs (c) and (d) are revised for consistency with § 178.345–10 (see the preamble discussion to § 178.345–10).

Section 178.346–13

Two petitioners noted that the leakage test prescribed by paragraph (a), and by § 180.407(h), cannot be performed on a cargo tank equipped with a one psig normal vent unless the normal vent is removed or rendered inoperative. They suggested that a sentence be added to the leakage test procedure to allow venting devices set to discharge at less than the leakage test pressure to be removed or rendered inoperative during the test. We agree with the petitioners' suggestion, and have added the provisions to paragraph (c) of this section and to § 180.407(h).

Section 178.347–1 (General Requirements)

As requested by several petitioners, paragraphs (d)(3) and (d)(8) are revised for clarity. See the earlier preamble discussion on "Application of the ASME Code to low pressure cargo tank motor vehicles" for our response to TTMA's request for exemption from additional paragraphs of the ASME Code.

Section 178.347–2 (Material and Thickness of Material)

Several petitioners pointed out that the titles of Tables I & II should give material thicknesses "after forming." We agree with the petitioners and have changed the table titles.

Section 178.347–10 (Pressure Relief)

Several petitioners requested that paragraph (b)(1) be revised to state that vacuum relief devices are not required on cargo tanks designed to withstand full vacuum. We agree with the petitioners and have included such a provision in § 178.347–10(b)(1). Paragraph (d) is revised for consistency with § 178.345–10 (see the preamble discussion to § 178.345–10).

Section 178.348–1 (General Requirements)

In response to TTMA's petition, paragraph (d) is revised to require a cargo tank motor vehicle with a MAWP greater than 15 psig to have a circular cross-section, and paragraphs (e)(1) and (e)(2) are revised to clarify that only cargo tank motor vehicles with a MAWP greater than 15 psig must be "constructed and certified in conformance with the ASME Code". As requested by several petitioners, paragraphs (e)(2)(iii) and (e)(2)(viii) are revised for clarity. See the earlier preamble discussion on "Application of the ASME Code to low pressure cargo tank motor vehicles" for our response to TTMA's request for an exception from additional paragraphs of the ASME Code.

Section 178.348–2 (Material and Thickness of Material)

Several petitioners pointed out that the titles of Tables I and II should give material thicknesses "after forming." We agree with the petitioners and have changed the table titles.

Section 178.348–10 (Pressure Relief)

Several petitioners requested that paragraph (b)(1) be revised to state that vacuum relief devices are not required on cargo tanks designed to withstand full vacuum. We agree with the petitioners and have included such a provision in § 178.348–10(b)(1). TTMA requested that paragraph (d)(3) be clarified to indicate that the minimum total venting capacity required is determined from § 178.270–11(d)(3) and that the approximations provided in that section can be used in place of specific values for each commodity. We agree with TTMA that the use of the approximations provided in § 178.270–11(d)(3) will provide a venting capacity in excess of that required for a corrosive material and have revised paragraph (d)(3) as requested.

Section 180.403

A new definition for "Corrosive to the tank/valve," as used in § 180.407, is added. For explanation, refer to the preamble discussion to § 180.407 under the headings "External visual inspections." Also, the definitions for "Modification" and "Repair" are revised for consistency with other changes made in this amendment.

Section 180.405

Paragraph (f) is revised for consistency with changes made to § 178.345–11. Refer to the preamble discussion to § 178.345–11.

TTMA stated it appears, from paragraph (f), —1) that only a Design Certifying Engineer would be capable of determining compliance with "equally adequate accident damage protection" for the stop-valve, 2) that an unreinforced portion of a shell exceeding 60 inches had a construction which "produces a structural integrity of at least equal to that prescribed in § 178.345–3", and 3) that a cargo tank projection from the shell or head is "as strong as the tank shell or head and is located within appropriate accident damage protection device." We agree that the person performing certain

certifications would need design experience. However, we do not agree with TTMA that, for determining whether a cargo tank authorized under exemption qualifies for remarking as a specification cargo tank, a Design Certifying Engineer should be authorized to the exclusion of a Registered Inspector. The designs of these cargo tanks have already been approved by DOT. Therefore, in paragraph (f), we have allowed either (1) a Design Certifying Engineer or a Registered Inspector and (2) an owner of a cargo tank under exemption to determine if the tank qualifies for remarking as a specification cargo tank.

For changes to paragraph (h), refer to the preamble discussion to § 178.345–10.

In regard to paragraph (k), API pointed out that a design pressure of 3.0 psig would allow more cargo tanks now in service to remain operable in a fully loaded condition. We agree and have provided in this paragraph and in § 173.33(c)(2) for these cargo tanks to be marked with a design pressure or MAWP of 3.0 psig instead of 2.65.

Section 180.407 (Requirements for Test and Inspection of Cargo Tanks)

In response to petitioners, the title to this section, and various references in paragraphs (a), (b), and (c) are revised to clarify that the test and inspection requirements of this section apply only to specification cargo tanks. Paragraphs (a)(4) and (a)(5) are redesignated as paragraphs (a)(5) and (a)(6), respectively. Based on some petitioners' confusion over what to do with defects discovered during tests and inspections, a new § 180.407(a)(4) is added containing a reference to § 180.411, which describes acceptable results of tests and inspections. Paragraph (b)(3) is revised to require a cargo tank which has been out of hazardous materials transportation service for a period of one year or more to be hydrostatically or pneumatically tested in accordance with § 180.407(g) prior to further use. A hydrostatic pressure test is currently required prior to further use of a cargo tank which has been out of hazardous materials transportation service for one year or more. As written in the final rule, it could be construed that a cargo tank which has been out of hazardous materials transportation service for a year or more would not have to be pressure tested for 5 years.

In response to petitions, the May 22, 1990 amendment specified compliance dates for various provisions contained in the final rule. A table contained in the May 22 amendment, which sets forth the time intervals for performing periodic tests and inspections, and the dates by which the first tests and inspections must be completed, is revised and incorporated into § 180.407(c) of this amendment.

External Visual Inpsection

For clarification, NPGA suggested that the second sentence of § 180.407(d) be revised to read "Where visual inspection is precluded by both internal coating and external insulation *and where* the cargo tank is not equipped with a manhole * * *" (change underlined). We believe that NPGA's suggested wording implies that if a cargo tank is not equipped with a manhole or inspection opening, a pressure test is performed in place of the external visual inspection. It was not our intent in the final rule to require a pressure test in place of an external visual inspection, except where it is not possible to do either an external or an internal visual inspection. Therefore, NPGA's suggested wording is not incorporated into paragraph (d). However, we have revised the paragraph to clarify that where insulation precludes external visual inspection, and the cargo tank is not equipped with a manhole or inspection opening, the tank must be hydrostatically or pneumatically pressure tested. Other petitioners asked that the first sentence of paragraph (d) be revised to require that, where insulation precludes external inspection of the tank shell and heads, the insulation system or jacket be inspected in accordance with § 180.407(d)(2). We believe it is beyond the scope of this rulemaking to require the inspection of insulation or jacketing material. No such inspection requirements were proposed in the NPRM or adopted in the final rule. Such a requirement may be considered in a separate rulemaking action.

NTTC asked that § 180.407(d)(2)(iii) be revised by adding the following: "any manhole cover or gasket leakage discovered during this inspection must be eliminated." We believe the addition of such wording is unnecessary, because the repair of sources of leakage is addressed by § 180.411(d). NTTC also asked that paragraph (d)(2)(v) be revised to state "fusible linkage must be in working order and loose bolts and nuts must be tightened." NTTC argued that the existing wording, which states that mising bolts and nuts must be replaced, does not take into account situations where bolt holes are intentionally left empty by the cargo tank manufacturer. These empty bolt holes could give a false appearance of "missing" bolts and nuts. We believe that in cases where bolts and nuts are actually missing, they must be replaced. If a cargo tank motor vehicle design incorporates certain bolt holes which sometimes are not used, for instance, on upper coupler assemblies, then no bolts are considered missing. Therefore, no change has been made to paragraph (d)(2)(v). The revision suggested by NTTC specifying that the fusible linkage be in working order also is not adopted. We believe it is difficult to determine whether a fusible device is in working order without functioning of the device, and it is unreasonable to expect functioning of the fusible element during an inspection. Remote closure devices must be operated in accordance with paragraph (d)(2)(iv). For clarity, paragraph (d)(2)(v) is revised to refer to "fusible links or elements," because all fusible devices may not be "links."

NTTC recommended that § 180.407(d)(2)(vi) be revised to require only those markings prescribed by § 180.415 to be checked for legibility. We believe all required markings prescribed by parts 178 and 180 must be checked for legibility. However, this paragraph is revised to clarify that the markings to be checked do not extend to those prescribed by parts 172 and 173. A reference to 49 CFR part 396 is added to paragraph (d)(2)(vii), as suggested by NTTC.

NTTC asked for clarification of § 180.407(d)(2)(viii), regarding which components must be removed from the cargo tank for inspection and which components may be inspected in place. Paragraph (d)(2)(vii) does not require removal of any components for inspection. The only requirement for removal of a component at the time of the external visual inspection appears in paragraph (d)(3), when certain pressure relief valves must be removed from the cargo tank for inspection and testing.

Petitioners pointed out that the term "upper coupler (fifth wheel)" appears in paragraph (d)(2)(viii), while the term "upper skid plate" is used in paragraph (e)(3). NPGA recommended that the term "upper skid plate" be used throughout, because it is widely used in the liquefied petroleum gas industry. We agree with NPGA regarding the need to be consistent in the use of the term "upper skid plate" or "upper coupler (fifth wheel)". A number of other petitioners asked if these terms were synonymous, and if they refer to the "king pin plate". We believe the terms "upper coupler" and "fifth wheel" are most widely used and, therefore, have used the term "upper coupler (fifth wheel)" in paragraphs (d)(2)(viii) and (e)(3) of this amendment. Also, the term "upper coupler (fifth wheel)" is used in the cargo tank motor vehicle

specifications in part 178. Further, NPGA suggested a revision to paragraph (d)(2)(viii) to clarify that the upper skid plate assembly need not be dismantled at the time of the external inspection. We agree with the suggested wording. As discussed under the heading "Internal visual inspection" of this section, paragraphs (e)(2)(ix) and (g)(1)(iii) contain requirements for dismantling the upper coupler assembly for inspection of areas covered by the assembly.

A petitioner suggested that the requirement for removal of pressure relief valves from cargo tanks for inspection be moved from the external visual inspection to the internal visual inspection. The intent of paragraph (d)(3) is to require removal of all reclosing pressure relief valves from cargo tanks transporting lading corrosive to the valve on an annual basis. This intent would not be satisfied if this provision was moved to the internal visual inspection requirements. Therefore, the change suggested by the petitioner has not been made. Paragraph (d)(3) is revised to clarify the performance requirements of the reclosing pressure relief valves.

A number of petitioners urged RSPA to remove the undefined terminology "corrosive to the tank" and "corrosive to the valve" and instead refer to materials "classed as corrosive." It was our intent to refer not to materials which are classified as corrosive materials, but to any material which is corrosive to the tank or valve material. Some materials are classified as corrosive materials, but they are not corrosive to the material of construction of the cargo tank or valve. An example is a material which is corrosive only to skin. Cargo tanks carrying these materials would not be subject to the additional inspection and testing requirements. On the other hand, there are some materials which are not classed as corrosive materials, but which have a subsidiary corrosive hazard which makes them corrosive to the tank or valve. An example is a flammable liquid which is also corrosive. The additional test and inspection requirements would apply to these materials. For clarity, a definition of "lading corrosive to the tank/valve" is added in § 180.403. This new definition includes materials which meet the criteria in § 173.240(a)(2) for corrosion to the material of construction, and any other materials which, experience, has shown to be corrosive to the material of construction of the tank or valve. If the tank or valve is likely to corrode due to the lading, more frequent inspections are warranted. The references to lading "corrosive to the tank" and "corrosive to the valve" have not been changed in this amendment.

TTMA requested a revision of paragraph (d)(4) to clarify that only corroded or abraded areas of the cargo tank shell and head must be thickness tested in accordance with § 180.407(i), because there are no minimum thickness standards for appurtenances or attachments. The paragraph is revised to clarify that corroded or abraded areas "of the cargo tank wall" must be thickness tested.

Internal Visual Inspection

A petitioner suggested a five-year "phase-in" period for the internal inspection of cargo tanks in corrosive service for consistency with the five-year period authorized for completing the pressure retest. We do not agree that a five-year phase-in period should be allowed for the internal visual inspection for cargo tanks in corrosive service. The internal visual inspection for these cargo tanks is an annual inspection. NPGA suggested that a new paragraph (e)(2) be added to state that "the requirements for internal visual inspection for MC 330 and MC 331 cargo tanks shall coincide with the next required quinquennial requalification for required service." We do not intend to specify when each visual inspection is performed, as long as the internal visual inspection of each tank is performed prior to September 1, 1995.

Section 180.407(e)(2)(ii) requires lined cargo tanks to have the lining material inspected for defects. NTTC stated that this language should be eliminated from paragraph (e)(2)(ii), because lining inspections are addressed in paragraph (f). We agree that the lining inspection is adequately addressed by paragraph (f), and have deleted the first sentence of paragraph (e)(2)(ii). However, the requirement that tank liners be inspected as specified in § 180.407(f) is retained for clarity. Paragraph (e)(5), which refers to degraded or defective areas of the tank liner, is redesignated as paragraph (f)(3) for proper placement with other lining inspection requirements.

Several petitioners addressed the requirement in paragraph (e)(3) that tank head and shell areas covered by the upper skid plate be inspected for corroded and abraded areas. As was discussed earlier, the term "upper skid plate" is revised to read "upper coupler (fifth wheel)" in this amendment. The petitioners asked whether this paragraph would require removal of the upper coupler assembly for the inspection. It was our intent to require removal of the upper coupler assembly for this inspection, as suggested by comments to the NPRM. This requirement was placed in the internal visual inspection requirements rather than the external visual inspection requirements, because we do not believe it is necessary to require such an inspection on an annual basis. NTTC pointed out that for cargo tanks transporting materials which are corrosive to the tank, the upper coupler assembly would have to be removed once each year. NTTC suggested that this procedure be moved to the pressure testing requirements in paragraph (g), which would be required every 5 years, and that for cargo tanks in corrosive service, the removal of the upper coupler assembly for inspection be at a two year interval. We agree with NTTC, therefore, the requirement to remove the upper coupler assembly for cargo tanks carrying lading that is corrosive to the tank has been moved to paragraph (d)(2)(ix) as part of the external visual inspection. Paragraph (d)(2)(ix) clarifies that the upper skid plate must be removed and states that this part of the inspection is required only once each 2 years. For cargo tanks used to transport hazardous materials which are not corrosive to the tank, the requirement to remove the upper coupler assembly for inspection of tank head and shell areas covered by the assembly has been moved to paragraph (g)(1)(iii), and appears as part of the pressure retest. In paragraphs (d)(2)(ix) and (g)(1)(iii), the phrase "tank head and shell areas" is changed to "areas", because there may be cargo tank elements covered by the upper coupler assembly which are not head or shell areas.

A petitioner suggested that we add a clarification that only corroded or abraded areas of the tank shell and head must be thickness tested. We agree with the petitioner and have clarified in paragraph (e)(3) of this amendment that corroded or abraded areas "of the cargo tank wall" must be thickness tested.

Lining Inspection

A petitioner suggested that we revise paragraph (f)(1)(i) by changing the word "frequency" to "voltage." We do not agree with this suggested change. The wording adopted in the final rule is consistent with Technical Bulletin 13 of the Rubber Manufacturers' Association, which addresses the inspection of protective linings.

A petitioner asked that paragraph (f)(2) be revised to state that test equipment and procedures could be obtained from lining installers or distributors as well as lining manufacturers. The petitioner indicated

that when cross-linked polyethylene liners are used, it is difficult to get test procedures from either the polyethylene resin manufacturer or the lining installers, each claiming they are not the lining "manufacturer." We do not believe it is necessary that lining installers and distributors be referenced in this paragraph. It is our opinion that where cross-linked polyethylene resins are used as lining material, the person installing the polyethylene in the cargo tank is considered to be the lining manufacturer.

New paragraph (f)(3) contains requirements, formerly in paragraph (e)(5), regarding what to do with degraded or defective areas of the tank liner.

As suggested by NTTC, a new paragraph (f)(4) is added to require that an inspector record the results of the lining inspection in accordance with § 180.417(b).

Pressure Retest

Paragraph (g)(1)(iv) states that an owner of five or more cargo tank motor vehicles used to transport liquid hazardous materials must pressure test at least 20% of the cargo tank motor vehicles in his ownership each year. API requested that this paragraph reference § 173.33 so a shipper will know that a carrier is complying with the phase-in requirement. We do not believe it is necessary to relate the requirements in § 180.407(g)(1)(iv) to § 173.33, because it is not necessary for a shipper to know if the carrier is complying with the requirement to test 20% of his cargo tank motor vehicles each year. Section 173.22(a)(2), as revised in this amendment, does not require a shipper to determine whether a cargo tank motor vehicle meets the continuing qualification requirements of part 180.

TTMA suggested that paragraph (a)(1)(viii) be revised to limit the pressure used for the pneumatic test to 6 psig. TTMA recommended the same revision for the pressure testing of new tanks in § 178.345–13. As was discussed in the preamble to § 178.345–13, we do not believe it is necessary to limit the pneumatic test pressure to 6 psig, but have revised paragraph (g)(1)(viii) for consistency with § 178.345–13.

A petitioner requested clarification about when the wet fluorescent magnetic particle inspection of MC 330 and MC 331 cargo tanks is to be performed in accordance with paragraph (g)(3). The wet fluorescent magnetic particle inspection, when required, is performed immediately prior to and in conjunction with the required pressure test and, therefore, should be performed when the cargo tank is due for the pressure test. The wet fluorescent magnetic particle inspection need not be performed prior to the effective date of the final rule.

Section (g)(5)(ii) of the final rule contained an exception from pressure testing for certain uninsulated lined or clad cargo tanks. The same exception appeared as Note 2 to the table in § 180.407(c). A petitioner suggested that, because cladding material is integral with the base metal, paragraph (g)(5)(ii) be revised to subject clad cargo tanks to the same test requirements as tanks that are not clad. We agree with the petitioner and have revised paragraph (g)(5)(ii) to except only certain uninsulated lined cargo tanks from the pressure testing requirements. Additionally, Note 2 to the table in § 180.407(c) is similarly revised.

Section 180.407(g)(6) contains the acceptance criteria for cargo tanks subjected to the pressure test. TTMA and NTTC pointed out that paragraph (g)(6), as written would place a cargo tank out of service if the heating system failed the pressure test, even if the cargo tank otherwise passes the pressure test. They noted that the failure of the heating system alone would not adversely impact the lading retention capability or integrity of the cargo tank. TTMA suggested that paragraph (g)(6) be revised to allow a cargo tank which fails the heating system pressure test in § 180.407(g)(4) to be returned to service as an unheated cargo tank, under certain conditions. We agree that failure of a heating system to retain pressure under test does not necessarily render the cargo tank unsuitable for transportation of all hazardous materials. Such a cargo tank could safely be used under certain conditions for hazardous materials lading which does not require heating of the cargo tank. However, we believe an unsafe condition could occur if hazardous material lading leaks into the heading system and reacts with other incompatible residue. Therefore, paragraph (g)(6) is revised to authorize the use of such a cargo tank as an unheated cargo tank, if certain conditions are met.

Leakage Test

NPGA argued that the leakage test requirements, in paragraph (h), should not apply to cargo tanks transporting compressed gases, because these cargo tanks, including their piping systems, are effectively leak tested each time they are used. Conversely, another petitioner argued that the leakage test requirements should apply only to cargo tanks transporting compressed gases. Both petitioners argued that a requirement to leak test at 80% of the MAWP would penalize a shipper who offers a liquid material in an MC 330 or MC 331 cargo tank a lower integrity is authorized.

We believe all cargo tanks should be leak tested annually to assess their continued integrity. Paragraph (h) was revised in the final rule to clarify that the leakage test may be evaluated with hazardous material in the cargo tank for MC 330 and MC 331 cargo tanks. However, in their petition, NPGA stated it is impractical to reach the required 80% of the MAWP with a compressed gas lading in the cargo tank. We believe for a cargo tank with a higher MAWP, leaks can be detected at less than 80% of the MAWP. Therefore, paragraph (h)(1) is revised to permit a cargo tank with an MAWP of not less than 100 psig which is in dedicated service or services to be leakage tested at its normal operating pressure. When these cargo tanks are transporting compressed gases, leaks can be detected at the normal operating pressure of the cargo tank. The cargo tank must be leak-tight at the pressure at which it is operated. However, a cargo tank may not be operated at a pressure higher than the pressure to which it has successfully passed a leakage tested within the previous year. As discussed in the preamble to § 178.346–13, paragraph (h) is revised to allow venting devices which are set to discharge at less than the leakage test pressure to be removed or rendered inoperative during the test.

Paragraph (h)(1) requires that each cargo tank be leak tested at 80% of its MAWP. An equipment manufacturer recommended that the required leakage test pressure be reduced to 50% of its MAWP, because the vents they currently produce for MC 307 cargo tanks experience slight leakage at 50–60% of the MAWP when equipped with a teflon valve seat. However, the manufacturer also indicated that valve seats are available which enable the vent to withstand the required pressures. We have not receive any other information to suggest that pressure relief devices cannot pass the required leakage test. Therefore, the leakage test pressure requirements have not been changed, other than as indicated for high pressure cargo tanks.

NPGA suggested paragraph (h)(3) be revised to clarify that if a cargo tank fails to retain leakage test pressure, it may be returned to service if defects are corrected and test pressure requirements are met. As discussed earlier with regard to the results of visual inspections, the acceptable results of tests and inspections all

appear in § 180.411. Paragraph (d) of that section states that all sources of leakage must be properly repaired prior to returning a cargo tank to hazardous materials service. For clarity, a reference to § 180.411(d) is added to § 180.407(h)(3).

Thickness Testing

The shell and head thickness of all unlined cargo tanks used for the transportation of materials corrosive to the tank must be measured every two years. A petitioner recommended that the thickness testing requirement, in paragraph (i), be phased in over a 5-year period. We have not authorized a 5-year phase in period, since this test must be performed on a 2-year, not a 5-year, basis. The first thickness test must be completed on affected cargo tanks by September 1, 1992. Another petitioner objected to paragraph (i)(2), which states that the measuring device used must be capable of accurately measuring thickness to 0.002 of an inch, stating that the paragraph should be revised to require use of a device "having an accuracy of +/− 0.002 inch." It was our intent to require that the device used for measuring thickness be capable of measuring to the third decimal place, with an accuracy of +/− 0.002 of an inch. Revised paragraph (i)(2) clarifies this point.

TTMA and NTTC recommended that paragraph (i)(4) be revised to clarify that only areas of the cargo tank shell and heads need to be thickness tested. We agree and have revised this paragraph accordingly.

NTTC objected to paragraph (i)(5), which requires a cargo tank which no longer meets the prescribed minimum thickness to be removed from hazardous materials service. NTTC argued that a cargo tank can be safely used to haul less dense products, i.e. downgraded from 16 pounds per gallon product to 12 pounds per gallon product service. NTTC suggested a revision to the paragraph to allow continued use of a thinned cargo tank that has the specification plate re-marked to indicate its new service limits. We agree that a cargo tank which has thinned from its manufactured thickness may be suitable for carrying a lading with a density less than the maximum lading density marked on the cargo tank nameplate. However, we believe that a Design Certifying Engineer must certify that the cargo tank meets the structural integrity requirements for the lower density lading, and the cargo tank nameplate must be changed to reflect the new service limitations (maximum density of lading). A cargo tank which no longer meets the absolute minimum thickness requirement for the specification under which it was manufactured may not be returned to hazardous materials service. A new paragraph (i)(5) specifying the conditions under which these cargo tanks may be used is added. Revised paragraph (i)(6), which appeared in the final rule as paragraph (i)(5), provides that a cargo tank must be taken out of hazardous materials service if it no longer meets the minimum thickness prescribed by the applicable specification.

Section 180.409

Several petitioners stated that the tests and inspections described § 180.407(c) would have to be done by Registered Inspectors if performed in a manufacturing or repair facility, but could be done by persons who do not qualify as Registered Inspectors if performed by an employee of a carrier or cargo tank owner. It was evident from petitions that some people held the mistaken notion that *all* tests and inspections found at § 180.407(c) were covered by this section. Several raised objections to the "paperwork" called for by paragraph (b). Others objected to the provision for training "in accordance with the requirements of the ASME Code." One person pointed out that thickness test requirement should be moved to § 180.407(i). Our intent was to require that all periodic tests and inspections be performed only at registered facilities by persons certified to be qualified by virtue of being trained and experienced in use of the required inspection and test equipment. Under the NPRM, these persons were to be Authorized Inspectors. However, in response to comments, this requirement was relaxed in the final rule to allow properly trained, experienced employees to do pressure testing only for carriers and cargo tank owners if their facilities were registered to conduct these tests. The person who is identified as the responsible official in the registration application must certify that anyone performing such pressure testing is properly qualified.

This entire section has been rewritten to clarify our intentions. The requirements for training in accordance with the ASME Code and for submitting information on the tester are deleted.

Section 180.413 (Repair, Modification, Stretching, and Rebarrelling)

The Petroleum Marketeers Association of America (PMAA) petitioned RSPA to reconsider § 180.413 which requires that any repair, modification, stretching, or rebarrelling of a cargo tank be performed by a holder of an ASME "U" stamp or a National Board "R" stamp. PMAA stated the cost for obtaining certification may be from $35,000 to $50,000. As stated in the preamble to the final rule, current § 178.340–2(a) prescribes that cargo tanks are to be "designed and constructed in accordance with the best known and available practices." The ASME Code is a nationally recognized industry standard for the design and construction of pressure vessels, and ASME quality control procedures and qualified welders are among the best known and available. We believe the cost of obtaining an ASME "U" stamp certification or a National Board "R" stamp certification will be minimal for those facilities which are currently utilizing the best known and available practices, and which have established quality control procedures. Further, we believe this certification is necesary to ensure that organizations performing repairs and modifications to cargo tanks have qualified personnel and adequate quality control programs to effect proper repairs and modifications to cargo tanks used to transport hazardous materials.

PMAA also urged RSPA to expand paragraph (a) to permit organizations other than the ASME and the National Board to participate in the certification of repair shops. PMAA requested that RSPA "be receptive" to the formation of other certifying agencies. We are not aware of any other existing agencies or organizations which are qualified to certify cargo tank repair facilities, nor have any other organizations expressed an interest in certifying these facilities. The ASME and the National Board both have established procedures for the inspection and certification of facilities engaged in the construction and repair or pressure vessels. These organizations also are independent, disinterested parties. We believe it is important for a "third party" (e.g. not the person performing a repair, or the owner of the cargo tank) to evaluate and certify a facility as being capable of performing repairs and any modifications, stretching, and/or rebarrelling. Therefore, the requirement that repairs, modifications, stretching, and rebarrelling be performed in a facility which is certified for use of the ASME "U" stamp or National Board "R" stamp has not been changed. However, it should be noted that the procedures in 49 CFR 106.31 provide for interested persons to petition for rulemaking. If petitioned, RSPA will consider authorizing other third party organizations to certify cargo tank repair facilities if the third party organization can show that it is capable

of adequately evaluating and certifying these facilities.

PMAA expressed a concern that many repair facilities may not be able to obtain certification by the ASME or National Board before repairs must be performed in certified shops. PMAA urged a one-year delay to give repair facilities adequate time to obtain certification. The May 22 amendment established a compliance date of December 31, 1991, for repair facilities to obtain ASME or National Board certification.

In addition to requiring certification of each facility performing a repair or modification by the ASME or National Board, the final rule requires that each repair be certified by a Registered Inspector. PMAA characterized these requirements as redundant. We agree with another petitioner who stated that requiring a repair shop to hold a "U" stamp or "R" stamp does not guarantee that repairs are carried out in accordance with the quality assurance procedures required by the ASME or the National Board. We also believe that an inspection of each repair by a qualified person is necessary to ensure compliance with applicable specification requirements. The minimum qualifications for Registered Inspectors in this amendment will allow more employees who are currently working at repair facilities to qualify as Registered Inspectors. The requirement for inspection of each repair by a Registered Inspector is retained in this amendment.

A petitioner noted that paragraph (a) does not reference the MC 302 and MC 310 cargo tanks, and asked that they be added to this paragraph. We did not intend to exclude the MC 302 and MC 310 cargo tanks from this provision, and have corrected this omission.

A petitioner, addressing paragraph (b)(1)(vi)(A), suggested that when a wet fluorescent magnetic particle inspection is performed after a repair, the test should only be required on the area of the cargo tank affected by the repair, because the entire cargo tank was already tested to detect the defect. We agree that the wet fluorescent magnetic particle inspection need only be repeated on the area of the cargo tank which was affected by the repair, and have revised paragraph (b)(1)(vi)(A) accordingly.

A petitioner asked that a sentence be added to paragraph (b)(3) to require any repair or modification of a cargo tank which is not ASME Code "U" stamped be performed in accordance with the National Board Inspection Code, with the exception of those provisions of the ASME Code specifically exempted in the specifications for DOT 406, 407, and 412 cargo tanks. We do not believe it is necessary or appropriate to apply the National Board Inspection Code to the repair of cargo tanks which are not ASME Code "U" stamped.

Paragraph (b)(6) requires owners to retain all records of repairs and modifications. RSPA received a request that motor carriers who are not the owner also should retain copies of these records. Retention of these records by motor carriers was not a part of the NPRM or the final rule. However, we recognize that there may be situations where these record should be retained by the motor carrier, and have added a new sentence at the end of paragraph (b)(5).

Several petitioners requested clarification of paragraph (c). Specifically, they asked what testing must be performed after the repair or replacement for components, such as piping, valves, hoses, or fittings. These petitioners pointed out that, if a hydrostatic pressure test is required, the paragraph would essentially prohibit any work on these components while the cargo tank is loaded with hazardous material lading. It was not our intent in paragraph (c) to prohibit the maintenance or replacement of external valves, vents, or dust covers on loaded cargo tanks, as long as no welding is performed on the cargo tank. NTTC and the Hazardous Waste Association of California (HWAOC) suggested that paragraph (c) be revised to state only that piping, valves or fittings "must be properly installed in accordance with the applicable specification." We believe that the proper repair or replacement of any piping, valve, or fitting must be confirmed by testing. However, we do not believe there is a need to perform a hydrostatic pressure test in all cases. If any welding is perform on the cargo tank wall, which is defined as a "repair," pressure testing is required. For these reasons, paragraph (c) is revised to require only that piping, valves, and fittings be leak-tested after a repair or replacement which does not involve welding on the cargo tank wall. As suggested by NTTC and HWAOC, the first sentence in revised paragraph (c) states that these components "must be properly installed in accordance with the applicable specification." Also, as requested by API, revised paragraph (c) clarifies that the hose testing requirements apply only to hoses permanently attached to the cargo tank.

NTTC and HWAOC understood paragraph (d) to require all components of a cargo tank be brought up to the most current specification if the cargo tank is stretched or rebarrelled and requested clarification. Similarly, some petitioners stated that, under paragraph (d)(3), the Registered Inspector should certify only that portion of the cargo tank that was stretched or rebarrelled, not the entire cargo tank. We did not intend to require, when a cargo tank is stretched or rebarrelled, that the entire cargo tank be brought into compliance with the most current specification. We realize that it may be impossible to convert an existing cargo tank into a new specification cargo tank. An example, presented by NPGA in comments to the NPRM and in their petition to reconsider the final rule, is an MC 330 cargo tank which may not be converted into an MC 331 cargo tank because of the MC 331 specification restrictions on the location of longitudinal seams.

In this amendment, only the stretched or rebarrelled portion of the cargo tank, as well as equipment directly affected by the stretched or rebarrelled portion, must be in accordance with the most current specification. However, we believe that when a cargo tank motor vehicle is stretched or rebarrelled, a Design Certifying Engineer must verify that the entire cargo tank meets the structural integrity requirements of the most current specification. Inspection of the stretched or rebarrelled cargo tank motor vehicle by a Registered Inspector, on the other hand, need only be of the stretched or rebarrelled portion of the cargo tank motor vehicle. The provisions in paragraphs (d)(1) and (d)(3) are revised to clarify what portions of the cargo tank must be brought into compliance with current specifications when stretching or rebarrelling, and to what degree the Design Certifying Engineer must certify the stretched or rebarrelled cargo tank motor vehicle to current specifications.

TTMA requested that paragraph (d) be revised to authorize any "design type change," as long as the requirements of this paragraph are met. We disagree with TTMA's request. We believe that the definitions of "modification", "repair", "stretching", and "rebarrelling" adequately address the types of changes which are likely to be made to cargo tank motor vehicles, and § 180.413 specifically covers such changes. Paragraph (d) applies to operations defined as "stretching" and "rebarrelling," while § 178.320 requires each "design type" to be certified by a Design Certifying Engineer. Therefore, we believe it is unnecessary to revise § 180.413(d) to include any "design type change."

NPGA objected to a requirement in paragraph (d)(2)(v) to change the

existing specification plate after stretching or rebarrelling. NPGA questioned whether the original ASME nameplate or the specification plate could be removed or change without invalidating the original certification of the tank or vehicle construction. NPGA recommended that a supplemental plate, noting the appropriate changes made to the cargo tank, be attached near the original plate. The final rule did not require or suggest that the ASME nameplate be altered or removed from the cargo tank. Changing the existing specification plate would not invalidate the original certification of the tank, because the rebarrelled or stretched cargo tank's design must be certified by a Design Certifying Engineer, and the stretching or rebarrelling must be inspected and certified by a Registered Inspector. However, we believe the attachment of a supplemental plate, noting appropriate changes that have been made, would accomplish the intended purpose of the revised or replaced specification plate. Therefore, paragraph (d)(2)(v) is revised to permit the attachment of a supplemental specification plate as an alternative to changing or removing the existing specification plate.

Section 180.415 (Test and Inspection Markings)

NTTC and HWAOC inquired whether test and inspection markings may be placed anywhere on the front head on a cargo tank, regardless of the location of the specification plate. This section is revised to clarify that these markings must be on the cargo tank shell near the specification plate, or anywhere on the front head. They also requested guidance with respect to the applicability of the marking requirements in the case of cargo tank motor vehicles composed of more than one cargo tank, particularly if one cargo tank is repaired and tested and the others are not. This section is revised to clarify test and inspection markings for cargo tank motor vehicles composed of more than one cargo tank.

Section 180.417 (Reporting and Record Retention Requirements)

NTTC and HWAOC inquired whether a current requirement for a written report following the wet florescent magnetic particle inspection was eliminated under the final rule. Paragraph (c) of the final rule contains the same requirement. The reporting requirement was broadened to include cargo tanks used in liquefied petroleum gas, or any other service that may cause stress corrosion cracking. However, a requirement in § 177.824(f), that carriers file with the Office of Motor Carrier Field Operations a written listing of all MC 330 and MC 331 cargo tanks in service, was eliminated in the final rule.

A petitioner requested that the first sentence of paragraph (a) be revised to apply the reporting and record retention requirements only to owners of specification cargo tanks. We agree and have revised the requirement accordingly.

NPGA requested that consideration be given to allowing the certification required by paragraph (a)(3)(ii) to be performed by a Registered Inspector in place of an Authorized Inspector. We believe that, in this case, compliance with the ASME Code requirements will be assured by obtaining a copy of the manufacturer's data report, or the information on the cargo tank's ASME Code plate. We have revised this paragraph to permit the certification to be performed by a Registered Inspector.

Both NTTC and HWAOC recommended that the DOT registration number of the facility or the person performing the test be added to the written test or inspection report required by paragraph (b), to provide a more complete compliance record. They also recommended that the DOT registration number of the inspector be added to the report. We agree that this additional information will assure a more complete compliance record. Therefore, the phrase "and DOT registration number of the facility or the person performing the test" is added at the end of paragraph (b)(1)(vi), and paragraph (b)(1)(viii) is revised to require the inspector's DOT registration number to appear on the report as well as the inspector's signature.

A petitioner requested that alternatives to the actual signature of an inspector be authorized in paragraph (b)(1)(viii), to facilitate computerized recordkeeping. We believe a handwritten signature is necessary on test and inspection reports to ensure that an individual has taken responsibility for ensuring the test or inspection was performed in accordance with applicable requirements. For that reason, and to ensure signatures are not preprinted on reports, the petitioner's request is denied.

Administrative Notices

A. Executive Order 12291

This final rule has been reviewed under the criteria specified in section 1(b) of Executive Order 12291 and is determined not to be a major rule. However, it is a significant rule under the regulatory procedures of the Department of Transportation (44 FR 11034). This rule does not require a Regulatory Impact Analysis, or an environmental impact statement under the National Environmental Policy Act (42 U.S.C. 4321 *et seq.*). This final rule does not impose additional requirements and has the net result of reducing costs imposed under the final rule published in the Federal Register on June 12, 1989, without reducing safety (54 FR 24982). The original regulatory evaluation of the Final rule was not modified because the changes made under this rule will result in a minimal economic impact on industry.

B. Executive Order 12612

This action has been analyzed in accordance with the principles and criteria contained in Executive Order 12612, and it has been determined that the final rule does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

C. Regulatory Flexibility Act

Based on limited information concerning the size and nature of entities likely to be affected by this rule, I certify this rule will not have a significant economic impact on a substantial number of small entities. A regulatory flexibility analysis is available for review in the docket.

D. Paperwork Reduction Act

This amendment imposes no changes to the information collection and recordkeeping requirements contained in the June 12, 1989 final rule, which was approved by the Office of Management and Budget under the provisions of 44 U.S.C. chapter 35 and assigned control number 2137-0014 (approved through 6-30-92).

List of Subjects

49 CFR Part 107

Administrative practice and procedure, Hazardous materials transportation.

49 CFR Part 171

Exports, Hazardous materials transportation, Hazardous waste, Imports, Incorporation by reference, Reporting and recordkeeping requirements.

49 CFR Part 172

Hazardous materials transportation, Hazardous waste, Labeling, Packaging and containers, Reporting and recordkeeping requirements.

49 CFR Part 173

Hazardous materials transportation, Packaging and containers, Radioactive materials, Reporting and recordkeeping requirements, Uranium.

49 CFR Part 176

Hazardous materials transportation, Maritime carriers, Radioactive materials, Reporting and recordkeeping requirements.

49 CFR Part 177

Hazardous materials transportation, Motor carriers, Radioactive materials, Reporting and recordkeeping requirements.

49 CFR Part 178

Hazardous materials transportation, Motor vehicle safety, Packaging and containers, Reporting and recordkeeping requirements.

49 CFR Part 180

Hazardous materials transportation, Motor carriers, Motor vehicle safety, Packaging and containers, Reporting and recordkeeping requirements.

In consideration of the foregoing, title 49, chapter I, subchapters B and C of the Code of Federal Regulations, is amended as follows:

PART 107—HAZARDOUS MATERIALS PROGRAM PROCEDURES

1. The authority citation for part 107 continues to read as follows:

Authority: 49 U.S.C. App. 1421(c); 49 U.S.C. App. 1802, 1806, 1808–1811; 49 CFR 1.45 and 1.53, and Pub. L. 89–670 (49 U.S.C. App. 1653(d), 1655).

2. Section 107.501, as added at 54 FR 25003, on June 12, 1989, is revised to read as follows:

Subpart F—Registration of cargo tank and cargo tank motor vehicle manufacturers and repairers and cargo tank motor vehicle assemblers

§ 107.501 Scope.

(a) This subpart establishes a registration procedure for persons who are engaged in the manufacture, assembly, inspection and testing, certification, or repair of a cargo tank or a cargo tank motor vehicle manufactured in accordance with a DOT specification under subchapter C of this chapter or under terms of an exemption issued under this part.

(b) Persons engaged in continuing qualification and maintenance of cargo tanks and cargo tank motor vehicles must be familiar with the requirements set forth in part 180, subpart E, of this chapter.

3. In § 107.502, as added at 54 FR 25003, on June 12, 1989, paragraph (e) is removed, paragraphs (a) through (d) are redesignated as paragraphs (b) through (e) respectively, and new paragraphs (a) and (f) are added to read as follows:

§ 107.502 General registration requirements.

(a) *Definitions:* For purposes of this subpart—

(1) *Assembly* means the assembly of one or more tanks or cargo tanks to a motor vehicle or to a motor vehicle suspension component and involves no welding on the cargo tank wall.

(2) The terms *Authorized Inspector, Cargo tank, Cargo tank motor vehicle, Design Certifying Engineer, Registered Inspector,* and *Person* are defined in § 171.8 of this chapter.

(3) The terms *cargo tank wall* and *manufacturer* are defined in § 178.320(a), and *repair* is defined in § 180.403 of this chapter.

* * * * *

(f) Persons who do not meet the minimum educational requirements for Registered Inspector or Design Certifying Engineer may register to perform the applicable duties of the respective function, if the person—

(1) Has at least three years of work experience in performing the duties of the respective function no later than September 1, 1991; and

(2) Submits a registration statement before December 31, 1991.

4. In § 107.503, as added at 54 FR 25003, on June 12, 1989, paragraphs (a) introductory text, (a)(3), (a)(4), (a)(6), (b) and (c) are revised to read as follows:

§ 107.503 Registration statement.

(a) Each registration statement must be in English and contain the following information:

* * * * *

(3) A statement signed by the person responsible for compliance with the applicable requirements of this chapter, certifying knowledge of those requirements and that each employee who is a Registered Inspector or Design Certifying Engineer meets the minimum qualification requirements set forth in § 171.8 of this chapter for "Registered Inspector" or "Design Certifying Engineer", except as provided by § 107.502(f) of this part. The following language may be used.

I certify that all Registered Inspectors and Design Certifying Engineers used in performance of the prescribed functions meet the minimum qualification requirements set forth in 49 CFR 171.8, that I am the person responsible for ensuring compliance with the applicable requirements of this chapter, and that I have knowledge of the requirements applicable to the functions to be performed.

(4) A description of the specific functions to be performed on cargo tanks or cargo tank motor vehicles, e.g.:

(i) Manufacture,

(ii) Assembly,

(iii) Inspection and testing (specify type, e.g., external or internal visual inspection, lining inspection, hydrostatic pressure test, leakage test, thickness test),

(iv) Certification,

(v) Repair, or

(vi) Equipment manufacture;

* * * * *

(6) A statement indicating whether the registrant employs Registered Inspectors or Design Certifying Engineers to conduct certification, inspection or testing functions addressed by this subpart. If the registrant engages a person who is not an employee of the registrant to perform these functions, provide the name, address and registration number of that person; and

* * * * *

(b) In addition to the information required under paragraph (a) of this section, each person who manufactures or assembles a cargo tank or cargo tank motor vehicle must submit a copy of the manufacturer's current ASME Certificate of Authorization for the use of the ASME "U" stamp.

(1) Any person who manufactures MC 306, MC 307 or MC 312 cargo tanks must submit a copy of the ASME Certificate of Authorization to RSPA before December 31, 1991.

(2) This requirement does not apply to an assembler who performs no welding on a cargo tank wall.

(c) In addition to the information required under paragraph (a) of this section, each person who repairs a cargo tank or cargo tank motor vehicle must submit a copy of the repair facility's current National Board Certificate of Authorization for the use of the "R" stamp or ASME Certificate of Authorization for the use of the ASME "U" stamp. Any person who repairs MC-series cargo tanks which are not certified to the ASME Code must submit a copy of the National Board or ASME Certification of Authorization to RSPA before December 31, 1991.

5. In § 107.504, as added at 54 FR 25003, on June 12, 1989, paragraph (a) is revised, a sentence is added at the end of paragraph (c), and a new paragraph (f) is added, to read as follows:

§ 107.504 Period of registration, updates, and record retention.

(a) Registration will be for a maximum of three years from the date of the original registration.

* * * * *

(c) * * * Any person initially registered under the provisions of § 107.502(f) and who is in good standing is eligible for renewal.

* * * * *

(f) The issuance of a registration number under this subpart is not an approval or endorsement by the Department of the qualifications of any person to perform the specified functions.

PART 171—GENERAL INFORMATION, REGULATIONS, AND DEFINITIONS

6. The authority citation for part 171 continues to read as follows:

Authority: 49 U.S.C. App. 1802, 1803, 1804, 1805, 1808; 49 CFR part 1.

7. In § 171.8, as amended at 54 FR 25004, on June 12, 1989, the definitions for "Cargo tank," "Design Certifying Engineer," and "Registered Inspector" are revised, to read as follows:

§ 171.8 Definitions and abbreviations.

* * * * *

Cargo tank means a bulk packaging which:

(1) Is a tank intended primarily for the carriage of liquids or gases and includes appurtenances, reinforcements, fittings, and closures (for "tank", see 49 CFR 178.345–1(c), 178.337–1, or 178.338–1, as applicable);

(2) Is permanently attached to or forms a part of a motor vehicle, or is not permanently attached to a motor vehicle but which, by reason of its size, construction or attachment to a motor vehicle is loaded or unloaded without being removed from the motor vehicle; and

(3) Is not fabricated under a specification for cylinders, portable tanks, tank cars, or multi-unit tank car tanks.

* * * * *

Design Certifying Engineer means a person registered with the Department in accordance with part 107, subpart F of this chapter who has the knowledge and ability to perform stress analysis of pressure vessels and otherwise determine if a cargo tank design and construction meets the applicable DOT specification and has an engineering degree and one year of work experience in structural or mechanical design. (See § 107.502(f)). Persons registered as professional engineers by appropriate authority of a State of the United States, or a Province of Canada, who have the requisite experience may be registered under this program.

* * * * *

Registered Inspector means a person registered with the Department in accordance with part 107, subpart F of this chapter who has the knowledge and ability to determine if a cargo tank conforms with the applicable DOT specification and has, at a minimum, any of the following combinations of education (see § 107.502(f)) and work experience in cargo tank design, construction, inspection, or repair:

(1) An engineering degree and one year of work experience,

(2) An associate degree in engineering and two years of work experience, or

(3) A high school diploma (or General Equivalency Diploma) and three years of work experience.

* * * * *

PART 172—HAZARDOUS MATERIALS TABLES, HAZARDOUS MATERIALS COMMUNICATIONS REQUIREMENTS AND EMERGENCY RESPONSE INFORMATION REQUIREMENTS

8. The authority citation for part 172 continues to read as follows:

Authority: 49 U.S.C. App. 1803, 1804, 1805, 1808; 49 CFR part 1.

§ 172.101 [Amended]

9. In § 172.101 Hazardous Materials Table, column (2), the entry for "Ammonium nitrate, solution" is revised to read as follows: "Ammonium nitrate, solution *(containing 35% or less water). See 173.154(a)(4) and 173.154(a)(17)*".

§ 172.203 [Amended]

9a. Section 172.203(h)(1)(i), as amended at 54 FR 25004, on June 12, 1989, is further amended by removing the reference "§ 173.315(a), Note 15" and inserting, in its place, the reference "§ 173.315(a), Note 14".

PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS

10. The authority citation for part 173 continues to read as follows:

Authority: 49 U.S.C. App. 1803, 1804, 1805, 1806, 1807, 1808; 49 CFR part 1, unless otherwise noted.

11. In § 173.22, as amended at 54 FR 25004, on June 12, 1989, paragraph (a)(2) introduction text is revised to read as follows:

§ 173.22 Shipper's responsibility.

(a) * * *

(2) The person shall determine that the packaging or container is an authorized packaging, including part 173 requirements, and that it has been manufactured, assembled, and marked in accordance with:

* * * * *

12. In § 173.33, as revised at 54 FR 25005, on June 12, 1989, and amended at 55 FR 21037, on May 22, 1990, the first sentence of paragraph (d)(3) and paragraphs (a)(3), (b)(3), (b)(4), (c)(1) introductory text, (c)(1)(vi), (c)(2)–(c)(5), (d)(1), (d)(2) and (e) are revised to read as follows:

§ 173.33 Hazardous materials in cargo tank motor vehicles.

(a) * * *

(3) A specification cargo tank motor vehicle, for which the prescribed periodic retest or reinspection under subpart E of part 180 of this subchapter is past due, may not be filled and offered for transportation until the retest or inspection has been successfully completed. This requirement does not apply to any cargo tank filled prior to the retest or inspection due date.

(b) * * *

(3) Air pressure in excess of ambient atmospheric pressure may not be used to load or unload any lading which may create an air-enriched mixture within the flammability range of the lading in the vapor space of the tank.

(4) To prevent cargo tank rupture in a loading or unloading accident, the loading or unloading rate used must be less than or equal to that indicated on the cargo tank specification plate, except as specified in § 173.318(b)(6). If no loading or unloading rate is marked on the specification plate, the loading or unloading rate and pressure used must be limited such that the pressure in the tank may not exceed 130% of the MAWP.

(c) * * *

(1) Prior to loading and offering a cargo tank motor vehicle for transportation with material that requires the use of a specification cargo tank, the person must confirm that the cargo tank motor vehicle conforms to the specification required for the lading and that the MAWP of the cargo tank is greater than or equal to the largest pressure obtained under the following conditions:

* * * * *

(vi) The maximum pressure in the tank during loading or unloading.

* * * * *

(2) Any Specification MC 300, MC 301, MC 302, MC 303, MC 305, MC 306 or MC 312, cargo tank motor vehicle with no marked design pressure or marked with a design pressure of 3 psig or less may

be used for an authorized lading where the pressure derived from § 173.33(c)(1) is less than or equal to 3 psig. After December 31, 1990, a cargo tank may not be loaded and offered for transportation unless marked or remarked with an MAWP or design pressure in accordance with 49 CFR 180.405(k).

(3) Any Specification MC 310 or MC 311 cargo tank motor vehicle may be used for an authorized lading where the pressure derived from § 173.33(c)(1) is less than or equal to the MAWP or MWP, respectively, as marked on the specification plate.

(4) Any cargo tank manufactured prior to December 31, 1990, marked with a design pressure rather than an MAWP may be used for an authorized lading where the largest pressure derived from § 173.33(c)(1) is less than or equal to the design pressure marked on the cargo tank.

(5) Any material that meets the definition of a Poison B material must be loaded in a cargo tank motor vehicle having a MAWP of 25 psig or greater.

(d) * * *

(1) Non-reclosing pressure relief devices are not authorized in any cargo tank except when in series with a reclosing pressure relief device. However, a cargo tank constructed before December 31, 1990 which is fitted with non-reclosing pressure relief devices may continue to be used in any hazardous material service for which it is authorized. The requirements in this paragraph do not apply to MC 330, MC 331 and MC 338 cargo tanks.

(2) Each cargo tank motor vehicle used to transport a liquid hazardous material in its gaseous state must have a pressure relief system that provides the venting capacity prescribed in § 178.345-10(e) of this subchapter. The requirements in this paragraph do not apply to MC 330, MC 331 and MC 338 cargo tanks.

(3) A cargo tank motor vehicle made to a specification listed in column 1 may have pressure relief devices or outlets conforming to the applicable specification to which the tank was constructed, or the pressure relief devices or outlets may be modified to meet the applicable requirement for the specification listed in column 2 without changing the markings on the tank specification plate. * * *

* * * * *

(3) *Retention of hazardous materials in product piping during transportation.* DOT specification cargo tanks used for the transportation of any material that is a Poison B liquid, oxidizer liquid, liquid organic peroxide or corrosive liquid (corrosive to skin only) may not be transported with hazardous materials lading retained in the piping, unless the cargo tank motor vehicle is equipped with bottom damage protection devices meeting the requirements of § 178.337-10 or § 178.345-8(b) of this subchapter, or the accident damage protection requirements of the specification under which it was manufactured. This requirement does not apply to a residue which remains after the piping is drained. A sacrificial device (see § 178.345-1 of this subchapter) may not be used to satisfy the accident damage protection requirements of this paragraph.

13. In § 173.119, as amended at 54 FR 25006, on June 12, 1989, paragraphs (a)(17)(i) and (ii), (e)(3)(ii) and (iii), and (m)(10)(iv) and (v) are revised to read as follows:

§ 173.119 Flammable liquids not specifically provided for.

(a) * * *

(17) * * *

(i) Except as provided by § 173.33(d), each cargo tank is equipped with a pressure relief system meeting the requirements in § 178.346-10 or § 178.347-10 of this subchapter. However, pressure relief devices on Specification MC 310, MC 311 or MC 312 cargo tanks must meet the requirements for a Specification MC 307 cargo tank. Pressure relief devices on Specification MC 330 and MC 331 cargo tanks must meet the requirements in § 178.337-9 of this subchapter.

(ii) Bottom outlets on Specification DOT 406, DOT 407, or DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345-11 of this subchapter; Specification MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means and by a closure activated at a temperature not over 250° F., and Specification MC 330 and MC 331 cargo tanks are equipped with internal self-closing stop-valves meeting the requirements in § 178.337-11 of this subchapter.

* * * * *

(e) * * *

(3) * * *

(ii) Except as provided by § 173.33(d), each cargo tank is equipped with a pressure relief system meeting the requirements in § 178.347-10 of this subchapter. However, pressure relief devices on Specification MC 310, MC 311 or MC 312 cargo tanks must meet the requirements for a Specification MC 307 cargo tank. Pressure relief devices on Specification MC 330 and MC 331 cargo tanks must meet the requirements in § 178.337-9 of this subchapter.

(iii) Bottom outlets on Specification DOT 407, DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345-11 of this subchapter; Specification MC 304, MC 307, MC 310, MC 311, MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means and by a closure activated at a temperature not over 250° F.; and Specification MC 330 and MC 331 are equipped with internal self-closing stop-valves meeting the requirements in § 178.337-11 of this subchapter.

* * * * *

(m) * * *

(10) * * *

(iv) Except as provided by § 173.33(d), each cargo tank is equipped with a pressure relief system meeting the requirements in § 178.347-10 of this subchapter. However, Pressure relief devices on Specification MC 310, MC 311 or MC 312 Cargo tanks must meet the requirements for a Specification MC 307 cargo tank. However, Pressure relief devices on Specification MC 330 and MC 331 cargo tanks must meet the requirements in § 178.337-9 of this subchapter.

(v) Bottom outlets on Specification DOT 407, and DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345-11 of this subchapter; Specification MC 304, MC 307, MC 310, MC 311 or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means and by a closure activated at a temperature not over 250° F.; and Specification MC 330 and MC 331 are equipped with internal self-closing stop-valves meeting the requirements of § 178.337-11 of this subchapter.

* * * * *

14. In § 173.131, as amended at 54 FR 254007, on June 12, 1989, paragraph (a)(2) is revised to read as follows:

§ 173.131 Road asphalt, or tar, liquid.

(a) * * *

(2) A nonspecification cargo tank motor vehicle that is at least equivalent in design and construction to a Specification MC 306 or DOT 406 (§§ 178.345, 178.346 of this subchapter) cargo tank motor vehicle, except the cargo tank motor vehicle need not conform to requirements in §§ 178.345-7(d)(5), 178.345-8 (c) and (d), 178.345-14, 178.345-15, 178.346-5, 178.346-10, and

178.346–11 of this subchapter (or the certification, manhole, venting, and emergency flow control requirements of the MC 306 cargo tank specification). Also, the design stress limits at elevated temperatures of the ASME Code are not applicable. The design stress limits may not exceed 25 percent of the stress limit provided by the Aluminum Association Inc. in a publication entitled "Aluminum Standards and Data" for 0 temper at the maximum design temperature of the cargo tank motor vehicle.

15. In § 173.135, as amended at 54 FR 25007, on June 12, 1989, paragraphs (a)(9)(iii), (iv) and (v) are revised to read as follows:

§ 173.135 Diethyl dichlorosilane, dimethyl dichlorosilane, ethyl dichlorosilane, ethyl trichlorosilane, methyl trichlorosilane, trimethyl chlorosilane, and vinyl trichlorosilane.

(a) * * *

(9) * * *

(iii) The cargo tank, except Specification MC 330 or MC 331 cargo tank, meets the corrosion protection requirements in § 178.345–2(c) of this subchapter.

(iv) Except as provided by § 173.33(d), the cargo tank is equipped with a pressure relief system meeting the requirements in § 178.347–10 of this subchapter. However, pressure relief devices on Specification MC 330 and MC 331 cargo tanks must meet the requirements in § 178.337–9 of this subchapter.

(v) Bottom outlets on Specification DOT 407 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; Specification MC 304, MC 307 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means or in the case of fire by a thermally activated closure activated at a temperature not over 250° F., and Specification MC 330 or and MC 331 are equipped with internal self-closing stop-valves meeting the requirements of § 178.337–11 of this subchapter.

* * * * *

16. In § 173.136, as amended at 54 FR 25007, on June 12, 1989, paragraph (a)(8) is revised to read as follows:

§ 173.136 Methyl dichlorosilane and trichlorosilane.

(a) * * *

(8) Specification MC 330 or MC 331 (§ 178.337 of this subchapter) cargo tank motor vehicle. Bottom outlets must be equipped with internal self-closing stop-valves meeting the requirements in § 178.337–11 of this subchapter.

* * * * *

17. In § 173.141, as amended at 54 FR 25007, on June 12, 1989, paragraph (a)(8) is revised to read as follows:

§ 173.141 Amyl mercaptan, butyl mercaptan, ethyl mercaptan, isopropyl mercaptan, propyl mercaptan, and aliphatic mercaptan mixtures.

(a) * * *

(8) Specification MC 330 or MC 331 (§ 178.337 of this subchapter) cargo tank motor vehicle. Bottom outlets must be equipped with internal self-closing stop-valves meeting the requirements in § 178.337–11 of this subchapter.

* * * * *

18. In § 173.145, as amended at 54 FR 25007, paragraph (a)(7)(ii) is revised to read as follows:

§ 173.145 Dimethylhydrazine, unsymmetrical, and methylhydrazine.

(a) * * *

(7) * * *

(ii) Except as provided by § 173.33(d), each cargo tank is equipped with steel pressure relief valves meeting the requirements in § 173.33(d) or § 178.347–10 of this subchapter. However, pressure relief devices on MC 311 or MC 312 cargo tanks must meet the requirements for a Specification MC 307 cargo tank. Pressure relief devices on Specification MC 330 and MC 331 cargo tanks must meet the requirements in § 178.337–9 of this subchapter.

* * * * *

19. In § 173.154, the third sentence in paragraph (a)(17) is revised to read: "Authorized only for ammonium nitrate with 35 percent or less water in solution at a maximum temperature of 240° F."; and as amended at 54 FR 25007, on June 12, 1989, paragraphs (a)(4)(iii)–(a)(4)(vi) are redesignated as paragraphs (a)(4)(ii)–(a)(4)(v) respectively; and paragraphs (a)(4)(i) (B) and (C), newly designated paragraphs (a)(4)(ii), and (a)(4)(v) are revised to read as follows:

§ 173.154 Flammable solids, organic peroxide solids and oxidizers not specifically provided for.

(a) * * *

(4) * * *

(i) * * *

(B) Potassium nitrite solutions, except that MC 306 cargo tanks are not authorized; or

(C) Ammonium nitrate with 35 percent or less water in solution at a maximum temperature of 240° F., except that transportation in uninsulated tanks and in MC 303, MC 306, MC 310 and DOT 406 cargo tank motor vehicles is not authorized.

(ii) Bottom outlets on Specification DOT 407 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; Specification MC 304, MC 307 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means or in the case of fire by a thermally activated closure activated at a temperature not over 250° F., and Specification MC 330 or and MC 331 are equipped with internal self-closing stop-valves meeting the requirements of § 178.337–11 of this subchapter.

* * * * *

(v) Each cargo tank is equipped with pressure relief devices meeting the requirements in § 173.33(d) or § 178.347–10 of this subchapter.

* * * * *

20. In § 173.190, as revised at 54 FR 25008, on June 12, 1989, paragraph (b)(4)(iv) is revised to read as follows:

§ 173.190 Phosphorus, white or yellow.

* * * * *

(b) * * *

(4) * * *

(iv) Each cargo tank is equipped with pressure relief devices meeting the requirements in § 173.33(d) or § 178.347–10 of this subchapter.

* * * * *

21. In § 173.206, as amended at 54 25008, on June 12, 1989, paragraph (c)(3)(v) is revised to read as follows:

§ 173.206 Sodium or potassium, metallic; sodium amide; sodium potassium alloys; sodium aluminum hydride; lithium metal; lithium silicon, lithium ferro silicon; lithium hydride; lithium borohydride; lithium aluminum hydride; lithium acetylide-ethylene diamine complex; aluminum hydride; cesium metal; rubidium metal; zirconium hydride; powdered.

* * * * *

(c) * * *

(v) The cargo tank is equipped with spring-loaded pressure relief valves having a start-to-discharge pressure not exceeding 150 psig which at a minimum are sized for the padding gas at its charge pressure.

* * * * *

22. In § 173.224, as amended at 54 FR 25008, on June 12, 1989, paragraphs (a)(4)(iii) and (iv) are redesignated as paragraphs (a)(4)(ii) and (a)(4)(iii) respectively, and newly designated paragraph (a)(4)(iii) is revised to read as follows:

§ 173.224 Cumene hydroperoxide, dicumyl peroxide, diisopropylbenzene hydroperoxide, paramenthane hydroperoxide, pinane hydroperoxide, and tertiary butylisopropyl benzene hydroperoxide.

(a) * * *

(4) * * *

(iii) The pressure relief system on the cargo tank meets the requirements in § 173.33(d) or § 178.347–10 of this subchapter.

* * * * *

23. In § 173.245, as revised at 54 FR 25008, on June 12, 1989, paragraphs (a)(29)(iii) and (iv) are revised to read as follows:

§ 173.245 Corrosive liquids not specifically provided for.

(a) * * *

(29) * * *

(iii) The cargo tank meets the corrosion protection requirements in § 178.345–2(c) of this subchapter.

(iv) Bottom outlets on Specification DOT 407 or DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 303, MC 306, MC 307, MC 310, MC 311, MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

24. In § 173.247, as amended at 54 FR 25008, on June 12, 1989, paragraph (a)(12)(ii) is revised to read as follows:

§ 173.247 Acetyl bromide; acetyl chloride; acetyl iodide; antimony pentachloride; benzoyl chloride; boron trifluoride acetic acid complex; chromyl chloride; dichloroacetyl chloride; diphenylmethyl bromide solutions; pyrosulfuryl chloride; silicon chloride; sulfur chloride (mono and di); sulfuryl chloride; thionyl chloride; tin tetrachloride (anhydrous); titanium tetrachloride; trimethyl acetyl chloride.

(a) * * *

(12) * * *

(ii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

25. In § 173.247a, as amended at 54 FR 25008, on June 12, 1989, paragraph (a)(3)(iii) is revised to read as follows:

§ 173.247a Vanadium tetrachloride and vanadium oxytrichloride.

(a) * * *

(3) * * *

(iii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

26. In § 173.248, as amended at 54 FR 25008, on June 12, 1989, paragraph (a)(6)(ii) is revised to read as follows:

§ 173.248 Spent sulfuric acid, or spent mixed acid.

(a) * * *

(6) * * *

(ii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

27. In § 173.249, as amended at 54 FR 25009, on June 12, 1989, paragraph (a)(6)(iv) is revised to read as follows:

§ 173.249 Alkaline corrosive liquids, n.o.s.; alkaline liquids, n.o.s.; alkaline corrosive battery fluid; potassium fluoride solution; potassium hydrogen fluoride solution; sodium aluminate, liquid; sodium hydroxide solution; potassium hydroxide solution.

(a) * * *

(6) * * *

(iv) Bottom outlets on Specification DOT 407 or DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 303, MC 304, MC 306, MC 307, MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

28. In § 173.249a, as amended at 54 FR 25009, on June 12, 1989, paragraph (d)(6)(iv) is revised to read as follows:

§ 173.249a Cleaning compound, liquid; coal tar dye, liquid; dye intermediate, liquid; mining reagent, liquid; and textile treating compound or mixture, liquid.

* * * * *

(d) * * *

(6) * * *

(iv) Bottom outlets on Specification DOT 407 or DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 303, MC 304, MC 306, MC 307, MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

29. In § 173.250a, as amended at 54 FR 25009, on June 12, 1989, paragraph (a)(2)(ii) is revised to read as follows:

§ 173.250a Benzene phosphorus dichloride and benzene phosphorus thiodichloride.

(a) * * *

(2) * * *

(ii) Bottom outlets on Specification DOT 407 or DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 304, MC 307, MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

30. In § 173.252, as amended at 54 FR 25009, on June 12, 1989, paragraph (a)(4)(ii) is amended by removing "cladding," and paragraphs (a)(4) (iv) and (v) are revised to read as follows:

§ 173.252 Bromine.

(a) * * *

(4) * * *

(iv) The cargo tank meets the corrosion protection guidelines in § 178.345–2(c) of this subchapter.

(v) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

31. In § 173.253, as amended at 54 FR 25009, on June 12, 1989, paragraph (a)(6)(iii) is revised to read as follows:

§ 173.253 Chloroacetyl chloride.

(a) * * *

(6) * * *

(iii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

32. In § 173.254, as amended at 54 FR 25009, on June 12, 1989, paragraph (a)(5)(ii) is revised to read as follows:

§ 173.254 Chlorosulfonic acid and mixtures of chlorosulfonic acid-sulfur trioxide.

(a) * * *

(5) * * *

(ii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

33. In § 173.257, as amended at 54 FR 25009, on June 12, 1989, paragraph (a)(4)(ii) is revised to read as follows:

§ 173.257 Electrolyte (acid) and alkaline corrosive battery fluid.

(a) * * *

(4) * * *

(ii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

34. In § 173.262, amended at 54 FR 25010, on June 12, 1989, paragraph (a)(11)(ii) is revised to read as follows:

§ 173.262 Hydrobromic acid.

(a) * * *

(11) * * *

(ii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

35. In § 173.263, as amended at 54 FR 25010, on June 12, 1989, paragraph (a)(10)(ii) is revised to read as follows:

§ 173.263 Hydrochloric (muriatic) acid; hydrochloric (muriatic) acid mixtures; hydrochloric (muriatic) acid solution, inhibited; sodium chlorite solution (not exceeding 42 percent sodium chlorite); and cleaning compounds, liquids, containing hydrochloric (muriatic) acid.

(a) * * *

(10) * * *

(ii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

36. In § 173.264, as amended at 54 FR 25010, on June 12, 1989, paragraphs (a)(14)(ii) and (b)(3) are revised to read as follows:

§ 173.264 Hydrofluoric acid; White acid.

(a) * * *

(14) * * *

(ii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

(b) * * *

(3) Specification MC 310, MC 311, MC 312 or DOT 412 (§§ 178.345, 178.348 of this subchapter) cargo tank motor vehicle. Bottom outlets on: Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

37. In § 173.265, as amended at 54 FR 25010, on June 12, 1989, paragraph (b)(4)(ii) is revised to read as follows:

§ 173.265 Fluorosilicic acid (hydrofluorosilicic acid) (hydrofluoosilicic acid).

(b) * * *

(4) * * *

(ii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

38. In § 173.266, as amended at 54 FR 25010, on June 12, 1989, paragraph (f)(2)(iv) immediately following paragraph (f)(2)(v) is redesignated as paragraph (f)(2)(vi), and paragraph (f)(2)(v) is revised to read as follows:

§ 173.266 Hydrogen peroxide solution in water.

* * * * *

(f) * * *

(2) * * *

(v) The cargo tank metal specification plate must be marked "DOT MC 310–H_2O_2", "DOT MC 312–AL–H_2O_2", "DOT MC 312–SS–H_2O_2", or as appropriate. In addition to the required markings prescribed in § 172.328 of this subchapter, each such cargo tank is marked in letters at least 1 inch high "FOR HYDROGEN PEROXIDE ONLY".

* * * * *

39. In § 173.271, as amended at 54 FR 25010, on June 12, 1989, paragraph (a)(8)(iv) is revised to read as follows:

§ 173.271 Methyl phosphonic dichloride, phosphorus oxybromide, phosphorus oxychloride, phosphorus trichloride, and thiophosphoryl chloride.

(a) * * *

(8) * * *

(iv) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

40. In § 173.272, as amended at 54 FR 25011, on June 12, 1989, paragraphs (d), (e), (f), (g), (h), and (i)(21)(iv) are revised to read as follows:

§ 173.272 Sulfuric acid.

* * * * *

(d) *Concentrations of greater than 51 percent to not over 65.25 percent.* Authorized packagings for sulfuric acid at concentrations of 51 percent to not over 65.25 percent are prescribed in paragraphs (i)(1)–(i)(16), (i)(21), and (i)(27)–(i)(30) of this section.

(e) *Concentrations of greater than 65.25 percent to not over 77.5 percent.* Authorized packagings for sulfuric acid at concentrations of 65.25 percent to not over 77.5 percent are prescribed in paragraphs (i)(1)–(i)(16), (i)(20)–(i)(22), and (i)(29)–(i)(30) of this section.

(f) *Concentrations of greater than 77.5 percent to not over 95 percent.* Authorized packagings for sulfuric acid concentrations of 77.5 percent to not over 95 percent are prescribed in paragraphs (i)(1)–(i)(22), and (i)(29)–(i)(30) of this section.

(g) *Concentrations of greater than 95 percent to not over 100.5 percent.* Authorized packagings for sulfuric acid concentrations of greater than 95 percent to not over 100.5 percent are prescribed in paragraphs (i)(1)–(i)(4), (i)(6), (i)(9), (i)(14)–(i)(22), and (i)(29)–(i)(30) of this section.

(h) *Concentrations of over 100.5 percent.* Authorized packagings for sulfuric acid concentrations of over 100.5 percent are prescribed in

paragraphs (i)(1)–(i)(4), (i)(17), and (i)(19)–(i)(23) of this section.

(i) * * *

(21) * * *

(iv) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

41. In § 173.273, as amended at 54 FR 25011, on June 12, 1989, paragraphs (a)(5) and (b)(2) are revised to read as follows:

§ 173.273 Sulfur trioxide.

(a) * * *

(5) Specification MC 310, MC 311, MC 312 or DOT 412 (§§ 178.345, 178.348 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) The cargo tank is equipped with a pressure relief system meeting the requirements in § 173.33(d) or § 178.345–10 of this subchapter and consisting of a spring-loaded pressure relief valve, or a combination spring-loaded pressure relief valve and a frangible (rupture disk) installed in series with the relief valve. When the pressure relief system consists of a spring-loaded pressure relief valve and a frangible (rupture disk) installed in series with the pressure relief valve, the spring-loaded pressure relief value must be set-to-discharge at a pressure not exceeding 125 percent of the design pressure.

(ii) The tank is not equipped with interior heating coils.

(iii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

(b) * * *

(2) Specification MC 311, MC 312 or DOT 412 (§§ 178.345, 178.348 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) The cargo tank is insulated.

(ii) The tank is not equipped with interior heating coils.

(iii) The cargo tank is equipped with a pressure relief system meeting the requirements in § 173.33(d) or § 178.345–10 of this subchapter and consisting of a spring-loaded pressure relief valve, or a combination spring-loaded pressure relief valve and a frangible (rupture) disk installed in series with the relief valve. When the pressure relief system consists of a spring-loaded pressure relief valve and a frangible (rupture) disk installed in series with the pressure relief valve, the spring-loaded pressure relief value must be set-to-discharge at a pressure not exceeding 125 percent of the design pressure.

* * * * *

42. In § 173.274, as amended at 54 FR 25011, on June 12, 1989, paragraph (a)(4) is revised to read as follows:

§ 173.274 Fluosulfonic acid.

(a) * * *

(4) Specification MC 310, MC 311, MC 312 or DOT 412 (§§ 178.345, 178.348 of this subchapter) cargo tank motor vehicle. Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

43. In § 173.276, as amended at 54 FR 25011, on June 12, 1989, paragraphs (a)(6) introductory text and (a)(6)(iii) are revised to read as follows:

§ 173.276 Anhydrous hydrazine and hydrazine solution.

(a) * * *

(6) Specification MC 310, MC 311, MC 312, DOT 412, MC 330 or MC 331 (§§ 178.345, 178.348, 178.337 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

* * * * *

(iii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means; and MC 330 and MC 331 cargo tanks are equipped with internal self-closing stop-valves meeting the requirements in § 178.337–11 of this subchapter.

* * * * *

44. In § 173.277, as amended at 54 FR 25011, on June 12, 1989, paragraph (a)(9)(ii) is revised to read as follows:

§ 173.277 Hypochlorite solutions.

(a) * * *

(9) * * *

(ii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

45. In § 173.280, as amended at 54 FR 25012, on June 12, 1989, paragraph (a)(8)(ii) is revised to read as follows:

§ 173.280 Trichlorosilanes.

(a) * * *

(8) * * *

(ii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

46. In § 173.292, as amended at 54 FR 25012, on June 12, 1989, the section heading and paragraph (a)(2)(iv) are revised to read as follows:

§ 173.292 Hexamethylenediamine solution.

(a) * * *

(2) * * *

(iv) Bottom outlets on Specification DOT 406, DOT 407, DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

47. In § 173.294, as amended at 54 FR 25012, on June 12, 1989, paragraph (a)(3)(ii) is correctly revised to read as follows:

§ 173.294 Monochloroacetic acid, liquid or solution.

(a) * * *

(3) * * *

(ii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

48. In § 173.295, as amended at 54 FR 25012, on June 12, 1989, paragraph (a)(9)(iii) is revised to read as follows:

§ 173.295 Benzyl chloride.

(a) * * *

(9) * * *

(iii) Bottom outlets on Specification DOT 412 cargo tanks are equipped with

stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

49. In § 173.297, as amended at 54 FR 25012, on June 12, 1989, there was an error in the designation used in the regulatory text. The regulatory text was correctly placed in paragraph (a)(1) instead of paragraph (a)(4) of the October 1, 1989, edition of the CFR.

§ 173.297 Titanium sulfate solution containing not more than 45 percent sulfuric acid.

(a) * * *

(1) * * *

(ii) Bottom outlets on Specifications DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; and Specification MC 310, MC 311, or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means.

* * * * *

50. In § 173.315, paragraph (a) is amended by removing the introductory text of paragraph (a)(1); and paragraphs (i)(1)(ii), as revised at 54 FR 25012, on June 12, 1989, is revised to read as follows:

§ 173.315 Compressed gases in cargo tanks and portable tanks.

* * * * *

(i) * * *

(1) * * *

(ii) The flow capacity rating, testing and marking must be in accordance with Sections 5, 6 and 7 of CGA Pamphlet S–1.2.

* * * * *

51. In § 173.318, as amended at 54 FR 25013, on June 12, 1989, paragraphs (b)(2)(i)(C) and the last sentence in paragraph (b)(2)(ii) are revised to read as follows:

§ 173.318 Cryogenic liquids in cargo tanks.

* * * * *

(b) * * *

(2) * * *

(i) * * *

(C) The flow capacity and rating must be verified and marked by the manufacturer of the device in accordance with CGA Pamphlet S–1.2.

(ii) * * * The flow capacity and rating must be verified and marked by the manufacturer of the device in accordance with CGA Pamphlet S–1.2.

* * * * *

52. In § 173.346, as amended at 54 FR 25013, on June 12, 1989, paragraph (a)(12) is revised to read as follows:

§ 173.346 Poison B liquids not specifically provided for.

(a) * * *

(12) Specification MC 304, MC 307, MC 310, MC 311, MC 312, DOT 407, DOT 412, MC 330 or MC 331 (§§ 178.345, 178.347, 178.348, 178.337 of this subchapter) cargo tank motor vehicle subject to the following conditions:

(i) The design pressure of the cargo tank is at least 25 psig.

(ii) Bottom outlets on Specification DOT 406 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; Specification MC 304, MC 307, MC 310, MC 311 or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means or in the case of fire by a thermally activated closure activated at a temperature not over 250° F., and Specification MC 330 and MC 331 must be equipped with internal self-closing stop-valves meeting the requirements of § 178.337–11 of this subchapter.

(iii) Each tank is equipped with a pressure relief system meeting the requirements in § 173.33(d) or § 178.347–10 of this subchapter. However, pressure relief devices on MC 330 or MC 331 cargo tanks must meet the requirements in § 178.337–9 of this subchapter.

* * * * *

53. In § 173.353, as amended at 54 FR 25013, on June 12, 1989, paragraph (e)(3) is revised to read as follows:

§ 173.353 Methyl bromide and methyl bromide mixtures.

* * * * *

(e) * * *

(3) Bottom outlets on the cargo tank are equipped with internal self-closing stop-valves meeting the requirements in § 178.337–11 of this subchapter.

§ 173.354 [Amended]

54. In § 173.354(a)(5), as revised at 54 FR 25013, on June 12, 1989, the word "vehicle" is revised to read "vehicles."

55. In § 173.358, as amended at 54 FR 25014, on June 12, 1989, paragraph (a)(14)(vi) and (vii) are revised to read as follows:

§ 173.358 Hexaethyl tetraphosphate, methyl parathion, organic phosphate compound, organic phosphorus compound, parathion, tetraethyl dithio pyrophosphate, and tetraethyl pyrophosphate, liquid.

(a) * * *

(14) * * *

(vi) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; Specification MC 310, MC 311 or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means or in the case of fire by a thermally activated closure activated at a temperature not over 250° F., and Specification MC 330 and MC 331 are equipped with internal self-closing stop-valves meeting the requirements of § 178.337–11 of this subchapter.

(vii) Each tank is equipped with a pressure relief system meeting the requirements in § 173.33(d) or § 178.347–10 of this subchapter, except that pressure relief devices on MC 330 or MC 331 cargo tanks must meet the requirements in § 178.337–9 of this subchapter.

* * * * *

56. In § 173.359, as amended at 54 FR 25014, on June 12, 1989, paragraph (a)(16)(v) and (vi) are revised to read as follows:

§ 173.359 Hexaethyl tetraphosphate mixtures; methyl parathion mixtures; organic phosphorus compound mixtures, organic phosphate compound mixtures; parathion mixtures, tetraethyl dithio pyrophosphate mixtures; and tetraethyl pyrophosphate mixtures, liquid (includes solutions, emulsions, or emulsifiable liquids).

(a) * * *

(16) * * *

(v) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; Specification MC 310, MC 311 or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed wthin 30 seconds of actuation by manual or mechanical means or in the case of fire by a thermally activated closure activated at a temperature not over 250° F., and Specification MC 330 and MC 331 are equipped with internal self-closing stop-valves meeting the requirements of § 178.337–11 of this subchapter.

(vi) Each tank is equipped with a pressure relief system meeting the requirements in § 173.33(d) or § 178.345–10 of this subchapter, except that pressure relief devices on MC 330 or MC 331 cargo tanks must meet the requirements in the § 178.337–9 of this subchapter.

* * * * *

57. In § 173.369, as amended at 54 FR 25014, on June 12, 1989, paragraph (a)(14)(iii) is revised to read as follows:

§ 173.369 Carbolic acid (phenol), not liquid.

(a) * * *

(14) * * *

(iii) Bottom outlets on Specification DOT 407 or DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; Specification MC 304, MC 307, MC 310, MC 311 or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means or in the case of fire by a thermally activated closure activated at a temperature not over 250° F., and Specification MC 330 and MC 331 are equipped with internal self-closing stop-valves meeting the requirements of § 178.337–11 of this subchapter.

* * * * *

58. In § 173.373, as amended at 54 FR 25014, on June 12, 1989, paragraphs (a)(6)(i) and (iv) are revised to read as follows:

§ 173.373 Ortho-nitroaniline and paranitroaniline.

(a) * * *

(6) * * *

(i) The tanks are authorized only for ortho-nitroaniline which must be loaded in a liquefied state at a temperature not over 180° F.

* * * * *

(iv) Bottom outlets on Specification DOT 407 or DOT 412 cargo tanks are equipped with stop-valves meeting the requirement of § 178.345–11 of this subchapter; Specification MC 304, MC 307, MC 310, MC 311 or MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means or in the case of fire by a thermally activated closure activated at a temperature not over 250° F., and Specification MC 330 and MC 331 are equipped with internal self-closing stop-valves meeting the requirements of § 178.337–11 of this subchapter.

* * * * *

59. In § 173.374, as amended at 54 FR 25014, on June 12, 1989, paragraph (a)(4)(v) is revised to read as follows:

§ 173.374 Nitrochlorobenzene, meta or para.

(a) * * *

(4) * * *

(v) Bottom outlets on Specification DOT 412 cargo tanks are equipped with stop-valves meeting the requirements of § 178.345–11 of this subchapter; Specification MC 312 cargo tanks are equipped with stop-valves capable of being remotely closed within 30 seconds of actuation by manual or mechanical means or in the case of fire by a thermally activited closure activated at a temperature not over 250° F., and Specification MC 330 and MC 331 are equipped with internal self-closing stop-valves meeting the requirements of § 178.337–11 of this subchapter.

* * * * *

PART 176—CARRIAGE BY VESSEL

60. The authority citation for Part 176 continues to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1808; 49 CFR 1.53, app. A to part 1.

61. The text of paragaph (b) of § 176.76, as amended at 54 FR 25014, on June 12, 1989, contained an error in the amendatory language, the text as it appears in the October 1, 1989, edition of the CFR is accurate.

PART 177—CARRIAGE BY PUBLIC HIGHWAY

62. The authority citation for Part 177 continues to read as follows:

Authority: 49 App. U.S.C. 1803, 1804, 1805, 49 CFR Part 1.

63. Section 177.824 is revised to read as follows:

§ 177.824 Retesting and inspection of cargo tanks.

Except as otherwise provided in this subchapter, no motor carrier may operate a specification cargo tank motor vehicle containing a hazardous material unless the cargo tank motor vehicle conforms to the retest and inspection requirements set forth in Subpart E of Part 180 of this subchapter. This paragraph does not apply to any cargo tank filled prior to the retest or inspection due date.

PART 178—SHIPPING CONTAINER SPECIFICATIONS

64. The authority citation for part 178 continues to read as follows:

Authority: 49 U.S.C. App. 1803, 1804, 1805, 1806, 1808; 49 part 1.

65. Section 178.320, as added at 54 FR 25015, on June 12, 1989, is revised to read as follows:

§ 178.320 General requirements applicable to all DOT specification cargo tank motor vehicles.

(a) *Definitions.* For the purposes of this subpart,

Cargo tank, as defined in § 171.8 of this subchapter, means a bulk packaging which:

(1) Is a tank intended primarily for the carriage of liquids or gases (including appurtenances, reinforcements, fittings, and closures) (For definition of "tank", see § 178.345–1(c), § 178.337–1, or § 178.338–1, as applicable);

(2) Is permanently attached to or forms a part of a motor vehicle but which, by reason of its size, construction or attachment to a motor vehicle is loaded or unloaded without being removed from the motor vehicle; and

(3) Is not fabricated under a specification for cylinders, portable tanks, tank cars, or multi-unit tank car tanks.

Cargo tank motor vehicle, as defined in § 171.8 of this subchapter, means a motor vehicle with one or more cargo tanks permanently attached to or forming an integral part of the motor vehicle.

Cargo tank wall means those parts of the cargo tank which make up the primary lading retention structure including shell, bulkheads, and fittings which, when closed during transportation of lading, yields the minimum volume of the cargo tank assembly.

Design type means one or more cargo tanks which are made—

(1) To the same specification;

(2) By the same manufacturer;

(3) To the same engineering drawings and calculations, except for minor variations in piping which do not affect the lading retention capability of the cargo tank;

(4) Of the same materials of construction;

(5) To the same cross-sectional dimensions;

(6) To a length varying by no more than five percent;

(7) With the volume varying by no more than five percent (due to a change in length only); and

(8) For the purposes of § 178.338 only, with the same insulation system.

Manufacturer means any person engaged in the manufacture or assembly of a DOT specification cargo tank, cargo tank motor vehicle, or cargo tank equipment which forms part of the cargo tank wall. A manufacturer shall register with the Department in accordance with subpart F of part 107 in subchapter B of this chapter.

(b) *Design certification.* (1) Each cargo tank design type shall be certified in conformance with the specification requirements by a Design Certifying Engineer registered in accordance with subpart F of part 107.

(2) The Design Certifying Engineer shall furnish to the manufacturer a certificate to indicate compliance with the specification requirements. The certificate must include the sketches, drawings, and calculations used for certification. Each certificate, including

sketches, drawings, and calculations, shall be signed by the Design Certifying Engineer.

(3) The manufacturer shall retain the design certificate at his principal place of business for as long as he manufactures DOT specification cargo tanks.

(c) *Exceptions to the ASME Code.* Unless otherwise specified, when exceptions are provided in this subpart from compliance with certain paragraphs of the ASME Code, compliance with those paragraphs is not prohibited.

§ 178.337-1 [Amended].

66. In § 178.337-1, as amended at 54 FR 25015, on June 12, 1989, the last sentence in paragraph (e)(2) is amended by removing the word "self-extinguishing".

67. Section 178.337-3 is revised to read as follows:

§ 178.337-3 Structural integrity.

(a) General requirements and acceptance criteria. (1) Except as provided in paragraph (d) of this section, the maximum calculated design stress at any point in the cargo tank may not exceed the maximum allowable stress value prescribed in Section VIII of the ASME Code, or 25 percent of the tensile strength of the material used.

(2) The relevant physical properties of the materials used in each cargo tank may be established either by a certified test report from the material manufacturer or by testing in conformance with a recognized national standard. In either case, the ultimate tensile strength of the material used in the design may not exceed 120 percent of the ultimate tensile strength specified in either the ASME Code or the ASTM standard to which the material is manufactured.

(3) The maximum design stress at any point in the cargo tank must be calculated separately for the loading conditions described in paragraphs (b), (c), and (d) of this section. Alternate test or analytical methods, or a combination thereof, may be used in place of the procedures described in paragraphs (b), (c), and (d) of this section, if the methods are accurate and verifiable.

(4) Corrosion allowance material may not be included to satisfy any of the design calculation requirements of this section.

(b) The static design and construction of each cargo tank must be in accordance with section VIII of the ASME Code. The cargo tank design must include calculation of stresses generated by design pressure, the weight of lading, the weight of structure supported by the tank wall, and the effect of temperature gradients resulting from lading and ambient temperature extremes. When dissimilar materials are used, their thermal coefficients must be used in calculation of thermal stresses. Stress concentrations in tension, bending and torsion which occur at pads, cradles, or other supports must be considered in accordance with appendix G of the ASME Code.

(c) Stresses resulting from static and dynamic loadings, or a combination thereof, are not uniform throughout the cargo tank motor vehicle. The following is a simplified procedure for calculating the effective stress in the cargo tank resulting from static and dynamic loadings. The effective stress (the maximum principal stress at any point) must be determined by the following formula:

$$S = 0.5\,(S_y + S_x) \pm (0.25(S_y - S_x)^2 + S_s^2)^{0.5}$$

Where:

S = effective stress, in psi, at any given point under the most severe combination of static and dynamic loadings that can occur at the same time.

S_y = circumferential stress generated by internal and external pressure when applicable, in psi.

S_x = the net longitudinal stress, in psi, generated by the following loading conditions:

(1) The longitudinal tensile stress generated by internal pressure;

(2) The tensile or compressive stress generated by the axial load resulting from a decelerative force equal to twice the static weight of the fully loaded vehicle applied independently to each suspension assembly at the road surface;

(3) The tensile or compressive stress generated by the bending moment resulting from a decelerative force equal to twice the static weight of the fully loaded vehicle applied independently to each suspension assembly at the road surface;

(4) The tensile or compressive stress generated by the axial load resulting from an accelerative force equal to the static weight of the fully loaded vehicle applied to the horizontal pivot of the fifth wheel supporting the vehicle;

(5) The tensile or compressive stress generated by the bending moment resulting from an accelerative force equal to the static weight of the fully loaded vehicle applied to the horizontal pivot of the fifth wheel supporting the vehicle; and

(6) The tensile or compressive stress generated by a bending moment produced by a vertical force equal to three times the static weight of the fully loaded vehicle.

S_s = The following shear stresses, in psi, that apply:

(1) The shear stress generated by a vertical force equal to three times the static weight of the tank and contents;

(2) The lateral shear stress generated by a lateral accelerative force which will produce an overturn but not less than 0.75 times the static weight of the fully loaded vehicle, applied at the road surface; and

(3) The torsional shear stress generated by a lateral accelerative force which will produce an overturn but not less than 0.75 times the static weight of the fully loaded vehicle, applied at the road surface.

(d) In order to account for stresses due to impact in an accident, the design calculations for the cargo tank shell and heads must include the load resulting from the design pressure in combination with the dynamic pressure resulting from a longitudinal deceleration of "2g". For this loading condition the stress value used may not exceed the lesser of the yield strength or 75 percent of the ultimate tensile strength of the material of construction. For cargo tanks constructed of stainless steel the maximum design stress may not exceed 75 percent of the ultimate tensile strength of the type steel used.

(e) The minimum metal thickness for the shell and heads must be 0.187 inch for steel and 0.270 inch for aluminum, except for chlorine and sulfur dioxide tanks. For a cargo tank used in chlorine or sulfur dioxide service, the cargo tank must be made of steel. A corrosion allowance of 20 percent or 0.10 inch, whichever is less, must be added to the thickness otherwise required for sulfur dioxide and chlorine tank material. In chlorine tanks the wall thickness must be at least five-eighths inch, including corrosion allowance.

(f) Where a tank support is attached to any part of the tank wall, the stresses imposed on the tank wall must meet the requirements in paragraph (a) of this section.

(g) The design, construction, and installation of an appurtenance to the cargo tank must be such that, in the event of its damage or failure, the lading retention integrity of the tank will not be adversely affected.

(1) A lightweight attachment, such as a conduit clip, brakeline clip or placard holder, must be constructed of a material of lesser strength than the cargo tank wall material and may not be more than 72 percent of the thickness of the material to which it is attached. The attachment may be secured directly to the cargo tank wall if the device is designed and installed in such a manner that, if damaged, it will not affect the lading retention integrity of the tank. The lightweight attachment must be secured to the cargo tank wall by continuous weld or in such a manner as to preclude formation of pockets, which may become sites for incipient corrosion. Attachments meeting the requirements of this paragraph are not

authorized for cargo tanks constructed under part UHT of the ASME Code.

(2) Except as prescribed in § 178.337-3(g)(1), the welding of any appurtenance of the cargo tank wall must be made by attachment of a mounting pad, so that there will be no adverse effect upon the lading retention integrity of the cargo tank if any force is applied to the appurtenance, from any direction. The thickness of the mounting pad may not be less than that of the shell or head to which it is attached, and not more than 1.5 times the shell or head thickness. However, a pad with a minimum thickness of 0.250 inch may be used when the shell or head thickness is over 0.250 inch. If weep holes or tell-tale holes are used, the pad must be drilled or punched at its lowest point before it is welded. Each pad must:

(i) Extend at least 2 inches in each direction from any point of attachment of an appurtenance;

(ii) Have rounded corners, or otherwise be shaped in a manner to minimize stress concentrations on the shell or head; and

(iii) Be attached by a continuous weld around the pad, except for a small gap at the lowest point for draining, using filler material conforming to the recommendations of the manufacturer of the head or shell material.

67a. In § 178.337-9, as amended at 54 FR 25017, on June 12, 1989, paragraph (b)(6) is revised to read as follows:

§ 178.337-9 Pressure relief devices, piping, valves, hoses, and fittings.

* * * * *

(b) * * *

(6) All *piping, valves, and fittings* on a cargo tank must be proven free from leaks. This requirement is met when such piping, valves, and fittings have been tested after installation at not less than 80 percent of the design pressure marked on the cargo tank. This requirement is applicable to hoses used in the cargo tank, except that hoses may be tested before or after installation on the tank.

* * * * *

68. In § 178.337-11, as revised at 54 FR 25017, on June 12, 1989, the second sentence in paragraph (a)(1)(v) is amended by removing the word "hose" and adding, in its place, the word "hoses", and paragraph (c)(1) is amended by removing the words "self closing" and adding, in their place, the word "self-closing".

69. In § 178.337-18, as amended at 54 FR 25018, on June 12, 1989, paragraph (a) is revised to read as follows:

§ 178.337-18 Certification.

(a) At or before the time of delivery, the cargo tank manufacturer must supply and the owner must obtain, a tank manufacturer's data report as required by the ASME Code, and a certificate stating that the completed cargo tank motor vehicle conforms in all respects to Specification MC 331 and the ASME Code. The registration numbers of the manufacturer, the Design Certifying Engineer, and the Registered Inspector, as appropriate, must appear on the certificates (see subpart F, part 107 in subchapter B of this chapter).

(1) For each design type, the certificate must be signed by a responsible official of the manufacturer and a Design Certifying Engineer; and

(2) For each cargo tank motor vehicle, the certificate must be signed by a responsible official of the manufacturer and a Registered Inspector.

(3) The certificate must state whether or not it includes certification that all valves, piping, and protective devices comply with the requirements of the specification. If it does not so certify, the installer of any such valve, piping, or device shall supply and the owner shall obtain a certificate asserting complete compliance with these specifications for such devices. The certificate, or certificates, will include sufficient sketches, drawings, and other information to indicate the location, make, model, and size of each valve and the arrangement of all piping associated with the tank.

(4) The certificate must contain a statement indicating whether or not the cargo tank was postweld heat treated for anhydrous ammonia as specified in § 178.337-1(f).

* * * * *

70. Section 178.338-3 is revised to read and follows:

§ 178.338-3 Structural integrity.

(a) *General requirements and acceptance criteria.* (1) Except as permitted in paragraph (d) of this section, the maximum calculated design stress at any point in the tank may not exceed the lesser of the maximum allowable stress value prescribed in section VIII of the ASME Code, or 25 percent of the tensile strength of the material used.

(2) The relevant physical properties of the materials used in each tank may be established either by a certified test report from the material manufacturer or by testing in conformance with a recognized national standard. In either case, the ultimate tensile strength of the material used in the design may not exceed 120 percent of the minimum ultimate tensile strength specified in either the ASME Code or the ASTM standard to which the material is manufactured.

(3) The maximum design stress at any point in the tank must be calculated separately for the loading conditions described in paragraphs (b), (c), and (d) of this section. Alternate test or analytical methods, or a combination thereof, may be used in lieu of the procedures described in paragraphs (b), (c), and (d) of this section, if the methods are accurate and verifiable.

(4) Corrosion allowance material may not be included to satisfy any of the design calculation requirements of this section.

(b) The static design and construction of each tank must be in accordance with section VIII of the ASME Code. The tank design must include calculation of stresses due to design pressure, the weight of lading, the weight of structures supported by the tank wall, and the effect of temperature gradients resulting from lading and ambient temperature extremes. When dissimilar materials are used, their thermal coefficients must be used in calculation of the thermal stresses. Stress concentrations in tension, bending and torsion which occur at pads, cradles, or other supports must be considered in accordance with Appendix G of the ASME Code.

(c) Stresses resulting from static and dynamic loadings, or a combination thereof, are not uniform throughout the cargo tank motor vehicle. The following is a simplified procedure for calculating the effective stress in the tank resulting from static and dynamic loadings. The effective stress (the maximum principal stress at any point) must be determined by the following formula:

$$S = 0.5 (S_y + S_x) \pm (0.25(S_y - S_x)^2 + S_s^2)^{**}$$

Where:

S = effective stress, in psi, at any given point under the most severe combination of static and dynamic loadings that can occur at the same time.

S_y = circumferential stress generated by internal and external pressure when applicable, in psi.

S_x = the net longitudinal stress, in psi, generated by the following loading conditions:

(1) The longitudinal tensile stress generated by internal pressure;

(2) The tensile or compressive stress generated by the axial load resulting from a decelerative force applied independently to each suspension assembly at the road surface using applicable static loadings specified in § 178.338-13 (b) and (c);

(3) The tensile or compressive stress generated by the bending moment resulting from a decelerative force applied independently to each suspension assembly

at the road surface using applicable static loadings specified in § 178.338-13 (b) and (c);

(4) The tensile or compressive stress generated by the axial load resulting from an accelerative force applied to the horizontal pivot of the fifth wheel supporting the vehicle using applicable static loadings specified in § 178.338-13 (b) and (c);

(5) The tensile or compressive stress generated by the bending moment resulting from an accelerative force applied to the horizontal pivot of the fifth wheel supporting the vehicle using applicable static loadings specified in § 178.338-13 (b) and (c); and

(6) The tensile or compressive stress generated by a bending moment produced by a vertical force using applicable static loadings specified in § 178.338-13 (b) and (c).

S_s = The following shear stresses, in psi, that apply: The vectorial sum of the applicable shear stresses in the plane under consideration, including direct shear generated by the static vertical loading; direct lateral and torsional shear generated by a lateral accelerative force applied at the road surface, using applicable static loads specified in § 178.338-13(b) and (c).

(d) In order to account for stresses due to impact in an accident, the design calculations for the tank shell and heads must include the load resulting from the design pressure in combination with the dynamic pressure resulting from a longitudinal deceleration of "2g". For this loading condition the stress value used may not exceed the lesser of the yield strength or 75 percent of the ultimate tensile strength of the material of construction. For a cargo tank constructed of stainless steel, the maximum design stress may not exceed 75 percent of the ultimate tensile strength of the type steel used.

(e) The minimum thickness of the shell or heads of the tank must be 0.187 inch for steel and 0.270 inch for aluminum. However, the minimum thickness for steel may be 0.110 inches provided the cargo tank is:

(1) Vacuum insulated, or

(2) Double walled with a load bearing jacket designed to carry a proportionate amount of structural loads prescribed in this section.

(f) Where a tank support is attached to any part of the tank wall, the stresses imposed on the tank wall must meet the requirements in paragraph (a) of this section.

(g) The design, construction, and installation of an appurtenance to the cargo tank or jacket must be such that, in the event of its damage or failure, the lading retention integrity of the tank will not be adversely affected.

(1) A lightweight attachment, such as a conduit clip, brakeline clip or placard holder, must be constructed of a material of lesser strength than the cargo tank wall or jacket material and may not be more than 72 percent of the thickness of the material to which it is attached. The attachment may be secured directly to the cargo tank wall or jacket if the device is designed and installed in such a manner that, if damaged, it will not affect the lading retention integrity of the tank. The lightweight attachment must be secured to the cargo tank wall or jacket by continuous weld or in such a manner as to preclude formation of pockets, which may become sites for incipient corrosion. Attachments conforming with this paragraph are not authorized for cargo tanks constructed under part UHT of the ASME Code.

(2) Except as prescribed in § 178.338-3(g)(1), the welding of any appurtenance to the cargo tank wall or jacket must be made by attachment of a mounting pad, so that there will be no adverse affect upon the lading retention integrity of the tank if any force is applied to the appurtenance, from any direction. The thickness of the mounting pad may not be less than that of the shell or head to which it is attached, and not more than 1.5 times the shell or head thickness. However, a pad with a minimum thickness of 0.187 inch may be used when the shell or head thickness is over 0.187 inch. If weep holes or tell tale holes are used, the pad must be drilled or punched at its lowest point before it is welded. Each pad must—

(i) Extend at least 2 inches in each direction from any point of attachment of an appurtenance;

(ii) Be attached by a continuous weld around the pad except for a small gap at the lowest point for draining.

71. In § 178.338-17, as revised at 54 FR 25020, on June 12, 1989, paragraph (b) is revised to read as follows:

§ 178.338-17 Pumps and compressors.

* * * * *

(b) A valve or fitting made of aluminum with internal rubbing or abrading aluminum parts that may come in contact with oxygen, cryogenic liquid, may not be installed on any cargo tank used to transport oxygen, cryogenic liquid, unless the parts are anodized in accordance with ASTM Standard B 580.

72. In § 178.338-19, paragraph (a) and the first sentence of paragraph (b) are revised to read as follows:

§ 178.338-19 Certification.

(a) At or before the time of delivery, the manufacturer of a cargo tank motor vehicle shall furnish to the owner of the completed vehicle the following:

(1) The tank manufacturer's data report as required by the ASME Code, and a certificate bearing the manufacturer's vehicle serial number stating that the completed cargo tank motor vehicle conforms to all applicable requirements of Specification MC 338, including the ASME Code in effect on the date (month, year) of certification. The registration numbers of the manufacturer, the Design Certifying Engineer, and the Registered Inspector, as appropriate, must appear on the certificates (See subpart F, part 107 in subchapter B of this chapter).

(i) For each design type, the certificate must be signed by a responsible official of the manufacturer and a Design Certifying Engineer; and

(ii) For each cargo tank motor vehicle, the certificate must be signed by a responsible official of the manufacturer and a Design Certifying Engineer;

(2) A photograph, pencil rub, or other facsimile of the plates required by paragraphs (a) and (b) of § 178.338-18.

(b) In the case of a cargo tank vehicle manufactured in two or more stages, each manufacturer who performs a manufacturing operation on the incomplete vehicle or portion thereof shall furnish to the succeeding manufacturer, at or before the time of delivery, a certificate covering the particular operation performed by that manufacturer, and any certificates received from previous manufacturers, Registered Inspectors, and Design Certifying Engineers.

* * * * *

73. In § 178.345-1, as added at 54 FR 25020, on June 12, 1989, definitions for "Flange," "Internal self-closing stop-valve," "Nozzle," "Outlet," "Pipe coupling," and "Shell" in paragraph (c) are revised, and paragraphs (h), and (i)(2) (k) are revised to read as follows:

§ 178.345-1 General requirements.

* * * * *

(c) * * *

Flange means the structural ring for guiding or attachment of a pipe or fitting with another flange (companion flange), pipe, fitting or other attachment.

* * * * *

Internal self-closing stop-valve means a self-closing stop-valve designed so that the self-stored energy source is located inside the tank or tank sump, or within the welded flange, and the valve seat is located within the tank or within one inch of the external face of the welded flange or sump of the tank

* * * * *

Nozzle means the subassembly consisting of a pipe or tubular section with or without a welded or forged flange on one end.

Outlet means any opening in the shell or head of a tank, (including the means

for attaching a closure), except that the following are not outlets: A threaded opening securely closed during transportation with a threaded plug or a threaded cap, a flanged opening securely closed during transportation with a bolted or welded blank flange, a manhole, or gauging devices, thermometer wells, and safety relief devices.

* * * * *

Pipe coupling means a fitting with internal threads on both ends.

* * * * *

Shell means the circumferential portion of a tank defined by the basic design radius or radii excluding the closing heads.

* * * * *

(h) Any additional requirements prescribed in part 173 of this subchapter that pertain to the transportation of a specific lading are incorporated into these specifications.

(i) * * *

(2) The strength of the connecting structure joining multiple cargo tanks in a cargo tank motor vehicle must meet the structural design requirements in § 178.345-3. Any void within the connecting structure must be vented to the atmosphere by a drain of at least 1 inch inside diameter which must be kept open at all times. The connecting structure must have inspection openings of sufficient size and number to permit proper visual internal inspection of the connecting structure and cargo tank surfaces. Each drainage and inspection opening must be accessible.

* * * * *

74. In § 178.345-2, as added at 54 FR 25021, on June 12, 1989, paragraphs (a) introductory text, (a)(1), (b) and (c), introductory text are revised to read as follows:

§ 178.345-2 Material and material thickness.

(a) All material for shell, heads, bulkheads, and baffles must conform to Section II, Parts A and B, of the ASME Code except as follows:

(1)The following steels are also authorized for cargo tanks "constructed in accordance with the ASME Code".

ASTM A 569
ASTM A 570
ASTM A 572
ASTM A 656
ASTM A 715

* * * * *

(b) *Minimum thickness.* The minimum thickness for the shell and heads must be such that the maximum stress levels specified in § 178.345-3 of this subpart are not exceeded. In no case may the shell or head thickness be less than that specified in the applicable specification.

(c) *Corrosion or abrasion protection.* When required by 49 CFR part 173 for a particular lading, a cargo tank or a part thereof, subject to thinning by corrosion or mechanical abrasion due to the lading, must be protected by providing the tank or part of the tank with a suitable increase in thickness of material, a lining or some other suitable method of protection.

* * * * *

75. Section 178.345-3, as added at 54 FR 25021, on June 12, 1989, is revised to read as follows:

§ 178.345-3 Structural integrity.

(a) *General requirements and acceptance criteria.* (1) Except as provided in paragraph (d) of this section, the maximum calculated design stress at any point in the tank wall may not exceed the lesser of the maximum allowable stress value prescribed in section VIII of the ASME Code, or 25 percent of the tensile strength of the material used.

(2) The relevant physical properties of the materials used in each cargo tank may be established either by a certified test report from the material manufacturer or by testing in conformance with a recognized national standard. In either case, the ultimate tensile strength of the material used in the design may not exceed 120 percent of the minimum ultimate tensile strength specified in either the ASME Code or the ASTM standard to which the material is manufactured.

(3) The maximum design stress at any point in the cargo tank must be calculated spearately for the loading conditions described in paragraphs (b), (c), and (d) of this section. Alternate test or analytical methods, or a combination thereof, may be used in place of the procedures described in paragraphs (b), (c), and (d) of this section, if the methods are accurate and verifiable.

(4) Corrosion allowance material may not be included to satisfy any of the design calculation requirements of this section.

(b) The static design and construction of each cargo tank must be in accordance with section VIII of the ASME Code. The tank design must include calculation of stresses generated by the MAWP, the weight of lading, the weight of structures supported by the tank wall, and the effect of temperature gradients resulting from lading and ambient temperatures extremes. When dissimilar materials are used, their thermal coefficients must be used in the calculation of thermal stresses. Stress concentrations in tension, bending and torsion which occur at pads, cradles, or other supports must be considered in accordance with Appendix G of the ASME Code.

(c) Stresses resulting from static or dynamic loadings, or a combination thereof, are not uniform throughout the cargo tank motor vehicle. The following is a simplified procedure for calculating the effective stress in the tank shell and heads resulting from static and dynamic loadings. The effective stress (the maximum principal stress at any point) must be determined by the following formula:

$$S = 0.5(S_y + S_x) \pm (0.25(S_y - S_x)^2 + S_s^2)^{0.5}$$

Where:

S = effective stress, at any given point under the most severe combination of static and dynamic loadings that can occur at the same time, in psi.

S_y = circumferential stress generated by internal and external pressure, when applicable, in psi.

S_x = the net longitudinal stress, in psi, generated by the following loading conditions:

(1) The longitudinal stresses resulting from the MAWP and from the lowest pressure at which the cargo tank may operate, in combination with the bending stress generated by the weight of the lading, the weight of the cargo tank and other structures and equipment supported by the cargo tank wall;

(2) The tensile or comprehensive stress generated by the axial load resulting from a longitudinal decelerative force equal to 0.75 times the vertical reaction at each suspension assembly, applied at the road surface. The vertical reaction must be calculated based on the static weight of the fully loaded cargo tank motor vehicle;

(3) The tensile or comprehensive stress generated by the bending moment resulting from a longitudinal decelerative force equal to 0.75 times the vertical reaction at each suspension assembly, applied at the road surface. The vertical reaction must be calculated based on the static weight of the fully loaded cargo tank motor vehicle;

(4) The tensile or compressive stress generated by the axial load resulting from a longitudinal accelerative force equal to 0.7 times the static weight of the fully loaded cargo tank, applied at the horizontal pivot of the upper coupler (fifth wheel) or turntable supporting the cargo tank motor vehicle;

(5) The tensile or compressive stress generated by the bending moment resulting from a longitudinal accelerative force equal to 0.75 times the static weight of the fully loaded cargo tank applied to the horizontal pivot of the upper coupler (fifth wheel) or turntable supporting the cargo tank motor vehicle; and

(6) The tensile or compressive stress generated by the bending moment resulting from a veritically up accelerative force equal to 0.7 times the vertical reaction, applied at each suspension assembly. The vertical reaction must be calculated based on the static weight of the lading, the weight of the

cargo tank and other structures and equipment supported by the cargo tank wall.

S_s = The following shear stresses, in psi, that apply:

(1) The vertical shear stress generated by a vertical force equal to 1.7 times the vertical reaction, applied at each suspension assembly. The vertical reaction must be calculated based on the static weight of the lading, the weight of the cargo tank and other structures and equipment supported by the cargo tank wall;

(2) The lateral shear stress generated by a lateral accelerative force equal to 0.4 times the vertical reaction, applied laterally at the road surface. The vertical reaction must be calculated based on the static weight of the fully loaded cargo tank motor vehicle; and

(3) The torsional shear stress generated by a lateral accelerative force equal to 0.4 times the vertical reaction, applied laterally at the road surface. The vertical reaction must be calculated based on the static weight of the fully loaded cargo tank motor vehicle.

(d) In order to account for stresses due to impact in an accident, the design calculations for the tank shell and heads must include the load resulting from the design pressure in combination with the dynamic pressure resulting from a longitudinal deceleration of "2g". For this loading condition the stress value used may not exceed the lesser of the yield strength or 75 percent of the ultimate tensile strength of the material of construction. For a cargo tank constructed of stainless steel, the maximum design stress may not exceed 75 percent of the ultimate tensile strength of the type steel used. For cargo tanks with internal baffles, the decelerative force may be reduced by "0.25g" for each baffle assembly, but in no case may the total reduction in decelerative force exceed "1g".

(e) In no case may the minimum thickness of the cargo tank wall be less than that prescribed in § 178.346–2, 178.347–2, or § 178.348–2, as applicable.

(f) For a cargo tank mounted on a frame or built with integral structural supports, the calculation of effective stresses for the loading conditions in paragraph (c) of this section may include the structural contribution of the frame or the integral structural supports.

(g) The design, construction, and installation of an appurtenance to the cargo tank must conform to the following requirements.

(1) Structural members, the suspension subframe, accident protection and external rings must be used as sites for attachment of appurtenances and other accessories to the cargo tank, when practicable.

(2) A lightweight attachment, such as a conduit clip, brakeline clip, skirting structure, lamp mounting bracket or placard holder, must be constructed of a material of lesser strength than the cargo tank wall materials and may not be more than 72 percent of the thickness of the material to which it is attached. The lightweight attachment may be secured directly to the cargo tank wall if the device is designed and installed in such a manner that, if damaged, it will not affect the lading retention integrity of the tank. A lightweight attachment must be secured to the tank shell or head by continuous weld or in such a manner as to preclude formation of pockets, which may become sites for incipient corrosion.

(3) Except as prescribed in paragraphs (g)(1) and (g)(2) of this section, the welding of any appurtenance to the cargo tank wall must be made by attachment of a mounting pad, so that there will be no adverse effect upon the lading retention integrity of the cargo tank if any force less than that prescribed in § 178.345–8(b)(1) of this subchapter is applied from any direction. The thickness of the mounting pad may not be less than that of the shell or head to which it is attached, and not more than 1.5 times the shell or head thickness. However, a pad with a minimum thickness of 0.187 inch may be used when the shell or head thickness is over 0.187 inch. If weep holes or tell-tale holes are used, the pad must be drilled or punched at its lowest point before it is welded. Each pad must—

(i) Extend at least 2 inches in each direction from any point of attachment of an appurtenance;

(ii) Have rounded corners, or otherwise be shaped in a manner to minimize stress concentrations on the shell or head; and

(iii) Be attached by a continuous weld around the pad except for a small gap at the lowest point for draining.

76. Section 178.345–7, as added at 54 FR 25023, on June 12, 1989, is revised to read as follows:

§ 178.345–7 Circumferential reinforcements.

(a) A tank with a shell thickness of less than ⅜ inch must be circumferentially reinforced with bulkheads, baffles, ring stiffeners, or any combination thereof, in addition to the tank heads.

(1) Circumferential reinforcement must be located so that the thickness and tensile strength of the shell material in combination with the frame and reinforcement produces structural integrity at least equal to that prescribed in § 178.345–3 and in such a manner that the maximum unreinforced portion of the shell does not exceed 60 inches. For cargo tanks designed to be loaded by vacuum, spacing of circumferential reinforcement may exceed 60 inches provided the maximum unreinforced portion of the shell conforms with the requirements of Section VIII, Division 1 of the ASME Code.

(2) Where discontinuity in the alignment of longitudinal shell sheets exceeds the greater of 10 degrees or eight inches, circumferential reinforcement must be located within one inch of the shell joint, unless otherwise reinforced with structural members are capable of maintaining shell stress levels authorized in § 178.345–3.

(b) Except for doubler plates and knuckle pads, no reinforcement may cover any circumferential joint.

(c) When a baffle or baffle attachment ring is used as a circumferential reinforcement member, it must produce structural integrity at least equal to that prescribed in § 178.345–3 and must be circumferentially welded to the tank shell. The welded portion may not be less than 50 percent of the total circumference of the tank and the length of any unwelded space on the joint may not exceed 40 times the shell thickness.

(d) When a ring stiffener is used as a circumferential reinforcement member, whether internal or external, it must be continuous around the circumference of the cargo tank shell and must be in accordance with the following:

(1) The section modulus about the neutral axis of the ring section parallel to the shell must be at least equal to that derived from the applicable formula:

$I/C = 0.00027WL$, for MS, HSLA and SS; or
$I/C = 0.00046WL$, for aluminum alloys;

[1] Where:

I/C = Section modulus in inches 3
W = Tank width, or diameter, inches
L = Spacing of ring stiffener, inches; i.e., the maximum longitudinal distance from the midpoint of the unsupported shell on one side of the ring stiffener to the midpoint of the unsupported shell on the opposite side of the ring stiffener.

(2) If a ring stiffener is welded to the tank shell, a portion of the shell may be considered as part of the ring section for purposes of computing the ring section modulus. This portion of the shell may be used provided at least 50 percent of the total circumference of the tank is welded and the length of any unwelded space on the joint does not exceed 40 times the shell thickness. The maximum portion of the shell to be used in these calculations is as follows:

Number of circumferential ring stiffener-to-shell welds	W	Value of t
1		20t
2	Less than 20t	20t + W
2	20t or more	40t

[1] where:
t = Shell thickness, inches;
W = Length of unwelded joint between parallel circumferential ring stiffener-to-shell welds.

(3) When used to meet the vacuum requirements of this section, ring stiffeners must be as prescribed in the ASME Code.

(4) If configuration of internal or external ring stiffener encloses an air space, this air space must be arranged for venting and be equipped with drainage facilities which must be kept operative at all times.

(5) Hat shaped or open channel ring stiffeners which prevent visual inspection of the tank shell are prohibited on cargo tank motor vehicles constructed of carbon steel.

77. In § 178.345–8, as added at 54 FR 25023, on June 12, 1989, the second sentence of paragraph (a)(3) is amended by removing the word "may" and adding, in its place, the word "must", paragraphs (a) introductory text, (a)(1) introductory text, (a)(5), (b) introductory text, (c) introductory text, (d) introductory text, (d)(1), (d)(2)(i) and (d)(3) are revised to read as follows:

§ 178.345–8 Accident damage protection.

(a) *General.* Each cargo tank motor vehicle must be designed and constructed in accordance with the requirements of this section and the applicable individual specification to minimize the potential for the loss of lading due to an accident.

(1) Any dome, sump, or washout cover plate projecting from the cargo tank wall that retains lading in any tank orientation, must be as strong and tough as the cargo tank wall and have a thickness at least equal to that specified by the appropriate cargo tank specification. Any such projection located in the lower ⅓ of the tank circumference (or cross section perimeter for non-circular tanks) that extends more than half its diameter at the point of attachment to the tank or more than 4 inches from the cargo tank wall, or located in the upper ⅔ of the tank circumference (or cross section perimeter for non-circular tanks) that extends more than ¼ its diameter or more than 2 inches from the point of attachment to the tank must have accident damage protection that are:

* * * * *

(5) *Minimum road clearance.* The minimum allowable road clearance of any cargo tank motor vehicle component for protection device located between any two adjacent axles on a vehicle or vehicle combination must be at least one-half inch for each foot separating such axles, and in no case less than 12 inches.

(b) *Bottom damage protection.* Each outlet, projection or piping located in the lower ⅕ of the tank circumference (or cross section perimeter for non-circular tanks) that could be damaged in an accident thereby resulting in the loss of lading must be protected by a bottom damage protection device, except as provided by paragraph (a)(1) of this section and § 173.33(e) of this subchapter.

* * * * *

(c) *Rollover Damage Protection.* Each closure for openings, including but not limited to manhole, filling or inspection openings, and each valve, fitting, pressure relief device, vapor recovery stop valve or other lading retaining fitting located in the upper ⅖ of a cargo tank circumference (or cross section perimeter for non-circular tanks) must be protected by being enclosed inside the body of the tank, by being enclosed inside a rollover damage protection device, or by being 125 percent as strong as the otherwise required damage protection device.

* * * * *

(d) *Rear-end protection.* Each cargo tank motor vehicle must be provided with a rear-end protection device to protect the tank and piping in the event of a rear-end collision and reduce the likelihood of damage which could result in the loss of lading. The rear-end tank protection device must conform to the following requirements (Nothing in this paragraph shall be construed to relieve a manufacturer of responsibility for complying with the requirements of § 393.86 of this title):

(1) The rear-end tank protection device must be designed so that it can deflect at least 6 inches horizontally forward with no contact between any part of the cargo tank motor vehicle which contains lading during transit and with any part of the rear-end protection device, or with a vertical plane passing through the outboard surface of the protection device.

(2) * * *

(i) The bottom surface of the rear-end protection device must be at least 4 inches below the lower surface of any part at the rear of the cargo tank motor vehicle which contains lading during transit and not more than 60 inches from the ground when the vehicle is empty.

* * * * *

(3) The structure of the rear-end protection device and its attachment to the vehicle must be designed to satisfy the conditions specified in paragraph (d)(1) of this section when subjected to an impact of the cargo tank motor vehicle at rated payload, at a deceleration of 2 "g". The design stress level may be no more than one-half the ultimate strength of the materials used. Such impact must be considered uniformally and applied horizontally (parellel to the ground) from any direction at an angle not to exceed 30 degrees to the longitudinal axis of the vehicle.

78. In § 178.345–9, as added at 54 FR 25025, on June 12, 1989, paragraphs (c)–(g) are redesignated as paragraphs (d)–(h) respectively, a new paragraphs (c) is added, and paragraphs (a), (b), and newly designated paragraphs (d) and (h) are revised to read as follows:

§ 178.345–9 Pumps, piping, hoses and connections.

(a) Each loading or unloading pump mounted on a cargo tank motor vehicle that may pressurize the cargo tank must be provided with an automatic means to prevent internal pressure from exceeding the MAWP of the tank and tank-mounted equipment.

(b) Each hose, piping, stop-valve, lading retention fitting and closure must be designed for a bursting pressure of the greater of 100 psig or four times the MAWP.

(c) Each hose coupling must be designed for a bursting pressure of the greater of 120 psig or 4.8 times the MAWP of the cargo tank, and must be designed so that there will be no leakage when connected.

(d) Suitable provision must be made to allow for and prevent damage due to expansion, contraction, jarring, and vibration. Slip joints may not be used for this purpose in the lading retention system.

* * * * *

(h) Use of a nonmetallic pipe, valve or connection that is not as strong and heat resistant as the tank material is authorized only if such attachment is located outboard of the lading retention system.

79. In § 178.345–10, as added at 54 FR 25025, on June 12, 1989, the table heading in paragraph (e) introductory text is amended by removing the designation "Table 1." and adding, in its place, "Table I"; paragraphs (a), (b)(2), (b)(3), (b)(4), (c), (d), (e)

introductory text, (g)(1), and (h)(3) are revised to read as follows:

§ 178.345-10 Pressure relief.

(a) Each cargo tank must be equipped to relieve pressure and vacuum conditions in conformance with this section and the applicable individual specification. The pressure and vacuum relief system must be designed to operate and have sufficient capacity to prevent tank rupture or collapse due to over-pressurization or vacuum resulting from loading, unloading, or from heating and cooling of lading.

(b) * * *

(2) When provided by § 173.33(c)(1)(iii) of this subchapter, cargo tanks may be equipped with a normal vent. Such vents must be set to open at not less than 1 psig and must be designed to prevent loss of lading through the device in case of vehicle overturn.

(3) Each pressure relief system must be designed to prevent loss of liquid lading due to pressure surges caused by overturn or other accident. This requirement is satisfied by a pressure relief system designed to withstand with no loss of lading a dynamic pressure surge reaching 30 psig above the designed set pressure of the relief system and sustained above the set pressure for at least 60 milliseconds. Set pressure is a function of MAWP as set forth in paragraph (d) of this section.

(i) After August 31, 1992, each pressure actuated relief valve which is unseated by a dynamic pressure surge described in paragraph (a)(3) of this section must reseat to a leak-tight condition.

(A) This capability must be demonstrated by tests which subject pressure actuated relief valves to a dynamic pressure surge reaching 30 psig above the designed set pressure of the valve and sustained above the set pressure for at least 60 milliseconds. One approach to such a test procedure is outlined in TTMA RP No. 81— "Performance of Spring-Loaded Pressure Relief Valves on MC 306, MC 307, and MC 312 Tanks."

(B) The total volume of liquid released during the test may not exceed one gallon.

(ii) After August 31, 1995, each pressure relief system must be able to withstand the dynamic pressure surge described in paragraph (a)(3) of this section with no loss of lading. This requirement must be met regardless of vehicle orientation.

(4) Each reclosing pressure relief valve must be constructed and installed in such a manner as to prevent unauthorized adjustment of the relief valve setting.

* * * * *

(c) *Location of relief devices.* Each pressure relief device must communicate with the vapor space above the lading as near as practicable to the center of the vapor space. For example, on a tank designed to operate in a level attitude, the device should be positioned at the horizontal and transverse center of the tank; on tanks sloped to the rear, the device should be located in the forward half of the tank. The discharge from any device must be unrestricted. Protective devices which deflect the flow of vapor are permissible provided the required vent capacity is maintained.

(d) *Settings of pressure relief system.* The set pressure of the pressure relief system is the pressure at which it starts to open, allowing discharge.

(1) *Primary pressure relief system.* The set pressure of each primary relief valve must be no less than 120 percent of the MAWP, and no more than 132 percent of the MAWP. The valve must reclose at not less than 108 percent of the MAWP and remain closed at lower pressures.

(2) *Secondary pressure relief system.* The set pressure of each pressure relief valve used as a secondary relief device must be not less than 120 percent of the MAWP.

(e) *Venting capacity of pressure relief systems.* The pressure relief system (primary and secondary, including piping) must have sufficient venting capacity to limit the tank internal pressure to not more than the tank test pressure. The total venting capacity, rated at not more than the tank test pressure, must be at least that specified in Table I, except as provided in § 178.348-10(d).

* * * * *

(g) * * *

(1) At least 3 devices of each specific model must be tested for flow capacity at a pressure not greater than the test pressure of the cargo tank. For a device model to be certified, the capacities of the devices tested must fall within a range of plus or minus 5 percent of the average for the devices tested.

* * * * *

(h) * * *

(3) Set pressure, in psig; and

* * * * *

80. Section 178.345-11, as added at 54 FR 25026, on June 12, 1989, is revised to read as follows:

§ 178.345-11 Tank outlets.

(a) Each tank outlet that may contain lading in any tank attitude must be equipped with a stop-value or other leak-tight closure in accordance with this section. Tank outlets, closures and associated piping must be protected in accordance with § 178.345-8.

(b) A self-closing system must be provided to close loading/unloading outlets within 30 seconds of actuation. The self-closing system must consist of an internal self-closing stop-valve (with remote linkage and actuators) or external stop-valve (with energy source, remote linkage and actuator). In addition, the self-closing system must be designed according to the following:

(1) If the actuating system is damaged or sheared-off in an accident during transportation, each loading/unloading outlet must remain securely closed and capable of retaining lading.

(2) Any loading/unloading connection extending beyond an internal self-closing stop-valve or the innermost external stop-valve which is part of a self-closing system must be fitted with another stop-valve or other leak-tight closure at the end of such connection.

(3) It must be fitted with a remotely actuated means of closure located more than 10 feet from the loading/unloading connection where vehicle length allows, or on the end of the cargo tank farthest away from the loading/unloading connection. If a cable linkage is used, it must be corrosion resistant and effective in all types of environment and weather. In addition:

(i) When required by part 173 for materials that are flammable, pyrophoric, oxidizing or Poison B liquids, the remote means of closure must be activated by manual, mechanical, or thermal means. A thermally activated system must engage at a temperature not over 250° F. The means by which the system is thermally activated for closure must be located as close as practicable to the loading/unloading connection.

(ii) Cargo tanks intended exclusively for lading other than those specified in paragraph (b)(4)(i) of this section do not require thermally activated self-closing systems and may be activated by manual or mechanical means only.

81. Section 178.345-12 as added at 54 FR 25026, on June 12, 1989, is revised to read as follows:

§ 178.345-12 Gauging devices.

Each cargo tank, except a tank intended to be filled by weight, must be equipped with a gauging device that indicates the maximum permitted liquid level to within 0.5 percent of the nominal capacity as measured by volume or liquid level. Gauge glasses are not permitted.

82. In § 178.345–13, as added at 54 FR 25026, on June 12, 1989, paragraph (b)(2) is revised to read as follows:

§ 178.345–13 Pressure and leakage tests.

* * * * *

(b) * * *

(2) *Pneumatic method.* A pneumatic test may be used in place of the hydrostatic test. However, pneumatic pressure testing may involve higher risk than hydrostatic testing. Therefore, suitable safeguards must be provided to protect personnel and facilities should failure occur during the test. The tank must be pressurized with air or an inert gas. Test pressure must be reached gradually by increasing the pressure to one half of test pressure. Thereafter, the pressure must be increased in steps of approximately one tenth of the test pressure until test pressure is reached. Test pressure must be held for at least 5 minutes. The pressure must then be reduced to the inspection pressure which must be maintained while the entire cargo tank surface is inspected for leakage and other sign of defects. The inspection method must consist of coating all joints and fittings with a solution of soap and water or other equally sensitive method.

* * * * *

83. In § 178.345–14 as added at 54 FR 25027, on June 12, 1989, paragraph (e)(1) is amended by removing the entry "Fusible type _____" under the heading "Pressure relief devices", and paragraphs (b) introductory text, (b)(3), (b)(7)–(b)(15), (c)(1), (c)(2), (c)(8), and (d) are revised to read as follows:

§ 178.345–14 Marking.

* * * * *

(b) *Nameplate.* Each cargo tank must have a corrosion resistant nameplate permanently attached to it. The following information, in addition to any applicable information required by the ASME Code, must be marked on the tank nameplate (parenthetical abbreviations may be used):

* * * * *

(3) Tank (MAWP) in psig.

* * * * *

(7) Maximum design density of lading (Max. lading density), in pounds per gallon.

(8) Material specification number—shell (Shell matl, yyy***), where "yyy" is replaced by the alloy designation and "***" by the alloy type.

(9) Material specification number—heads (Head matl, yyy***), where "yyy" is replaced by the alloy designation and "***" by the alloy type.

Note.—When the shell and heads materials are the same thickness, they may be combined. (Shell&head matl, yyy*).**

(10) Weld material (Weld matl.).

(11) Minimum thickness—shell (Min. shell-thick), in inches. When minimum shell thicknesses is not the same for different areas, show (top ___, side ___, bottom ___, in inches).

(12) Minimum thickness—heads (Min. heads thick.), in inches.

(13) Manufactured thickness—shell (Mfd. shell thick.), top ___, side ___, bottom ___, in inches. (Required when additional thickness is provided for corrosion allowance.)

(14) Manufactured thickness—heads (Mfd. heads thick.), in inches. (Required when additional thickness is provided for corrosion allowance.)

(15) Exposed surface area, in square feet

(c) * * *

(1) Cargo tank motor vehicle manufacturer (CTMV mfr.).

(2) Cargo tank motor vehicle certification date (CTMV cert. date), if different from the cargo tank certification date.

* * * * *

(8) Lining material (Lining), if applicable.

* * * * *

(d) *Multi-cargo tank cargo tank motor vehicle.* For a cargo tank motor vehicle having one cargo tank or having all its cargo tanks not separated by any void, the information required by paragraphs (b) and (c) of this section may be combined on one specification plate. When separated by a void, each cargo tank must have an individual nameplate as required in paragraph (b) of this section, unless all of the cargo tanks are identical. The cargo tank motor vehicle may have a combined nameplate and specification plate. When only one plate is used, the plate must be visible and not covered by insulation and the required information must be listed on the plate from front to rear in the order of the corresponding cargo tank location.

* * * * *

84. Section 178.345–15, as added at 54 FR 25028, on June 12, 1989, is revised to read as follows:

§ 178.345–15 Certification.

(a) At or before the time of delivery, the manufacturer of a cargo tank motor vehicle must provide certification documents to the owner of the cargo tank motor vehicle. The registration numbers of the manufacturer, the Design Certifying Engineer, and the Registered Inspector, as appropriate, must appear on the certificates (see subpart F, part 107 in subchapter B of this chapter).

(b) The manufacturer of a cargo tank motor vehicle made to any of these specifications must provide:

(1) For each design type, a certificate signed by a responsible official of the manufacturer and a Design Certifying Engineer certifying that the cargo tank motor vehicle design meets the applicable specification; and

(2) For each cargo tank motor vehicle, a certificate signed by a responsible official of the manufacturer and a Registered Inspector certifying that the cargo tank motor vehicle is constructed, tested and completed in conformance with the applicable specification.

(c) The manufacturer of a variable specification cargo tank motor vehicle must provide:

(1) For each design type, a certificate signed by a responsible official of the manufacturer and a Design Certifying Engineer certifying that the cargo tank motor vehicle design meets the applicable specifications; and

(2) For each variable specification cargo tank motor vehicle, a certificate signed by a responsible official of the manufacturer and a Registered Inspector certifying that the cargo tank motor vehicle is constructed, tested and completed in conformance with the applicable specifications. The certificate must include all the information required and marked on the variable specification plate.

(d) In the case of a cargo tank motor vehicle manufactured in two or more stages, each manufacturer who performs a manufacturing operation on the incomplete vehicle or portion thereof shall provide to the succeeding manufacturer, at or before the time of delivery, a certificate covering the particular operation performed by that manufacturer, including any certificates received from previous manufacturers, Registered Inspectors, and Design Certifying Engineers. Each certificate must indicate the portion of the complete cargo tank motor vehicle represented thereby, such as basic tank fabrication, insulation, jacket, lining, or piping. The final manufacturer shall provide all applicable certificates to the owner.

85. In § 178.346, as added at 54 FR 25028, on June 12, 1989, paragraphs (d)(3) and (d)(8) are revised to read as follows:

§ 178.346 Specification DOT 406; cargo tank motor vehicle.

§ 178.346–1 General requirements.

* * * * *

(d) * * *

(3) The knuckle radius of flanged heads must be at least three times the material thickness, and in no case less than 0.5 inch. Stuffed (inserted) heads may be attached to the shell by a fillet

weld. The knuckle radius and dish radius versus diameter limitations of UG-32 do not apply. Shell sections of cargo tanks designed with a non-circular cross section need not be given a preliminary curvature, as prescribed in UG-79(b).

* * * * *

(8) The following paragraphs in Parts UG and UW of the ASME Code, Section VIII, Division I do not apply: UG-11, UG-12, UG-22(g), UG-32(e), UG-34, UG-35, UG-44, UG-76, UG-77, UG-80, UG-81, UG-96, UG-97, and UW-13.1(f).

86. In § 178.346-2, as added at 54 FR 25028, on June 12, 1989, paragraph (a) Table I is amended by removing the column heading "Over 14 to 22" and adding, in its place, "Over 14 to 23", and by removing the column heading "23 and over" and adding, in its place, "Over 23"; and by revising Table I heading to read as follows:

§ 178.346-2 Material and thickness of material.

(a) * * *

TABLE I.—MINIMUM THICKNESS OF HEADS (OR BULKHEADS AND BAFFLES WHEN USED AS TANK REINFORCEMENT) USING MILD STEEL (MS), HIGH STRENGTH LOW ALLOY STEEL (HSLA), AUSTENITIC STAINLESS STEEL (SS) OR ALUMINUM (AL)—EXPRESSED IN DECIMALS OF AN INCH AFTER FORMING

* * * * *

87. In § 178.346-10, as added at 54 FR 25029, on June 12, 1989, paragraphs (b)(2), (c) and (d) are revised to read as follows:

§ 178.346-10 Pressure relief.

* * * * *

(b) * * *

(2) When intended for use only for lading meeting the requirements of § 173.33(c)(1)(iii) of this subchapter, the cargo tank may be equipped with a normal vent. Such vents must be set to open at not less than 1 psig and must be designed to prevent loss of lading through the device in case of vehicle upset.

(c) *Pressure settings of relief valves.*

(1) Notwithstanding the requirements in § 178.345-10, the set pressure of each primary relief valve must be not less than 125 percent of the MAWP or 3.3 psig, whichever is greater, and not more than 138 percent of the MAWP. The valve must close at no less than the MAWP and remain closed at lower pressures.

(2) Each vacuum relief device must be set to open at no more than 8 ounces vacuum.

(d) *Venting capacities.* (1) In addition to the requirements in § 178.345-10(e), the primary pressure relief valve must have a venting capacity of at least 6,000 SCFH of free air, rated at not greater than the tank test pressure.

(2) Each vacuum relief system must have sufficient capacity to limit the vacuum to 1 psig.

(3) If pressure loading or unloading devices are provided, the relief system must have adequate vapor and liquid capacity to limit the tank pressure to the cargo tank test pressure at maximum loading or unloading rate. The maximum loading and unloading rates must be included on the metal specification plate.

88. In § 178.346-13, as added at 54 FR 25029, on June 12, 1989, paragraph (c) is revised to read as follows:

§ 178.346-13 Pressure and leakage tests.

* * * * *

(c) *Leakage test.* (1) Any venting device set to discharge at less than the leakage test pressure must be removed or rendered inoperative during the leak test.

(2) Where applicable, the Environmental Protection Agency's "Method 27—Determination of Vapor Tightness of Gasoline Delivery Tank Using Pressure—Vacuum Test," as set forth in 40 CFR part 60, appendix A, is an acceptable alternate leakage test.

89. In § 178.347, as added at 54 FR 25029, on June 12, 1989, paragraphs (d) introductory text, (d)(3) and (d)(8) are revised to read as follows:

§ 178.347 Specification DOT 407; cargo tank motor vehicle.

* * * * *

(d) Each cargo tank built to this specification with MAWP of 35 psig or less must be "constructed in accordance with the ASME Code" except as modified herein:

* * * * *

(3) The knuckle radius of flanged heads must be at least three times the material thickness, and in no case less than 0.5 inch. Stuffed (inserted) heads may be attached to the shell by a fillet weld. The knuckle radius and dish radius versus diameter limitations of UG-32 do not apply for cargo tank motor vehicles with a MAWP of 35 psig or less.

* * * * *

(8) The following paragraphs in Parts UG and UW of the ASME Code, Section VIII, Division I do not apply: UG-11, UG-12, UG-22(g), UG-32(e), UG-34, UG-35, UG-44, UG-76, UG-77, UG-80, UG-81, UG-96, UG-97, and UW-13.1(f).

90. In § 178.347-2, as added at 54 FR 25030, on June 12, 1989, paragraph (a) Table I and II headings are revised to read as follows:

§ 178.347-2 Material and thickness of material.

(a) * * *

TABLE I.—MINIMUM THICKNESS OF HEADS (OR BULKHEADS AND BAFFLES WHEN USED AS TANK REINFORCEMENT) USING MILD STEEL (MS), HIGH STRENGTH LOW ALLOY STEEL (HSLA), AUSTENITIC STAINLESS STEEL (SS) OR ALUMINUM (AL)—EXPRESSED IN DECIMALS OF AN INCH AFTER FORMING

* * * * *

TABLE II.—MINIMUM THICKNESS OF SHELL USING MILD STEEL (MS), HIGH STRENGTH LOW ALLOY STEEL (HSLA), AUSTENITIC STAINLESS STEEL (SS) OR ALUMINUM (AL)—EXPRESSED IN DECIMALS OF AN INCH AFTER FORMING

* * * * *

91. In § 178.347-10, as added at 54 FR 25030, on June 12, 1989, paragraph (a) is amended by revising the reference "§ 178.340-10" to read "§ 178.345-10", and paragraphs (b) and (d) are revised to read as follows:

§ 178.347-10 Pressure relief.

* * * * *

(b) *Type and Construction.* Vacuum relief devices are not required for cargo tanks designed to be loaded by vacuum or built to withstand full vacuum.

* * * * *

(d) *Venting capacities.* (1) The vacuum relief system must limit the vacuum to less than 80 percent of the design vacuum capability of the cargo tank.

(2) If pressure loading or unloading devices are provided, the relief system must have adequate vapor and liquid capacity to limit the tank pressure to the cargo tank test pressure at maximum loading or unloading rate. The maximum loading or unloading rate must be included on the metal specification plate.

* * * * *

92. In § 178.348-1, as added at 54 FR 25031, on June 12, 1989, paragraphs (d),

(e)(1), (e)(2) introductory text, (e)(2)(iii) and (viii) are revised to read as follows:

§ 178.348–1 General requirements.

* * * * *

(d) Each cargo tank having a MAWP greater than 15 psig must be of circular cross-section.

(e) * * *

(1) MAWP greater than 15 psig must be "constructed and certified in conformance with the ASME Code"; or

(2) MAWP of 15 psig or less must be "constructed in accordance with the ASME Code," except as modified herein:

* * * * *

(iii) The knuckle radius of flanged heads must be at least three times the material thickness, and in no case less than 0.5 inch. Stuffed (inserted) heads may be attached to the shell by a fillet weld. The knuckle radius and dish radius versus diameter limitations of UG–32 do not apply for cargo tank motor vehicles with a MAWP of 15 psig or less. Shell sections of cargo tanks designed with a non-circular cross section need not be given a preliminary curvature, as prescribed in UG–79(b).

* * * * *

(viii) The following paragraphs in Parts UG and UW of the ASME Code, Section VIII, Division I do not apply: UG–11, UG–12, UG–22(g), UG–32(e), UG–34, UG–35, UG–44, UG–76, UG–77, UG–80, UG–81, UG–86, UG–97, and UW–13.1(f).

93. In § 178.348–2, as added at 54 FR 25031, on June 12, 1989, paragraph (a), in Table I, under the column "Volume capacity (gallons per inch)", the third entry is revised to read: "Thickness (inch), aluminum"; under the column "10 or less", the entry "Over 16 to 26 lbs" is revised to read "Over 16 lbs"; the Note following Table II is removed, and Table I and II headings are revised to read as follows:

§ 178.348–2 Material and thickness of material.

* * * * *

TABLE I.—MINIMUM THICKNESS OF HEADS (OR BULKHEADS AND BAFFLES WHEN USED AS TANK REINFORCEMENT) USING MILD STEEL (MS), HIGH STRENGTH LOW ALLOY STEEL (HSLA), AUSTENITIC STAINLESS STEEL (SS) OR ALUMINUM (AL)—EXPRESSED IN DECIMALS OF AN INCH AFTER FORMING

* * * * *

TABLE II.—MINIMUM THICKNESS OF SHELL USING MILD STEEL (MS), HIGH STRENGTH LO ALLOY STEEL (HSLA) OR AUSTENITIC STAINLESS STEEL (SS) OR ALUMINUM (AL)—EXPRESSED IN DECIMALS OF AN INCH AFTER FORMING

* * * * *

94. Section 178.348–9, as added at 54 FR 25032, or June 12, 1989, is revised to read as follows:

§ 178.348–9 Pumps, piping, hoses and connections.

Each pump and all piping, hoses and connections on each cargo tank motor vehicle must conform to § 178.345–9, except that the use of nonmetallic pipes, valves, or connections are authorized on DOT 412 cargo tanks.

95. In § 178.348–10, as added at 54 FR 25032, on June 12, 1989, paragraph (a) is amended by revising the reference "§ 178.340–10" to read "§ 178.345–10"; and paragraphs (b) and (d)(3) are revised to read as follows:

§ 178.348–10 Pressure relief.

* * * * *

(b) *Type and construction.* Vacuum relief devices are not required for cargo tanks designed to be loaded by vacuum or built to withstand full vacuum.

* * * * *

(d) * * *

(3) Cargo tanks used in dedicated service for materials classed as corrosive material, with no secondary hazard, may have a total venting capacity which is less than required by § 178.345–10(e). The minimum total venting capacity for these cargo tanks must be determined in accordance with the formula contained in § 178.270–11(d)(3). Use of the approximate values given for the formula in § 178.270–11(d)(3) is acceptable as this will provide a great vent capacity requirement.

PART 180—CONTINUING QUALIFICATION AND MAINTENANCE OF PACKAGINGS

96. The authority citation for part 180 is revised to read as follows:

Authority: 49 U.S.C. App. 1803; 49 CFR part 1.

§ 180.401 [Amended]

97. Section 180.401, as added at 54 FR 25033, on June 12, 1989, is amended by adding "107," immediately preceding "171".

98. In § 180.403, as added at 25033, on June 12, 1989, a definition for "Corrosive to the tank/valve" is added alphabetically and definitions for "Modification," "Owner," and "Repair" are revised to read as follows:

§ 180.403 Definitions.

* * * * *

Corrosive to the tank/valve means a lading meets the criteria for corrosivity specified in § 173.240 of this subchapter, for the material of construction of the tank or valve; or the lading has been shown through experience to be corrosive to the tank or valve.

* * * * *

Modification means any change to the original design and construction of a cargo tank or a cargo tank motor vehicle which affects its structural integrity or lading retention capability. Excluded from this category are the following:

(1) A change to motor vehicle equipment such as lights, truck or tractor power train components, steering and brake systems, and suspension parts, and changes to appurtenances, such as fender attachments, lighting brackets, ladder brackets; and

(2) Replacement of components such as valves, vents, and fittings with a component of a similar design and of the same size.

Owner means the person who owns a cargo tank motor vehicle used for the transportation of hazardous materials, or that person's authorized agent.

* * * * *

Repair means any welding on a cargo tank wall done to return a cargo tank or a cargo tank motor vehicle to its original design and construction specification, or to a condition prescribed for a later equivalent specification in effect at the time of the repair. Excluded from this category are the following:

(1) A change to motor vehicle equipment such as lights, truck or tractor power train components, steering and brake systems, and suspension parts, and changes to appurtenances, such as fender attachments, lighting brackets, ladder brackets; and

(2) Replacement of components such as valves, vents, and fittings with a component of a similar design and of the same size.

(3) Replacement of an appurtenance by welding to a mounting pad.

* * * * *

99. In § 180.405, as added at 54 FR 25033, on June 12, 1989, paragraph (c)(2)(iii) is amended by removing the words "MC 304 or cargo" and adding, in their place, the words "MC 304 cargo"; the last sentence in paragraph (e), and paragraphs (h), (f) introductory text, (f)(1)(ii) introductory text, (f)(2), (f)(4),

(g)(1), (g)(2), (h), and (k) introductory text are revised to read as follows:

§ 180.405 Qualification of cargo tanks.

* * * * *

(b) *Cargo tank specifications.* To qualify as an authorized packaging, each cargo tank must conform to this subpart, the applicable requirements specified in part 173 of this subchapter for the specific lading and, *where a DOT specification cargo tank is required,* an applicable specification in effect on the date the initial construction began: MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, MC 312, MC 330, MC 331, MC 338, DOT 406, DOT 407, or DOT 412 (§ 178.337, § 178.338, § 178.345, § 178.346, § 178.347, § 178.348 of this subchapter). However, construction of MC 306, MC 307, or MC 312 cargo tanks meeting the requirements of the applicable specification in effect on December 30, 1990, is authorized until August 31, 1993.

* * * * *

(e) * * * During the period the cargo tank is in service, the owner of a cargo tank that is remarked in this manner must retain at the owner's principal place of business a copy of the last exemption in effect.

(f) *MC 306, MC 307, MC 312 cargo tanks.* Either a Registered Inspector or a Design Certifying Engineer and the owner of a MC 306, MC 307 or MC 312 cargo tank motor vehicle constructed in accordance with and used under an exemption issued before December 31, 1990, that authorizes a condition specified in this paragraph shall examine the cargo tank motor vehicle and its design to determine if it meets the requirements of the applicable MC 306, MC 307 or MC 312 specification in effect at the time of manufacture, except as specified herein.

* * * * *

(1) * * *

(ii) An outlet equipped with a self-closing system which includes an external stop-valve must have the stop valve and associated piping protected within the vehicle's rear-end tank protection device, vehicle frame or an equally adequate accident damage protection device (See § 178.345–8 of this subchapter.) The self-closing system (See § 178.345–11 of this subchapter) must be equipped with a remotely actuated means of closure as follows:

* * * * *

(2) A vacuum-loaded cargo tank constructed after August 1, 1981, or the date specified in the applicable exemption, in conformance with paragraph (f)(1) of this section, except that an outlet is equipped with an external valve which is not part of a self-closing system:

(i) Must be equipped with a self-closing system prior to September 1, 1993.

(ii) May be remarked and certified in accordance with paragraphs (f)(5) and (6) of this section after the cargo tank motor vehicle has been equipped with the self-closing system.

* * * * *

(4) A vacuum-loaded cargo tank constructed prior to August 1, 1981, in conformance with paragraph (f)(1) of this section, except for paragraph (f)(1)(i) of this section, and an outlet is equipped with an external valve which is not part of a self-closing system:

(i) Must be equipped with a self-closing system prior to September 1, 1993.

(ii) May be remarked and certified in accordance with paragraphs (f)(5) and (6) of this section after the cargo tank motor vehicle has been equipped with the self-closing system.

* * * * *

(g) * * *

(1) On or before August 31, 1995, each owner of a cargo tank manufactured prior to December 31, 1990, authorized for the transportation of a hazardous material, must have the cargo tank equipped with manhole assemblies conforming with 49 CFR 178.345–5 except for the marking requirements in 49 CFR 178.345–5(e) and the hydrostatic testing requirement in 178.345–5(b) of this subchapter. Manhole assemblies installed on an MC 300, MC 301, MC 302, MC 303, MC 305, MC 306, MC 310, MC 311 or MC 312 cargo tank prior to December 31, 1990, which are marked or certified in writing as conforming to TTMA RP No. 61 may be considered to be in compliance with this paragraph. Any manhole assembly installed on a cargo tank after December 30, 1990 must meet the requirements in 49 CFR 178.345–5.

(2) The owner of an MC 300, MC 301, MC 302, MC 303, MC 305, MC 306, MC 310, MC 311, or MC 312 cargo tank manufactured prior to December 31, 1990, which is equipped with a manhole assembly or assemblies manufactured prior to December 31, 1990, which are not certified in conformance with TTMA RP No. 61 may have them certified in accordance with the Recommended Practice by the manufacturer of the manhole closure. Those manhole closures which the manufacturer cannot indentify and certify, or for which the manufacturer cannot be identified, may be tested and certified in accordance with TTMA TB No. 107. These certifications must be performed on or before August 31, 1995.

* * * * *

(h) *Pressure Relief System.* Properly functioning reclosing pressure relief valves and frangible or fusible vents need not be replaced. However, replacement is authorized on DOT MC-specification cargo tanks as provided in paragraph (c)(2) of this section. Reclosing pressure relief valves which are replaced for any reason must meet the following requirements:

(1) After August 31, 1992, replacements for any reclosing pressure relief valve must be capable of reseating to a leak-tight condition after a pressure surge, and the volume of lading released may not exceed one gallon. Specific performance requirements for these pressure relief valves are set forth in § 178.345–10(b)(3)(i) of this subchapter. This requirement applies to DOT 406, DOT 407 and DOT 412 cargo tank motor vehicles and to all DOT MC-specification cargo tanks except MC 330, MC 331 and MC 338; and

(2) After August 31, 1995, any reclosing pressure relief valve installed on any DOT 406, DOT 407 or DOT 412 cargo tank motor vehicle, either on new units or as replacements, must withstand pressure surges with no loss of lading regardless of vehicle orientation. Specific performance requirements for these pressure relief valves are set forth in § 178.345–10(b)(3)(ii) of this subchapter.

* * * * *

(k) *DOT specification cargo tank with no marked design pressure or a marked design pressure of less than 3 psig.* The owner of an MC 300, MC 301, MC 302, MC 303, MC 305, MC 306 or MC 312 cargo tank, which has a pressure relief system set at 3 psig, may mark or remark the cargo tank with an MAWP or design pressure of not greater than 3 psig.

* * * * *

100. In § 180.407, as added at 25035, on June 12, 1989, the section heading is revised, paragraphs (a)(4) and (a)(5) are redesignated as paragraphs (a)(5) and (a)(6) respectively, paragraph (e)(3) is removed and paragraphs (e)(4) through (e)(6) are redesignated as paragraphs (e)(3) through (e)(5) respectively, paragraphs (g)(1)(iii)–(viii) are redesignated as paragraphs (g)(1)(iv)–(ix) respectively; new paragraphs (a)(4), (d)(2)(ix), (f)(3), (f)(4) and (g)(1)(iii) are added; and paragraphs (b) introductory text, (b)(3), (c), (d)(1), (d)(2)(v)–(viii), (d)(3), (d)(4), (e)(2)(ii), (e)(3), (f)(1)(ii), (g)(5)(ii), (g)(6), (h)(1), (h)(3), (i) and

newly designated paragraphs (e)(3), and (g)(1)(ix) are revised, to read as follows:

§ 180.407 Requirements for test and inspection of specification cargo tanks.

(a) * * *

(4) Each cargo tank must be evaluated in accordance with the acceptable results of tests and inspections prescribed in § 180.411.

* * * * *

(b) *Conditions requiring test and inspection of cargo tanks.* Without regard to any other test or inspection requirements, a specification cargo tank must be tested and inspected in accordance with this section prior to further use if:

* * * * *

(3) The cargo tank has been out of hazardous materials transportation service for a period of one year or more. Each cargo tank that has been out of hazardous materials transportation service for a period of one year or more must be pressure tested in accordance with § 180.407(g) prior to further use.

(c) *Periodic test and inspection.* Each specification cargo tank must be tested and inspected as specified in the following table by an inspector meeting the qualifications in § 180.409.

COMPLIANCE DATES—INSPECTIONS AND RETESTS UNDER § 180.407(C)

Test or inspection (cargo tank specification, configuration, and service)	Date by which first test must be completed (see note 1)	Interval period after first test
External Visual Inspection:		
All cargo tanks designed to be loaded by vacuum with full opening rear heads	September 1, 1991	6 months.
All other cargo tanks	September 1, 1991	1 year.
Internal Visual Inspection:		
All insulated cargo tanks, except MC 330, MC 331, MC 338	September 1, 1991	1 year.
All cargo tanks transporting lading corrosive to the tank	September 1, 1991	1 year.
All other cargo tanks, except MC 338	September 1, 1995	5 years.
Lining Inspection:		
All lined cargo tanks transporting lading corrosive to the tank	September 1, 1991	1 year.
Leakage Test:		
All cargo tanks except MC 338	September 1, 1991	1 year.
Pressure Retest:		
(Hydrostatic or pneumatic) (See Notes 2 and 3)		
All cargo tanks which are insulated with no manhole or insulated and lined, except MC 338.	September 1, 1991	1 year.
All cargo tanks designed to be loaded by vacuum with full opening rear heads	September 1, 1992	2 years.
MC 330 and MC 331 cargo tanks in chlorine service	September 1, 1992	2 years.
All other cargo tanks	September 1, 1995	5 years.
Thickness Test:		
All unlined cargo tanks in corrosive service, except MC 338	September 1, 1992	2 years.

Note 1: If a cargo tank is subject to an applicable inspection or test requirement under the regulations in effect on December 30, 1990, and the due date (as specified by a requirement in effect on December 30, 1990) for completing the required inspection or test occurs before the compliance date listed in Table I, the earlier date applies.

Note 2: Pressure testing is not required for MC 330 and MC 331 cargo tanks in dedicated sodium metal service.

Note 3: Pressure testing is not required for uninsulated lined cargo tanks, with a design pressure or MAWP 15 psig or less, which receive an external visual inspection and lining inspection at least once each year.

(d) * * *

(1) Where insulation precludes external visual inspection, the cargo tank must be given a visual internal inspection in accordance with § 180.407(e). The tank must be hydrostatically or pneumatically tested in accordance with § 180.407(c) and (g) where:

(i) Visual inspection is precluded by both internal coating and external insulation, or

(ii) Visual inspection is precluded by external insulation, and the cargo tank is not equipped with a manhole or inspection opening.

(2) * * *

(v) Missing bolts, nuts and fusible links or elements must be replaced, and loose bolts and nuts must be tightened;

(vi) All markings on the cargo tank required by parts 178 and 180 must be legible;

(vii) The cargo tank motor vehicle must conform to parts 393 and 396 of this title (the Federal Motor Carrier Safety Regulations) and, where appropriate, part 571 of this title (the Federal Motor Vehicle Safety Standards);

(viii) All major appurtenances and structural attachments on the cargo tank including, but not limited to, suspension system attachments, connecting structures, and those elements of the upper coupler (fifth wheel) assembly that can be inspected without dismantling the upper coupler (fifth wheel) assembly must be inspected for any corrosion or damage which might prevent safe operation.

(ix) For cargo tanks transporting lading corrosive to the tank, areas covered by the upper coupler (fifth wheel) assembly must be inspected at least once in each two year period for corroded and abraded areas, dents, distortions, defects in welds, and any other condition that might render the tank unsafe for transportation service. The upper coupler (fifth wheel) assembly must be removed from the cargo tank for this inspection.

(3) All reclosing pressure relief valves must be externally inspected for any corrosion or damage which might prevent safe operation. All reclosing pressure relief valves on cargo tanks carrying lading corrosive to the valve must be removed from the cargo tank for inspection and testing. Each reclosing pressure relief valve required to be removed and tested must open at the required set pressure and reseat to a leak-tight condition at 90 percent of the set-to-discharge pressure or the pressure prescribed for the applicable cargo tank specification.

(4) Corroded or abraded areas of the cargo wall must be thickness tested in accordance with the procedures set forth in paragraphs (i)(2), (i)(3), (i)(5) and (i)(6) of this section.

* * * * *

(e) * * *

(2) * * *

(ii) Tank liners must be inspected as specified § 180.407(f).

(3) Corroded or abraded areas of the cargo tank wall must be thickness tested

in accordance with paragraphs (i)(2), (i)(3), (i)(5) and (i)(8) of this section.

* * * * *

(f) * * *

(1) * * *

(ii) The probe must be passed over the surface of the calibration block in a constant uninterrupted manner until the leak is found. The leak is detected when a white or light blue spark forms. (A leak-free lining causes a dark blue or purple spark.) The voltage must be adjusted to the lowest setting that will produce a minimum 0.5 inch spark, measured from the top of the lining to the probe. To assure that the setting on the probe has not changed, the spark tester must be calibrated periodically using the test calibration block and using the same power source, probe and cable length.

* * * * *

(3) Degraded or defective areas of the tank liner must be removed and tank wall below the defect must be inspected. Corroded areas of the tank wall must be thickness tested in accordance with § 180.407(i).

(4) The inspector must record the results of the lining inspection as specified in § 180.417(b).

(g) * * *

(1) * * *

(iii) Except for cargo tanks carrying lading corrosive to the tank, areas covered by the upper coupler (fifth wheel) assembly must be inspected for corroded and abraded areas, dents, distortions, defects in welds, and any other condition that might render the tank unsafe for transportation service. The upper coupler (fifth wheel) assembly must be removed from the cargo tank for this inspection.

* * * * *

(ix) *Pneumatic test method.* Pneumatic testing may involve higher risk than hydrostatic testing. Therefore, suitable safeguards must be provided to protect personnel and facilities should failure occur during the test. The tank must be pressurized with air or an insert gas. The pneumatic test pressure in the tank must be reached by gradually increasing the pressure to one-half of the test pressure. Thereafter, the pressure must be increased in steps of approximately one-tenth of the test pressure until the required test pressure has been reached. The test pressure must be held for at least 5 minutes. The pressure must then be reduced to the MAWP, which must be maintained during the time the entire tank surface is inspected. During the inspection, a suitable method must be used for detecting the existence of leaks. This method must consist either of coating the entire surface of all joints under pressure with a solution of soap and water, or using other equally sensitive methods.

* * * * *

(5) * * *

(ii) Pressure testing is not required for uninsulated lined cargo tanks, with a design pressure or MAWP of 15 psig or less, which receive an external visual inspection and a lining inspection at least once each year.

(6) *Acceptance criteria.* A cargo tank that leaks, fails to retain test pressure or pneumatic inspection pressure, shows distortion, excessive permanent expansion, or other evidence of weakness that might render the cargo tank unsafe for transportation service, may not be returned to service, except as follows: A cargo tank with a heating system which does not hold pressure may remain in service as an unheated cargo tank if:

(i) The heating system remains in place and is structurally sound and no lading may leak into the heating system, and

(ii) The specification plate heating system information is changed to indicate that the cargo tank has no working heating system.

* * * * *

(h) * * *

(1) Each cargo tank must be leak tested in accordance with § 180.407(c). The cargo tank, with all valves and accessories in place and operative, must be tested at not less than 80 percent of the tank design pressure or MAWP, whichever is marked on the certification or specification plate. Any venting device set to discharge at less than the leakage test pressure must be removed or rendered inoperative during the test. The pressure must be maintained for at least 5 minutes. The leakage test must include product piping. MC 330 and MC 331 cargo tanks may be leak tested with the hazardous materials contained in the tank during the test. Suitable safeguards shall be provided to protect employees and other persons should a failure occur. A cargo tank with an MAWP not less than 100 psig, which is in dedicated service or services, may be leakage tested at its normal operating pressure. No cargo tank may be operated at a pressure which is greater than the pressure to which it has been leakage tested within the previous year.

* * * * *

(3) A cargo tank that fails to retain leakage test pressure may not be returned to service as a specification cargo tank, except under conditions specified in § 180.411(d).

* * * * *

(i) *Thickness testing.* (1) The shell and head thickness of all unlined cargo tanks used for the transportation of materials corrosive to the tank must be measured at least once every 2 years, except that cargo tanks measuring less than the sum of the minimum prescribed thickness, plus one-fifth of the original corrosion allowance, must be tested annually.

(2) Measurements must be made using a device capable of accurately measuring thickness to within +/− 0.002 of an inch.

(3) Any person performing thickness testing must be trained in the proper use of the thickness testing device used in accordance with the manufacturer's instruction.

(4) Thickness testing must be performed in the following areas of the cargo tank wall, as a minimum:

(i) Areas of the tank shell and heads and shell and head area around any piping that retains lading;

(ii) Areas of high shell stress such as the bottom center of the tank;

(iii) Areas near openings;

(iv) Areas around weld joints;

(v) Areas around shell reinforcements;

(vi) Areas around appurtenance attachments;

(vii) Areas near upper coupler (fifth wheel) assembly attachments;

(viii) Areas near suspension system attachments and connecting structures; and

(ix) Known thin areas in the tank shell and nominal liquid level lines.

(5) An owner of a cargo tank that no longer conforms with the minimum thickness prescribed for the maximum lading density marked on the specification plate may use the cargo tank to carry lading of lower density under the following conditions:

(i) A Design Certifying Engineer must certify that the cargo tank design and thickness is appropriate for the lower density lading, by issuance of a new manufacturer's certificate and

(ii) The tank's nameplate must be changed to reflect the new service limits (maximum density of lading).

(6) an owner of a cargo tank that no longer conforms with the minimum thickness prescribed for the specification may not return the cargo tank to hazardous materials service. The tank's specification plate must be removed, obliterated or covered in a secure manner.

(7) The inspector must record the results of the thickness test as specified in § 180.417(b).

101. Section 180.409, as added at 54 FR 25038, on June 12, 1989, is revised to read as follows:

§ 180.409 Minimum qualifications for inspectors and testers.

(a) Any person performing or witnessing the inspections and tests specified in § 180.407(c) must—

(1) Be registered with the Department in accordance with part 107, subpart F of this chapter, and

(2) Be familiar with DOT specification cargo tanks and must be trained and experienced in use of the inspection and testing equipment needed.

(b) A motor carrier or cargo tank owner may use an employee who is not a Registered Inspector to perform the pressure testing required by § 180.407(c), if—

(1) the employee is familiar with the cargo tank and is trained and experienced in the use of the inspection and testing equipment used;

(2) the employer submits certification that such employee meets the qualification requirements to the Director, Office of Hazardous Materials Transportation, Attn: (DHM-32), Research and Special Programs Administration, Department of Transportation, 400 Seventh Street, SW, Washington, DC 20590; and

(3) the employer retains a copy of the tester's qualifications with the documents required by § 180.417(b).

105. In § 180.413, as added at 54 FR 20538, on June 12, 1989, paragraph (a) introductory text, the last sentence in paragraph (b)(1)(vi)(A), and paragraphs (b)(5), (c), (d)(1) introductory text, (d)(1)(iii) and (v), and (d)(3) are revised to read as follows:

§ 180.413 Repair, modification, stretching, or rebarrelling of a cargo tank.

(a) For purposes of this section only, "stretching" is not considered a "modification", and "rebarrelling" is not considered a "repair." Any repair, modification, stretching, or rebarrelling of a cargo tank must be performed in conformance with the requirements of this section. Except for work performed on a MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, or MC 312 before January 1, 1992, the repair, modification, stretching, or rebarrelling must be performed by:

* * * * *

(b) * * *

(1) * * *

(vi) * * *

(A) * * * When any repair is made of defects revealed by the wet fluorescent magnetic particle inspection, including those by grinding, the affected area of the cargo tank must again be examined by the wet fluorescent magnetic particle method after hydrostatic testing to assure that all defects have been removed.

* * * * *

(5) Each owner of a cargo tank must retain at its principal place of business all records of repairs or modifications made to each tank during the time the tank is in service and for one year thereafter. Copies of these records may be retained by a motor carrier, who is not the owner, at its principal place of business during the period the tanks is in the carrier's service.

(c) *Maintenance or replacement of piping, valves, hoses or fittings.* In the event of repair, maintenance or replacement, any piping, valve, or fitting must be properly installed in accordance with the provisions of the applicable specification before the cargo tank is returned to hazardous materials service. After maintenance or replacement which does not involve welding on the cargo tank wall, piping, valves and fittings must be leak tested. After repair or replacement of piping, valves or fittings which involves welding on the cargo tank wall, the cargo tank, including the repaired or replaced piping, valve, or fitting must be hydrostatically pressure tested in accordance with the applicable specification. Hoses permanently attached to the cargo tank must be tested either before or after installation.

(d) * * *

(1) All new material and equipment, and equipment affected by the stretching or rebarrelling conform with requirements of the specification in effect at the time of such work. Stretching or rebarrelling must be performed such that the cargo tank, as stretched or rebarrelled, meets the structural integrity requirements (§ 178.337-3, § 178.338-6, or § 178.345-3, as applicable) of the specification in effect at the time of such work, as follows:

* * * * *

(iii) Assure compliance with all applicable Federal Motor Carrier Safety Regulations for any newly installed safety equipment;

* * * * *

(v) Change the existing specification plate to reflect the cargo tank as modified, attach a supplemental specification plate noting appropriate changes that have been made to the cargo tank, or remove the existing specification plate and attach a new specification plate to the cargo tank;

* * * * *

(3) The design of the rebarrelled or stretched cargo tank must be certified by a Design Certifying Engineer registered in accordance with subpart F of part 107. The Design Certifying Engineer must certify that the rebarrelled or stretched cargo tank meets the structural integrity requirements of the applicable specification. The person performing the stretching or rebarrelling and a Registered Inspector must certify that the cargo tank is in accordance with this section and the applicable specification by issuing a supplemental manufacturer's certificate. The registration number of the Registered Inspector must be entered on the certificate.

103. Section 180.415, as added at 54 FR 25039, on June 12, 1989, is revised to read as follows:

§ 189.415 Test and inspection markings.

Each cargo tank successfully completing the test and inspection requirements contained in § 180.407 must be marked as specified in this section. Each cargo tank must be durably and legibly marked, in English, with the test date (month and year) followed by the type of test or inspection. The marking must be in letters and numbers at least 1¼ inches high, on the tank shell near the specification plate, or anywhere on the front head. For a cargo tank motor vehicle composed of multiple cargo tanks constructed to the same specification, which are tested and inspected at the same time, one set of test and inspection markings may be used to satisfy the requirements of this section. For a cargo tank motor vehicle composed of multiple cargo tanks constructed to different specifications, which are tested and inspected at different intervals, the test and inspection markings must appear in the order of the cargo tank's corresponding location, from front to rear. The type of test or inspection may be abbreviated as follows: V for external visual inspection and test; I for internal visual inspection: P for pressure retest: L for lining test, K for leakage test; and T for thickness test. For example, the marking "10-85 P, V, L" would indicate that in October 1985 the cargo tank received and pass the prescribed pressure retest, external visual inspection and test, and the lining inspection.

104. In § 180.417, as added at 54 FR 25039, on June 12, 1989, the first sentence in paragraph (a)(1) is amended by adding the word "specification" immediately preceding the words "cargo tank" each place it appears; the second sentence in paragraph (a)(3)(ii) is amended by removing the words "Authorized Inspector" and adding, in its place, the words "Registered

Inspector"; and paragraphs (b)(1)(vi) and (b)(1)(viii) are revised to read as follows:

§ 180.417 Reporting and record retention requirements.

* * * * *

(b) * * *

(1) * * *

(vi) Name and address of person performing the test, the DOT registration number of the facility or the person performing the test;

* * * * *

(viii) DOT registration number of the inspector, and dated signature of inspector and owner.

* * * * *

Issued in Washington, DC on August 29, 1990 under authority delegated in 49 CFR part 106.

Douglas Ham,

Deputy Administrator, Research and Special Programs Administration.

[FR Doc. 90-20733 Filed 9-31-00; 3:19 pm]

BILLING CODE 4910-60-M