DEPARTMENT OF TRANSPORTATION

Research and Special Programs Administration

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

[Docket Nos. HM-183, 183A; Notice No. 85-4]

Requirements for Cargo Tanks

AGENCY: Materials Transportation Bureau (MTB), Research and Special Programs Administration (DOT).

ACTION: Notice of proposed rulemaking and public hearing.

SUMMARY: MTB proposes to revise and clarify the Hazardous Materials Regulations (HMR) (49 CFR Parts 171–179) pertaining to the manufacture of cargo tanks and the operation, maintenance, repair and requalification of all specification cargo tanks (including specifications not authorized for new construction). This proposal would revise and clarify certain commodity sections in Part 173, organize the cargo tank specifications in Part 178, provide for vacuum-loaded cargo tanks, and establish a new Part 180, Subpart E, containing requirements governing the maintenance, use, inspection, repair, retest and requalification of cargo tanks used to transport hazardous materials.

This action is being taken to correct certain deficiencies in the requirements pertaining to cargo tanks that have been brought to the attention of MTB and the Bureau of Motor Carrier Safety (BMCS), Federal Highway Administration, through research findings, petitions for rulemaking, requests for interpretation of the regulations, and recommendations from other agencies. The intended effect of this action is to enhance the safe transportation of hazardous materials in cargo tanks.

DATES: (1) *Written Comments:* Comments must be submitted on or before February 11, 1986.

(2) *Public briefing.* A public briefing will be held on October 15, 1985, 8:30 a.m. to 1:00 p.m., Rosemont, Illinois.

(3) *Public hearings.* Public hearings will be held on—December 4, 1985, 9:00 a.m. to 5:00 p.m., Burlingame, California; and January 9, 1986, 9:30 a.m. to 5:00 p.m., Washington, D.C.

ADDRESS: The public briefing and hearings will be held at the following locations:

1. October 15, 1985—Hyatt Regency O'Hare (Rosemont B), 9300 West Bryn Mawr Ave., Rosemont, Illinois 60018.

2. December 4, 1985—Days Inn (Bayside I, II, III), 777 Airport Blvd., Burlingame, California 94010.

3. January 9, 1986—U.S. Department of Transportation (Room 2230, Nassif Bldg.), 400 Seventh Street, SW, Washington, DC 20590.

Any person wishing to present an oral statement at the briefing may notify the Dockets Branch no later than October 11, 1985, by telephone. Any person wishing to present an oral statement at a public hearing may notify the Dockets Branch, by telephone or in writing, at least two days in advance of the hearing date. Each request must identify the speaker; organization represented, if any; daytime telephone number; and the anticipated length of the presentation, not to exceed 10 minutes. Written text of oral statements should be presented to the hearing officer prior to the oral presentation. *Written comments* should be submitted to Dockets Branch, Materials Transportation Bureau, Research and Special Programs Administration, U.S. Department of Transportation, Washington, D.C. 20590. Comments should identify the docket and be submitted, if possible, in 5 copies. Persons wishing to receive confirmation of receipt of their comments should include a self-addressed stamped postcard. The Dockets Branch is located in Room 8426 of the Nassif Building, 400 Seventh Street, SW., Washington, DC 20590, Telephone number (202) 426–3148. Office hours are 8:30 a.m. to 5:00 p.m., Monday through Friday.

FOR FURTHER INFORMATION CONTACT: James O'Steen, Jose Pena or Charles Hochman (202) 755–4906, Office hours are 8:00 a.m. to 4:30 p.m., Office of Hazardous Materials Regulation, Materials Transportation Bureau: or Joseph J. Fulnecky (202) 755–1011, Office hours are 7:45 a.m. to 4:15 p.m., Bureau of Motor Carrier Safety, Federal Highway Administration, U.S. Department of Transportation, Washington, DC 20590.

SUPPLEMENTARY INFORMATION: This proposal includes provisions—

1. To require that all manufacturers of cargo tanks hold a current ASME certificate of authorization.

2. To require that each cargo tank designed with an internal design pressure of 15 psig or greater be "constructed and certified in conformance with the ASME Code", and each cargo tank with an internal design pressure less than 15 psig be "constructed in accordance with the ASME Code".

3. To require that all new specification cargo tanks be certified by an Authorized Inspector who is commissioned by the National Board of Boiler and Pressure Vessel Inspectors (National Board).

4. To require that ring stiffeners on a cargo tank be of a design that can be visually inspected.

5. To authorize the use of external self-closing stop valves in place of internal self-closing stop valves in certain circumstances.

6. To require that the strength of connecting structures on a multitank cargo tank be equal to that required of the cargo tank motor vehicle.

7. To specify minimum standards for the strength and size for a manhole on all new cargo tanks.

8. To require retrofit of any manhole closures not conforming to the prescribed strength requirement, within five years from the effective date of the final rule.

9. To specify the accident damage protection required for cargo tank motor vehicles.

10. To specify in Parts 173 and 177 the relationship between the cargo tank and its lading to guide manufacturers and shippers.

11. To clarify that the prescribed minimum thickness for the tank shell and heads excludes materials added for cladding, lining or corrosion allowance.

12. To specify the parameters to be considered in determining the effective stresses on a cargo tank.

13. To clarify that a remote means of closure for all internal or external self-closing stop valves is required.

14. To require that on all cargo tanks constructed after (the effective date of the final rule) all pressure relief devices be reclosing, except a frangible disc may be used in series with a reclosing pressure relief device.

15. To revise the MC 307 and MC 312 cargo tank specifications to provide for the manufacture of vacuum-loaded cargo tanks.

16. To specify a minimum design pressure of 15 psig for Specification MC 312 cargo tanks.

17. To require that all specification cargo tanks be pressure retested.

18. To require that all specification cargo tanks be visually inspected every year.

19. To require that the shell and head of an unlined cargo tank in a service corrosive to tank metal be thickness tested at least once every two years.

20. To specify certain additional safety control measures for a cargo tank used to transport a lading having more than one hazard class.

21. To require that a cargo tank used to transport a poison B material and certain hazardous materials having

multiple hazards have a minimum design pressure of 25 psig.

22. To require that a cargo tank inspector or tester meet certain minimum knowledge and experience qualifications.

23. To require that major repairs on cargo tanks be performed by a facility that is a holder of a ASME U stamp, a National Board R stamp or be witnessed and certified by an Authorized Inspector.

24. To require that an owner of a cargo tank used in the transportation of hazardous materials retain certain records.

I. Background

Cargo tanks are used for the bulk transport by highway of vast quantities of liquid and gaseous hazardous material essential to the support of our Nation's economy. This transportation over our Nation's highways represents a significant potential collective risk to the public and requires a continuing examination of safety control measures to ensure that the risk is minimized.

Each year MTB receives a large number of incident reports on the release of hazardous materials as a result of cargo tank motor vehicle collisions, overturns and loading/unloading accidents. As a result of these reports, BMCS and MTB jointly initiated in 1975 a long term research and development program. The objective of the research has been to evaluate the records of cargo tank accidents, re-examine existing HMR pertaining to cargo tanks, and document typical industry practices with respect to all DOT cargo tank specifications, except the recently adopted MC 338 cryogenic cargo tank. The industry practices portion of the research program included the examination of industry design, fabrication, operation, inspection, maintenance, test, and repair practices and procedures.

The initial focus of the program was on the MC 306 type cargo tank which is the major highway transport vehicle used to transport flammable and combustible liquids, such as gasoline and fuel oils. For the purpose of the research, the MC 306 type cargo tank included the MC 306 and its predecessors, the MC 300, MC 301, MC 302, MC 303, and MC 305 cargo tanks. Research findings showed that the MC 306 type cargo tank is highly susceptible to leakage and presents a substantial fire risk when the tank is involved in overturn accidents. Based on these findings, MTB and BMCS issued an advance notice of proposed rulemaking (ANPRM), which was published in the **Federal Register** under Docket HM-183, on June 28, 1982 (47 FR 27876). In the ANPRM, MTB and BMCS solicited comments on the advisability of revising the HMR covering MC 306 type cargo tanks to reduce the risk of release of lading from the cargo tank in overturn accidents. Comments to Docket HM-183 are included in the subject and the section-by-section discussions herein.

The second cargo tank type studied was the specification MC 331 and its predecessor, the MC 330. The MC 331 type cargo tank is used to transport liquefied gases, such as ammonia (NH_3) and liquefied petroleum gas (LPG). Because of the high pressure integrity required to contain these gases and the high potential risks associated with their release, cargo tanks used to transport these gases are designed, constructed and certified to the American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel Code. The ASME Code prescribes requirements for manufacturer qualification, manufacturing quality control and independent inspection and certification. Research findings confirmed that, while these cargo tanks are for the most part adequately designed and constructed, in some cases they are not being properly maintained and requalified. External corrosion which caused leaks, particularly in hidden areas such as the fifth wheel and stiffening rings, frequently went undetected. A large percentage of the pressure relief valves failed the basic operating tests. The study also found a substantial amount of stress-corrosion cracking, a condition that may severely degrade the integrity of a cargo tank. The regional geographical distribution of cargo tanks showing evidence of stress corrosion cracking suggests that shippers in certain locales are offering hazardous materials for transportation in cargo tanks when those materials are not compatible with the tank material. The research contractor, Dynamics Sciences, Inc., pointed out that such practices were most probably induced by improper quality control procedures for the lading. Additionally, HMR contain no requirement pertaining to the qualification of cargo tank testers and research findings indicate that cargo tank tests are not always being performed by persons who are qualified to perform those functions.

The third group of cargo tanks studied was the MC 307 type cargo tank including its predecessor, the MC 304; and the MC 312 type cargo tank including its predecessors, the MC 310 and MC 311. The MC 307 and MC 312 type cargo tanks are used to transport high vapor pressure flammable liquids, poisonous materials, corrosive materials, and hazardous materials meeting two or more of these hazard classes. The variety of hazardous materials transported in these cargo tanks is substantial. Like the MC 331 type cargo tank, the MC 307 and MC 312 type cargo tanks with higher design pressures are required to conform with the ASME Code. As with the other types of cargo tanks, research findings have shown that poor maintenance, repair and requalification of these cargo tanks are major problems. Corrosion (external and internal) resulting from the road environment, lading spillage and chemical reaction between the lading and the tank materials, is a predominant problem. Another serious problem that has been identified is leakage of lading during loading and unloading operations due to malfunctioning valves.

MTB and BMCS believe these research findings have identified many shortcomings, inconsistencies and ambiguous requirements that currently exist in the cargo tank regulations. These deficiencies have resulted in situations, in which improper procedures have been used (intentionally as well as unintentionally) in the construction, operation, repair, and testing of cargo tanks.

MTB and BMCS agree with the research findings that cargo tank integrity and therefore safety in the transportation of hazardous materials in cargo tanks could be improved by revising and clarifying the HMR. This proposal is intended to accomplish that goal as follows:

(1) Sections 173.33, 177.814 would be completely revised. The requirements dealing with the continuing qualification, maintenance, and periodic testing of cargo tanks contained in those sections would be removed and placed in proposed Part 180, Subpart E. Other requirements pertaining to the manufacturing of cargo tanks contained in those sections have been removed and placed in the appropriate specifications in Part 178.

(2) Sections 178.340, 178.341, 178.342, and 178.343 would be revised for clarity. Identical requirements applicable to MC 306, MC 307, and MC 312 cargo tanks would be contained in the general section, § 178.340. The sections in the

individual specifications, i.e., §§ 178.341, 178.342, 178.343, would be arranged to correspond with the sections contained in § 178.340. For example, § 178.340–10 contains requirements on pressure relief devices applicable to MC 306, MC 307 and MC 312 cargo tanks. Any specific requirement applicable to an individual specification appears in § 178.341–10 for MC 306 cargo tanks, § 178.342–10 for MC 307 cargo tanks, and § 178.343–10 for MC 312 cargo tanks.

In the past years, MTB has received in excess of 25 petitions for rulemaking, granted in excess of 40 exemptions, and issued numerous telephonic and written interpretations on regulations pertaining to cargo tanks. In preparing this NPRM, MTB and BMCS have considered all the comments to Docket HM–183, the applicable outstanding petitions for rulemaking interpretations issued by the MTB and BMCS, and the recommendations made by the research contractors, and the National Transportation Safety Board (NTSB), as well as some found in general literature.

Both MTB and BMCS have participated in the development and issuance of the research contracts, the ANPRM and this NPRM. In the interest of brevity "we" is used hereinafter in referring to "MTB and BMCS."

II. Specification Design and Construction Requirements

A. Cargo Tank Overturn Integrity

Research conducted by the States of Michigan and California and DOT has shown that failures of the tank shell, manhole closures and pressure relief valves occur frequently in cargo tank overturn accidents. In a substantial number of instances, these failures resulted in serious leakage, sometimes resulting in fires. These research studies showed that leakage resulted from tank shell puncture, tank shell rupture, weld failure, manhole closures being blown off or badly deformed and, thereby, not reseating, and failure of pressure relief valves and vents.

As an example, a December 1981 study by the California Highway Patrol titled "California Tank Truck Accident Survey" provides insight into the problem. The report analyzed 131 tank truck accidents that occurred from February 1, 1980 to January 31, 1981. The report states: "Spills occurred in 79 percent of the overturns and 16 percent of the nonoverturns spills." With respect to frequency of fires, the study states: "Fires occurred in 22 percent of the spill accidents and two percent of those without spills" and "Forty-four (44) percent of the fires were with cargoes of gasoline, whereas this type of cargo was being carried in only 23 percent of all tank truck accidents."

With respect to the source of spills, the report states: "Most of the spills for which the source was reported occurred through cracks, ruptures, and punctures (52 percent). Another 44 percent occurred through dome covers, vents, or safety valves. The domes also leaked or came open in 11 of the 33 cases of ruptures or punctures of the tank."

The identification of manhole closures as a major source of spills in overturn accidents has resulted in many manufacturers developing a manhole closure of greater integrity. Many cargo tank owners have equipped their new cargo tanks and, in some cases, retrofitted existing cargo tank with these higher integrity manhole closures. Further, the Truck Trailer Manufacturers Association (TTMA) has adopted a recommended practice, RP#61–82, that all manhole closures be capable of withstanding a minimum static pressure of 36 psig without leakage or permanent deformation. We are proposing that all manhole closures on construction of new cargo tanks be designed and tested to a minimum static pressure of 36 psig without leakage or permanent deformation. Because of the severe consequences of manhole closure failures and the fact that cargo tanks may remain in service for 30 years or more, we believe that the retrofitting of manhole closures on existing cargo tanks is necessary. To minimize the economic impact of any retrofitting, we are proposing that the retrofitting be accomplished over a five-year period, with at least 20% of the affected cargo tanks being retrofitted each year. We believe a five year period will permit scheduled replacement that can coincide with normal tank testing, repair, and component replacement, thereby minimizing the cost of retrofit. Based on comments to Docket HM–183 and the research program, the estimated cost of such a retrofit ranges between $20 and $250 per manhole when included as part of scheduled maintenance and testing.

Substantially increasing the tank wall thickness is often proposed as a countermeasure to tank puncture and rupture. We believe that a cargo tank should retain its lading in an overturn on the roadway if the cargo tank does not strike a substantial obstacle. Many cargo tanks have survived such accidents without loss of lading. However, we believe that requiring a substantial increase in cargo tank wall thickness to eliminate tank puncture or rupture would constitute such a major action that more detailed accident analyses, engineering analyses and the consideration of costs and benefits should be studied before such an action is initiated. Although we are not proposing an increase in wall thickness in this rulemaking, we are proposing greater manufacturing quality controls on cargo tanks, improved accident damage protection and more comprehensive and systematic consideration of cargo tank overturn integrity. Discussion of these issues are found later in this preamble.

B. Design Pressure of Cargo Tanks

We are aware that the present regulations do not clearly state a specific relationship between the design pressure of the cargo tank and the properties of the lading. Further, the regulations do not specify a consistent relationship between the design pressure and operational factors such as loading and unloading pressures and the pressure of gas paddings. The lack of such a specific set of relationships can result in: (1) The release of a hazardous material under normal transportation conditions; and (2) the uncontrolled release of a hazardous material as a result of an overturn accident even when the cargo tank is not severely damaged.

As an example, the MC 306 cargo tank has a design pressure of not less than the static pressure generated by the lading, and the pressure relief devices are set-to-discharge at 3 psig. Section 173.119 permits the transportation in cargo tanks of a flammable liquid with a vapor pressure of 16 psia (1.3 psig) at 100 °F. Some of these ladings have a vapor pressure as high as 5.8 psig at 115° F. Thus such a lading would continuously vent under normal transportation conditions. Further, in an overturn accident the pressure relief device is required to withstand both the vapor pressure and the static pressure of the lading. For a typical MC 306 cargo tank the static pressure of the lading at the bottom of an inverted vehicle is in the range of 1 to 2 psig. The resulting pressure on a pressure relief device set-to-discharge at 3 psig could be as high as 7.4 psig. This condition would result in the uncontrolled release of the flammable liquid lading though the pressure relief system of an inverted cargo tank that is not in motion (static condition) even though the system is undamaged and operating as designed. Such potential releases are unacceptable and are not limited to MC 306 cargo tanks. MC 307 and 312 cargo tanks are vulnerable under similar conditions. MC 307 cargo tanks often transport ladings protected by a gas pad at or near the tank's design pressure. The pressure from this pad, in addition

to the vapor pressure and static pressure from the lading, could result in an uncontrolled release of the lading in an overturn accident. The MC 312 cargo tank specification has no minimum design pressure limit and yet such a cargo tank is often used to transport high density ladings that can produce substantial static pressures.

We believe that such conditions may present an unacceptable risk. Accordingly, we are proposing to specify both design and shipper requirements for relating the cargo tank design pressure to both operational factors and lading physical properties. Included would be a design reference temperature of 115 °F. for liquid hazardous materials transported in cargo tanks, the same as presently specified for liquefied gases in uninsulated cargo tanks. The proposal would require that the design pressure be greater than or equal to the largest of the following:

(1) The minimum pressure prescribed in the individual specification;

(2) The pressure prescribed for the lading in Part 173;

(3) 120 percent of the sum of the vapor pressure of the lading at 115 °F., the pressure of any gas pad (including air) in the ullage space, and the maxmium static pressure exerted by the lading; or

(4) The maximum pressure used to load or unload the lading.

The design pressure requirement would apply to cargo tanks constructed after the effective date of the final rule and could result in an increase in the design pressure of some cargo tanks which are used for the transportation of certain materials. We believe, however, that the design pressure of cargo tanks used for most ladings, including gasoline, will not be significantly affected by this necessary change.

Under proposed § 173.33, shippers would be required to verify that the design pressure of the cargo tank is adequate for their hazardous material. In some cases, certain hazardous materials will no longer be authorized for transportation in the lower pressure cargo tanks. We believe this change will affect a relatively small percentage of hazardous materials being transported in cargo tanks and will not have a substantial effect on most shippers and carriers.

We are aware that:

(1) Many MC 305 and 306 cargo tanks have been manufactured and marked with a design pressure of zero psig in non conformance with § 178.341–1(b) which states, "The design pressure of each cargo tank shall be not less than that pressure exerted by the static head of the fully loaded tank in the upright position";

(2) The present MC 312 cargo tank specification authorizes a design pressure of zero psig;

(3) The MC 300, 301, 302, 303, and 305 cargo tank specifications do not address design pressure and do not require the marking of the design pressure; and

(4) The MC 310 and 311 cargo tank specifications require the marking of maximum allowable working pressure (MAWP) and maximum working pressure (MWP), respectively, but not the design pressure.

Notwithstanding these marking and manufacturing inconsistencies, each MC 300, 301, 304, 303, 305, 306, 310 and 311 cargo tank has been pressure tested to at least 3 psig. Accordingly, proposed § 173.33 would not preclude the use of a cargo tank having a design pressure of less than 3 psig or without a marked design pressure, nor would it preclude the remarking of the marked design pressure on a cargo tank.

Specifically, we are proposing that:

(1) Any existing MC 306 type or MC 312 cargo tank whose pressure relief system is set-to-discharge at 3 psig may be marked with a design pressure not greater than 3 psig;

(2) Any existing MC 300, 301, 302, 303, 304, 305, 306, 307, 310, or 312 cargo tank may be marked or remarked with a design pressure based on the design requirements of proposed § 178.340–1(l);

(3) MC 300, 301, 302, 303, 305, 306, and 312 cargo tanks with no marked design pressure or a design pressure of less than 3 psig may be used for authorized ladings where the largest pressure derived from the design pressure requirements in proposed § 173.33 is less than or equal to 3 psig; and

(4) MC 310 and MC 311 cargo tanks may be used for authorized ladings where the largest pressure derived from the design pressure requirements in proposed § 173.33 is less than or equal to the marked MAWP and MWP, respectively.

C. Accident Damage Protection

We believe the cargo tank design should take into consideration: (1) The need to protect the structural integrity of the head, shell, and piping in collision and overturn accidents; (2) the puncture, abrasion, and crush resistance of the head and shell; and (3) the distribution of loads transmitted into the head and shell by projections, fittings, appurtenances and protection devices. We have observed cargo tanks where little or no consideration was given to the distribution of accident loads from roll-over guards into the tank shall. The involvement of these cargo tanks in accidents in some cases has resulted in the puncture or tearing of the tank shell and the subsequent loss of lading. To clarify the requirement that the cargo tank motor vehicle has to be considered as a system with respect to accident damage protection, it is proposed that accident damage protection devices or projections be designed to distribute any potential accident load into the tank shell so that the stress resulting from the specified loads in combination with the stresses resulting from maximum design pressure during transportation do not result in a stress in the tank shell greater than 75 percent of the ultimate strength of the tank material at that point. We believe that any projections from a tank shell, fitting, or closure that retain lading under any tank orientation should reasonably be able to withstand the forces to which they may be subjected due to collision with other vehicles or objects or in cargo tank rollover or else be adequately protected. Accordingly, in the proposal on accident damage protection, both general and specific requirements are prescribed where we believe the present requirements have allowed questionable design practices.

D. Vacuum-Loaded Cargo Tanks (Waste Tanks)

MTB received two petitions (P–870, P–883) requesting the addition of provisions to the HMR covering the transportation of hazardous waste materials in vacuum-loaded cargo tanks. The petitions requested that MTB add a new vacuum-loaded cargo tank specification based on the present MC 307 or MC 312 cargo tank specification modified to allow (a) the use of external self-closing valves that are protected by the truck's suspension and frame in place of internal self-closing valves, (b) the use of circumferential reinforcements placed much farther apart than prescribed in the regulations and compensated for by a thicker cargo tank shell, (c) design and construction with a minimum internal design pressure of 25 psig and external design pressure of 15 psig because of the partial vacuum developed in the tank.

We have included these provisions in the proposed MC 307 and MC 312 cargo tank specifications. We are not proposing to restrict transportation in MC 307 and MC 312 vacuum-loaded cargo tanks to hazardous wastes. We believe that the structural integrity of these cargo tanks would be adequate for other hazardous materials and that there is no significant difference in the risks associated with the transportation of hazardous wastes and other types of hazardous materials. If adopted in a

final rule, these provisions would eliminate the need for over 40 exemptions authorizing the use of vacuum-loaded cargo tanks.

E. Cargo Tank; Manufacturer Qualification, Quality Control, and Certification

The present DOT certification system for cargo tanks, with the exception of ASME Code cargo tanks, allows the manufacturer to certify that a cargo tank conforms with all requirements of the appropriate specification. The manufacturer's technical knowledge and skill, integrity and product liability are some factors that assure the cargo tank purchaser and the public that the cargo tank is in conformance with the HMR and adequate for the safe transport of hazardous materials. The HMR provides no specific criteria for the assessment of any of these factors. Most cargo tank manufacturers exhibit great knowledge, skill and integrity. On the other hand, however, a number of manufacturers have demonstrated very limited knowledge and skill with respect to matters such as stress analyses, welding, metallurgy, recognized good design and quality control practices, and the HMR.

In contrast, a plumber or an electrical contractor involved in the construction of a building in most cases has to demonstrate knowledge and skill with respect to his trade including knowledge of local regulations. Further, a plumber's or electrician's work is generally inspected by a State, city, county, insurance inspector or an independent engineering firm to assure the building is adequately constructed, and provides an acceptable level of safety for the public. The construction of boilers and pressure vessels used in buildings are similarly regulated. We believe that the risk to the public from the transport of bulk quantities of hazardous materials in cargo tanks over our streets and highways is no less than that presented by a building's plumbing, electrical systems and boilers or pressure vessels. For this reason, we believe that a qualification system is necessary for cargo tank manufacturers and repair facilities. Further, we believe that an independent inspector is needed to assure cargo tank design construction, and test quality. Pursuant to this goal, we are proposing that all cargo tank manufacturers hold a current ASME certficate of authorization and that each cargo tank be certified in accordance with the ASME Code and the appropriate specifications by an Authorized Inspector holding a valid commission from the National Board of Boiler and Pressure Vessel Inspectors (National Board). The National Board "is organized for the purpose of promoting greater safety to life and property by securing concerted action and maintaining uniformity in the construction, installation, inspection and repair of boilers and other pressure vessels and their appurtenances, thereby assuring acceptance and interchangeability among Jurisdictional Authorities responsible for the administration and enforcement of the various sections of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code". Its inspectors are employees of states or cities or work for an "Authorized Inspection Agency," such as an insurance company.

Most States in the United States and every Province in Canada now require pressure vessels having a design pressure of 15 psig or greater to be designed, fabricated, and inspected in conformance with the ASME Code by a National Board Authorized Inspector. Presently, the HMR require ASME Code construction on MC 330, MC 331 and MC 338 cargo tanks, MC 307 cargo tanks with a design pressure in excess of 50 psig, and MC 312 cargo tanks that are unloaded with a pressure in excess of 15 psig. This proposal would align the Federal standards for cargo tanks having a design pressure of 15 psig or greater with the system of quality assurance used by most of the States. For cargo tanks built with a design pressure of 15 psig and greater, both the manufacturer and the Authorized Inspector must certify on the cargo tank certificate that the cargo tank is constructed and certified in conformance with the appropriate MC specification and the ASME Code.

Cargo tanks built with a design pressure less than 15 psig are below the lower boundary of applicability defined by the ASME Code. We are proposing to use the ASME Code for tanks in this lower pressure range in order to gain the many benefits of the ASME Code. Because ASME makes no provisions for certification and stamping of such tanks, we are proposing that both the manufacturer and the Authorized Inspector certify on the cargo tank certificate that the cargo tank meet the appropriate cargo tank specification and, thereby, "constructed in accordance with the ASME Code".

We realize that the cargo tank specifications contained in this proposal would differ in some respect from the requirements in the ASME Code. These differences result because a cargo tank is a highway transport vehicle and is subject to different accident scenarios and dynamic shock loadings during transportation. These forces are not considered by the ASME Code, which basically establishes standards for stationary pressure vessels. Therefore, we have provided for these additional factors, which are unique to the road transport of hazardous materials.

We recognize also that at the present time many Authorized Inspectors are not knowledgeable about the requirements contained in the DOT cargo tank specifications. It is very important that an Authorized Inspector be knowledgeable of the specification requirements to insure the adequacy of the overall cargo tank motor vehicle. To achieve this goal, we intend to work in combination with the National Board to develop a qualification process for Authorized Inspectors desiring to certify DOT specification cargo tank motor vehicles.

III. Increased Testing and Inspection

A major problem uncovered during the research program was that maintenance and testing of cargo tanks is inadequate. This is particularly true where the requirements for cargo tank retesting and reinspection are concerned. The requirements in § 177.824 are generally assumed to apply to the testing and inspection of repaired cargo tanks rather than to an ongoing test and inspection program. Several commenters to Docket HM-183 stated that it was not clear whether § 177.824 applied to cargo tank repairs or to an ongoing test and inspection program.

In reviewing the existing regulations concerning the maintenance, testing and inspection of cargo tanks, we have found that there are no well defined requirements for an ongoing cargo tank maintenance program. We have placed too much reliance on the provisions of § 173.24(d) which states "For specification containers, compliance with the applicable specifications in Parts 178 and 179 of this subchapter shall be required in all details, except as otherwise provided in this subchapter" for the continuing qualification, maintenance and testing of cargo tanks. This reliance on § 173.24(d) has led many shippers and carriers who are not fully aware of all the requirements of the HMR to think that no ongoing cargo tank maintenance program is required. Several omissions regarding the requirements of the HMR which have surfaced are:

(1) Other than a 2 year visual inspection, there is no requirement for an ongoing cargo tank maintenance system;

(2) There is no requirement for cargo tanks to be subject to a formalized and systematic maintenance program; and

(3) Cargo tank corrosion is not adequately addressed in the present HMR.

We agree with both the research findings and commenters that the maintenance, inspection and testing of cargo tanks are inadequate. Further, we believe that the present requirements are inadequate to properly protect the public and are therefore unacceptable. This conclusion is supported by the enactment in October 1984 of Pub. L. 98-554 (Motor Carrier Safety Act of 1984), specifically section 210(b), which states:

> The Secretary shall, by rule, establish Federal standards for inspections of commercial motor vehicles and retention by employers of records of such inspections. Such standards shall provide for annual or more frequent inspections of commercial motor vehicles unless the Secretary finds that another inspection system is as effective as an annual or more frequent inspection system. For purposes of this title, such standards shall be deemed to be regulations issued by the Secretary under section 206.

While not a part of the Hazardous Materials Transportation Act, the authority for the HMR, this law is an example of the public's and Congress' understanding of the importance placed on the maintenance and inspection of parts and accessories necessary for safe operation of a commercial motor vehicle, including a cargo tank motor vehicle. It is obvious that maintenance and inspection of a cargo tank containing a hazardous material during transportation is even more critical to public safety than a commercial motor vehicle used to transport food products. Accordingly, we are proposing requirements for annual and other periodic inspections as well as a requirement for a formal tank maintenance program for cargo tanks. These proposed requirements would be in addition to the requirements in the FHWA Federal Motor Carrier Safety Regulations governing maintenance and inspection of equipment.

The present § 177.824(a) requires inspection and retesting of all authorized specification cargo tanks, except for a cargo tank having a capacity of 3,000 gallons or less used exclusively for flammable liquids. There is little basis in terms of safety for such an exception. Such cargo tanks are built to the same specifications, operated under similar conditions, and operated over the same roads with the same hazardous materials as typical 4,000 to 9,000 gallon cargo tanks motor vehicles. Although smaller in capacity than a typical cargo tank motor vehicle, a vehicle transporting 3,000 gallons of flammable liquid may pose a risk to the public in an accident. Further, we believe that periodic maintenance, inspection, and retest of any vehicle transporting hazardous material must be an integral part of any responsible operator's safety management program. For these reasons, we are proposing that all cargo tank motor vehicles be subject to test and inspection requirements.

In order to ensure that all DOT specification cargo tanks undergo a formalized maintenance program, we have expanded and placed all the requirements for the maintenance and retesting of cargo tanks presently contained in §§ 173.33 and 177.824 in Subpart E to Part 180. Subpart E of Part 180 would be entitled, "Cargo Tanks: Qualification, Maintenance and Use." Proposed § 180.307(a), Table shows the specific type of testing and inspection required for each DOT Specification cargo tank. The table also specifies the test and inspection interval for various cargo tank configurations. Other provisions contained in this subpart are procedures for the test, inspection, repair and modification of a cargo tank. To ensure that all work is properly performed, requirements for the qualification of persons performing and certifying this type of work are also proposed.

Part 180 would contain all requirements applicable to persons who perform functions relating to maintenance and continuing qualification of packagings, such as the prescribed inspections, testing, reconditioning and repair requirements. Persons performing these functions include retesters, reconditioners, approval and inspection agencies, shippers and carriers. We believe that consolidating all the qualification, maintenance and use requirements in one part of the HMR will result in regulations that are easier to understand. Also, this action removes test and inspection criteria from regulations applicable to shippers in Part 173 and to carriers in Parts 174-177. An outline of the subparts that would be contained in part 180 and the present sections containing these requirements is as follows:

Part 180—Continuing Qualification and Maintenance of Packagings:

Subpart A—General.
Subpart B—Non-bulk packagings (except cylinders); Qualification and maintenance (§ 173.28).
Subpart C—Cylinders; Qualification and maintenance (§ 173.34).
Subpart D—Portable Tanks; Qualification and maintenance (§ 173.32, 173.32a, 173.32b, 173.32c).
Subpart E—Cargo Tanks; Qualification and maintenance (§ 173.33).
Subpart F—Tank Cars; Qualification and maintenance (§ 173.31).

Only the requirements contained in subpart E are addressed in this proposal.

IV. Transportation of Hazardous Materials in Cargo Tanks

A. Flammable Liquids or Pyrophoric Liquids

We propose to eliminate several discrepancies pertaining to the transportation of flammable liquids and pyrophoric liquids in cargo tanks. In this proposal, § 173.119 and certain other sections in Subpart D are revised to clarify and reiterate the following:

(a) MC 310, MC 311 and MC 312 cargo tanks that are used in flammable liquid service must be equipped with pressure relief devices having venting capacities adequate for flammable liquid ladings. We are proposing that pressure relief system on these cargo tanks when used in flammable liquid service must be equivalent to a pressure relief system required for a MC 307 cargo tank.

(b) Any cargo tank with bottom outlets would have to be equipped with self-closing stop valves capable of being remotely operated by both thermal and mechanical means as required for MC 306 and MC 307 cargo tanks.

(c) Under the present § 173.119(m), there is no requirement for safeguards to assure the containment integrity of a cargo tank used to transport flammable liquids with secondary hazards. Based on a petition (P-607), parameters would be provided to allow the use of certain cargo tanks for a lading with more than one hazard class. In the proposal, a cargo tank used to transport a flammable liquid that is also corrosive must be constructed of, or lined with a material that is compatible with the lading or be constructed with added shell thickness for a corrosion allowance. A cargo tank transporting a flammable liquid that is also a poison B liquid must have a design pressure of 25 psig. These design parameters agree with the requirements of subparts F and H of the HMR.

(d) The use of air pressure to unload a cargo tank containing a lading having a flash point of 20°F. closed cup or less would be prohibited. We believe the unloading procedure may pose a potential risk of fire should an air enriched atmosphere at or near the flammability range of the flammable liquid lading be created in the vapor space of the tank.

(e) The use of non-reclosing pressure relief devices would be prohibited except when such devices are arranged in series with a spring loaded pressure relief valve. Nonreclosing pressure relief devices present the risk of a continuous release of lading as compared to a partial release to relieve pressure. Such a continuous release of a flammable lading in the event of a fire could produce catastrophic results.

Sections that would be affected by these revisions are as follows: 173.119, 173.135, 173.145

B. Flammable Solids, Oxidizers and Organic Peroxides

We believe that certain flammable solids, oxidizers and organic peroxides have hazardous characteristics similar to flammable liquids and pyrophoric liquids. Therefore, we are proposing that cargo tanks equipped with bottom outlets when used to transport these hazardous materials have self-closing stop valves capable of being remotely operated by both thermal and mechanical means as required for other cargo tanks used in flammable liquid service.

Sections that would be affected by this revision are as follows: 173.154, 173.190, 173.224.

C. Corrosive Materials

Requirements for corrosive materials in cargo tanks would be standardized. We are proposing that a cargo tank used to transport a corrosive material be constructed of, or lined with a material that is compatible with the lading or have added shell thickness for a corrosion allowance. Further, cargo tanks equipped with bottom outlets when used to transport corrosive materials would be required to be equipped with self-closing stop valves that are capable of being remotely operated by mechanical means.

Sections that would be affected by this revision are as follows:

173.245, 173.247, 173.248, 173.249, 173.250a, 173.252, 173.253, 173.254, 173.255, 173.257, 173.262, 173.263, 173.264, 173.266, 173.267, 173.268, 173.271, 173.272, 173.273, 173.274, 173.276, 173.280, 173.289, 173.292, 173.294, 173.295, 173.296, 173.297

D. Poison B Materials

Requirements for poison B materials in cargo tanks would be standardized. Given the substantial acute and environmental risks associated with the release of a poisonous material, we are proposing that a cargo tank used to transport a poison B material have a design pressure of 25 psig. Any cargo tank equipped with bottom outlets used to transport a poison B liquid would be required to have self-closing stop valves capable of being remotely controlled by both thermal and mechanical means. The type of cargo tank authorized to transport poison B solids would be based on the specific properties of these materials.

Sections that would be affected by these revisions are as follows:

173.346, 173.347, 173.352, 173.358, 173.359, 173.369, 173.373, 173.374

V. Other Issues

Question eight in Docket HM 183 asked "Should the scope of this docket be expanded to address the design and construction of the MC 306 cargo tank in its entirety?" "No!", with some qualification was the anwer given by all manufacturers and operators of MC 306 cargo tanks. The commenters stated that the basic design of the MC 306 cargo tank was adequate and major changes were not justified. On the other hand, several commenters stated that gains in safety and productivity are probable in a major redesign of cargo tanks. These commenters stated, and we agree, that to achieve such gains would require considering the cargo tank motor vehicle as a system and, further, the highway and vehicle as part of a transportation system. Such an effort involves vehicle size and weight laws and vehicle design standards and is a large, long term undertaking.

A number of cargo tank operators commented that more uniform requirements and a greater level of enforcement are necessary to stimulate improvement in cargo tank maintenance. We agree with these commenters. Aiding enforcement personnel by removing the many regulatory shortcomings, inconsistencies and ambiguous requirements is a goal of this NPRM.

Additionally, the DOT has been active in fostering adoption of the Federal regulations by States and supporting them in their enforcement efforts. MIB's State Hazardous Materials Enforcement Development program provided monies to States to adopt and enforce the HMR. Concommitant with this program is the training of enforcement personnel in the technical aspects of the regulations dealing with the transport of hazardous materials. BMCS also has an ongoing program, titled the Motor Carrier Safety Assistance Program, whose objective is to substantially increase commercial motor vehicle enforcement programs by providing development and implementation grants to States in return for their agreeing to adopt Federal safety programs, including the Federal Motor Carrier Safety Regulations and the HMR, or compatable requirements, and establishing enforcement policies and programs. Again, many State personnel have and are being trained in enforcement procedures and regulatory compliance requirements.

New training courses in cargo tank regulations have been developed by BMCS in an effort to provide better training of enforcement personnel. Emphasis areas dealing with such requirements as minimum shell thickness measurements during inspections provide for uniform compliance on the part of industry.

Many commenters stated the driver qualifications and trainings are as important to controlling safety as packaging integrity. We agree that driver qualification and training are critical to the safe transport of any commodity and particularly hazardous materials. The strengthening of driver qualification and training requirements will be addressed in future rulemaking actions.

Review By Section

The following is an analysis and explanation, by section, of the more significant features of this regulatory proposal.

Section 171.3. This section would permit the continued use of a non DOT specification cargo tank for transportation a hazardous waste provided it is operated exclusively by an intrastate motor carrier in a State where its use is permitted by that State.

Section 171.7. This section would incorporate the latest edition of the ASME Code, as requested by petitioners (P–794, P–824); extend applicability to include Sections II and V of the ASME Code; reflect a change in the reference numbering of the American Welding Society (AWS) Code from 3.0 to 2.1 (and a change in address); incorporate additional ASTM and CGA standards; and add references to certain publications of the Rubber Manufacturers Association and the American Society for Non-Destructive Testing.

Section 171.8. Definitions of "Authorized Inspector" and "Authorized Inspection Agency" would be added to clarify who is qualified to perform inspections as required by the HMR. The definition of "cargo tank" would be revised to clarify that the term includes all attached appurtenances, reinforcements, fittings and closures. A definition of "cargo tank motor vehicle" would be added for clarity and to provide for consistent use of terminology when referring to the transport vehicle.

Section 172.203. This section would remove the reference "173.315(a)(1)" and insert in its place "173.315(a)" for consistency with a change made in that section.

Section 173.33. This section would be completely revised and entitled "Hazardous materials in cargo tank motor vehicles". It would contain only general shipper requirements for the use of cargo tanks transporting hazardous materials. For example, this section would provide a means for a shippper to determine if the design pressure of a cargo tank is adequate for a particular commodity. Present requirements pertaining to commodities, cargo tank design, qualification, maintenance and use of cargo tanks would be revised and placed as appropriate in Parts 173, 177, 178 and 180. Highlights of other proposed changes are:

(1) MC 300, MC 301, MC 302, MC 303, MC 305, MC 306 and MC 312 cargo tanks with no marked design pressure or marked with a design pressure of less than 3 psig may be used for authorized ladings where the largest pressure derived under paragraph (d) is less than or equal to 3 psig.

(2) MC 310 and MC 311 cargo tanks may be used for authorized ladings where the largest pressure derived from paragraph (d) is less than or equal to the marked MAWP or MWP, respectively.

(3) "MC 306 type" cargo tanks may be upgraded to the MC 306 cargo tank specification; MC 304 cargo tanks to the MC 307 specification; and "MC 312 type" cargo tanks to the MC 312 specification.

(4) Non-reclosing pressure relief devices are prohibited on a cargo tank used in flammable liquid service unless such device is in series with a spring loaded pressure relief valve.

(5) A cargo tank may not be loaded with a hazardous material if a dangerous reaction may occur in the tank between a contaminant or a residue and the new lading.

(6) No two or more materials, the mixing of which may produce an unsafe condition, may be transported in a cargo tank motor vehicle.

Sections 173.119—173.374. These sections would be revised as discussed earlier in this preamble under the heading "Transportation of Hazardous Materials in Cargo Tanks." In addition, certain other changes would be made for clarity.

Section 173.131 would remove the reference to 178.340-10; 178.341-4 and 178.341-5 and insert in their place references to §§ 178.340-14 and 178.340-16, 178.341-10 and 178.341-11, as applicable.

Section 173.250a would delete paragraph (a)(2) as unnecessary since these requirements are contained in paragraph (a)(1).

Section 173.252 would clarify that the ⅜ inch minimum thickness prescribed for the tank shell and head is exclusive of any lining, cladding or corrosion allowance.

Section 173.272 would clarify that the temperature of the lading may not exceed the design temperature of the cargo tank.

Section 173.289 would delete paragraph (a)(4) as unnecessary since the requirement is contained in paragraph (a)(1).

Section 173.292 would delete paragraph (a)(2) as unnecessry since the requirement is contained in paragraph (a)(1).

Section 173.294 would clarify that the tank must be made of, or lined with, pure nickel or stainless steel.

Section 173.295 would clarify that cargo tanks made of steel are authorized for stabilized benzyl chloride only. The requirements in paragraph (a)(10) pertaining to cargo tanks made of nickel would be removed and placed in paragraph (a)(9). Paragraph (a)(10) would be reserved.

Section 173.315 would remove references to § 173.33 and add the applicable reference to Part 180. Additionally, the present provisions of §§ 173.33(f)(7)(8) and (9) would be removed and placed in §§ 173.315(h)(4), 173.315(n) and 173.315(o), respectively.

Section 173.318 would add the present requirements contained in § 173.33(d)(1)(ii) as new § 173.318(g)(4).

Section 176.76. The requirement in § 173.33(a)(1) authorizing a cargo tank motor vehicle containing a hazardous material to be transported aboard a vessel would be removed and placed in § 176.76(b)(1).

Sections 177.800, 177.801 and 177.802. Sections 177.800 and 177.801 would be simplified and revised for clarity. Section 177.802 would be removed and a new section governing the inspection of carrier facilities and records would be added. These inspection requirements are similar to those applicable to rail and air carriers.

Section 177.814. The existing provisions on record retention and reporting requirements of this section would be removed and placed in § 180.317. A new § 177.814 would reference those requirements.

Section 177.824. The existing provisions on the inspection and retest of cargo tanks of this section would be removed and placed in Part 180 of this sub-chaper. A new § 177.824 would reference those requirements.

Section 177.840. Paragraph (f) would inform carriers of certain equipment testing requirements applicable to the transportation of chlorine that are contained in § 173.315(o).

Section 178.337. This section would add those requirements presently found in § 173.33 which pertain to the manufacture of a DOT Specification MC 331 cargo tank.

In § 178.337-1, paragraph (a) would remove a reference to § 173.33(i) and insert in its place a reference to paragraph (e). Paragraph (e) would remove a reference to § 173.33(i). The requirements presently contained in § 173.33(i) would be added in new paragraph (e)(2).

Section 178.337-2(c) would remove the reference to § 173.33(g)(1) and add those requirements presently contained in § 173.33(g)(1). Also a provision to allow the use of properly joined aluminum baffles would be added.

Section 178.337-3 would revise the minimum thickness formula contained in paragraph (b), as discussed earlier in this preamble under § 178.340-3.

Section 178.337-4(b) would require that welding procedure and welder performance tests be performed in accordance with the ASME Code.

Section 178.337-6(a) would be revised to require manholes on all cargo tanks.

Section 178.337-8(b) would remove the references to § 173.33(f)(9), (h)(4) and (5). The special requirements for chlorine angle valves contained in paragraph (b) would be placed in § 178.337-9(b).

Section 178.337-9 would contain requirements for piping, pipe fittings, pressure devices, hoses and other pressure parts. New paragraph (b)(7) would incorporate certain special requirements for chlorine cargo tanks now found in §§ 173.33 and 178.337-8.

Paragraph (d)(1) would incorporate the provision now found in § 173.33(j) permitting mounting a refrigeration unit on a motor vehicle.

Section 178.337-11(a) would remove all references to § 173.33(h) and add those requirements presently contained in § 173.33(h) through (h)(2) and certain provisions presently contained in § 178.337-11(c). A new paragraph (a)(4) would incorporate certain special requirements for chlorine excess flow values that are presently contained in § 173.33(h)(4). Paragraph (b) would remove the reference to § 173.33(h)(3) and add the requirements contained in that paragraph. Paragraphs (f) and (g) would require that cable linkages for the internal valve be corrosion resistant.

Section 178.337-14(b) would remove the reference to § 173.33(f)(7) and add

the requirements contained in that paragraph.

Section 178.337–15 would remove the references to § 173.33(f) (6) and (10) and add the requirements contained in those paragaphs.

Section178.338. This section would be revised by adding those requirements presently found in § 173.33 which pertain to the manufacture of a DOT Specification MC 338 cargo tank.

Section 178.338–8(b) would remove the reference to § 173.33(f) and add certain applicable requirements contained in § 173.33 (f) through (f)(5).

Section 178.338–17 would remove the references to §§ 173.33(f)(6) and 173.318(a)(4) and add the requirements now contained in those paragaphs.

Section 178.340. This section contains the general design and construction requirements applicable to MC 306, MC 307 and MC 312 cargo tanks. This section would add a table of headings covering §§ 178.340–1 through 178.340–14 for easier reference of the requirements contained in these sections.

Section 178.340–1. In this section, over 30 terms would be defined for clarity. New terms would be used whenever existing terms are found inappropriate. For example, "fail safe" device would replace the term "shear section" to permit the use of any device designed to fail in order to protect a major part. This proposal considers each "compartment" a separate cargo tank. Similarly, a multiple compartment tank is a series of connected cargo tanks. Thus, the term "compartment" will no longer be used.

This section would specify the ASME Code as well as the appropriate specification as the basis for cargo tank motor vehicle design and construction. Each cargo tank with a design pressure of 15 psig or greater would have to be "constructed and certified in conformance with the ASME Code" and code stamped. Each cargo tank with a design pressure of less than 15 psig would have to be "constructed in accordance with the ASME Code", but may not bear on ASME code stamp. In either case, the design and construction techniques would be the same and the design and construction would be certified by an Authorized Inspector. This procedure will provide shippers, cargo tank motor vehicle owners, and insurance carriers with greater assurance that each specification cargo tank motor vehicle conforms to spsecification requirements.

Based on satisfactory experience under the exemption program and several petitions (P–537, P–768, P–870, P–883), vacuum-loaded cargo tanks made to the MC 307 and MC 312 cargo tank specifications would be authorized.

Design parameters for connecting structures would provide for the over-all structural integrity of the cargo tank motor vehicle based, in part, on NTSB recommendations H–83–25 through –30.

The structural requirements specified for connecting structures are the same as those specified for a cargo tank with the exception of pressure.

Section 178.340–2. Requirements for construction materials, including the thickness of these materials, would be contained in this section. All construction materials for the cargo tank shell, heads, bulkheads and baffles would be of a metal suitable for building pressure vessels in conformance with the ASME Code. This provision, in response to a petition for rule change (P–870) and satisfactory exemption experience, would expand the types of construction materials authorized and, thereby, eliminate the need for an exemption for cargo tanks made of metallic materials other than steel or aluminum.

Two petitioners (P–310, P–452) requested that the minimum thicknesses for shells, heads, bulkheads and baffles be expressed in decimals in place of gauge. These petitions are denied as unnecessary since the proposed specifications would require conformance with the ASME Code.

The present requirement that cargo tanks in corrosive service must be designed for a 10-year service life would be removed. We believe this requirement restricts the economic optimization of the tank design and does not provide assurance that the tank shell thickness is greater than the prescribed minimum thickness. We are proposing that cargo tanks may be designed for any service life. An acceptable level of safety would be maintained by new inspection and thickness monitoring requirements specified in proposed subpart E, of Part 180. Tanks with shells below the minimum thickness must be repaired or the specification plate must be removed.

Section 178.340–3. Requirements for the structural integrity of cargo tanks would be contained in this section. The shell thickness and cargo tank structure would conform with the structural requirements prescribed in this section, in addition to the minimum shell and head thickness requirements in the individual specification and the accident damage protection requirements in § 178.340–8. Further, the cargo tank manufacturer must consider all structural loading and damage that would result from accidents, such as an overturn on the roadway.

The proposal contains a requirement that stresses resulting from specific operating loadings be evaluated in the design of a cargo tank in place of the present general loading requirement. We are proposing to specify the same loadings presently prescribed for the MC 331 cargo tank. We believe the MC 331 loading requirements adequately take into account the forces actually encountered in transportation. For frameless cargo tank motor vehicles, where the tank shell serves as the vehicle frame, the basic structural integrity of a cargo tank would be calculated using a specific formula. The proposed formula is an improved version of that specified in § 178.337–3 of the MC 331 cargo tank specification. The proposed formula was developed as a part of the MC 331 cargo tank integrity study by the research contractor, Dynamic Sciences, Inc., and its industry advisors. The proposed formula includes shear stresses resulting from internal pressure, a factor not included in the present formula in § 178.337–3. For cargo tanks mounted on a frame or built with integral structural supports, the stress analysis appropriate to the tank and structural configuration would be made using the required loadings. Since conformance with the ASME Code would be required, the present 5:1 safety factor would be relaxed to the 4:1 safety factor allowed by the ASME Code.

Section 178.340–4. Requirements for the joints in the tank would be contained in this section. Joint preparation, welding procedures and welder performance are as prescribed in the AMSE Code. This Code includes supervision of welding, information on proper type and size of electrodes used, number of passes, etc., and in addition, require that work drawings indicate details and tolerances as well as verification of welder competence all of which are necessary to assure the structural integrity of the tank.

Since conformance with the ASME Code would be required, the confusing requirements of optimum fabrication techniques and efficiency determination would be removed. Any welding technique and its corresponding allowable weld efficiency permitted by the ASME Code would now be acceptable. Conformance with the ASME Code would also obviate the need for the compliance test in addition to ASME Code requirements.

Section 178.340–5. Manhole requirements would be contained in this section. Under the proposed rule, a manhole closure would have a structural strength much greater than that presently prescribed. A minimum

manhole size would also be prescribed. Additional comments and changes to this section are addressed earlier in this preamble under the heading "Cargo Tank Overturn Integrity".

Section 178.340–6. Supports and anchoring requirements would be contained in this section. The minimum dynamic loadings specified for the cargo tank would be applicable to the tank supports and anchoring systems. See earlier preamble discussion under § 178.340–3.

Section 178.340–7. Circumferential reinforcement requirements would be contained in this section. These requirements are relaxed to permit, under certain conditions, the unreinforced portion of the shell to exceed 60 inches. This relaxation is based on a petition (P–537) and the satisfactory experience of cargo tanks made to this requirement under exemption. This section would also prohibit any type of reinforcement that precludes visual inspection of the tank shell or head. The placement of reinforcement rings over circumferential shell joints would be prohibited.

Section 178.340–8. Requirements for protection from accident damage would be contained in this section. This proposal is organized into both general requirements and individual requirements for the following accident protection zones: the bottom damage protection zone (the lower ⅓ of the tank), the roll over damage protection zone (the upper ⅔ of the tank), and the rear-end tank protection zone (area subject to rear-end or backing collisions).

The general requirements for accident damage protection would require a cargo tank, its piping, closures and valves that may contain lading to be designed and constructed to minimize the potential for loss of lading resulting from an accident. Projections from the cargo tank shell that retain lading such as domes and sumps would be required to be designed to minimized the possibility of the loss of lading in an accident, be constructed of a material having a strength equivalent to that of the tank shell, and have a thickness at least equal to that specified by the appropriate specification. Any projection that extends more than two inches from the tank shell would be required to be protected from accident damage. To provide for maximum design freedom and to minimize cargo tank cost, projections that have a strength of at least 125 percent of the requirements specified for the appropriate accident damage protection device would not be required to have accident damage protection. Additionally, such projections may be considered as accident damage protection devices for the protection of fittings, piping, etc.

a. *Bottom damage protection.* Bottom damage protection devices are intended to protect any outlet, projection, sump, or piping located in the bottom damage protection zone from accidental damage such as a collision with another vehicle or with a road side structure, such as a guard rail.

The present specifications require the use of internal self-closing stop valves to provide lading rention in collision accidents. Vacuum-loaded cargo tanks, operating under DOT exemption, are authorized to have external self-closing stop valves which are protected by bottom accident damage protection. These cargo tanks have demonstrated a high level of intergrity. The bottom accident damage protection used on vacuum-loaded cargo tanks consists of the vehicle frame, rear wheels, suspension system and rear end tank protection. Because of the excellent safety record of vacuum-loaded cargo tanks, we are proposing to allow external self-closing stop valves with bottom accident damage protection as an alternative to the internal self-closing stop valves on all MC 307 and MC 312 cargo tanks.

Accident data from studies of under-ride accidents indicate that a significant percentage of under-ride accidents occur at or near highway speed limits. Based on these studies, we are proposing that the bottom accident damage protection system must be capable of absorbing or deflecting an energy of 275,000 foot-pounds based on the ultimate strength of the material. This is equivalent to the impact of a 4,000 pound automobile at a speed of 50 miles per hour or the impact of a 80,000 pound truck backing into a stationary structure at 10 miles per hour. This impact energy is applied to the bottom damage protection device at any point and from any direction, i.e. front, rear, side or bottom, over an area not greater than 6 square feet.

Also, requirements would be relaxed to allow the use of valve protection features other than a shear section to provide greater flexibility for cargo tank manufactures and operators.

b. *Rollover damage protection.* The most common highway accident involving the loss of cargo tank lading is a rollover. Such accidents generally result in damage to the upper ⅔ of the cargo tank. The most vulnerable areas are the cargo tank sides, top and front head. Present requirements allow the lateral strength of rollover damage protection devices to be only ¼ the strength required normal to the shell. In a rollover accident, the rollover damage protection system can receive lateral loads that equal or exceed the normally applied load. For this reason, we are proposing that the rollover damage protection system on each cargo tank motor vehicle be designed for a lateral load equivalent to twice the gross weight of the loaded cargo tank motor vehicle. If more than one rollover protection device is used, each device must be designed for a lateral load no less than one-half the gross weight of the loaded cargo tank motor vehicle.

c. *Rear-end tank protection.* A petitioner (P–452) maintains that the present rear bumper requirements serve two functions. First, as required by § 178.340–8 the bumper must protect the cargo tank and any tank component that may retain lading from damage as a result of a collision with another vehicle or with a structure during backing. Second, as required by 49 CFR 393.86 the bumper serves as a rear-end under-ride protection device to protect occupants of any vehicle that may collide with the rear-end of the cargo tank. The petitioner requested that the regulations be revised to separate the two functions.

We agree and are proposing to relax the requirement for rear-end protection by allowing a rear-end tank protection device which may be different from the rear-end under-ride protection device. This would be accomplished by removing the height restriction for the location of the rear-end tank protection. The placement of the rear-end tank protection device would protect the cargo tank and any piping, fittings, etc., from collision damage. The strength requirements for the rear-end tank protection device would remain unchanged. The rear-end under-ride device must conform with the design and strength requirements specified in 49 CFR 393.86.

MTB has received several petitions (P–904, P–911, P–923) for rule change requesting that rear-end tank protection be required only on the rearmost unit of a "double" cargo tank motor vehicle configuration. The petitioners argued that the present requirement adds cost and weight to the cargo tank configuration with no safety benefits. We do not agree. We believe that the forward unit of a "double" is vulnerable to rear-end tank damage particularly in turning maneuvers. This vulnerability increases in proportion to the length of the draw bar between the cargo tank units. The forward unit of a "double" is at times operated without the protection afforded by the rear units. Operation of such a forward unit, whether with a full load or with only residual lading

presents an unacceptable risk. Furthermore, we believe that the removal of the location restriction on rear-end tank protection devices, as proposed in this rule, would eliminate the need for a heavy supporting structure and minimize the cost and weight of the protection device. For these reasons, these petitions are denied.

Section 178.340–9. This section would contain and clarify the present requirements relative to pumps, piping, hoses, connections, etc. contained in §§ 178.340–8(d) (3), (4), (5) and (6). It would also contain a provision that hose couplings must be designed for a burst pressure of not less than 120 percent of the design burst pressure of the hose.

A requirement would be added that loading/unloading and charging lines be of sufficient strength or be protected by a fail-safe device in order to prevent damage to the cargo tank that could result in loss of lading from any forces applied by loading/unloading or charging lines attached to the cargo tank. This should prevent the uncontrolled loss of lading from the cargo tank should the cargo tank motor vehicle be moved while the loading/unloading or charging lines are still attached to the facility's tanks. Finally, a provision would be added to authorize the use of nonmetallic piping, valves or connections located outboard of the lading retention system.

Section 178.340–10. Pressure relief device requirements would be contained in this section. The proposal differs from existing regulations as follows:

1. Provisions for possible arrangements, types, location and pressure setting of pressure relief devices are expanded and revised for clarity. This section contains requirements currently found in §§ 178.341–4, 178.342–4 and 178.343–4.

2. Research and experiments have shown that cargo tanks can experience short duration pressure surges of up to 50 psig in a rollover. This has been shown to cause the release of about two gallons of lading through the pressure relief devices on a typical MC 306 cargo tank. The proposal clarifies the fact that the present regulations require pressure relief systems to be capable of withstanding a pressure surge without leakage of lading and yet be capable of operating when there is a sustained pressure rise in the tank.

3. We are not aware of a valid reason for a normal vent valve set-to-discharge at 1 psig since, in many rollover conditions, the static head of the lading would open and operate such a valve. Additionally, the vapor pressure of some ladings exceeds 1 psig in transportation resulting in continuous venting. Therefore, we are proposing to prohibit the use of normal vent valves.

4. We propose to revise the procedures used to establish the rated flow capacity for pressure relief devices. The proposal requires that a manufacturer of a pressure relief device certify that the pressure relief device model (design, size and set pressure) is designed, tested and meets the requirements contained in this section and the applicable cargo tank specification. Each pressure relief device model would be flow capacity tested prior to its first use. The rated flow capacity for each pressure relief device model would be based on testing of at least three prototype pressure relief devices. The marked rated flow capacity of the pressure relief device would not be greater than 90 percent of the average value for the devices tested. Additionally, we are proposing that an Authorized Inspector withness and approve the flow capacity test for each pressure relief device model and sign the manufacturers certification for that model.

5. We believe that the risk from hazardous material transportation is substantially reduced when packaging is designed to retain the lading in non catastrophic accidents and to minimize the quantity of lading released when release is inevitable. However, in a cargo tank accident, particularly an overturn followed by a fire, the functioning of a frangible disc or a fusible element would result in the release of a substantial quantity of lading. A reclosing pressure relief device on the other hand would minimize the quantity of lading released. Further, we believe that frangible disc and fusible elements particularly in low pressure applications are much more likely to fail as a result of impact and liquid surge than reclosing pressure relief devices. Accordingly, for all cargo tanks constructed after the effective date of the final rule, we are proposing that all pressure relief devices be reclosing, except a frangible disc may be used in series with a reclosing pressure relief device.

Section 178.340–11. Requirements for tank outlets would be contained in this section. In this proposal, the present requirements contained in §§ 178.341–5, 178.342–5 and 178.343–5 are revised to provide practical guidelines for the design of cargo tank openings, outlets and their attached piping, connections and appurtenances.

Requirements for remote closure of a cargo tank loading/unloading outlet would be clarified. Each cargo tank self-closing stop valve used for loading and/or unloading would be required to have a remote means of closure. When used to transport a flammable liquid, pyrophoric liquid, oxidizer or Poison B liquid, a cargo tank would be required to be equipped with a self-closing stop valve capable of being remotely operated by both thermal and mechanical means. These requirements presently are contained in § 173.119 but have not been consistently required for all flammable liquids and other hazardous materials presenting similar risks. Non self-closing stop valves with mechanical means of remote closures would be authorized for corrosive materials.

Based on a petition (P–537) and on exemption experience, requirements for internal outlet self-closing stop valves would be relaxed to allow the use of an external self-closing stop valve in certain cases. See the preamble discussion of § 178.340–8 on accident damage protection.

Provisions regarding top outlets would be clarified. An opening in the top of a cargo tank that is securely closed during transportation with a welded or bolted blank flange or by a threaded plug would not be considered an outlet. Such openings would be considered projections and if they extend more than two inches from the tank shell or head accident damage protection would be required. See proposed § 178.340-8(a)(1).

Section 178.340–12. Gauging device requirements would be contained in this section. Existing requirements for gauging devices are applicable only to MC 307 cargo tanks. These requirements would be revised and made applicable to MC 306 and MC 312 cargo tanks. As proposed, any method that measures the maximum permitted liquid level or amount of the lading to an accuracy of 0.5 percent would permitted. Sight glass gauging devices would continue to be prohibited.

Section 178.340–13. This section would contain the general pressure testing requirements presently found in §§ 178.341–7, 178.342–7 and 178.343–7. This section would also contain a general pressure test procedure which emphasizes that a cargo tank must be subjected to a prescribed test pressure to assure the pressure integrity of the cargo tank.

The proposal authorizes pneumatic pressure testing for all DOT Specification MC 306, MC 307 or MC 312 cargo tanks. If pneumatic testing is used, the cargo tank must be inspected for leakage or other signs of defects at the inspection pressure specified in the applicable specification. The pneumatic inspection pressure specified would be

lower than test pressure due to the potential hazards involved in a pneumatic pressure test.

Section 178.340–14. This section would revise and clarify the cargo tank marking requirements presently contained in § 178.340–10. The required markings will all be found on the cargo tank nameplate or the cargo tank motor vehicle specification plate. It would also require that all markings must be in English.

Since all DOT Specification MC 306, MC 307 and MC 312 cargo tanks will either be "constructed and certified in conformance with the ASME Code" or "constructed in accordance with the ASME Code", each cargo tank nameplate would be required to contain all the information required by the ASME Code. In addition, the nameplate would also be required to contain other markings such as cargo tank design pressure, cargo tank test pressure, cargo tank design temperature range, material specification (shell and heads), minimum shell and head thickness, and maximum design density of the lading.

The marking of the cargo tank design pressure would be required because shippers of hazardous materials must be able to determine if a cargo tank has adequate lading retention capability for the commodity to be shipped. The cargo tank design temperature range marking would make shippers and carriers aware of the temperature range at which the cargo tank can be safely operated. Operating the cargo tank at temperatures outside this range might affect the strength and physical properties of the cargo tank's material of construction. Marking the minimum shell thickness for the cargo tank top, side and bottom, would acknowledge the industry practice, especially in MC 306 cargo tank construction, of building a cargo tank with thicker top and bottom plates and a thinner sidewall. Marking the maximum design density of the lading on the nameplate should prevent the loading of a cargo tank with a lading which is heavier than the design density of the cargo tank.

Additionally, each cargo tank motor vehicle would be required to have a specification plate providing safety and operational data. The specification plate would contain such information as exposed surface area, maximum loading and unloading rates, heating system design pressure and temperature, lining material, the name of the cargo tank and cargo tank motor vehicle manufacturer and the cargo tank motor vehicle certification date.

The marking of the exposed surface area would provide a means of determining the required venting capacity. The marking of the maximum loading and unloading rates and the heating system design pressure and temperature would provide shippers and carriers with important operational information about the cargo tank motor vehicle. For example, this information could prevent the use of a heating medium which is warmer than the design temperature of the system.

The proposal allows the combination of the nameplate and specification plate on an uninsulated cargo tank. In this case, the combination plate would be welded or brazed to the cargo tank. For an insulated cargo tank, the nameplate would be required to be welded or brazed to the cargo tank and the specification plate would be welded, brazed, or riveted to the insulation jacket or to an integral supporting structure of the cargo tank motor vehicle. The ASME Code requires that the nameplate be visible after insulation is applied. Additionally, paragraph UG–119(f) of the ASME Code contains provisions for installation of a duplicate nameplate on the insulation jacket. The use of duplicate plates is also important on ASME Code cargo tanks if the specification plate is lost or becomes illegible. The nameplate which is on the cargo tank would serve to verify ASME Code construction and would enable the owner to replace the specification plate.

Secton 178.340–15. This section would revise and clarify the certification requirements presently contained in § 178.340–10. The proposal requires that in addition to a responsible official of the manufacturer that an Authorized Inspector would also be required to sign a certificate certifying that the cargo tank or cargo tank motor vehicle is designed, fabricated, tested and completed in conformance with the application specification.

Additionally, the proposal requires that the manufacturer of each stage of a cargo tank motor vehicle construction not only must furnish a certificate covering its work to any succeeding manufacturer, but also must pass along any certificates received from earlier manufacturers. This will ensure that at the end of staged construction, the final manufactuer will possess certificates covering the entire construction process. The proposal also would require that the manufacturer furnish the owner with all certificates and other documentation required by this section.

Section 178.341. Individual specification requirements applicable to an MC 306 cargo tank motor vehicle are contained in this section.

The MC 306 type cargo tank is a low pressure cargo tank used mostly for the transportation of low vapor pressure flammable liquids. The research contractor estimates that there are approximately 102,500 cargo tanks of all specifications in hazardous materials service and that approximately 57 percent (57,900) of these are MC 306 type cargo tanks. The MTB incident data base for the years 1980 through 1983 shows that MC 306 type cargo tanks accounted for about 88 percent of the deaths reported for cargo tanks of known type in hazardous material service. We believe that this data depicts the combined high risk potential of the highly flammable hazardous materials transported and the comparatively low integrity of MC 306 type cargo tanks relative to other specification cargo tanks. MC 306 type cargo tanks have a thin shell and heads that require additional reinforcement to accommodate the prescribed environmental loads.

Because we do not have sufficient data to assess the suitability of the basic shell integrity of MC 306 type cargo tanks in accidents or to evaluate various countermeasures such as increased shell and head thickness and improved roll stability, we have not proposed any revision of the regulations on this issue. This proposal, however, does address the matching of hazardous material properties with tank design parameters.

Presently there are no requirements for the design pressure specified for the MC 306 cargo tank except that the tank must be designed for a "Design Pressure" not less than the static head of the fully loaded tank in the upright position. Several petitioners (P–562, P–827) requested revision of the requirement that the tank shell be designed to withstand a pressure not less than that exerted by the static head of the lading. The petitioners claim that the design pressure of a typical MC 306 cargo tank is zero. We disagree. At present, MC 306 cargo tanks must have a design pressure of not less than the static head of a fully loaded tank and be pressure tested at 3 psig. The low capacity normal vent is set-to-discharge at one psig. The emergency pressure relief devices for fire conditions are set-to-discharge at 3 psig and are flow rated at 5 psig. The unloading relief protection system is designed to prevent pressure in the tank from exceeding 3 psig. The tank is in effect normally operated at up to 3 psig and in an emergency situation at 5 psig which is 166 percent of the test pressure.

MC 306 cargo tanks should be designed for a test pressure of 5 psig, the pressure at which the pressure relief valve is rated. Section 173.119 permits MC 306 cargo tanks for ladings with a

vapor pressure of 16 psia at 100 °F. or 1.3 psig. Some of these ladings have a vapor pressure of 5.8 psig at 115 °F, the reference design temperature. For a typical MC 306 cargo tank of elliptical cross section, minor axis of 61 inches, typical ladings can produce a static pressure of 1.5 to 2.0 psig. For example, pentane should be transported in a cargo tank with a design pressure of at least 8.7 psig [1.2 times (vapor pressure at 115 °F=5.8 psig; plus the static head =1.4 psig for a tank 60 inches high)]. Given the potential magnitude and the variability of these properties over the vast number of hazardous materials authorized, we believe a design pressure of not less than 3 psig is necessary. A maximum design pressure of 14.9 psig is being proposed for the MC 306 cargo tank.

The pressure design parameters for a tank are generally based on the vapor and static pressure of the lading and the loading/unloading pressure. For most cargo tanks, the tank test pressure is 150 percent of the design pressure and the emergency relief devices are set-to-discharge and flow rated at not lower than the design pressure and not above the test pressure. This philosophy assures that the emergency relief devices would not operate under normal transportation conditions and yet during an emergency condition would operate at less than or equal to a pressure for which the tank has been proof-tested.

Based on this discussion, we propose to revise the MC 306 specification as follows:

1. A minimum design pressure of 3 psig would be specified for MC 306 cargo tanks. This design pressure is consistent with the setting presently used for both loading/unloading and emergency relief devices.

2. The maximum design pressure for MC 306 cargo tanks would be increased to 14.9 psig. This is a relaxation of the present requirements and will be consistent with § 173.119 which allows the MC 306 for a lading with a vapor pressure of 16 psia at 100 °F. and takes into account that some ladings will have higher vapor pressures at 115 °F.

3. A test pressure of 150% of the design pressures, and in no case less than 5 psig, would be required for MC 306 cargo tanks. This is an extension of the present requirement of flow rating the relief devices at 5 psig (1.66 times 3 psig). We believe this 1.66 ratio is adequate for a 3 psig design pressure and is compatible with the presently used operating and emergency venting pressures.

4. The minimum set-to-discharge pressure for any pressure relief valve would be the design pressure (3 psig minimum). The pressure relief valve must close at not less than the design pressure.

5. For a cargo tank designed to be loaded or unloaded with the dome cover closed, the cargo tank must be equipped with a vacuum relief device to limit the vacuum to 1 psig and a pressure relief valve to limit the tank pressure to design pressure based on the product transfer rate marked on the cargo tank specification plate. This change allows greater flexibility for cargo tanks having a design pressure greater than 3 psig.

6. The use of the existing relief valve for normal venting conditions (set-to-discharge at 1 psig) would be prohibited. This relief valve has been shown by research to be a source of leakage in a cargo tank rollover and allows the release of lading under normal transportation conditions. The release of lading through these valves does not conform to the no leakage requirement in § 178.341-4(d)(2) of the present regulations. The leakage in a rollover may be due to static pressure plus vapor pressure of lading acting on the device.

Certain other revisions to the MC 306 cargo tank motor vehicle specification would also be made. The use of rupture discs would continue to be prohibited in cargo tanks intended for a flammable liquid lading. As stated earlier in the preamble discussion to § 178.340-5, the required strength of the manhole would be increased to that used by most of the tank manufacturers.

Section 178.342. Individual specification requirements applicable to a MC 307 cargo tank motor vehicle are contained in this section. Based on exemption experience, construction of a vacuum-loaded cargo tank motor vehicle designed in conformance with the MC 307 cargo tank motor vehicle specification would be authorized.

Petitioners (P-262, P-327) have requested a revision that would change the maximum allowable stress of ⅛ of the ultimate strength of the metal used to ¼. This suggested revision has been incorporated by the adoption of the ASME Code.

Section 178.343. Individual specification requirements applicable to a MC 312 cargo tank motor vehicle are contained in this section. Based on exemption experience, construction of a vacuum-loaded cargo tank motor vehicle with an internal design pressure of 25 psig and an external design pressure of 15 psig designed in conformance with the MC 312 cargo tank specification would be authorized. Given the substantial acute and environmental risks associated with the release of corrosive materials, we are proposing a minimum design pressure of 15 psig for MC 312 cargo tank motor vehicle.

Section 180 Subpart E. The requirements for the continuing qualification, maintenance and periodic testing of MC 300 thru MC 312, MC 330, MC 331 and MC 338 cargo tank motor vehicles presently found in §§ 173.33, 177.814 and 177.824 would be contained in this new subpart.

Section 180.405 This section would contain general requirements for the use of cargo tank motor vehicles. The requirements are based on the regulations presently found in § 173.33 or have been developed as a result of the research programs described earlier in the preamble. The requirements would provide for the continued use of—an existing cargo tank motor vehicle made to an obsolete specification, cargo tank motor vehicles conforming with and used under a DOT exemption whose provisions have been incorporated into the HMR, and DOT Specification cargo tank motor vehicles having no marked design pressure or a marked design pressure of less than 3 psig (see earlier preamble discussion titled "Design Pressure of Cargo Tank"). These requirements would assure that the level of safety of each cargo tank motor vehicle would be in accordance with the intent of the regulations.

As stated earlier in the preamble discussion to § 178.340-5, research findings have shown that in a rollover condition manhole covers frequently fail or are deformed, causing lading leakage. To correct this problem, proposed § 180.305(g) would require a retrofit on certain cargo tank manhole closures within 5 years of the effective date of the final rule with at least 20 percent of the affected cargo tanks being retrofitted each year. Each manhole closure would be required to be capable of withstanding a static internal pressure of at least 36 psig or the cargo tank test pressure, whichever is greater, without leakage or permanent deformation.

Presently § 173.33(b)(2) authorizes MC 304 cargo tanks to have pressure relief devices and outlets which conform with DOT Specification MC 307 cargo tanks. We can find no valid reason why other DOT Specification cargo tanks made to an obsolete specification cannot be similarly modified. This proposal would allow MC 300, MC 301, MC 302, MC 303 and MC 305 cargo tanks to have pressure relief devices and outlets which conform with MC 306 cargo tanks, MC 310 and MC 311 cargo tanks to have pressure relief devices and outlets which conform with MC 312 cargo tanks, and MC 330 cargo tanks to have

pressure relief devices and outlets which conform with MC 331 cargo tanks.

Section 180.407. This section would contain all the requirements for the test and inspection of DOT Specification cargo tank motor vehicles. It would contain the general requirements presently in §§ 173.33 and 177.824, in addition to the proposed new requirements which have been developed as a result of the research program. Among the revisions to the general requirements is a clarification of the test requirements and the required test and inspection frequency in tabular format. The proposed test frequency would be consistent with and justified by the research program and associated recommendations and findings. Additionally, this section would emphasize the need to have trained and experienced inspectors.

Paragraph (d) would contain the requirements for an annual external visual inspection and testing. This section would contain the present periodic testing and inspection requirements contained in § 177.824(b) and the following new requirements:

(a) The annual external visual inspection would be expanded to include DOT Specification MC 330, 331 and 338 cargo tank motor vehicles based on the need demonstrated by the research studies;

(b) Provisions on the inspection and testing of remote closure devices and the inspection of other appurtenances and accessories (that the research studies have shown should be inspected) would be added.

Paragraph (e) would provide the conditions under which an annual internal visual inspection is required. This section would contain some of the present requirements contained in § 177.824(b).

Paragraph (f) would contain the retesting requirements on all lined cargo tanks. These are proposed new requirements which resulted from the research program and NTSB recommendations.

Paragraph (g) would specify the pressure retest requirements for all cargo tanks. This section would contain the requirements presently found in §§ 177.824(c), (d) and 173.33(d), and the following revisions or additions:

(a) Specify the retest pressure for all cargo tanks in tabular form.

(b) Specify that each cargo tank must be pressurized to test pressure, except that the inspection for leaks and damage at design pressure would be permitted if the cargo tank is pneumatically retested.

(c) Require that pressure bearing parts of a cargo tank heating system be hydrostatically tested at a minimum of one and one-half times the heating system design pressure once every five years. The test pressure is based on several petitions for rulemaking (P–262, P–316, P–327).

(d) Require that each pressure retest be witnessed and certified by an Authorized Inspector. Additionally, each cargo tank motor vehicle would be required ferred to have an external and internal visual inspection performed by an authorized inspector every five years as part of the pressure retest. To minimize the economic impact of pressure retesting all affected DOT specification cargo tanks, we are proposing that at least 20% of each owner's affected cargo tanks be retested each year.

(e) Establish a requirement that each MC 330 and MC 331 cargo tank constructed of QT steel be subjected to periodic internal fluorescent magnetic particle reinspection when used for the transport of liquefied petroleum gas or any lading that may cause stress corrosion cracking, the same as is now required for cargo tanks in ammonia service. Research on the integrity of MC 330 and MC 331 cargo tanks shows that the incidence of stress corrosion cracking is increasing and not limited to cargo tanks in anhydrous ammonia service. We believe requiring fluorescent magnetic particle reinspection is necessary for cargo tanks that transport any material that may cause stress corrosion cracking, except those constructed of other than part UHT materials that are postweld heat treated. We are specifically soliciting comments and rationale as to whether this proposed requirement should be extended to cargo tanks made of steel that are not postweld heat treated and to cargo tanks of less than 3500 gallons capacity without a manhole.

(f) Paragraph (h) would require an annual leakage test on all cargo tanks. This would be a new requirement based on the results of the research studies which found numerous leaks in the majority of cargo tank compartments tested. In order to limit cost and equipment down time, the test prescribed in the Environmental Protection Agency's "Determination of Vapor Tightness of Gasoline Delivery Tank Using Pressure-Vacuum Test" is an acceptable alternative test.

(g) Paragraph (i) would require thickness testing of cargo tank motor vehicles under certain conditions. This requirement is based on the need shown by analysis of accidents involving cargo tank motor vehicles in corrosive service. This requirement is consistent with a rule-related notice that was published in the **Federal Register** (48 FR 15127; April 7, 1983) requiring the owner to assure himself that the cargo tank motor vehicle conforms at all times with the specification under which it was constructed.

Thickness testing would be required when:

1. Visual inspection at any time indicates significant corrosion.

2. A cargo tank motor vehicle is unlined and is in corrosive service or is exposed to a corrosive environment capable of affecting the structural integrity of the cargo tank motor vehicle.

Section 180.409. This section would establish minimum qualification standards for any persons performing or witnessing a test or inspection required in § 180.407. Specific qualification standards are prescribed for each required test or inspection. This section would be included to assure that all cargo tanks are tested and inspected by experienced and qualified personnel who are familiar with both the cargo tank motor vehicle specifications and proper testing methods. This section addresses a finding in the cargo tank research program that showed some testers are unqualified.

Section 180.411. This section would establish pass-fail criteria for each required test and inspection contained in § 180.407. The establishment of pass-fail criteria would ensure that the results of each required test and inspection in § 180.407 would be evaluated in the same way.

Section 180.413. This section would contain the repair, replacement of appurtenances, and modification requirements presently prescribed in §§ 173.33–(d)(11), (e) and 177.824, and the following revisions:

1. Repair requirements for MC 300 thru MC 305, MC 310 and MC 311 cargo tanks would be specified. Such requirements are merely implied in the existing regulations.

2. All cargo tank repairs would be required to be performed in a facility having a current certificate of authorization from the ASME for Section VIII (Division 1), having a current certificate from the National Board, or under the direct supervision of an Authorized Inspector.

3. Modification, stretching, and rebarrelling parameters would be specified and qualifications for facilities performing such work would be prescribed. The facility requirements would be identical to those specified for repairs.

Section 180.415. This section would contain the marking requirements presently contained in § 177.824(h) plus a new requirement to identify the type

of test or inspection performed. This new requirement would enable shippers, carriers and enforcement personnel to readily determine if a cargo tank motor vehicle has been tested or inspected as required by proposed § 180.407.

Section 180.417. This section would contain the reporting and record retention requirements presently prescribed in §§ 173.33 and 177.824, and the following revisions:

1. A requirement that each owner of a cargo tank motor vehicle retain in its files a certificate or manufacturer's data report certifying that the cargo tank motor vehicle is in conformance with the specification under which it was constructed. This proposed requirement has been added based on the results of the research program which indicated that a significant number of owners did not have these documents in their possession. Additionally, the research program showed that most owners did not have drawings or calculations for their equipment. This information will be of great assistance to the owner and other persons in verifying that a cargo tank conforms with the regulations. If a manufacturer's certificate is unavailable, owners of non-ASME Code stamped cargo tanks manufactured before the effective date of the final rule would be permitted to certify their equipment when supervised by an Authorized Inspector, owners of ASME Code stamped cargo tanks would be able to obtain a copy of the manufacturer's data report from the National Board or copy the information contained on the cargo tank nameplate and ASME Code plate. In both cases, the owner and the Authorized Inspector would be required to sign the certificate stating that the cargo tank fully conforms to the appropriate specification.

2. This section would expand the information required on the cargo tank test or inspection report presently required in § 177.824. The additional information will make readily available to all concerned parties exactly what type of testing or inspection was performed along with the results of each test or inspection. This proposed requirement was based upon the recommendations of the research program and comments to Docket HM-183 recommending close monitoring of compliance with the HMR.

3. Reporting requirements for MC 330 and MC 331 cargo tanks carrying liquefied petroleum gas or any other material that may cause stress corrosion cracking would be specified. This is presently required for MC 330 and MC 331 cargo tanks in anhydrous ammonia service. We believe that this requirement is justified because research has shown that the incidence of stress corrosion cracking is increasing and is not limited to cargo tanks in anhydrous ammonia service.

Comments

MTB and BMCS are requesting that interested persons submit constructive comments, together with supporting data, for or against the rules proposed in this notice. The submission of general comments without supporting data or documentation will not assist MTB and BMCS in the development of a final rule. In order to fully consider the impact of this complex and technical proposal on public safety and the regulated industry, commenters are strongly encouraged to provide substantive data, calculations and test results to support their views. Commenters are requested to make their comments in a manner that will clearly identify the particular matters on which they are commenting. Unless comments are general in nature pertaining to the entire Notice, it is requested that each paragraph of comments be identified in the following manner:

"*Part 176.* We think ——" or "*Section 172.503* We believe ——".

MTB and BMCS are particularly interested in receiving constructive comments in the following areas:

(1) What would be the incremental cost and benefits to the public and to cargo tank motor vehicle purchasers of requiring ASME Code construction of new cargo tank motor vehicles?

(2) What would be the incremental cost and benefits of requiring the use of National Board Authorized Inspectors and requiring that an Authorized Inspector certify that a cargo tank motor vehicle conforms with the applicable DOT specification?

(3) What would be the incremental cost and benefits of requiring that repairs to a cargo tank be performed by the following: a cargo tank manufacturer holding an ASME "U" stamp; a repair facility holding a "R" stamp; or under the direct supervision of an Authorized Inspector who certifies the repair as being acceptable?

(4) What would be the incremental savings on insurance to cargo tank manufacturers and cargo tank motor vehicle operators on cargo tank motor vehicles built to the ASME Code and certified by an Authorized Inspector?

(5) What would be the incremental savings realized by authorizing the use of external self-closing stop valves as proposed in § 178.340-11(a)?

(6) What would be the incremental savings realized if the rear end tank damage protection requirements as proposed in § 178.340-8(d) were adopted?

(7) Should we require National Board registration for all new construction of cargo tank motor vehicles?

(8) Should we require that an Authorized Inspector perform and approve or witness and approve all the tests and inspections specified in Part 180 of this proposal?

(9) What would be the impact of no longer authorizing the use of MC 300, MC 301, MC 302, MC 303, or MC 305 cargo tank motor vehicles for transporting hazardous materials?

(10) Should we limit the service life of a cargo tank motor vehicle in hazardous materials service? If so, what should this service life limit be?

(11) Are there any hazardous materials presently authorized in MC 306 type cargo tanks that are too hazardous to be transported in such tanks?

(12) Is it likely that a lined cargo tank with external insulation could have corrosion that significantly reduces its structural integrity yet would still pass the prescribed pressure test? If so, what test or inspection procedures could be used to identify and prevent this condition?

(13) Should MTB required special construction, test, operational or restricted lading authorizations on a cargo tank fitted with a very large closure (e.g. an openable rear head) located below the normal liquid level of a full cargo tank?

(14) In addition to answers to the above questions, MTB solicits comments on the overall cost effectiveness (and the incremental cost change) if the rules proposed in this Notice are adopted.

VII. Administrative Notice

A. Executive Order 12291

The effect of this rule, as proposed, does not meet criteria specified in § 1(b) of Executive Order 12291 and is, therefore, not a major rule, but is a significant rule under the regulatory procedures of the Department of Transportation (44 FR 11034). This proposed 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 sq.) A regulatory evaluation and flexibility analysis is available for review in the Docket.

B. Impact on Small Entities

Based on limited information concerning size and nature on entities likely affected by this proposed rule, I certify this proposal will not, if

promulgated, have a significant economic impact on a substantial number of small entities. This certification is subject to modification as a result of a review of comments received in response to this proposal. A preliminary regulatory flexibility analysis is available for review in the docket.

C. Paperwork Reduction Act

Information collection requirements contained in this proposal are being submitted for approval to the Office of Management and Budget (OMB) under the provisions of the Paperwork Reduction Act of 1980 (Pub. Law 96–511).

List of Subjects

49 CFR Part 171

Hazardous materials transportation, Incorporation by reference.

49 CFR Part 172

Hazardous materials transportation.

49 CFR Part 173

Gases, Hazardous materials transportation, Packaging and containers, Reporting and recordkeeping requirements.

49 CFR Part 176

Hazardous materials transportation, Maritime carriers, Cargo vessels.

49 CFR Part 177

Hazardous materials transportation, Motor carriers.

49 CFR Part 178

Hazardous materials transportation, Packaging and containers.

49 CFR Part 180

Hazardous materials transportation, Packaging and containers.

In consideration of the foregoing, Parts 171, 172, 173, 176, 177 and 178 of Title 49, Code of Federal Regulations, would be amended and a new Part 180 would be added to read as follows:

PART 171—GENERAL INFORMATION, REGULATIONS AND DEFINITIONS

1. The authority citation for Part 171 continues to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1807, 1808; 49 CFR 1.53(e).

2. In § 171.3, paragraph (f) would be added to read as follows:

§ 171.3 Hazardous waste.

* * * * *

(f) A nonspecification cargo tank motor vehicle manufactured prior to (effective date of final rule) may continue to be used for the transportation of a hazardous waste if the cargo tank motor vehicle—

(1) Was manufactured to a standard reasonably equivalent to a DOT MC 307 or MC 312 specification cargo tank;

(2) Was used to transport a hazardous waste prior to (effective date of final rule);

(3) Has a capacity of 3,500 gallons or less;

(4) Is operated exclusively by an intrastate motor carrier in a State where its operation was permitted by the laws of that State prior to (effective date of final rule);

(5) Is operated in that State in accordance with all other requirements of this subchapter; and

(6) Is maintained, retested and inspected as specified for a MC 307 or MC 312 cargo tank motor vehicle in Subpart E, Part 180, of this subchapter.

3. In § 171.7, paragraphs (c)(21), (d)(1) and (d)(15)(i) would be revised; paragraphs (c)(32), (c)(33), (c)(34), (d)(3)(x), (d)(28), (d)(29) and (d)(30) would be added to read as follows:

§ 171.7 Matter incorporated by reference.

* * * * *

(c) * * *

(21) AWS: American Welding Society, 550 NW LeJeune Rd., Miami, Florida 33126.

* * * * *

(32) ASNT: American Society for Nondestructive Testing, P.O. Box 21124, Columbus, Ohio 43221.

(33) RMA: Rubber Manufacturers Association, 1400 K St., N.W., Washington, D.C. 20005.

(34) National Board: National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229.

(d) * * *

(1) ASME Code means Sections II (Parts A and B), V, VIII (Division 1), and IX of the 1983 edition of the "American Society of Mechanical Engineers Boiler and Pressure Vessel Code" and addenda thereto through December 31, 1984.

* * * * *

(3) * * *

(x) CGA Technical Bulletin TB–2 is titled, "Guidelines for Inspection and Repair of MC 330 and MC 331 Cargo Tanks," 1980 edition.

* * * * *

(15) * * *

(i) AWS Code 2.1 is titled, "Standard Qualification Procedure," 1984 edition.

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(28) ASNT Recommended Practice No. SNT–TC–1A is titled "Personnel Qualification and Certification in Nondestructive Testing," 1980 edition, and applicable supplements.

(29) RMA Technical Bulletin 13 is titled "Procedure for Spark Testing Elastomeric Sheet Lining," 7–1985 edition.

(30) National Board Inspection Code is titled "National Board Inspection Code, A Manual for Boiler and Pressure Vessel Inspectors" NB–23, Rev. 4, 1983 edition.

* * * * *

4. In § 171.8, the definition of "cargo tank" would be revised and a definition for "Authorized Inspector", "Authorized Inspection Agency" and "cargo tank motor vehicle" would be added in alphabetical sequence to read as follows:

§ 171.8 Definitions and abbreviations.

* * * * *

"Authorized Inspector" means an Inspector who is currently commissioned by the National Board of Boiler and Pressure Vessel Inspectors and employed as an Inspector by an Authorized Inspection Agency.

"Authorized Inspection Agency" means (1) a jurisdiction which has adopted and administers one or more sections of the ASME Boiler and Pressure Vessel Code as a legal requirement and has a representative serving as a member of the ASME Conference Committee, or (2) an insurance company which has been licensed or registered by the appropriate authority of a State of the United States or a Province of Canada to write boiler and pressure vessel insurance in such State or Province.

* * * * *

"Cargo tank" means a tank (including the appurtenances, reinforcements, fittings and closures) having a capacity over 110 gallons that is premanently 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 and unloaded without being removed from the motor vehicle. For "tank", see § 178.340–1(c). A packaging fabricated under a specification for cylinders, portable tanks, tank cars or multi-unit tank car tanks is not a cargo tank.

"Cargo tank motor vehicle" means a motor vehicle with one or more cargo tanks permanently attached to or forming an integral part of the motor vehicle.

* * * * *

PART 172—HAZARDOUS MATERIALS TABLES AND HAZARDOUS MATERIALS COMMUNICATIONS REGULATIONS

5. The authority citation for Part 172 continues to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1807, 1808, 49 CFR 1.53(e).

6. In § 172.203, paragraph (h)(2) would be amended by removing the reference "§ 173.315(a)(1), Note 15" and inserting in its place the reference "§ 173.315(a), Note 15".

PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS

7. The authority citation for Part 173 continues to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1807, 1808; 49 CFR 1.53(e).

8. Part 173, Subpart B of the Table of sections would be amended by revising the entry for § 173.33 to read as follows:

Subpart B—Preparation of Hazardous Materials for Transportation.

Sec.

* * * * *

173.33 Hazardous materials in cargo tank motor vehicles.

* * * * *

9. In § 173.22, the introductory text to paragraph (a)(2) and paragraph (b) would be revised to read as follows:

§ 173.22 Shipper's responsibility.

(a) * * *

(2) The shipper must determine that the packaging or container is an authorized packaging, including all special requirements, and that the packaging has been manufactured, assembled and marked in accordance with:

* * * * *

(b) When a person performs a function covered by or having an effect on a specification prescribed in Part 178, 179 or 180 of this subchapter, an approval issued under this subchapter, or an exemption issued under Subchapter B of this chapter, that person must perform the function in accordance with that specification, approval or exemption, as appropriate.

* * * * *

10. Section 173.33 would be revised to read as follows:

§ 173.33 Hazardous materials in cargo tank motor vehicles.

(a) *General requirements.* (1) No person may offer a hazardous material for transportation in a cargo tank motor vehicle except as authorized by this subchapter.

(2) No two or more materials, the mixing of which may produce an unsafe condition, may be shipped in a cargo tank motor vehicle.

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

(b) *Loading requirements.* (1) A hazardous material may not be loaded in a cargo tank if any part of the tank in contact with the hazardous material during transportation would have a dangerous reaction with the hazardous material.

(2) A cargo tank may not be loaded with hazardous material that:

(i) May combine chemically with any residue or contaminants in the tank to produce an unsafe condition.

(ii) Has a density exceeding the maximum density of lading specified on the tank specification plate.

(iii) Is warmer or colder than the design temperature range specified on the tank specification plate.

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

(4) 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 § 173.315 or § 173.318.

(c) *Design pressure.* (1) Prior to a cargo tank motor vehicle being filled and offered for transportation, the shipper must confirm that the cargo tank motor vehicle conforms with the specification required for the lading and that the design pressure of the cargo tank is greater than or equal to the largest of the following:

(i) 120 percent of the sum of the vapor pressure of the lading at 115 °F., the tank static head exerted by the lading, and any pressure exerted by the gas padding, including air in the ullage space or dome;

(ii) The pressure prescribed in Subpart B, D, E, F, G or H, as applicable; or

(iii) The maximum pressure used to load or unload the lading.

(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 largest pressure derived from § 173.33(d) of § 178.340–1 of this subchapter is less than or equal to 3 psig.

(3) Any Specification MC 310 or MC 312 cargo tank motor vehicle may be used for an authorized lading where the largest pressure derived from § 173.33(d) or § 178.340–1(l) of this subchapter is less than or equal to the MAWP or MWP respectively, as marked on the specification plate.

(4) Any material that meets the definition of a Poison B material must be shipped in a cargo tank motor vehicle having a design pressure of 25 psig or greater.

(5) Any material that meets the definition of more than one hazard class must be transported in a cargo tank motor vehicle having a design pressure of 25 psig or greater.

(d) *Relief system.* (1) A non-reclosing pressure relief device, except when installed in series with a pressure relief valve, should not be fitted in a cargo tank used to transport hazardous materials. However, a cargo tank constructed before (effective date of final rule) that is fitted with a non-reclosing pressure relief device installed paralled to a pressure relief valve may continue to be used in hazardous material service.

(2) Each cargo tank used to transport a gaseous hazardous material must have a pressure relief system that provides the venting capacity prescribed in § 178.340–10(e) of this subchapter.

(3) A cargo tank made to a specification listed in column 1 may be ungraded or have the relief devices or outlets modified to conform with the applicable requirement for the specification listed in column 2 without changing the markings on the tank's specification plate.

Column 1	Column 2
MC 300, MC 301, MC 302, MC 303, MC 305	MC 306.
MC 304	MC 307.
MC 310, MC 311	MC 312.
MC 330	MC 331.

(e) *Excess flow valves and back flow check valves.* Each MC 330 and MC 331 cargo tank used to transport a flammable liquid must have each liquid or vapor discharge opening equipped with a remotely controlled internal self-closing stop valve conforming to § 178.337–11(a) of this subchapter.

11. In § 173.119, paragraphs (m)(11) and (m)(12) would be removed and reserved; the introductory text of paragraphs (a) and (b), and paragraphs (a)(17), (b)(1), (e)(3), and (m)(10) would be revised; and paragraph (b)(12) would be added to read as follows:

§ 173.119 Flammable liquids not specifically provided for.

(a) *Flammable liquids with flash point 20 °F., or below.* Flammable liquids with flash points of 20 °F., or below and having a vapor pressure (Reid [1] test) not over 16 pounds per square inch, absolute, at 100 °F., other than those for which special requirements are prescribed in this Part, must be offered for transportation in specification containers constructed of materials that will not react dangerously with or be decomposed by the lading, as follows:

* * * * *

(17) Specification MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, MC 312, MC 330, or MC 331 (§§ 178.340, 178.341, 178.342, 178.343, 178.337 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each cargo tank must be equipped with a pressure relief system conforming to § 178.341–10 or § 178.342–10 of this subchapter, except that pressure relief devices on Specification MC 330 and MC 331 cargo tanks must conform to § 178.337–9 of this subchapter.

(ii) Bottom outlets equipped with self-closing stop valves conforming to § 178.340–11(a)(1)(i) of this subchapter are authorized, except that bottom outlets on Specification MC 330 and MC 331 cargo tanks must be equipped with internal self-closing stop valves conforming to § 178.337–11(a) of this subchapter.

* * * * *

(b) *Flammable liquids with flash points above 20 °F. to 73 °F.* Flammable liquids with flash points above 20 °F. to 73 °F. having vapor pressure (Reid [1] test) not over 16 pounds per square inch, absolute, at 100 °F., other than those for which special requirements are prescribed in this Part, must be offered for transportation in specification containers constructed of materials that will not react dangerously with or be decomposed by the lading, as follows:

(1) Containers as prescribed in paragraph (a) of this section, except paragraph (a)(17). Openings greater than 2.3 inches in diameter in barrels and drums are authorized when permitted by the specification.

* * * * *

(12) Any cargo tank motor vehicle as prescribed in paragraph (a)(17) of this section, except that top unloading is permitted. (See § 173.33(b)(3).

* * * * *

(c) * * *

(3) Specification MC 304, MC 307, MC 310, MC 311, MC 312, MC 330 or MC 331 (§§ 178.340, 178.342, 178.337, 178,337 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) The design pressure must be at least 25 psig.

(ii) Each cargo tank must be equipped with a pressure relief system conforming to § 178.342–10 of this subchapter, except that pressure relief devices on Specification MC 330 and MC 331 cargo tanks must conform to § 178.337–9 of this subchapter.

(iii) Bottom outlets equipped with self-closing stop valves conforming to § 178.340–11(a)(1)(i) of this subchapter are authorized, except that bottom outlets on Specification MC 330 and MC 331 cargo tanks must be equipped with internal self-closing stop valves conforming to § 178.337–11(a) of this subchapter.

* * * * *

(m) * * *

(10) Specification MC 304, MC 307, MC 310, MC 311, MC 312, MC 330 or MC 331 (§§ 178.337, 178.340, 178.342, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Not authorized for a flammable liquid which is also an organic peroxide, oxidizer or radioactive material.

(ii) A cargo tank used to transport a flammable liquid that is also a Poison B material must have a design pressure of at least 25 psig.

(iii) A cargo tank used to transport a flammable liquid that is also a corrosive liquid must conform to the corrosion protection requirements of § 178.340–2 or § 178.343–2 of this subchapter.

(iv) The design pressure must be at least 25 psig or as prescribed in § 178.340–1(l) of this subchapter whichever is greater.

(v) Each cargo tank must be equipped with a pressure relief system conforming to § 178.342–10 of this subchapter, except that pressure relief devices on Specifications MC 330 and MC 331 cargo tanks must conform to § 178.337–9 of this subchapter.

(vi) Bottom outlets equipped with self-closing stop valves conforming to § 178.340–11(a)(1)(i) of this subchapter are authorized, except that bottom outlets on Specification MC 330 and MC 331 cargo tanks must be equipped with internal self-closing stop valves conforming to § 178.337–11(a) of this subchapter.

(11)–(12) [reserved]

* * * * *

12. In § 173.123, paragraph (a)(6) would be revised to read as follows:

§ 173.123 Ethyl chloride.

(a) * * *

(6) Specification MC 330 or MC 331 (§ 178.337 of this subchapter) cargo tank motor vehicle, subject to the following condition: Bottom outlets must be equipped with internal self-closing stop valves conforming to § 178.337–11(a) of this subchapter.

* * * * *

13. In § 173.131, the introductory text to paragraph (a) and paragraph (a)(2) would be revised to read as follows:

§ 173.131 Road asphalt, or tar, liquid.

(a) Road asphalt, or tar, liquid must be packed in containers as follows:

* * * * *

(2) A nonspecification cargo tank motor vehicle that is at least equivalent in design and construction to a Specification MC 306 (§ 178.340, 178.341 of this subchapter) cargo tank motor vehicle, except for the requirements of §§ 178.340–14, 178.340–15, 178.341–5, 178.341–10, and 178.341–11 of this subchapter.

14. In § 173.134, paragraph (a)(6) would be revised to read as follows:

§ 173.134 Pyroforic liquids, n.o.s.

(a) * * *

(6) Specification MC 330 or MC 331 (§ 178.337 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) The design pressure must be at least 175 psig.

(ii) Each pressure relief device must have direct communication with the vapor space in the tank when fully loaded.

(iii) Bottom outlets must be equipped with internal self-closing stop valves conforming to § 178.337–11(a) of this subchapter.

15. In § 173.135, paragraph (a)(9) would be revised to read as follows:

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

(a) * * *

(9) Specification MC 304, MC 307, MC 330 or MC 331 (§§ 178.340, 178.342, 178.337 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) The cargo tank must be fabricated from steel or stainless steel.

(ii) The design pressure of the cargo tank must be as prescribed in § 178.340–1(l) of this subchapter.

(iii) Each cargo tank, except Specification MC 330 and MC 331 cargo tanks, must conform to the corrosion protection requirements in § 178.340–2(c) or § 178.343–2 of this subchapter.

(iv) Each cargo tank must be equipped with a pressure relief system conforming to § 178.342–10 of this subchapter, except that pressure relief devices on Specification MC 330 and MC 331 cargo tanks must conform to § 178.337–9 of this subchapter.

(v) Bottom outlets equipped with self-closing stop valves conforming to § 178.340–11(a)(1)(i) of this subchapter are authorized, except that bottom outlets on Specification MC 330 and MC 331 cargo tanks must be equipped with internal self-closing stop valves conforming to § 178.337–11(a) of this subchapter.

* * * * *

16. In § 173.136, paragraph (a)(8) would be 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, subject to the following condition: Bottom outlets must be equipped with internal self-closing stop valves conforming to § 178.337–11(a) of this subchapter.

* * * * *

17. In § 173.141, paragraph (a)(8) would be 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, subject to the following condition: Bottom outlets must be equipped with internal self-closing stop valves conforming to § 178.337–11(a) of this subchapter.

* * * * *

18. In § 173.145, paragraph (a)(7) would be revised to read as follows:

§ 173.145 Dimethylhydrazine, unsymmetrical, and methylhydrazine.

(a) * * *

(7) Specification MC 304, MC 307, MC 310, MC 311 or MC 312 (§§ 178.340, 178.342, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) The design pressure of the cargo tank must be as prescribed in § 178.340–1(l) of this subchapter.

(ii) Each cargo tank must be equipped with steel pressure relief valves conforming to § 178.341–10 or § 178.342–10 of this subchapter.

(iii) Each cargo tank must conform to the corrosion protection requirements in § 178.340–2(c) or § 178.343–2 of this subchapter.

(iv) Bottom outlets are not authorized.

(v) Tanks must be fabricated from steel or stainless steel.

* * * * *

19. In § 173.148, paragraph (a)(5) would be revised to read as follows:

§ 173.148 Monoethylamine.

(a) * * *

(5) Any cargo tank motor vehicle as prescribed in § 173.119(e)(3).

* * * * *

20. In § 173.154, paragraph (a)(18) would be removed and reserved; paragraph (a)(4) would be revised, to read as follows:

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

(a) * * *

(4) Specification MC 303, MC 304, MC 306, MC 307, MC 311 or MC 312 (§§ 178.340, 178.341, 178.342, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Authorized only for sodium perchlorate or magnesium perchlorate, wet, with 10 percent or more water, equally distributed within the cargo tank; however, Specifications MC 311 and MC 312 cargo tanks are also authorized for potassium nitrate solutions.

(ii) An insulated Specification MC 307 or MC 311 cargo tank designed for operation at temperatures up to 250 °F. is authorized for the transportation of ammonium nitrate with 15 percent or more water in solution at a maximum temperature of 240 °F., except that transportation by vessel is not authorized.

(iii) Bottom outlets equipped with self-closing stop valves conforming to § 178.340–11(a)(1)(i) of this subchapter are authorized.

(iv) A cargo tank may have heating coils if an inorganic heating medium is used.

(v) Only a Specification MC 304 or MC 307 cargo tank motor vehicle is authorized for transportation by vessel.

* * * * *

(18) [reserved]

* * * * *

21. In § 173.190, paragraph (b)(4) would be revised to read as follows:

§ 173.190 Phosphorus, white or yellow.

* * * * *

(b) * * *

(4) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) The lading must be completely immersed in water or be completely blanketed with an inert gas. Loading temperature must not exceed 140 °F.

(ii) The cargo tank must have insulation at least 4 inches thick, or at least 2 inches thick if the tank is equipped with an exterior heating jacket. Interior heating coils are not authorized.

(iii) Bottom outlets are not authorized.

(iv) An empty cargo tank motor vehicle may not be offered for transportation unless the tank is cleaned, or is filled to capacity with water having a temperature not exceeding 140 °F.

* * * * *

22. In § 173.206, paragraph (c)(3) would be 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) * * *

(3) Specification MC 330 or MC 331 (§ 178.337 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) The material must be in molten condition when loaded and solidified before being moved over a public highway. Outage must be 5 percent or more at a sodium temperature of 208 °F.

(ii) The design pressure must be at least 150 psig.

(iii) The tank must be equipped with exterior heating coils fusion-welded to the tank shell and properly stressed relieved.

(iv) Each cargo tank must be equipped with pressure relief devices conforming to § 178.337–9 of this subchapter.

* * * * *

23. In § 173.224, paragraph (a)(4) would be revised to read as follows:

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

(a) * * *

(4) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Cargo tanks are authorized for:

(A) Diisopropylbenzene hydroperoxide not over 60 percent strength in a nonvolatile solvent.

(B) Paramenthane hydroperoxide not over 60 percent strength in a nonvolatile solvent.

(C) Pinane hydroperoxide not over 45 percent strength in a nonvolatile solvent.

(ii) Specifications MC 311 and MC 312 cargo tanks are also authorized for cumene hydroperoxide not over 90 percent strength in a nonvolatile solvent.

(iii) Bottom outlets are not authorized.

24. In § 173.245, paragraphs (a)(30) and (a)(31) would be removed and reserved; paragraph (a)(29) would be revised to read as follows:

§ 173.245 Corrosive liquids not specifically provided for.

(a) * * *

(29) Specification MC 303, MC 304, MC 306, MC 307, MC 310, MC 311 or MC 312 (§§ 178.340, 178.341, 178.342, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Specification MC 303 and MC 306 cargo tanks fabricated from Type 316 stainless steel not less than 0.100 inch thick are authorized only for monoethanolamine, primary amyl alcohol, phosphoric acid, and solutions thereof.

(ii) A Specification MC 306 cargo tank fabricated of aluminum is authorized only for monoethanolamine and primary amyl alcohol.

(iii) Each cargo tank must conforming to the corrosion protection requirements in § 178.340–2(c) or § 178.343–2 of this subchapter.

(iv) Bottom outlets equipped with self-closing stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

(30)–(31) [reserved]

* * * * *

25. In § 173.247, paragraph (a)(12) would be 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) Specification MC 310, MC 311, MC 312, MC 330, or MC 331 (§§ 178.340, 178.343, 178.337 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each cargo tank must conform to the corrosion protection requirements in § 178.340–2(c) or § 178.343–2 of this subchapter.

(ii) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized, except that bottom outlets on Specification MC 330 and MC 331 cargo tanks must be equipped with internal self-closing stop valves conforming to § 178.337–11(a) of this subchapter.

(iii) Cargo tanks made from aluminum are not authorized.

* * * * *

26. In § 173.247a, paragraph (a)(3) would be revised to read as follows:

§ 173.245a Vanadium tetrachloride and vanadium oxytrichloride.

(a) * * *

(3) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Authorized only for vanadium oxytrichloride padded with an inert non-soluble gas adequate to exclude the presence of air.

(ii) Each cargo tank must conform to the corrosion protection requirements in § 178.340–2(c) or § 178.343–2 of this subchapter.

(iii) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

(iv) Not authorized for transportation by vessel.

(v) Cargo tanks made of aluminum are not authorized.

* * * * *

27. In § 173.248, paragraph (a)(6) would be revised to read as follows:

§ 173.248 Spent sulfuric acid, or spent mixed acid.

(a) * * *

(6) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 78.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each cargo tank must conform to the corrosion protection requirements in § 178.340–2(c) or § 178.343–2 of this subchapter.

(ii) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

* * * * *

28. In § 173.249, paragraph (a)(1) and (a)(6) would be 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) * * *

(1) In packagings prescribed in § 173.245, except paragraph (a)(29).

* * * * *

(6) Specification MC 303, MC 304, MC 306, MC 307, MC 310, MC 311 or MC 312 (§§ 178.340, 178.341, 178.342, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Specification MC 303 cargo tanks must be fabricated from steel or stainless steel. Specification MC 303 cargo tanks fabricated of steel are authorized for alkaline corrosive liquid, n.o.s., and alkaline liquid, n.o.s. only. Not authorized for transportation by vessel.

(ii) Each cargo tank must conform to the corrosion protection requirements in § 178.340–2(c) or § 178.343–2 of this subchapter.

(iii) Specification MC 306 cargo tanks must be fabricated from Type 316 stainless steel not less than 0.100 inch thick.

(iv) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

* * * * *

29. In § 173.249a, paragraph (d)(1) would be revised, and a new paragraph (d)(6) would be added, to read as follows:

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

(d) * * *

(1) In specification packagings as prescribed in § 173.245, except paragraph (a)(29).

* * * * *

(6) Specification MC 303, MC 304, MC 306, MC 307, MC 310, MC 311 or MC 312 (§§ 178.340, 178.341, 178.342, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each cargo tank must conform to the corrosion protection requirements in § 178.340–2(c) or § 178.343–2 of this subchapter.

(ii) Specification MC 303 cargo tanks must be made from steel or stainless steel and are not authorized for transportation by vessel.

(iii) Specification MC 306 cargo tanks must have tanks fabricated from Type 316 stainless steel not less than 0.100 inch thick.

(iv) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

30. In § 173.250a, paragraphs (a)(1) and (a)(2) would be revised to read as follows:

§ 173.250a Benzene phosphorus dichloride and benzene phosphorus thiodichloride.

(a) * * *

(1) In specification packagings prescribed in § 173.245, except paragraph (a)(29), which are made of or lined with materials compatible with the lading.

(2) Specification MC 304, MC 307, MC 310, MC 311 or MC 312 (§§ 178.340, 178.342, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each cargo tank must conform to the corrosion protection requirements in § 178.340–2(c) or § 178.343–2 of this subchapter.

(ii) Bottom outlets equipped with self-closing stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

* * * * *

31. In § 173.252, paragraph (a)(4) would be revised to read as follows:

§ 173.252 Bromine.

(a) * * *

(4) Specification MC 310 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) The total volume of bromine loaded into a cargo tank must be at least 88 percent and not more than 96 percent of the volume of the tank.

(ii) Tank shell and heads must be at least ⅜ inch thick, excluding lining, cladding or corrosion allowance.

(iii) Each tank must have a nickel cladding material on the inside surface comprising at least 20 percent of the total thickness, or be lined with lead at least 3/16 inch thick. The cladding material must conform to ASME SB–162. The composite plate must conform to ASME SA–265.

(iv) Each cargo tank must conform to the corrosion protection requirements in § 178.340–2(c) or § 178.343–2 of this subchapter.

(v) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

* * * * *

32. In § 173.253, paragraph (a)(6) would be revised to read as follows:

§ 173.253 Chloroacetyl chloride.

(a) * * *

(6) Specification MC 310, MC 311 and MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each cargo tank must be fabricated from at least 99 percent nickel, or Type 316 stainless steel.

(ii) Each cargo tank must conform to the corrosion protection requirements in § 178.340–2(c) or § 178.343–2 of this subchapter.

(iii) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchaper are authorized.

* * * * *

33. In § 173.254, paragraph (a)(5) would be revised to read as follows:

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

(a) * * *

(5) Specification MC 310, MC 311, MC 312 (§§ 178.340, 173.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each cargo tank must conform to the corrosion protection requirements in § 178.340–2(c) or § 178.343.2 of this subchapter.

(ii) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

* * * * *

34. In § 173.255, paragraph (a)(5) would be revised to read as follows:

§ 173.255 Dimethyl sulfate.

(a) * * *

(5) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each cargo tank must conform to the corrosion protection requirements in § 178.340–2(c) or § 178.343–2 of this subchapter.

(ii) Bottom outlets must be equipped with internal self-closing stop valves conforming to § 178.340–11(a)(1) of this subchapter.

* * * * *

35. In § 173.257, paragraph (a)(4) would be revised to read as follows:

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

(a) * * *

(4) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each cargo tank must be lined with rubber or equally acid-resistant material of equivalent strength and durability.

(ii) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

* * * * *

36. In § 173.262, paragraphs (a)(11) and (b)(4) would be revised to read as follows:

§ 173.262 Hydrobromic acid.

(a) * * *

(11) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each cargo tank must be lined with rubber or equally acid-resistant material of equivalent strength and durability.

(ii) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

* * * * *

(b) * * *

(4) Cargo tank motor vehicles as prescribed in paragraph (a)(11) of this section.

* * * * *

37. In § 173.263, paragraph (a)(10) would be 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) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each tank must be lined with rubber, or other equally acid-resistant material of equivalent strength and durability, except that an unlined tank made from Type 304 or Type 316 stainless steel is authorized for sodium chlorite solutions not exceeding 42 percent strength.

(ii) Bottom outlets equipped with self-closing stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

* * * * *

38. In § 173.264, Note 1 to paragraph (a)(14) would be removed; paragraphs (a)(14) and (b)(3) would be revised to read as follows:

§ 173.264 Hydrofluoric acid; White acid.

(a) * * *

(14) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each cargo tank must be lined, except that an unlined cargo tank is authorized for hydrofluoric acid solutions of 60 percent to 65 percent concentration provided the lading is inhibited so that the corrosive effect on steel is not greater than that of 65 percent hydrofluoric acid.

(ii) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

* * * * *

(b) * * *

(3) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this

subchapter) cargo tank motor vehicle, subject to the following condition: Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of ths subchapter are authorized.

* * * * *

39. In § 173.265, paragraph (a)(4) would be revised to read as follows:

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

(a) * * *

(4) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each cargo tank must be lined with rubber or equally acid-resistant material of equivalent strength and durability.

(ii) Bottom outlets must be equipped with internal self-closing stop valves conforming to § 178.340–11(a)(1) of this subchapter.

* * * * *

40. In § 173.266, paragraph (f)(2) would be revised to read as follows:

§ 173.266 Hydrogen perioxide solution in water.

* * * * *

(f) * * *

(2) Specification MC 310, or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each tank must be fabricated from aluminum conforming with Aluminum Association designation 1060, 1260, 5254, or 5262 alloy, and have a minimum wall thickness of 0.50 inches.

(ii) The design pressure must be at least 40 psig.

(iii) Each tank must be designed and fabricated so that the internal surfaces can be effectively cleaned and passivated. All openings must be located on the top of the tank.

(iv) Bottom outlets are not authorized.

(v) A cargo tank in hydrogen peroxide service may be used in hydrogen peroxide service only and the cargo tank specification plate must be so marked. Each such cargo tank must also be marked in letters not less than 1 inch high "FOR HYDROGEN PEROXIDE ONLY" in additon to and near the marking prescribed in § 172.328 of this subchapter.

41. In § 173.267, paragraph (a)(7) would be revised to read as follows:

§ 173.267 Mixed acid (nitric and sulfuric acid) (nitrating acid).

(a) * * *

(7) Any cargo tank motor vehicle as prescribed in § 173.254(a)(5).

* * * * *

42. In § 173.268, paragraph (b)(3) would be revised to read as follows:

§ 173.268 Nitric acid.

* * * * *

(b) * * *

(3) Any cargo tank motor vehicle as prescribed in § 173.254(a)(5).

* * * * *

43. In § 173.271, paragraph (a)(8) would be revised to read as follows:

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

(a) * * *

(8) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each tank must be:

(A) Fabricated from mild steel, stainless steel, or at least 99 percent nickel (with all cast metal parts of the tank in contact with the lading at least 96.7 percent nickel); or

(B) Clad with Type 316 stainless at least 20 percent as thick as the tank parent metal; or

(C) Lined with lead at least 1/32 inch thick, or nickel at least 99 percent pure and at least 1/32 inch thick, at all points including rivets, welds and other joints, and edges of tank plates.

(ii) A tank fabricated from, or clad with, Type 316 stainless steel is authorized only for phosphorous oxychloride, phosphorous trichloride, and thiophosphoryl chloride.

(iii) A tank fabricated from mild steel or austenitic stainless steel, without cladding or lining, is authorized only for phosphorous trichloride service.

(iv) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

* * * * *

44. In § 173.272, paragraphs (i)(25) and (i)(28) would be removed and reserved; paragraphs (c), (d), (e), (f) and (i)(21) would be revised to read as follows:

§ 173.272 Sulfuric acid.

* * * * *

(c) *Sulfuric acid concentration of 51 percent or less:* Authorized packaging is described in paragraphs (i)(1), (16), (21), (24), and (26) of this section.

(d) *Sulfuric acid concentration of greater than 51 percent to not over 65.25 percent:* Authorized packaging is described in paragraphs (i)(1)–(16), (21), and (27)–(29) of this section.

(e) *Sulfuric acid concentration of greater than 65.25 percent to not over 77.5 percent:* Authorized packaging is described in paragraphs (i)(1)–(16), (20)–(22), and (29) of this section.

(f) *Sulfuric acid concentration of greater than 77.5 percent to not over 95 percent:* Authorized packaging is described in paragraphs (i)(1)–(22), and (29) of this section.

* * * * *

(i) * * *

(21) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) A cargo tank lined with rubber or equally acid-resistant material of equivalent strength and durability is authorized.

(ii) An unlined steel cargo tank is authorized for sulfuric acid of 65.25 percent or greater concentration, provided the corrosive effect on steel is not greater than that of 65.25 percent sulfuric acid measured at 100 °F.

(iii) The temperature of the lading may not exceed the design temperature of the cargo tank marked on the cargo tank specification plate.

(iv) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

* * * * *

(25) [reserved]

* * * * *

(28) [reserved]

* * * * *

45. In § 173.273, paragraphs (a)(5) and (b)(2) would be revised to read as follows:

§173.273 Sulfur trioxide.

(a) * * *

(5) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following condtions:

(i) Each cargo tank must be equipped with a pressure relief system conforming to § 178.340–10 of this subchapter and consisting of a spring-loaded pressure relief valve.

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

(iii) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

(b) * * *

(2) Specification MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each cargo tank must be insulated.

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

(iii) Each cargo tank must be equipped with a pressure relief system conforming to § 178.340–10 of this subchapter and consisting of a spring-loaded pressure relief valve or a spring-loaded pressure relief valve and a frangible disc

installed in series with the relief valve. When the pressure relief system consists of the pressure relief valve and a frangible disc installed in series with the pressure relief valve, the spring-loaded pressure relief valve must be set-to-discharge at a pressure not exceeding 150 percent of the design pressure.

* * * * *

46. In § 173.274, paragraph (a)(4) would be revised to read as follows:

§ 173.247 Fluosulfonic acid.

(a) * * *

(4) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following condition: Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

* * * * *

47. In § 173.276, paragraph (a)(6) would be revised to read as follows:

§ 173.276 Anhydrous hydrazine and hydrazine solution.

(a) * * *

(6) Specification MC 310, MC 311, MC 312, MC 330 or MC 331 (§§ 178.340, 178.343, 178.337 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each cargo tank must be fabricated from Type 304 or Type 347 stainless steel with molybdenum content not exceeding 1 percent.

(ii) Vapor space in each cargo tank must be filled with nitrogen gas at not less than atmospheric pressure.

(iii) Bottom outlets equipped with self-closing stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized, except that bottom outlets on Specification MC 330 and MC 331 cargo tanks must be equipped with internal self-closing stop valves conforming to § 178.337–11(c) of this subchapter.

* * * * *

48. In § 173.277, paragraph (a)(9) would be revised to read as follows:

§ 173.277 Hypochlorite solutions.

(a) * * *

(9) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle (except that continued use of nonspecification cargo tanks is authorized if they were used to transport hypochlorite solutions prior to January 1, 1983), subject to the following conditions:

(i) Each cargo tank must be lined with rubber or equally acid-resistant material of equivalent strength and durability.

(ii) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

* * * * *

49. In § 173.280, paragraph (a)(8) would be revised to read as follows:

§ 173.280 Trichlorosilanes.

(a) * * *

(8) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each tank must be made of steel or stainless steel.

(ii) Bottom outlets equipped with self-closing stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

* * * * *

50. In § 173.287, paragraph (b)(8) would be revised to read as follows:

§ 173.287 Chromic acid solution.

(b) * * *

(8) Any cargo tank motor vehicle as prescribed in § 173.254(a)(5).

* * * * *

51. In § 173.289, paragraphs (a)(1) and (a)(4) would be revised to read as follows:

§ 173.289 Formic acid and formic acid solutions.

(a) * * *

(1) In packagings prescribed in § 173.245, except (a)(14), (a)(29), and Spec. 5A (§ 178.81 of this subchapter).

* * * * *

(4) Any cargo tank motor vehicle as prescribed in § 173.254(a)(5).

* * * * *

52. In § 173.292, paragraphs (a)(1) and (a)(2) would be revised to read as follows:

§ 173.292 Hexamethylene diamine solution.

(a) * * *

(1) In packagings as prescribed in § 173.249, except paragraph (a)(6).

(2) Specification MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311 or MC 312 (§§ 178.340, 178.341, 178.342, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each cargo tank must conform to the corrosion protection requirements in § 178.340–2(c) or § 178.343–2 of this subchapter.

(ii) Each Specification MC 306 cargo tank must be fabricated from Type 316 stainless steel not less than 0.100 inch thick.

(iii) Each Specification MC 303 cargo tank must be fabricated from steel or stainless steel.

(iv) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

53. In § 173.294, paragraph (a)(3) would be revised to read as follows:

§ 173.294 Monochloroacetic acid, liquid or solution.

(a) * * *

(3) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Each tank must be fabricated from mild steel, Type 304 or Type 316 stainless steel, at least 99 percent nickel, titanium conforming to ASME SA–265, or suitably lined with nickel or stainless steel.

(ii) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

* * * * *

54. In § 173.295, paragraph (a)(10) would be removed and reserved; paragraph (a)(9) would be revised, to read as follows:

§ 173.295 Benzyl chloride.

(a) * * *

(9) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Stabilized benzyl chloride must be transported in steel cargo tanks.

(ii) Unstabilized benzyl chloride must be anhydrous and free from impurities such as iron, and must be transported in a tank fabricated from at least 99 percent nickel. All cast metal parts of the tank in contact with the lading must be fabricated from at least 96.7 percent nickel.

(iii) Bottom outlets equipped with stop valves conforming to § 178.340–11(a)(1) of this subchapter are authorized.

(10) [reserved]

* * * * *

55. In § 173.296, paragraph (a)(2) would be revised to read as follows:

§ 173.296 Di iso octyl acid phosphate.

(a) * * *

(2) Any cargo tank motor vehicle as prescribed in § 173.254(a)(5).

* * * * *

56. § 173.297, paragraph (a)(1) would be revised to read as follows:

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

(a) * * *

(1) Specification MC 310, MC 311 or MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle subject to the following conditions:

(i) Each cargo tank must be rubber lined.

(ii) Bottom outlets equipped with stop valves conforming to § 178.340-11(a)(1) of this subchapter are authorized.

* * * * *

§ 173.300 [Amended]

57. In § 173.300, paragraph (i) would be amended by removing the reference "173.315(a)(1)" and inserting in its place "173.315(a)".

58. In § 173.315, Note 4 and paragraph (5) of note 17 following paragraph (a), and paragraphs (a) introductory text, (b)(4), (i)(1) and (k)(5) would be revised; and paragraphs (n) and (o) would be added, to read as follows:

§ 173.315 Compressed gases in cargo tanks and portable tanks.

(a) A compressed gas offered for transportation in a cargo tank motor vehicle or a portable tank must be prepared in accordance with this section, § 173.32 and subpart E of Part 180 of this subchapter; for cryogenic liquids, see § 173.318 (for marking requirements see §§ 172.326 and 172.328 of this subchapter). A compressed gas must be loaded and offered for transportation in conformance with the following table:

* * * * *

Note 4.—Material must be steel. See paragraph (d) of this section for minimum thickness and corrosion allowance requirements.

* * * * *

Note 17.—* * *

(5) Has been inspected and tested in accordance with Subpart E of Part 180 of this subchapter as specified for MC 331 cargo tanks.

* * * * *

(b) * * *

(4) Each opening for a pressure gauge, except on a tank used exclusively for the transportation of carbon dioxide, refrigerated liquid; or nitrous oxide, refrigerated liquid must be restricted at or inside the tank by an orifice no larger than 0.060 inch in diameter. For carbon dioxide, refrigerated liquid; or nitrous oxide, refrigerated liquid service, the pressure gauge need only be used during the filling operation.

(i) * * *

(1) The safety relief valves on each tank must have a total relieving capacity as determined by the flow formulas contained in Section 5 of CGA Pamphlet S-1.2. These relief valves must have a total relieving capacity sufficient to prevent a maximum pressure in the tank of more than 120 percent of the design pressure. The flow capacity testing and rating must be in accordance with Section 5 of CGA Pamphlet S-1.2 and witnessed and certified by an Authorized Inspector. For an insulated tank, the required relieving capacity of the relief valves must be the same as for an uninsulated tank, unless the insulation will remain in place and will be effective under fire conditions. In this case, each insulated tank must be covered by a sheet metal jacket of not less than 16 gauge thickness. An MC 330 cargo tank that has relief valves sized by Fetterly's formula dated November 27, 1982, may be continued in service. Copies of this formula may be obtained from the Bureau of Explosives.

* * * * *

(k) * * *

(5) Has been inspected and tested in accordance with Subpart E of Part 180 of this subchapter as specified for MC 331 cargo tanks;

* * * * *

(n) Each MC 330 and MC 331 cargo tank used to transport a flammable gas, anhydrous ammonia or hydrogen chloride, refrigerated liquid must have each liquid or vapor discharge opening equipped in accordance with § 178.337-11 of this subchapter.

(o) *Chlorine cargo tanks.* Each cargo tank motor vehicle used for the transportation of chlorine must conform to the following:

(1) No piping, hose, or other means of loading or unloading may be attached to any valve, except at the time of loading or unloading. No hose, piping, or tubing used for loading or unloading may be mounted or carried on the motor vehicle. Except at the time of loading or unloading, the pipe connection of each angle valve must be closed with a screw plug which is chained or otherwise fastened to prevent misplacement.

(2) Each chlorine cargo tank angle valve must be tested to be leak free at not less than 225 psig using dry air or inert gas before installation and thereafter once every five loadings or once a week, whichever occurs first. Prior to each loading, the cargo tank must be inspected and the angle valves and gasketed joints must be examined and tested at a pressure of not less than 50 psig to determine that they are not leaking and are in proper condition for transportation. Any leaks must be corrected before the cargo tank is offered for transportation.

(3) Excess flow valves on the cargo tank must conform to § 178.337-11(a)(4) of this subchapter.

59. In § 173.318, paragraph (b)(1)(iii) would be revised and paragraphs (g)(3) would be added to read as follows:

§ 173.318 Cryogenic liquids in cargo tanks.

* * * * *

(b) * * *

(1) * * *

(iii) The rated relieving capacity for each pressure relief valve, pressure control valve and frangible disc must be as determined by the flow formulas in paragraph 5.3.4.4 of CGA Pamphlet S-1.2. The flow capacity testing and rating must be in accordance with Section 5 of Pamphlet S-1.2 and must be witnessed and approved by an Authorized Inspector.

* * * * *

(g) * * *

(3) Each cargo tank motor vehicle used to transport a flammable cryogenic liquid must be examined after each shipment to determine its actual holding time. The record required by § 177.840(h) of this subchapter may be used for this determination. If the examination indicates that the actual holding time of the cargo tank, after adjustment to reflect an average ambient temperature of 85 °F., is less than 90 percent of the marked rated holding time (MRHT) for the cryogenic liquid marked on the specification plate or adjacent thereto (see § 178.338-18(b) of this subchapter), the tank may not be refilled with any flammable cryogenic liquid until it is restored to its marked rated holding time value or it is re-marked with the actual marked rated holding time determined by this examination. If the name of the flammable cryogenic liquid that was transported and its marked rated holding time is not displayed on or adjacent to the specification plate, this requirement may be met by deriving the MRHT of the cargo tank for that flammable cryogenic liquid and comparing that derived MRHT with the actual holding time after adjustment.

60. In § 173.346, paragraph (a)(12) would be 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, MC 330 or MC 331 (§§ 178.340, 178.342, 178.343, 178.337 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) The design pressure must be at least 25 psig.

(ii) Bottom outlets equipped with self-closing stop valves conforming to § 178.340-11(a)(1)(i) of this subchapter are authorized, except that bottom outlets on Specification MC 330 and MC 331 cargo tanks must be equipped with

internal self-closing stop valves conforming to § 178.337–11(a) of this subchapter.

* * * * *

61. In § 173.347, paragraph (a)(3) would be revised to read as follows:

§173.347 Aniline oil.

(a) * * *

(3) Any cargo tank motor vehicle as prescribed in § 173.346(a)(12).

* * * * *

62. In § 173.352, paragraph (a)(5) would be revised to read as follows:

§ 173.352 Sodium and potassium cyanide solutions, and cyanide solution, n.o.s..

(a) * * *

(5) Any cargo tank motor vehicle as prescribed in § 173.346(a)(12), except that the tank must be at least 0.250 inch thick and bottom outlets are not authorized.

* * * * *

63. In 173.353, paragraph (e) would be revised to read as follows:

§ 173.353 Methyl bromide and methyl bromide mixtures.

* * * * *

(e) Specification MC 330 or MC 331 (§ 178.337 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(1) The design pressure must be at least 250 psig.

(2) The tank must have sufficient outage so that it will not become filled with lading at 130 °F.

(3) Bottom outlets must be equipped with internal self-closing stop valves conforming to § 178.337–11(a) of this subchapter.

64. In § 173.354, paragraph (a)(5) would be revised and Note 1 and footnote 1 would be removed to read as follows:

§ 173.354 Motor fuel antiknock compound or tetraethyl lead.

(a) * * *

(5) Specification MC 330 or MC 331 (§ 178.337 of this subchapter) cargo tank motor vehicle, subject to the following condition: Authorized for motor fuel antiknock compound only.

* * * * *

65. In § 173.358, paragraph (a)(14) would be 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) Specification MC 310, MC 311, MC 312, MC 330, or MC 331 (§§ 178.340, 178.343, 178.337 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Lading must be under no pressure except its own vapor pressure.

(ii) Only a Specification MC 330 or MC 331 cargo tank is authorized for hexaethyl tetraphosphate, parathion, tetraethyl dithio pyrophosphate or tetraethyl pyrophosphate, liquid.

(iii) Each Specification MC 310, MC 311 and MC 312 cargo tank must have a minimum shell and head thickness of 3/16 inch for a steel tank and 0.266 inch for an aluminum tank. Each such tank must be designed for a lading weight of at least 13 pounds per gallon.

(iv) The design pressure must be at least 25 psig.

(v) Transportation is authorized by private motor carrier only.

(vi) Bottom outlets equipped with self-closing stop valves conforming to § 178.340-(11)(a)(1)(i) of this subchapter are authorized, except that bottom outlets on Specification MC 330 and MC 331 cargo tanks must be equipped with internal self-closing stop valves conforming to § 178.337–11(a) of this subchapter.

* * * * *

66. In § 173.359, paragraph (a)(16) would be 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; tetraethyl pyrophosphate mixtures, liquid (includes solutions, emulsions, or emulsifiable liquids).

(a) * * *

(16) Specification MC 310, MC 311, MC 312, MC 330 or MC 331 (§§ 178.340, 178.343, 178.337 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Lading must be under no pressure except its own vapor pressure.

(ii) Each Specification MC 310, MC 311 and MC 312 cargo tank must have a minimum shell and head thickness of 3/16 inch for a steel tank and 0.266 inch for an aluminum tank. Each such tank must be designed for a lading weight of at least 13 pounds per gallon.

(iii) The design pressure must be at least 25 psig.

(iv) Transportation; is authorized by private motor carrier only.

(v) Bottom outlets equipped with self-closing stop valves conforming to § 178.340–11(a)(1)(i) of this subchapter are authorized, except that bottom outlets on Specification MC 330 and MC 331 cargo tanks must be equipped with internal self-closing stop valves conforming to § 178.337–11(a) of this subchapter.

* * * * *

67. In § 173.369, paragraph (a)(14) would be revised to read as follows:

§ 173.369 Carbolic acid (phenol), not liquid.

(a) * * *

(14) Specification MC 304, MC 307, MC 310, MC 311 or MC 312 (§§ 178.340, 178.342, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) The design pressure must be at least 25 psig.

(ii) The tank must have sufficient outage so that it will not become filled with lading at 130 °F.

(iii) Bottom outlets equipped with self-closing stop valves conforming to § 178.340–11(a)(1)(i) of this subchapter are authorized.

* * * * *

68. In § 173.373, paragraph (a)(6) would be revised to read as follows:

§ 173.373 Ortho-nitroaniline and paranitroaniline.

(a) * * *

(6) Specification MC 304, MC 307, MC 310, MC 311 or MC 312 (§§ 178.340, 178.342, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Authorized only for ortho-nitroaniline loaded in a liquefied state at a temperature not over 180 °F.

(ii) Each cargo tank must be made of steel and insulated.

(iii) The design pressure must be at least 25 psig.

(iv) Bottom outlets equipped with self-closing stop valves conforming to § 178.340–11(a)(1)(i) of this subchapter are authorized.

(v) Not authorized for transportation by vessel.

69. In§ 173.374, paragraph (a)(4) would be revised to read as follows:

§ 173.374 Nitrochlorobenzene, meta or para.

(a) * * *

(4) Specification MC 312 (§§ 178.340, 178.343 of this subchapter) cargo tank motor vehicle, subject to the following conditions:

(i) Authorized only for para nitrochlorobenzene, solid.

(ii) Each cargo tank must be insulated and equipped with heating coils.

(iii) The design pressure must be at least 25 psig.

(iv) Not authorized for transportation by vessel.

* * * * *

PART 176—CARRIAGE BY VESSEL

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

Authority: 49 U.S.C. 1803, 1804, 1805, 1808; 49 CFR 1.53(e).

71. In § 176.76, paragraph (b) would be revised to read as follows:

§ 176.76 Highway vehicles, railroad vehicles, freight containers, and portable tanks containing hazardous materials.

* * * * *

(b) * * *

(1) A cargo tank motor vehicle containing hazardous materials may be transported—

(i) On a carfloat or trailership if the material is authorized aboard a cargo vessel by § 172.101 of this subchapter, or

(ii) On a passenger ferry vessel or railroad car ferry vessel if the material is authorized aboard a passenger vessel by § 172.101 of this subchapter.

(2) [Reserved]

* * * * *

PART 177—CARRIAGE BY PUBLIC HIGHWAY

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

Authority: 49 U.S.C. 1803, 1804, 1805, 1808; 49 CFR 1.53(e).

73. Part 177, Subpart A of the table of sections would be amended by revising the headings for §§ 177.800, 177.801, 177.802, and 177.814 to read as follows:

Subpart A—General Information and Regulations

Sec.

177.800 Purpose and scope.

177.801 Unacceptable hazardous materials shipments.

177.802 Inspection.

* * * * *

177.814 Retention of cargo tank motor vehicle manufacturer's certificate, maintenance and other reports.

* * * * *

74. Sections 177.800, 177.801, 177.802 and their headings would be revised to read as follows:

§ 177.800 Purpose and scope.

(a) This part prescribes requirements, in addition to those contained in Parts 171, 172, 173, 178 and 180 of this subchapter, that are applicable to the acceptance and transportation of hazardous materials by private, common or contract carriers by motor vehicle.

(b) It is the duty of each motor carrier to make the prescribed regulations effective and to thoroughly instruct employees in relation thereto.

§ 177.801 Unacceptable hazardous materials shipments.

A hazardous material that is not prepared for transportation in accordance with the subchapter may not be accepted for transportation or transported by motor vehicle.

§ 177.802 Inspection.

(a) Records, equipment, packagings and containers under the control of a motor carrier, insofar as they affect safety in transportation of hazardous materials by motor vehicle, must be made available for examination and inspection by a duly authorized representative of the Department.

(b) Methods of manufacture, packaging, and storage of hazardous materials, insofar as they affect safety in transportation by motor vehicle, must be made available for examination and inspection by a duly authorized representative of the Department and the initial carrier.

(c) A duly authorized representative of this Department may enter upon, inspect and examine the records and properties of motor carriers operating in commerce for the purpose of determining compliance with this subchapter.

75. Section 177.814 and heading would be revised to read as follows:

§ 177.814 Retention of cargo tank motor vehicle manufacturer's certificate, maintenance and other reports.

Each owner of a cargo tank motor vehicle and a motor carrier must comply with the reporting and record retention requirements contained in § 180.317 of this subchapter.

76. Section 177.824 would be 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 cargo tank motor vehicle containing a hazardous material unless the cargo tank motor vehicle is in conformance with 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.

77. In § 177.840, paragraph (f) would be revised to read as follows:

§ 177.840 Compressed gases.

* * * * *

(f) No cargo tank motor vehicle used for transportation of chlorine may be moved, coupled or uncoupled, when any loading or unloading connections are attached to the vehicle, nor may it be left without the power unit attached unless the vehicle is chocked or equivalent means are provided to prevent motion. For additional requirements, see § 173.315(o) of this subchapter.

* * * * *

PART 178—SHIPPING CONTAINER SPECIFICATIONS

78. The authority citation for Part 178 continues to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1808; 49 CFR 1.53(e).

79. Part 178, Subpart J of the table of sections would be amended by revising the headings for §§ 178.337, 178.340, 178.341, 178.342 and 178.343 to read as follows:

Subpart J—Specifications for Containers for Motor Vehicle Transportation.

Sec.

* * * * *

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

* * * * *

178.340 General design and construction requirements applicable to Specification MC 306 (§ 178.341), MC 307 (§ 178.342) and MC 312 (§ 178.343) cargo tank motor vehicles.

178.341 Specification MC 306; cargo tank motor vehicle.

178.342 Specification MC 307; cargo tank motor vehicle.

178.343 Specification MC 312; cargo tank motor vehicle.

* * * * *

80. In § 178.337, the heading would be revised to read as follows:

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

* * * * *

81. In § 178.337–1, paragraphs (a)(3) and (e) would be revised to read as follows:

§ 178.337–1 General requirements.

(a) * * *

(3) Made of steel or aluminum; however, if aluminum is used, the cargo tank must be insulated and the hazardous material to be transported must be compatible with the aluminum (see §§ 173.315(a) Table Note 11, 178.337–1(e) and 178.337–2(a)(1) of this subchapter); and

* * * * *

(e) *Insulation.* (1) Compliance with the requirements for use and performance of insulation is required (see §§ 173.315(a)

Table Note 11 and 178.337-1(a)(3) of this subchapter).

(2) Each tank intended for chlorine; carbon dioxide, refrigerated liquid; or nitrous oxide, refrigerated liquid service must have suitable insulation of such thickness that the overall thermal conductance is not more than 0.08 Btu per square foot per degree F. differential per hour. The conductance must be determined at 60 °F. Insulation material used on tanks for nitrous oxide, refrigerated liquid must be noncombustible. Insulation material used on tanks for chlorine must be corkboard or self-extinguishing polyurethane foam, with minimum thickness of 4 inches.

* * * * *

82. In § 178.337-2, paragraph (c) would be revised to read as follows:

§ 178.337-2 Material.

* * * * *

(c) A cargo tank in anhydrous ammonia service must be constructed of steel. The use of copper, silver, zinc or their alloys is prohibited. Baffles made from aluminum may be used only if joined to the tank by a process not requiring postweld heat treatment of the tank.

83. Section 178.337-3 would be revised to read as follows:

§ 178.337-3 Structural integrity.

(a) The maximum calculated design stress value may not exceed the maximum design stress values prescribed in Section VIII of the ASME Code. Corrosion allowance material may not be used to satisfy the design requirements.

(1) The design and construction of each cargo tank must provide for all potential structural loadings, including but not limited to impact loading, dynamic pressure, inertial loadings, and the effect of temperature gradients resulting from lading and ambient temperature extremes. When dissimilar materials are used, their thermal coefficients must be considered in the calculation of the design stress value.

(2) Maximum concentrated stresses which might be created at pads, cradles or supports due to shear, bending and torsion shall also be calculated in accordance with Appendix G of Section VIII of the ASME Code.

(3) The design calculations for the cargo tank heads and shell must include the load resulting from the design pressure in combination with the dynamic pressure resulting from a longitudinal deceleration of 2 "g".

(b) The effective stress on the tank shell in a plane normal to the longitudinal axis may not exceed 25 percent of the minimum specified tensile strength of the metal or the maximum stress values prescribed in Section VIII of the ASME Code, at any point in the cargo tank. The forces, loads and stresses mast take into account the weight of the tank, the maximum weight of lading, and structures supported by the cargo tank, but not including the weight of the structures supporting the tank in normal conditions. The stresses due to the internal pressure and vertical loadings must be applied in all considerations. The accelerative, decelerative and lateral forces must be applied separately. The combination case which produces the maximum effective stress shall govern. Stress calculations must include all the following:

(1) The circumferential tensile stress due to internal pressure;

(2) The longitudinal tensile stress due to internal pressure;

(3) The tensile or compression stress generated by the axial load and bending moment resulting from both accelerative and decelerative forces equal to twice the weight of the fully loaded vehicle applied independently to each suspension assembly at the road surface;

(4) The tensile or compression stress generated by the axial load and bending moment resulting from both accelerative and decelerative forces equal to twice the weight of the fully loaded vehicle applied to the horizontal pivot of the fifth wheel supporting the vehicle;

(5) The tensile or compression stress due to a bending moment produced by a vertical force equal to three times the static weight of the tank and contents;

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

(7) The lateral shear stress due to a lateral accelerative force applied at the road surface which will produce a force equal to twice the static weight of the tank and contents; and

(8) The torsional shear stress due to a lateral accelerative force applied at the road surface based on half the loaded weight of the motor vehicle that will produce a force equal to twice the static weight of the tank and contents.

(c) For a frameless cargo tank motor vehicle where the cargo tank shell serves as the vehicle frame, the minimum thickness of the tank shell must be such that at no point will the effective stress in the tank shell exceed the stresses specified in paragraph (b) of this section. Calculation of the basic structural integrity must be made by the following formula:

$$S=(S_y+S_x)/2+[((S_y-S_x)^2)/4+S_s^2]^{0.5}$$

where at any given point under consideration, and for the worst combination of loadings that can occur at the same time, the stress levels produced at the point being considered are:

S = Effective stress as limited by this requirement, in psi.
S_y = The circumferential tensile stress due to internal pressure, in psi.
S_x = All of the tensile and compressive stresses as specified in paragraph (b) of this section that apply, including the longitudinal tensile stresses due to internal pressure, in psi.
S_s = Any of the shear stresses specified in paragraph (b) of this section that apply, in psi.

(d) A tank shell or head thickness less than that specified in paragraph (c) of this section may be used if the tank is supported by a frame or other form of structural support, provided that the effective stresses prescribed in paragraph (b) of this section are fully evaluated; except that steel less than 3/16 inch or aluminum less than 0.270 inch thick may not be used for the shell or heads of the tank. A corrosion allowance of at least 20 percent of the minimum shell and head thickness or 0.100 inch, whichever is less, must be added to the thickness requirement for a cargo tank used in chlorine or sulfur dioxide service. The head and shell thickness for chlorine tanks must be at least 5/8 inch, including corrosion allowance.

(e) The design, construction, and installation of any appurtenance to the shell or heads of the cargo tank must minimize the possibility of appurtenance damage or failure adversely affecting the lading retention integrity of the tank. Where a tank support is attached to any part of the tank head, the stresses imposed on the head must conform with the requirements of paragraph (a) of this section.

(1) A lighweight attachment, such as a conduit clip, brakeline clip or placard holder, must be constructed of a material of lesser strength than the tank shell or head material and may not be more than 72 percent of the thickness of the the tank shell or head to which it is attached. The attachment may be secured directly to the tank shell or head 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 attachment must be secured to the tank shell or head by continuous weld or in such manner as to preclude formation of pockets, which may become sites for incipient corrosion.

(2) Except as prescribed in §§ 178.337–3(e)(1) and 178.337–13(d), the welding of any appurtenance to a shell or head must be made by attachment of a mounting pad so that there will be no adverse effect upon the lading retention integrity of the tank if any force is applied to the appurtenance, from any direction. The thickness of a 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 paid not less than ¼ inch thick may be used when the shell or head is over ¼ inch thick. If weep holes or tell-tale holes are used, the pad must be drilled or punched at its lowest point before it is attached to the tank. 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 using filler material conforming to the recommendations of the manufacturer of the head or shell material.

84. In § 178.337–4, the first sentence in paragraph (b) would be revised to read as follows:

§ 178.377–4 Joints.

* * * * *

(b) Welding procedure and welder performance must be in accordance with Section IX of the ASME Code. * * *

* * * * *

85. In § 178.337–6, paragraph (a) would be revised to read as follows:

§ 178.377–6 Closure for manhole.

(a) A cargo tank must be provided with a manhole conforming to paragraph UG–46(g)(1) and other requirements of the ASME Code.

* * * * *

86. In § 178.337–8, paragraph (b) would be revised to read as follows:

§ 178.377–8 Outlets.

* * * * *

(b) Outlets on chlorine cargo tanks must conform with § 178.337–1(c)(2).

87. In § 178.337–9, the section heading, paragraph (a) heading, and paragraphs (b) and (d)(1) would be revised to read as follows:

§ 178.337–9 Pressure relief devices, piping, values, hose and fittings.

(a) *Pressure relief devices.* * * *

(b) *Piping, valves, hose, and fittings.*

(1) The burst pressure of all piping, pipe fittings, hose and other pressure parts, except for pump seals and pressure relief devices, must be at least 4 times the design pressure of the tank. Additionally, the burst pressure may not be less than 4 times any higher pressure to which each pipe, pipe fitting, hose or other pressure part may be subjected to in service. For chlorine service, see paragraph (b)(7) of this section.

(2) Pipe joints must be threaded, welded or flanged. If threaded pipe is used, the pipe and fittings must be Schedule 80 weight or heavier. Malleable metals must be used in the construction of valves and fittings. Where copper tubing is permitted, joints shall be brazed or be of equally strong metal union type. The melting point of the brazing material may not be lower than 1000° F. The method of joining tubing may not reduce the strength of the tubing, such as by the cutting of threads.

(3) Each *hose coupling* must be designed for a pressure of at least 120 percent of the hose design pressure and so that there will be no leakage when connected.

(4) Piping must be protected from damage due to thermal expansion and contraction, jarring, and vibration. Slip joints are not authorized for this purpose.

(5) *Piping and fittings* must be grouped in the smallest practicable space and protected from damage as required by § 178.337–10.

(6) All *piping, valves, and fittings* on a cargo tank must be proved free from leaks. This requirement is met when such piping, valves, and fittings have been tested after installation with gas or air and proved leak tight at not less than the design pressure marked on the cargo tank. This requirement is applicable to all hoses used on a cargo tank, except that hose may be tested before or after installation on the tank.

(7) *Chlorine cargo tanks.* Cargo tanks used to transport chlorine must conform with the following:

(i) No hose, piping or tubing used for loading or unloading may be mounted or carried on the cargo tank motor vehicle.

(ii) Angle valves on chlorine cargo tank motor vehicles must conform to the standards of The Chlorine Institute, Inc., as follows:

(A) For a cargo tank manufactured before January 1, 1975, to either Dwg. 104–4, dated May 5, 1958, or Dwg. 104–5, dated September 1, 1972.

(B) For cargo tank manufactured on or after January 1, 1975, to Dwg. 104–5, dated September 1, 1972.

(iii) Before installation, each angle valve must be tested for leakage at not less than 225 psig using dry air or inert gas.

* * * * *

(d) *Refrigeration and heating coils.* (1) Refrigeration and heating coils must be securely anchored, with provision for thermal expansion. The coils must be pressure tested externally to the tank test pressure, and internally to either the tank test pressure or twice the working pressure of the heating/refrigeration system, whichever is higher. A tank may not be placed in service if any leakage occurs or other evidence of damage is found. The refrigerant or heating medium to be circulated through the coils must not be capable of causing any adverse chemical reaction with the tank in the event of leakage. The unit furnishing refrigeration may be mounted on the motor vehicle.

* * * * *

88. Section 178.337–11 would be revised to read as follows:

§ 178.337–11 Emergency discharge control.

(a) *Excess flow valves, back flow check valves and stop valves.* (1) When required by § 178.337–8(a)(2), an excess flow valve or back flow check valve must be located inside the tank or inside a welded nozzle which is an integral part of the tank.

(i) Each internal self-closing stop valve or access flow valve must automatically close if any of its attachments are sheared off or if any attached hoses or piping are ruptured.

(ii) Each self-closing valve or excess flow valve must be located inside the tank or at a point outside the tank where the line enters or leaves the tank. The valve seat must be located inside the tank or within a welded flange, its companion flange, a nozzle or a coupling. The installation must be made so as to assure that any undue strain which causes a failure requiring the functioning of the valve will not impair the operation of the valve.

(iii) All parts of the valve inside the tank, or within a nozzle, flange, companion flange, or coupling must be made of material not subject to corrosion or other deterioration in the presence of the lading.

(iv) Any liquid level gauging device must be constructed so that the outward flow of the tank lading does not exceed the flow through a 0.060 inch diameter opening.

(v) Each excess flow valve must close automatically at the rated flow of gas or liquid, as specified by the valve manufacturer. The flow rating of the piping, fittings, valves, and hose on each side of the excess flow valve must be at

least that of the excess flow valve. If branching or any other restriction is incorporated in the system so that the flow rating is reduced to less than that of the excess flow valve at the tank, additional excess flow valves must be located where the flow rates are reduced. The additional valves must have sufficient flow rating so that total capacity equals or exceeds the excess flow valve capacity.

(vi) An excess flow valve may be designed with a bypass, not to exceed a 0.040-inch diameter opening, to allow equalization of pressures.

(vii) On a tank over 3,500 gallons water capacity, each internal self-closing stop valve must be provided with remote means of automatic closure, both mechnical and thermal, that are installed at the ends of the tank in at least two, diagonally opposite locations. Cable linkage between closures and remote operators must be corrosion resistant and effective in all types of environment and weather. If the discharge connection at the tank is not in the general vicinity of one of the two locations specified above, one additional fusible element must be installed so that heat from a fire in that area will activate the emergency control system. Fusible elements may not have a melting point exceeding 250 °F.

(viii) On a tank of 3,500 gallons water capacity or less, each internal self-closing stop valve must be provided with at least one remote means of automatic closure, which may be mechanical, installed at one end of the tank, away from the discharge connection area.

(2) Each liquid or vapor discharge opening in a cargo tank intended for the transportation of a flammable liquid; flammable compressed gas; hydrogen chloride, refrigerated liquid; or anhydrous ammonia must be equipped with a remotely controlled internal self-closing stop valve. For cargo tanks intended for use in chlorine service, see paragraph (a)(4) of this section.

(3) Unless otherwise specified in paragraph (c) of this section, each outlet of a cargo tank intended for the transportation of a nonflammable gas (except carbon dioxide, refrigerated liquid) must be provided with an internal self-closing stop valve or an automatic excess flow valve. Each outlet of a cargo tank intended for the transportation of a flammable liquid; a flammable liquefied gas; hydrogen chloride, refrigerated liquid; or anhydrous ammonia must be equipped with a remotely controlled internal self-closing stop valve.

(4) Excess flow valves on chlorine cargo tank motor vehicles must conform to the standards of The Chlorine Institute, Inc., as follows:

(i) For a cargo tank manufactured before January 1, 1975:

(A) A valve conforming to either Dwg. 101–4, dated May 16, 1969, or Dwg. 101–5, dated September 1, 1973, must be installed under each liquid angle valve.

(B) A valve conforming to either Dwg. 101–3, dated May 16, 1973, or Dwg. 101–5, dated September 1, 1973, must be installed under each gas angle valve.

(ii) For a cargo tank manufactured on or after January 1, 1975:

(A) A valve conforming to Dwg. 101–6, dated September 1, 1973, must be installed under each liquid angle valve.

(B) A valve conforming to Dwg. 106–5, dated September 1, 1973, must be installed under each gas angle valve.

(b) *Shut-off valves.* Each filling and discharge line must be provided with a manual stop valve located as close to the tank a practicable. However, if an automatic internal self-closing stop valve is used, the manual stop valve must be located in the line outboard of the hose connection. A single so-called "stop-check" or excess flow valve may not be used to satisfy the requirements of both this paragraph and of paragraph (a)(4) of this section, except as provided in paragraph (c) of this section.

(c) The requirements in paragraph (a) of this section do not apply to:

(1) A vapor or liquid discharge opening of less than 1¼ inch NPT equipped with an excessive flow valve together with a manually operated external self closing stop valve, in place of a remotely controlled internal self-closing stop valve.

(2) A vapor or liquid discharge opening of 1¼ inch NPT equipped with an excess flow valve together with a manually operated external stop valve installed before October 1, 1984.

(3) An engine fuel line, on a truck-mounted tank, of not over ¾ inch NPT equipped with a valve having an integral excess flow valve.

89. In § 178.337–14, paragraph (b) would be revised to read as follows:

§ 178.337–14 Gauging devices.

* * * * *

(b) *Pressure gauges.* (1) See § 173.315(h) of this subchapter.

(2) Each cargo tank used in carbon dioxide, refrigerated liquid or nitrous oxide, refrigerated liquid service must be provided with a suitable pressure gauge. A shut-off valve must be installed between the pressure gauge and the tank.

* * * * *

90. Section 178.337–15 would be revised to read as follows:

§ 178.337–15 Pumps and compressors.

(a) *Liquid pumps or gas compressors,* if used, must be of suitable design, adequately protected against breakage by collision, and kept in good condition. They may be driven by motor vehicle power takeoff or other mechanical, electrical, or hydraulic means. Unless they are of the centrifugal type, they shall be equipped with suitable pressure actuated by-pass valves permitting flow from discharge to suction or to the tank.

(b) A liquid chlorine pump may not be installed on a cargo tank intended for the transportation of chlorine.

91. In § 178.338–18, the first and second sentences of paragraph (a) would be revised to read as follows:

§ 178.337–18 Marking.

(a) The tank vehicle 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 with Specification MC 331 and the ASME Code. The certificate must be signed by a responsible official of the manufacturer and an Authorized Inspector. * * *

* * * * * *

92. Section 178.338–3 and heading would be revised to read as follows:

§ 178.338–3 Structural integrity.

(a) The maximum calculated design stress value may not exceed the maximum design stress values prescribed in Section VIII of the ASME Code. Corrosion allowance material may not be used to satisfy the design requirements.

(1) The design and construction of each cargo tank must provide for all potential structural loadings, including but not limited to impact loading, dynamic pressure, internal loadings, and the effect of temperature gradients resulting from lading and ambient temperature extremes. When dissimilar materials are used, their thermal coefficients must be considered in the calculation of the design stress value.

(2) Maximum concentrated stresses which might be created at pads, cradles or supports due to shear, bending and torsion shall also be considered and calculated in accordance with Appendix G of Section VIII of the ASME Code.

(3) The design calculations for the cargo tank heads and shell must include the load resulting from the design pressure in combination with the dynamic pressure resulting from a longitudinal deceleration of 2 "g".

(b) The effective stress on the tank shell in a plane normal to the longitudinal axis may not exceed 25 percent of the minimum specified tensile strength of the metal or the maximum stress values prescribed in Section VIII of the ASME Code, at any point in the cargo tank. The forces, loads and stresses must take into account the weight of the tank, the maximum weight of lading, and structures supported by the cargo tank, but not including the weight of the structures supporting the tank in normal conditions. The stresses due to internal pressure and vertical loadings must be applied in all considerations. The accelerative, decelerative and lateral forces must be applied separately. The combination case which produces the maximum effective stress shall govern. Stress calculations must include all the following:

(1) The circumferential tensile stress due to internal pressure;

(2) The longitudinal tensile stress due to internal pressure;

(3) The tensile or compression stress generated by the axial load and bending moment resulting from both accelerative and decelerative forces equal to twice the weight of the fully loaded vehicle applied independently to each suspension assembly at the road surface;

(4) The tensile or compression stress generated by the axial load and bending moment resulting from both accelerative and decelerative forces equal to twice the weight of the fully loaded vehicle applied to the horizontal pivot of the fifth wheel supporting the vehicle;

(5) The tensile or compression stress due to a bending moment produced by a vertical force equal to three times the static weight of the tank and contents;

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

(7) The lateral shear stress due to a lateral accelerative force applied at the road surface which will produce a force equal to twice the static weight of the tank and contents; and

(8) The torsional shear stress due to a lateral accelerative force applied at the road surface based on half the loaded weight of the motor vehicle that will produce a force equal to twice the static weight of the tank and contents.

(c) For a frameless cargo tank motor vehicle where the cargo tank shell serves as the vehicle frame, the minimum thickness of the tank shell must be such that at no point will the effective stress in the tank shell exceed the stresses specified in paragraph (b) of this section. Calculation of the basic structural integrity must be made by the following formula:

$$S=(S_y+S_x)/2+[((S_y-S_x)^2)/4+S_s^2]^{0.5}$$

where at any given point under consideration, and for the worst combination of loadings that can occur at the same time, the stress levels produced at the point being considered are:

S = Effective stress as limited by this requirement, in psi.

S_y = The circumferential tensile stress due to internal pressure, in psi.

S_x = All of the tensile and compressive stresses as specified in paragraph (b) of this section that apply, including the longitudinal tensile stresses due to internal pressure, in psi.

S_s = Any of the shear stresses specified in paragraph (b) of this section that apply, in psi.

(d) A tank shell or head thickness less than that specified in paragraph (c) of this section may be used if the tank is supported by a frame or other form of structural support, provided that the effective stresses prescribed in paragraph (b) of this section are fully evaluated; except that steel less than 3/16 inch thick may not be used for the shell or heads unless the tank is evacuated or has a load bearing jacket. Steel less than 0.110 inch thick may not be used for the shell or head under any circumstance.

(e) The design, construction, and installation of any appurtenance to the shell or head of the cargo tank must minimize the possibility of appurtenance damage or failure adversely affecting the lading retention integrity of the tank. Where a tank support is attached to any part of the tank head, the stresses imposed on the head must conform with the requirements of paragraph (a) of this section.

(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 tank shell or head material and may not be more than 72 percent of the thickness of the tank shell or head to which it is attached. The attachment may be secured directly to the tank shell or head 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 attachment must be secured to the tank shell or head by continuous weld or in such manner as to preclude formation of pockets, which may become sites for incipient corrosion.

(2) Except as prescribed in §§ 178.338-3(e)(1) and 178.338-338-13(a), the welding of any appurtenance to a shell or head must be made by attachment of a mounting pad so that there will be no adverse effect upon the lading retention integrity of the tank if any force is applied to the appurtenance, from any direction. The thickness of a 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 not less than 3/16 inch thick may be used when the shell or head is over 3/16 inch thick. If weep holes or tell-tale holes are used, the pad must be drilled or punched at its lowest point before it is attached to the tank. 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 using filler material conforming to the recommendations of the manufacturer of the head or shell material.

93. In § 178.338-3, paragraph (b) would be revised to read as follows:

§ 178.338-8 Pressure relief devices, piping, valves, and fittings.

* * * * *

(b) * * *

(1) The burst pressure of all piping, pipe fittings, hoses and other pressure parts, except for pump seals and pressure relief devices, must be at least 4 times the design pressure of the tank. Additionally, the burst pressure may not be less than 4 times any higher pressure to which each pipe, pipe fitting, hose or other pressure part may be subjected to in service.

(2) Pipe joints must be threaded, welded or flanged. If threaded pipe is used, the pipe and fittings must be Schedule 80 weight or heavier. Malleable metals must be used in the construction of valves and fittings. Where copper tubing is permitted, joints shall be brazed or be of equally strong metal union type. The melting point of the brazing materials may not be lower than 1000 °F. The method of joining tubing may not reduce the strength of the tubing, such as by the cutting of treads.

(3) Each *hose coupling* must be designed for a pressure of at least 120 percent of the hose design pressure and so that there will be no leakage when connected.

(4) Piping must be protected from damage due to thermal expansion and contraction, jarring, and vibration. Slip joints are not authorized for this purpose.

(5) All *piping, valves, and fittings* on a cargo tank must be proved free from leaks. This requirement is met when such piping, valves, and fittings have been tested after installation with gas or air and proved leak tight at not less than the design pressure marked on the cargo tank. This requirement is applicable to all hoses used in a cargo tank, except that hose may be tested before or after installation on the tank.

(6) Each valve must be suitable for the tank design pressure at the tank design service temperature.

(7) All fittings must be rated for the maximum tank pressure and suitable for the coldest temperature to which they will be subjected in actual service.

(8) All piping, valves and fittings must be grouped in the smallest practicable space and protected from damage as required by § 178.338–10.

(9) When a pressure-building coil is used on a tank designed to handle oxygen or flammable ladings, the vapor connection to that coil must be provided with a valve or check valve as close to the tank shell as practicable to prevent the loss of vapor from the tank in case of damage to the coil. The liquid connection to that coil must also be provided with a valve.

94. Section 178.338–17 would be revised to read as follows:

§ 178.338–17 Pumps and compressors.

(a) *Liquid pumps and gas compressors,* if used, must be of suitable design, adequately protected against breakage by collision, and kept in good condition. They may be driven by motor vehicle power takeoff or other mechanical, electrical, or hydraulic means. Unless they are of the centrifugal type, they shall be equipped with suitable pressure actuated by-pass valves permitting flow from discharge to suction or to the tank. Proper precautions must be taken to assure that no grease or oil contacts the lading when such pumps or compressors are used in oxygen, refrigerated liquid service.

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

95. In Part 178, §§ 178.340, 178.341, 178.342 and 178.343 and their headings would be revised to read as follows:

§ 178.340 General design and construction requirements applicable to Specification MC 306 (§ 178.341), MC 307 (§ 178.342), and MC 312 (§ 178.343) cargo tank motor vehicles.

§ 178.340–1 General requirements.

(a) Specification MC 306, MC 307, and MC 312 cargo tank motor vehicles must conform with this section in addition to the requirements of the applicable specification contained in § 178.341, § 178.342, or § 178.343.

(b) All specification requirements are minimum requirements.

(c) *Definitions.* The following terms apply to §§ 178.340, 178.341, 178.342 and 178.343.

"Appurtenance" means any cargo tank accessory attachment that has no lading retention or containment function and provides no structural support to the cargo tank.

"Baffle" means a device that deflects, checks or regulates fluid motion in a tank.

"Bottom damage protection zone" means the bottom ⅓ of a cargo tank, the area that is most vulnerable to damage as a result of collision with another vehicle or object.

"Bulkhead" means a tank head shared by two cargo tanks.

"Charging line" means a hose, tube, pipe, or similar device used to pressurize a tank with material other than the lading.

"Companion flange" means one of two mating flanges where the flange faces are in contact or separated only by a thin leak sealing gasket.

"Connecting structure" means the structure joining two cargo tanks.

"Constructed and certified in conformance with the ASME Code" means a cargo tank constructed, inspected, certified and stamped by an Authorized Inspector.

"Constructed in accordance with the ASME Code" means a cargo tank having a design pressure below 15 psig or other design features authorized by DOT that fall outside the scope of the ASME Code, and thus cannot be certified and stamped as an ASME pressure vessel. Notwithstanding this limitation on design pressure, such tank must meet all the requirements of the ASME Code, except as modified by the applicable specification and be constructed by a manufacturer holding a current ASME certificate of authorization.

"Design pressure" See § 178.340–1(l).

"Fail-safe device" means a device designed to fail sacrificially under load in order to prevent damage to any lading retention part or device.

"Flange" means the structural ring for guiding or attachment of a pipe or fitting with another flange (companion flange), pipe, fitting or other attachment. For size and shape, see ANSI B16.5.

"Inspection pressure" means the pressure used to determine leak tightness of the tank when testing with pneumatic pressure.

"Internal self-closing stop valve" means a self-closing stop valve designed so that the valve seat and the self-stored energy source are located inside the tank, or within a welded flange, its companion flange, a nozzle or a coupling attaching the stop valve to the tank.

"Lading" means the hazardous material contained in a cargo tank.

"Loading/unloading connection" means the fitting in the loading/unloading line farthest from the loading/unloading outlet to which the loading/unloading hose or device is attached.

"Loading/unloading outlet" means the tank outlet used for normal loading/unloading operations.

"Loading/unloading stop valve" means the stop valve farthest from the tank loading/unloading outlet to which the lading loading/unloading connection is attached.

"Manufacturer" means any person engaged in the manufacture or assembly of a cargo tank or cargo tank equipment, including any person who imports a cargo tank or cargo tank equipment for resale in the United States.

"Maximum allowable working pressure" or "MAWP" See § 178.340–1(k).

"Multispecification cargo tank motor vehicle" means a cargo tank motor vehicle equipped with cargo tanks fabricated to more than one cargo tank specification.

"Nozzle" means the subassembly consisting of a pipe section with a welded or forged flange on one end in which the flange is an integral part of the neck extension.

"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, a flanged opening securely closed during transportation with a bolted or welded blank flange, or a manhole.

"Outlet stop valve" means the stop valve at the tank loading/unloading outlet.

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

"Rear bumper" means the structure designed to prevent a vehicle or object from underriding the rear of a motor vehicle. See § 393.86 of this title.

"Rear-end tank protection device" means the structure designed to protect a cargo tank and any lading retention piping or devices in case of a rear end collision.

"Rollover damage protection zone" means the upper ⅔ of a cargo tank, the area that is most vulnerable to damage in the event of an overturn.

"Self-closing stop valve" means a stop valve held in the closed position by means of a self-stored energy, which opens only by application of an external force and which closes when the external force is removed.

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

"Stop valve" means a valve that stops the flow of lading.

"Sump" means a protrusion from the bottom of a tank shell designed to facilitate complete unloading of the lading.

"Tank" means a receptacle, consisting of a shell and heads, that forms a pressure tight vessel having openings designed to accept pressure tight fittings or closures, but excludes any appurtenances, reinforcements, fittings, or closures.

"Test pressure" means the pressure to which a tank is subjected to determine pressure integrity.

"Toughness of material" means the capability of a material to absorb relatively large quantities of energy and is represented by the area under the stress strain curve indicating the energy absorbed per unit volume of the material up to the point of rupture.

"Vacuum tank" means a tank that is loaded by reducing the pressure in the tank to below atmospheric pressure.

"Variable specification cargo tank" means a cargo tank that is constructed in accordance with one specification, but which may be altered to meet another specification by changing relief devices, closures, lading discharge devices, and other lading retention devices.

"Void" means the space between tank heads or bulkheads and a connecting structure.

(d) A manufacturer of a cargo tank must hold a current ASME certificate of authorization.

(e) All construction must be certified by an Authorized Inspector.

(f) Each cargo tank must be designed and constructed in conformance with the requirements of the applicable cargo tank specification. Each cargo tank with an internal design pressure of 15 psig or greater must be "constructed and certified in conformance with the ASME Code", except as limited or modified by the applicable cargo tank specification. Each cargo tank with an internal design pressure less than 15 psig must be "constructed in accordance with the ASME Code", except as limited or modified by the applicable cargo tank specification.

(g) Requirements relating to parts and accessories on motor vehicles, which are contained in Part 393 of the Federal Motor Carrier Safety Regulations of this title, are incorporated into these specifications.

(h) Any additional requirement prescribed in Part 173, 177, or 180 of this subchapter that pertain to the transportation of specific ladings are incorporated into these specifications.

(i) *Cargo tank motor vehicle composes of multiple cargo tanks.*

(1) A cargo tank motor vehicle composed of more than one cargo tank may be constructed with the cargo tanks made to the same specification or to different specifications. Each cargo tank must conform in all respects with the specification for which it is certified.

(2) The strength of the connecting structure joining multiple cargo tanks in a cargo tank motor vehicle must conform with the structural design requirements in § 178.340–3. Any void within the connecting structure must be vented to the atmosphere by a drain of at least 1 inch inside diameter which shall 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.

(j) *Variable specification cargo tank.* A cargo tank that may be physically altered to conform to another cargo tank specification must have the required physical alterations to convert from one specification to another clearly indicated on the variable specification plate.

(k) *Maximum Allowable Working Pressure (MAWP).* The MAWP for each cargo tank must be greater than or equal to the largest of the following:

(1) The MAWP, as stated in the ASME Code;

(2) Vapor pressure of the most volatile lading, at 115 °F. (expressed in psig); or

(3) The maximum pressure used to load or unload the lading.

(l) *Design Pressure.* The design pressure for each cargo tank must be greater than or equal to the largest of the following:

(1) The minimum pressure prescribed in the individual specification;

(2) The pressure prescribed for the lading in Part 173; or

(3) 1.2 times the sum of the MAWP, excluding loading and unloading pressure, plus the maximum static pressure exerted by the lading at the maximum lading density.

§ 178.340–2 Material and material thickness.

(a) All material for shell, heads, bulkheads, and baffles must be metal compatible with the lading intended to be transported therein and must conform to Section II, Parts A and B, of the ASME Code.

(b) *Minimum thickness.* (1) The minimum thickness for the shell and heads must be in accordance with the ASME Code and must be such that the maximum stress levels specified in § 178.340–3 (b), (c) or (d) of this subpart are not exceeded.

(2) For mild steel, in no case may the shell and head thickness be less than 0.110 inch, with a guaranteed minimum tensile strength of 45,000 psi and a guaranteed elongation of 20 percent.

(3) For material other than the mild steel, the minimum thickness for the shell and heads must be obtained from the following formula, but in no case may the thickness be less than 0.090 inch:

$$e_1 = (32.2e_0)/(R_{m1}A_1)^{1/5}$$

Where:

e_0 = Required thickness of the reference steel (See § 178.340–2 (b)(2)), in inches;

e_1 = Equivalent thickness of the material used, in inches;

R_{m1} = Specified minimum tensile strength of the material used, in psi; and

A_1 = Specified minimum percentage elongation of the material used, in percent times 100 (i.e., if 20% use 20.0)

(4) If the maximum allowable stress value is based on actual tensile strength, yield strength or elongation of the material used to fabricate the tank—

(i) The tensile strength, yield strength or the elongation values may not be greater than 120 percent of the minimum specified in the ASME Code; and

(ii) The test records and certification of test results must be approved by an Authorized Inspector and retained by the tank manufacturer for a period of not less than 15 years and made available to any duly identified representative of the Department or the owner of the tank.

(c) *Corrosion or abrasion protection.* A cargo tank or a part thereof, subject to thinning by corrosion, mechanical abrasion, or any other action, must be protected by providing the tank or part with a suitable increase in thickness of material, a lining, or some other suitable method of protection.

(1) *Corrosion allowance.* Material added for corrosion allowance need not be of uniform thickness if different rates of attack can reasonably be expected for various areas of the tank.

(2) *Lining.* Lining material must consist of a nonporous, homogeneous material not less elastic than the parent metal and substantially immune to attack by the lading. The lining material must be imperforate when applied, and bonded or attached by other appropriate means. Any joint or seam in the lining must be made by fusing the materials together, or by other satisfactory means.

§ 178.340-3 Structural integrity.

(a) The maximum calculated design stress value may not exceed the maximum design stress values prescribed in Section VIII of the ASME Code. Corrosion allowance material may not be used to satisfy the design requirements.

(1) The design and construction of each cargo tank must provide for all potential structural loadings, including but not limited to impact loading, dynamic pressure, inertial loadings, and the effect of temperature gradients resulting from loading and ambient temperature extremes. When dissimilar materials are used, their thermal coefficients must be considered in the calculation of the design stress value.

(2) Maximum concentrated stresses which might be created at pads, cradles or supports due to shear, bending and torsion shall also be calculated in accordance with Appendix G of Section VIII of the ASME Code.

) The design calculations for the cargo tank heads and shell must include the load resulting from the design pressure in combination with the dynamic pressure resulting from a longitudinal deceleration of 2 "g".

(b) The effective stress on the tank shell in a plane normal to the longitudinal axis may not exceed the maximum design stress values prescribed in Section VIII of the ASME Code, at any point in the cargo tank. The forces, loads and stresses must take into account the weight of the tank, the maximum weight of lading, and structures supported by the cargo tank, but not including the weight of the structures supporting the tank in normal conditions. The stresses due to internal pressure and vertical loadings must be applied in all considerations. The accelerative, decelerative and lateral forces must be applied separately. The combination case which produces the maximum effective stress shall govern. Stress calculations must include all the following:

(1) The circumferential tensile stress due to internal pressure;

(2) The longitudinal tensile stress due to internal pressure;

(3) The tensile or compression stress generated by the axial load and bending moment resulting from both accelerative and decelerative forces equal to twice the weight of the fully loaded vehicle applied independently to each suspension assembly at the road surface;

(4) The tensile or compression stress generated by the axial load and bending moment resulting from both accelerative and decelerative forces equal to twice the weight of the fully loaded vehicle applied to the horizontal pivot of the fifth wheel supporting the vehicle;

(5) The tensile or compression stress due to a bending moment produced by a vertical force equal to three times the static weight of the tank and contents;

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

(7) The lateral shear stress due to a lateral accelerative force applied at the road surface which will produce force equal to twice the static weight of the tank and contents; and

(8) The torsional shear stress due to a lateral accelerative force applied at the road surface based on half the loaded weight of the motor vehicle which will produce a force equal to twice the static weight of the tank and contents.

(c) For a frameless cargo tank motor vehicle where the cargo tank shell serves as the vehicle frame, the minimum thickness of the tank shell must be such that at no point will the effective stress in the tank exceed the stresses specified in paragraph (b) of this section. Calculation of the basic structural integrity must be made by the following formula:

$$S=(S_y+S_x)/2+[((S_y-S_x)^2)/4+S_s^2]^{0.5}$$

where at any given point under consideration, and for the worst combination of loadings that can occur at the same time, the stress levels produced at the point being considered are:

S = Effective stress as limited by this requirement in psi.
S_y = The circumferential tensile stress due to internal pressure, in psi.
S_x = All of the tensile and compression stresses as specified in paragraph (b) of this section that apply, including the longitudinal tensile stresses due to internal pressure, in psi.
S_s = Any of the shear stresses specified in paragraph (b) of this section that apply, in psi.

(d) If a tank is supported by a vehicle frame or other form of structural support, a tank shell or head thickness less than that specified in paragraph (c) of this section may be used provided that the effective stresses prescribed in paragraph (b) of this section are fully evaluated.

(e) The design, construction, and installation of any appurtenance to the shell or head of the cargo tank must minimize the possibility of appurtenance damage or failure adversely affecting the lading retention integrity of the tank.

(1) Structural members, the suspension subframe, accident protection devices and external rings should 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 or placard holder, must be constructed of a material of lesser strength than the tank shell or head material and may not be more than 72 percent of the thickness of the tank shell or head to which it is attached. The attachment may be secured directly to the tank shell or head if the device is designed and installed in such a manner that if damaged it will not affect the lading rention integrity of the tank. The attachment must be secured to the tank shell or head by continuous weld or in such manner as to preclude formation of pockets, which may become sites for incipient corrosion.

(3) Except as prescribed in paragraphs (e)(1) and (e)(2) of this section, the welding of any appurtenance to a shell or head must be made by attachment of a mounting pad so that there will be no adverse effect upon the lading rention integrity of the tank if any force is applied to the appurtenance, from any direction. The thickness of a 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 not less than 3/16 inch thick may be used when the shell or head is over 3/16 inch thick. If weep holes or tell-tale holes are used, the pad must be drilled or punched at its lowest point before it is attached to the tank. 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 using filler material conforming to the recommendations of the manufacturer of the head or shell material.

§ 178.340-4 Joints.

(a) All joints between tank shell, heads, baffles, baffle attaching rings, and bulkheads must be welded in conformance with the ASME Code.

(b) Where practical all welds must be easily accessible for inspection.

§ 178.340-5 Manhole Assemblies.

(a) Each cargo tank must be accessible through a manhole at least 15 inches in diameter.

(b) Unless otherwise provided in the applicable individual specification, each manhole must have a secure closure that is structurally capable of withstanding, without leakage or permanent deformation, static internal fluid pressures of at least 36 psig, or test pressure, whichever is greater.

(c) Each manhole cover must be fitted with a safety device that prevents the manhole cover from opening fully when internal pressure is present.

(d) Each manhole and filler cover must be secured with fastenings that will prevent opening of the covers as a result of vibration under normal transporation conditions or shock impact due to an accident.

§ 178.340-6 Supports and anchoring.

(a) A cargo tank with a frame not integral to the tank must have the tank secured by restraining devices to eliminate any motion between the tank and frame that may abrade the tank shell due to the stopping, starting, or turning of the vehicle. The design calculations of the support elements must include the stresses indicated in § 178.340-3(b). Such restraining devices must be readily accessible for inspection and maintenance, except that insulation and jacketing are permitted to cover the restraining devices.

(b) A cargo tank designed and constructed so that it constitutes in whole or in part the structural member used in lieu of a frame must be supported in such a manner that the resulting stress levels in the tank do not exceed those specified in § 178.340-3(a). The design calculations of the support elements must include the stresses indicated in § 178.340-3(b).

§ 178.340-7 Circumferential reinforcements.

(a) A tank with a shell thickness of less than 3/16 inch must be circumferentially reinforced with bulkheads, baffles, or 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 circumferential reinforcement produces structural integrity at least equal to that prescribed in §§ 178.340-3(a) and (b).

(2) Circumferential reinforcement must be located within 1 inch of points where discontinuity in longitudinal shell sheet alignment exceeds 10 degrees unless otherwise reinforced with structural members capable of maintaining shell stress levels authorized in § 178.340-3(a).

(b) No reinforcement may cover any circumferential joint.

(c) A baffle or baffle attachment ring, if used as a required reinforcement member, must produce structural integrity at least equal to that prescribed in § 178.340-3.

(d) *Stiffening rings.* (1) Stiffening rings, when used to conform with this section, must be as prescribed in the ASME Code.

(2) Stiffening rings must be of the type that can be visually inspected. Hat shaped or open channel rings precluding visual inspection of the tank shell are prohibited.

§ 178.340-8 Accident Damage Protection.

(a) *General.* Each cargo tank and its associated piping, closures, and values must be designed and constructed to minimize the potential for the loss of lading due to an accident. The cargo tank design and construction must take into consideration forces relating to puncture, abrasion, crush, dynamic pressure, and impact and inertial loadings:

(1) Any projection from the cargo tank shell that retains lading, e.g., domes, sumps, washouts, must be designed, constructed, and installed so as to minimize the possibility of impact during an accident which may adversely affect the lading retention integrity of the cargo tank. Such projections must be constructed from a material of a toughness equivalent to that of the tank shell and with a thickness at least equal to that specified by the appropriate cargo tank specification. Any projection that extends more than two inches from the tank shell must have accident damage protection devices as specified in this section, or when not so protected, the projection must:

(i) Be 125 percent as strong as the otherwise required accident damage protection device, or

(ii) Conform with the requirements of paragraph (a)(3) of this section.

(2) Outlets, valves, closures, associated piping, or any devices that if damaged in an accident could result in a loss of lading from the cargo tank must be protected by accident damage protection devices as specified in this section, or when not so protected these parts must:

(i) Be 125 percent as strong as the otherwise required accident damage protection device; or

(ii) Conform with the requirements of paragraph (a)(3) of this section.

(3) Accident damage protection devices attached to the shell of a cargo tank must be designed, constructed, and installed so as to maximize the distribution of loads to the shell and minimize the possibility of adversely affecting the lading retention integrity of the cargo tank. Each accident damage protection device must be designed to prevent loss of the lading retention capability of the cargo tank by failure of the device. Accident induced stress resulting from the accident damage protection device requirements in combination with the stresses from the tank operating at the design pressure may not result in a tank shell stress greater than 75 percent of the ultimate strength of the tank shell material.

(4) Piping that extends beyond an accident damage protection device must be equipped with a stop-valve and fail-safe device located within the accident damage protection device to prevent any accidental loss of lading. The fail-safe device must be located in the piping system outboard of the stop-valve. The fail-safe device must be designed to prevent damage to the stop-valve and to any piping between the tank outlet and the stop-valve due to loads transferred by the piping in an accident.

(5) All manhole covers, filling covers, washout covers, piping and stop-values that retain lading during transportation must be designed and fabricated to withstand all applicable dynamic and inertial loads resulting from an accident in which the cargo tank would be expected to retain its containment integrity without loss of lading.

(6) *Minimum road clearance.* The minimum allowable road clearance of any cargo tank component or protection device located between any two adjacent axles on a vehicle or vehicle combination shall 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 bottom damage protection zone that could be damaged in an accident thereby resulting in the loss of lading must be protected by a bottom damage protection device or must be 125 percent as strong as the otherwise required bottom damage protection device.

(1) A bottom damage protection device must be able to withstand or deflect away from the cargo tank an

impact equivalent to an energy of 275,000 foot-pounds applied to the bottom damage protection device at any point from any direction (front, side, rear or bottom) over an area not greater than 6 square feet, based on the ultimate strength of the material.

(2) A lading discharge opening equipped with an internal self-closing stop valve need not conform with paragraph (b)(1) of this section provided it is protected so as to reasonably assure against the accidental loss of lading. Protection for lading discharge piping must be provided by a fail-safe device located outboard of each internal self-closing stop valve and within 4 inches of the major radius of the tank shell. The fail-safe device must break under strain at no more than 80 percent of the strength of the shell material and leave the internal self-closing stop valve and its attachment to the tank intact and capable of retaining lading.

(c) *Rollover Damage Protection.* Each closure for an opening, including but not limited to filling, manhole, or inspection openings, and each valve, fitting, pressure relief device, or other accessory located in the rollover damage protection zone 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.

(1) A rollover damage protection device on a cargo tank motor vehicle must be designed and installed to withstand a load normal and tangential to the tank shell equal to at least twice the weight of the loaded cargo tank motor vehicle, based on the ultimate strength of the material used. These design loads may be considered independently. If more than one rollover protection device is used, each device must be capable of carrying at least one-fourth the required total tangential load and its proportionate share of the load normal to the tank shell. The design must be proven capable of carrying the required loads by calculations, tests or a combination of tests and calculations.

(2) A rollover damage protection device that would otherwise allow the accumulation of liquid on the top of the tank, must be provided with a drain that directs the liquid to a safe point of discharge away from any structural component of the cargo tank motor vehicle.

(d) *Rear-end tank protection.* Each cargo tank shall be provided with a rear-end tank protection device to protect the cargo tank and piping in the event of a rear-end collision and minimize the possibility of any part of the colliding object damaging the tank. The outboard surface of the rear-end tank protection device shall be located at least 6 inches to the rear of any vehicle component used for loading or unloading or that may contain lading while in transit. This protection device must be designed to successfully absorb (i.e. incur no damage that will cause leakage of lading) the impact of the cargo tank motor vehicle loaded at its rated payload, with a deceleration of 2 "g" using a safety factor of two based on the ultimate strength of the materials used. Such impact must be considered uniformly distributed and applied horizontally (parallel to the ground) from any direction at an angle not exceeding 30 degrees to the longitudinal axis of the vehicle. The rear-end tank protection device must be of a width and height adequate to protect the cargo tank, and all the valves, fittings and piping located at the rear of the cargo tank, from damage that could result in loss of lading.

§178.340-9 Pumps, piping, hoses and connections.

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

(b) Each hose, piping, stop valve, lading retention fitting, and closure for each cargo tank must be designed for a bursting pressure of at least 100 psig, and not less than four times the cargo tank design pressure. Each hose coupling must be designed for a bursting pressure of not less than 120 percent of the design bursting pressure of the hose and must be so designed that there will be no leakage when connected.

(c) 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.

(d) Any heating device, when installed, must be so constructed that the breaking of its external connections will not cause leakage of the tank lading.

(e) Any gauging, loading, or charging device, including associated valves, must be provided with an adequate means of secure closure to prevent leakage.

(f) Each loading/unloading or charging line must be constructed with sufficient strength, or be protected by a fail safe device, such that any load applied by loading/unloading or charing lines connected to the cargo tank cannot cause damage resulting in loss of lading from the cargo tank.

(g) 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 product retention system.

§ 178.340-10 Pressure relief.

(a) Each cargo tank must be equipped with a pressure and vacuum relief system 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 under any condition of overpressurization or vacuum resulting from tank heating, cooling, loading or unloading.

(b) *Type and construction of relief systems and devices.* (1) Each cargo tank must be provided with a primary pressure relief system consisting of one or more spring-loaded pressure relief valves. A secondary pressure relief system consisting of another spring-loaded pressure relief valve in parallel with the primary pressure relief system may be used to augment the total venting capacity of the cargo tank. Non-reclosing pressure relief devices are not authorized in any cargo tank except when in series with a spring-loaded pressure relief valve.

(2) If a frangible disc is inserted in series with a spring-loaded valve, the space between the frangible disc and the value must be provided with a suitable tell-tale indicator to permit detection of any frangible disc pinholing or leakage which may cause a malfunction of the pressure relief system. The frangible disc must rupture at a tank pressure within the range specified in paragraph (d)(1) of this section.

(3) Each pressure relief system must be designed to prevent loss of lading from the system in case of pressure surges, vehicle upset or accident. Each pressure relief system must be designed to withstand a dynamic pressure surge of 50 psig applied for at least 300 milliseconds without leakage of liquid lading regardless of vehicle orientation. Each pressure actuated relief system must function in the event of sustained pressure rise in excess of the prescribed set pressure.

(4) Each spring-loaded pressure relief valve must be constructed and installed in a manner to prevent unauthorized adjustment of the relief setting.

(5) No shut-off valve of other device that could prevent venting through the pressure relief system may be installed in a pressure relief system.

(6) The pressure relief system must be mounted, shielded and drained so as to eliminate the accumulation of material that could impair the operation or discharge capability of the system by freezing, corrosion or blockage.

(c) *Location of relief devices.* Each pressure relief device must communicate with the vapor space of the tank in a position as near as possible to the longitudinal and transverse center 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*—(1) *Primary pressure relief systems.* Unless otherwise prescribed in the applicable individual specification, each primary pressure relief valve must be set to function at design pressure. For all tanks, the spring-loaded value must close after discharge at a pressure not less then 90 percent of the set-to-discharge pressure and remain closed at lesser pressures.

(2) *Secondary pressure relief system.* Each spring-loaded pressure relief valve used as a secondary relief device may not be set-to-discharge at a pressure greater than 125 percent of the design pressure of the cargo tank.

(e) *Venting capacity of pressure relief systems.* The pressure relief system (primary and secondary, including any piping) in each tank must have sufficient venting capacity to limit the tank internal pressure to a maximum of 130 percent of the tank's design pressure. This total venting capacity may not be less than that shown in Table I of this paragraph.

(1) *Primary pressure relief systems.* Unless otherwise specified in the applicable individual specification, the primary pressure relief system must have a minimum venting capacity of 12,000 SCFH per 350 square feet of exposed tank area, but in any case at least one fourth the required total venting capacity for the cargo tank.

(2) *Secondary pressure relief system.* If the primary pressure relief system does not provide the required total venting capacity, additional capacity must be provided by a secondary pressure relief system.

TABLE I.—Minimum Emergency Vent Capacity in Cubic Feet; Free Air/Hour (14.7 psia and 60 °F.)

Exposed area square feet	Cubic feet, free air per hour
20	15,800
30	23,700
40	31,600
50	39,500
60	47,400
70	55,300
80	63,300
90	71,200
100	79,100
120	94,900
140	110,700
160	126,500
180	142,300
200	158,100
225	191,300
250	203,100
275	214,300
300	225,100
350	245,700
400	265,000
450	283,200
500	300,600
550	317,300
600	333,300
650	348,800
700	363,700
750	378,200
800	392,200
850	405,900
900	419,300
950	432,300
1,000	445,000

Note 1: Interpolate for intermediate sizes.

(f) *Certification of pressure relief devices.* The manufacturer of any pressure relief device, including valves, frangible discs, vacuum vents and combination devices, must certify that the device model was designed and tested in accordance with this section and the appropriate cargo tank specification. The certificate must contain sufficient information to describe the device and its performance. The certificate must be signed by a responsible official of the manufacturer and the Authorized Inspector who approved the flow capacity certification.

(g) *Rated flow capacity certification test.* (1) Each pressure relief device model must be successfully flow capacity certification tested prior to first use. Devices having one design, size and set pressure are considered to be one model. The testing requirements are as follows:

(i) At least 3 devices of each specific model must be flow capacity tested at a pressure not greater than 130 percent of the design pressure of the cargo tank. For a device 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.

(ii) The rated flow capacity of a device model may not be greater than 90 percent of the average value for the devices tested.

(iii) The rated flow capacity derived for each device model must be approved by an Authorized Inspector.

(h) *Marking of pressure relief devices.* Each pressure relief device must be permanently marked with the following:

(1) Manufacturer's name;

(2) Model number;

(3) Set-to-discharge pressure, in psig; and

(4) Rated flow capacity, in SCFH at the rating pressure, in psig.

§ 178.340–11 Tank Outlets.

(a) Each tank outlet that may contain lading in any tank attitude must be equipped with an stop valve or other leak tight closure in accordance with the following (such tank outlets, closures and associated piping must be protected in accordance with § 178.340–8):

(1) Each loading/unloading outlet must be equipped with a external self-closing stop valve located as close as possible to the tank shell or with an internal self-closing stop valve that is located inside the tank, within a welded flange, its companion flange, a nozzle or a coupling. Each internal or external self-closing stop valve must be fitted with a remotely activated means of closure located more than 10 feet from the stop valve, as specified below. Cable linkage to these closures must be corrosion resistant and effective in all types of environment and weather. Any loading/unloading connecton extending beyond the self-closing stop valve must be fitted with another manually or mechanically operated stop valve at the end of such connection.

(i) For cargo tanks intended for flammable, pyrophoric, oxidizing or Poison B liquids, the remote means of closure must be activated for closure by manual or mechanical means and in case of fire by an automatic heat activated means. Thermally activated closures must activate at a temperature not over 250 °F.

(ii) For cargo tanks intended exclusively for a lading other than those mentioned in paragraph (a)(1)(i) of this section, the remote means of closure may be actuated by manual or mechanical means only.

(2) Each tank outlet that is not a loading/unloading outlet must be equipped with a stop valve or other leak tight closure located as close as practicable to the tank outlet. Any connection extending beyond this closure must be fitted with another stop valve at the end of such connection.

(b) A loading/unloading outlet designed and installed so that a ruptured loading/unloading line would not result in release of lading by gravity or pressure need not be equipped with a self-closing stop valve.

§ 178.340-12 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 an accuracy of 0.5 percent. Gauge glasses are not permitted.

§ 178.340-13 Pressure tests.

(a) Each tank must be pressure tested in accordance with this section and § 178.341-13(a), § 178.342-13(a) or § 178.343-13(a), as applicable.

(b) Each tank must be tested hydrostatically or pneumatically. Each cargo tank of a multi-tank cargo tank motor vehicle must be tested with the adjacent cargo tanks empty and at atmospheric pressure. Every closure, except the pressure relief device and a loading and unloading venting device rated at less than the prescribed test pressure must be in place during the test. If the venting device is not removed during the test such device must be rendered inoperative by a clamp, plug or other equally effective restraining device, which may not prevent the detection of leaks, or damage the device, and which must be removed immediately after the test is completed.

(1) *Hydrostatic method.* Each tank, including its domes, must be filled with water or other liquid having similar viscosity, the temperature of which may not exceed 100 °F. The tank must then be pressurized as prescribed in the applicable specifications. The pressure must be gauged at the top of the cargo tank. The cargo tank must hold the prescribed test pressure for at least 10 minutes during which time the tank must be inspected for leakage, bulging or other defect.

(2) *Pneumatic method.* A pneumatic test may be used in place of the hydrostatic test. Due regard must be taken because of the potential hazard involved in a pneumatic test. The cargo tank must be pressurized with air or similar 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 and held for at least 5 minutes. The pressure must then be reduced to inspection pressure which must be maintained while the entire cargo tank surface is inspected for leakage or other sign of defects. The inspection method must consist of coating the entire surface of the tank, particularly each joint, with a solution of soap and water or other equally sensitive method. Suitable safeguards must be provided to protect employees and other persons should a failure occur.

(c) The cargo tank with all its accessories in place and operable must be leak tested at not less than 80 percent of design pressure, or 3 psig, whichever is higher, with the pressure maintained for at least 5 minutes.

(d) Any cargo tank that leaks, bulges or shows any other sign of defect while being tested in accordance with paragraphs (b) and (c) of this section must be suitably repaired and successfully retested. The retest after any repair must use the same method of test under which the cargo tank was originally rejected.

§ 178.340-14 Marking.

(a) *General.* The manufacturer shall certify that each cargo tank motor vehicle has been designed, constructed and tested in accordance with the applicable Specification MC 306, MC 307 or MC 312 (§§ 178.340, 178.341, 178.342, 178.343 of this part) cargo tank requirements, and the ASME Code. The certification shall be accomplished by marking the tank as prescribed in paragraphs (b) and (c) of this section and by preparing the certificate prescribed in § 178.340-15.

(1) *Multi-cargo tank motor vehicle.* Each cargo tank of a multi-tank cargo tank motor vehicle must be marked as prescribed in paragraph (b) of this section. For each cargo tank fabricated to the requirements of a different specification, details pertaining to the multispecification cargo tank motor vehicle configuration must be clearly indicated on the manufacturer's certificate and on the specification plate.

(2) *Variable specification cargo tank.* The alterations that must be performed in order for the tank to be modified from one specification to another must be clearly indicated on the manufacturer's certificate and on the variable specification plate.

(b) *Nameplate.* On the left side near the front of each tank, a corrosion resistant metal nameplate must be permanently affixed, by brazing or welding around its perimeter. The nameplate must be plainly marked, in English, by stamping, embossing, or other means of forming letters into the metal of the plate, in characters at least 3/16 inch high. The following information, in addition to that required by the ASME Code, must be included (parenthetical abbreviations may be used):

(1) DOT Specification number MC XXX (DOT MC XXX), where "XXX" is replaced with the applicable specification number.

(2) Original test date (Orig. Test Date).

(3) Tank design pressure, in psig (Design Pressure).

(4) Tank test pressure, in psig (Test Pressure).

(5) Tank design temperatures range, in degrees Fahrenheit (Design Tem. —— °F to —— °F).

(6) Nominal water capacity, in gallons (Water Cap.)

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

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

(9) Material specification number—heads (Mat. Spec.—heads yyy * * *), see paragraph (b)(8) of this section.

(10) Minimum thickness—shell, in inches (Min. Thick—shell top ——, side ——, bottom ——).

(11) Minimum thickness—heads, in inches (Min. Thick—head).

(12) Weld material (Weld Mat.).

(c) *Specification plate.* An additional plate, a corrosion resistant metal specification plate, must be affixed as prescribed by paragraph (d) or (e) of this section. The specification plate must be marked in English, by stamping, embossing, or other means of forming letters into the metal of the plate, in characters at least 3/16 inch high, with the information specified in paragraph (b) of this section and, in addition, the following (parenthetical abbreviations may be used):

(1) Cargo tank motor vehicle manufacturer (CTM Veh. Mfr.).

(2) Cargo tank motor vehicle certification date (CTM Veh. Cert. Date), if different from the cargo tank certification date.

(3) Cargo tank manufacturer (CT Mfr.);

(4) Cargo tank date of manufacturer (CT Date of Mfr.).

(5) Maximum design static pressure, in psig (Max. Design Static Press.).

(6) Exposed surface area, in square feet.

(7) Maximum weight of lading, in pounds (Max. Lading Wt.).

(8) Maximum loading rate, in gallons per minute at maximum loading pressure, in psig, (Max. Load. Rate —— gpm at —— psig).

(9) Maximum unloading rate, in gallons per minute at maximum unloading pressure in psig, (Max. Unload Rate —— gpm at —— psig).

(10) Lining material (Lining).

(11) Heating system design pressure, in psig, if applicable (Heating Sys. Press).

(12) Heating system design temperature, in degrees Fahrenheit, if applicable (Heating Sys. Temp).

(d) *Uninsulated cargo tanks.* For a cargo tank motor vehicle without an insulation jacket, having one or more cargo tanks all made to the same specification and not separated by any void space, the nameplate specified in paragraph (b) of this section is not require, provided—

(1) A specification plate is permanently affixed, by brazing or welding around its perimeter, to each cargo tank on the left side near the front, a place readily accessible for inspection; and

(2) The information required on the specification plate by paragraph (c) of this section must be listed from front to rear in the order of the corresponding cargo tanks.

(e) *Insulated cargo tanks.* For a cargo tank motor vehicle, with an insulation jacket, having one or more cargo tanks all made to the same specification and not separated by any void space, the nameplate specified in paragraph (b) of this section must be affixed to each tank. In addition,—

(1) A specification plate must be welded, brazed or riveted to the jacket or to an integral supporting structure on the left side near the front, in a place readily accessible for inspection; and

(2) The information required on the specification plate by paragraph (c) of this section is listed from front to rear in the order of the corresponding cargo tanks.

(f) *Variable specification cargo tank.* Each variable specification cargo tank must have a corrosion resistant metal variable specification plate permanently affixed, by brazing or welding, in a place readily accessible for inspection near the specification plate. The mounting of this variable specification plate must be secure and allow it to be configured so that only the plate identifying the applicable specification under which the tank is being operated is legible. The variable specification plate must be plainly marked, in English, in characters at least 3/16 inch high. The following information must be included (parenthetical abbreviations are authorized):

DOT Specification MC XXX (DOT MC XXX) where "XXX" is replaced with the applicable specification number.

Equipment required	Required rating—to meet the applicable specification
Pressure relief devices:	
Pressure actuated type	
Fusible type	
Frangible type	
Lading discharge devices	
Top	
Bottom	
Pressure unloading fitting	
Closures:	
Manhole	
Fill openings	
Discharge openings	

(1) If no change of the information appearing in the specification plate is required, the letters "NC" must follow the rating required. If cargo tank is not so equipped, the word "None" must be inserted.

(2) *Color Coding.* The equipment that is changed or added to conform with the applicable specification and the appropriate variable specification plate must be identified using the following colors:

Specification	Color
MC 306	Red.
MC 307	Green.
MC 312	Yellow.
Nonspecification	Blue.

(3) Those parts to be changed or added must be stamped with the appropriate MC Specification.

(4) Any alteration or modification to a cargo tank so that it can be used as a variable specification tank must be clearly indicated on the variable specification plate and on the manufacturer's certificate.

§ 178.340–15 Certification.

(a) The manufacturer of a cargo tank motor vehicle made to any of these specifications must furnish the owner, at or before the time of delivery, the following:

(1) A certificate signed by a responsible official of the manufacturer and an Authorized Inspector certifying that the cargo tank motor vehicle is designed, fabricated, tested and completed in conformance with the applicable specification. The certificate must include drawings, sketches and other information to indicate the location, make, model and size of each stop valve and pressure relief device and the arrangement of all piping associated with the cargo tank motor vehicle.

(2) For a cargo tank required to be "constructed in conformance with the ASME Code", a certificate certifying compliance with the ASME Code signed by an Authorized Inspector, and including the ASME Code required forms.

(3) For a cargo tank not requiring ASME Code certification, a certificate signed by a responsible official of the manufacturer and an Authorized Inspector certifying that the cargo tank is "constructed in accordance with the ASME Code".

(4) For a variable specification cargo tank, a certificate signed by a responsible official of the manufacturer and an Authorized Inspector that the cargo tank is constructed for variable specification service. The certificate must include all the information required and marked on the variable specification plate.

(b) 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 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. The certificates must 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. Each certificate must be signed by a responsible official of the manufacturing firm for the portion of the complete cargo tank motor vehicle represented thereby, such as basic tank fabrication, insulation, jacket, or piping. The final manufacturer shall furnish the owner with all certificates, as well as the documents required by paragraph (a) of the section.

(c) The owner shall retain the data report, certificates, and related papers in accordance with § 180.317 of this subchapter.

§ 178.341 Specification MC 306; cargo tank motor vehicle.

§ 178.341–1 General requirements.

(a) Each Specification MC 306 cargo tank motor vehicle must conform with the general design and construction requirements in § 178.340, in addition to the specific requirements contained in this section.

(b) Design pressure: The design pressure of each cargo tank must be no lower than 3 psig and no higher than 14.9 psig.

(c) Vacuum loaded cargo tanks may not be constructed to this specification.

(d) Each cargo tank must be "constructed in accordance with the ASME Code".

(e) Each cargo tank must have a cross sectional design capable of being analyzed either mathematically, or by experimental method contained in UG–101 of Section VIII of the ASME Code, or

by other methods acceptable to the Associate Director for HMR, MTB.

§ 178.341-2 Material and thickness of material.

The type and thickness of material for MC 306 cargo tanks must conform with § 178.340-2.

§ 178.341-3 Structural integrity.

The structural integrity of each cargo tank motor vehicle must conform with § 178.340-3.

§ 178.341-4 Joints.

All joints in the fabrication of each cargo tank must conform with § 178.340-4.

§ 178.341-5 Manhole assemblies.

Each manhole on each cargo tank must conform with § 178.340-5.

§ 178.341-6 Supports and anchoring.

Supports and anchoring on each cargo tank motor vehicle must be in conformance with § 178.340-6.

§ 178.341-7 Circumferential reinforcement.

The circumferential reinforcement on each cargo tank must conform with § 178.340-7.

§ 178.341-8 Accident damage protection.

Each cargo tank motor vehicle must be protected from accident damage in accordance with § 178.340-8.

§ 178.341-9 Pumps, piping, hoses and connections.

Each pump on each cargo tank motor vehicle must conform with § 178.340-9.

§ 178.341-10 Pressure relief.

(a) Each cargo tank must be equipped with pressure relief devices in accordance with § 178.340-10, and this section.

(b) *Type and construction.* In addition to the pressure relief devices required in § 178.340-10, each MC 306 cargo tank must be equipped with one or more vacuum relief devices. Pressure and vacuum relief devices must prevent the loss of lading through the device in the event of vehicle overturn.

(c) *Pressure settings of relief valves.* The setting of each pressure relief valve must be in accordance with § 178.340-10(d). Each tank must be equipped with one or more vacuum relief devices set to open at no more than 6 ounces vacuum.

(d) *Venting capacities.* (1) The total venting capacity of the pressure relief system must limit the cargo tank pressure to not greater than the cargo tank test pressure. The total venting capacity, rated at no greater than the cargo tank test pressure, must be at least that specified in the Table in § 178.340-10(e).

(2) The primary pressure relief valve must have a minimum venting capacity of at least 6000 SCFH, of free air, rated at not greater than the test pressure.

(3) If the cargo tank is designed to be loaded or unloaded with the dome cover closed, the pressure relief system must limit the vacuum to 1 psi and the cargo tank pressure to the design pressure, based on the maximum product loading rate as indicated on the specification plate. Unless automatic protection against overfilling is made, the pressure relief system must also have sufficient liquid capacity to prevent the pressure from exceeding the tank design pressure in case of accidental overfilling.

§ 178.341-11 Outlets.

All outlets on each tank must conform with § 178.340-11, except that external self-closing stop valves are not authorized as an alternative to internal self closing stop valves on loading/discharge outlets.

§ 178.341-12 Gauging devices.

Any gauging device must conform with § 178.340-12.

§ 178.341-13 Pressure test.

(a) Each cargo tank must be tested in accordance with § 178.340-13.

(b) Test pressure must be as follows:

(1) Using the hydrostatic test method, the test pressure must be 5.0 psig or 1.5 times the design pressure, whichever is greater.

(2) Using the pneumatic test method, the test pressure must be 5 psig or 1.5 times the design pressure, whichever is greater. The inspection pressure must be 3 psig or the design pressure, whichever is greater.

§ 178.341-14 Marking.

Each cargo tank motor vehicle must be marked in accordance with § 178.340-14.

§ 178.341-15 Certification.

Each cargo tank motor vehicle must be certified in accordance with § 178.340-15.

§ 178.342 Specification MC 307; cargo tank motor vehicle.

§ 178.342-1 General requirements.

(a) Each Specification MC 307 cargo tank motor vehicle must conform with the general design and construction requirements in § 178.340, in addition to the specific requirements contained in this section.

(b) The design pressure of each cargo tank must be at least 25 psig. Any cargo tank built to this specification must be constructed, certified and stamped in conformance with the ASME Code. The external design pressure for a cargo tank loaded by vacuum must be at least 15 psig.

(c) Each tank must be of circular cross-section.

§ 178.342-2 Material and thickness of material.

The type and thickness of tank material must conform with § 178.340-2. The knuckle radius of the head must be at least three times the material thickness. For butt-welded heads the straight flange must be at least three times the material thickness. For heads with pressure on the convex side the material thickness prescribed in section 178.340-2(b) must be increased by 67 percent, unless such heads are braced to prevent excessive distortion.

§ 178.342-3 Structural integrity.

The structural integrity of each cargo tank motor vehicle must conform with § 178.340-3.

§ 178.342-4 Joints.

All joints in the fabrication of each cargo tank must conform with § 178.340-4.

§ 178.342-5 Manhole assemblies.

Each manhole on each cargo tank must conform with § 178.340-5, except that closures for manholes must be capable of withstanding internal fluid pressures of 40 psig or 1.5 times the design pressure of the tank, whichever is greater.

§ 178.342-6 Supports and anchoring.

The supports and anchoring on each cargo tank motor vehicle must conform with § 178.340-6.

§ 178.342-7 Circumferential reinforcements.

The circumferential reinforcement for each cargo tank must conform with § 178.340-7.

§ 178.342-8 Accident damage protection.

Each cargo tank motor vehicle must be protected from accident damage in accordance with § 178.340-8.

§ 178.342-9 Pumps, piping, hoses and connections.

Each pump on each cargo tank must conform with § 178.340-9.

§ 178.342-10 Pressure relief.

(a) Each cargo tank must be equipped with pressure relief devices in accordance with § 178.340-10.

(b) If pressure loading or unloading devices are provided, the relief device must have adequate vapor and liquid

capacity to limit the tank pressure to 130 percent of design pressure at maximum loading rate. Such limits must be included on the metal specification plate.

§ 178.342-11 Outlets.

All outlets on each tank must conform with § 178.340-11.

§ 178.342-12 Gauging device.

Any gauging device must conform with § 178.340-12.

§ 178.342-13 Pressure test.

(a) Each cargo tank must be tested in accordance with § 178.340-13.

(b) Test pressure must be at least 40 psig or 1.5 times the design pressure, whichever is greater. Inspection pressure for the pneumatic test is the tank design pressure.

§ 178.342-14 Marking.

Each cargo tank motor vehicle must be marked in accordance with § 178.340-14.

§ 178.342-15 Certification.

Each cargo tank motor vehicle must be certified in accordance with § 178.340-15.

§ 178.343 Specification MC 312; cargo tank motor vehicle.

§ 178.343-1 General requirements.

(a) Each Specification MC 312 cargo tank motor vehicle must conform with the general design and construction requirements in § 178.340, in addition to the specific requirements contained in this section.

(b) The design pressure of each cargo tank must be at least 15 psig.

(c) The design pressure for each cargo tank loaded by vacuum must be at least 25 psig internal and 15 psi external.

(d) Each cargo tank must be "constructed and certified in conformance with the ASME Code."

(e) Each tank must be of circular cross section.

§ 178.343-2 Material and thickness of material.

The tank material must conform with § 178.340-2, except that the minimum thickness for the reference steel must be 0.125 inch, or 0.110 inch if stronger steels are used.

§ 178.343-3 Structural integrity.

The structural integrity of each cargo tank motor vehicle must conform with § 178.340-3.

§ 178.343-4 Joints.

All joints in the fabrication of each cargo tank must conform with § 178.340-4.

§ 178.343-5 Manhole assemblies.

Each manhole on each tank must conform with § 178.340-5.

§ 178.343-6 Supports and anchoring.

The supports and anchoring on each cargo tank motor vehicle must conform with § 178.340-6.

§ 178.343-7 Circumferential reinforcement.

The circumferential reinforcement on each cargo tank must conform with § 178.340-7.

§ 178.343-8 Accident damage protection.

Each cargo tank motor vehicle must be protected from accident damage in accordance with § 178.340-8.

§ 178.343-9 Pumps, piping, hose and connections.

Each pump on each cargo tank must conform with § 178.340-9.

§ 178.343-10 Pressure relief.

(a) Each cargo tank must be equipped with pressure relief devices in accordance with § 178.340-10.

(b) If pressure loading or unloading devices are provided, the relief valve must have adequate vapor and liquid capacity to limit tank pressure to 130 percent of design pressure at maximum inlet loading rate.

§ 178.343-11 Outlets.

All outlets on each cargo tank must conform with § 178.340-11.

§ 178.343-12 Gauging devices.

Any gauging device must conform with § 178.340-12.

§ 178.343-13 Pressure test.

(a) Each cargo tank must be tested in accordance with § 178.340-13.

(b) Test pressure must be at least 1.5 times the design pressure. When using the pneumatic test method the inspection pressure is the design pressure.

§ 178.343-14 Marking.

Each cargo tank motor vehicle must be marked and certified in accordance with § 178.340-14.

§ 178.343-15 Certification.

Each cargo tank motor vehicle must be certified in accordance with § 178.340-15.

96. A new part 180 would be added to Subchapter C of Title 49 to read as follows:

PART 180—CONTINUING QUALIFICATION AND MAINTENANCE OF PACKAGINGS

Subpart A—General

Sec.
180.1 Purpose and scope.
180.2 Applicability
180.3 General requirements.

Subpart B-D—[Reserved]

Subpart E—Qualification and Maintenance of Cargo Tanks

180.401 Applicability.
180.403 Definitions.
180.405 Qualification of cargo tanks.
180.407 Requirements for test and inspection of cargo tanks.
180.409 Minimum qualifications for inspectors and testers.
180.411 Acceptable results of tests and inspections.
180.413 Repair or modification of cargo tanks.
180.415 Test and inspection marking.
180.417 Reporting and record retention requirements.

Subpart F—[Reserved]

Authority: 49 U.S.C. 1803, 1804, 1805, 1808; 49 CFR 1.53(e).

Subpart A—General

§ 180.1 Purpose and scope.

This part prescribes requirements pertaining to the maintenance, reconditioning, repair, inspection and testing of packagings, and any other function having an effect on the continuing qualification and use of a packaging under the requirements of this subchapter.

§ 180.2 Applicability.

(a) Any person who performs a function prescribed in this part shall perform that function in accordance with this part.

(b) Any person who performs a function prescribed in this part is considered subject to the regulations of this subchapter when that person—

(1) Makes any representation indicating compliance with one or more of the requirements of this part; or

(2) Reintroduces a packaging into commerce that bears markings indicating compliance with this part.

§ 180.3 General requirements.

(a) No person may represent, mark, certify, sell, or offer a packaging or container as meeting the requirements of this part, or an exemption pertaining to this part issued under Subchapter B of this chapter, whether or not the packaging or container is intended to be used for the transportation of a hazardous material, unless it is marked, maintained, reconditioned, repaired, or

retested, as appropriate, in accordance with this part, an approval issued thereunder, or an exemption issued under Subchapter B of this chapter.

(b) The representations, markings, and certifications subject to the prohibitions of paragraph (a) of this section include:

(1) Identifications that include the letters "DOT" or "UN";

(2) Exemption, approval, and registration numbers that include the letters "DOT";

(3) Test dates displayed in association with specification, registration, approval, or exemption markings indicating conformance to a test or retest requirement of this subchapter, an approval issued thereunder, or an exemption issued under Subchapter B of this chapter;

(4) Documents indicating conformance to the testing, inspection, maintenance or other continuing qualification requirements of this part; and

(5) Sales literature, including advertising, indicating that the packaging or container represented therein conforms to requirements contained in Subchapter B or C of this chapter.

Subpart B-D—[Reserved]

Subpart E—Qualification, Maintenance and Use of Cargo Tanks

§ 180.401 Applicability.

This subpart prescribes requirements, in addition to those contained in Parts 171, 172, 173 and 178 of this subchapter, applicable to any person responsible for the continuing qualification, maintenance or periodic testing of a cargo tank.

§ 180.403 Definitions.

In addition to the definitions contained in §§ 171.8 and 178.340–1 of this subchapter, the following definitions apply to this subpart,

"Owner" means the owner of a cargo tank motor vehicle used for the transportation of hazardous materials, or his authorized agent.

"Modification" means any change to a cargo tank's original design and construction.

"Rebarrelling" means replacing more than 25 percent of the shell material of a cargo tank.

"Repair" means any work done to return a cargo tank to its original design and construction, or to a condition prescribed for that cargo tank specification in effect at the time of repair.

"Stretching" means any change in length, width or diameter of the cargo tank, or any change to a cargo tank motor vehicle's undercarriage that may affect the cargo tank's structural integrity, for example, lengthening the wheel base of the cargo tank motor vehicle.

§ 180.405 Qualification of cargo tanks.

(a) *General:* Unless otherwise provided in this subpart, each cargo tank used for the transportation of a hazardous material must be an authorized packaging.

(b) To qualify as an authorized packaging, each cargo tank must conform with this subpart, the applicable requirements specified in part 173 of this subchapter for the specific lading, and 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, or MC 338 (§ 178.340, § 178.341, § 178.342, § 178.343, § 178.337, § 178.338 of this subchapter).

(c) *Cargo tank specifications no longer authorized for construction.* (1) A cargo tank made to a specification listed in Column 1 may be used when authorized in this Part, provided tank construction began before the date listed in Column 2:

Column 2	Column 1
MC 300	Sept. 2, 1967.
MC 301	June 12, 1961.
MC 302, MC 303, MC 304, MC 305, MC 310, MC 311.	Sept. 2, 1967.
MC 330	May 15, 1967.

(2) A cargo tank of a specification listed in paragraph (c)(1) above, may have its pressure relief devices and outlets modified as follows:

(i) A Specification MC 300, MC 301, MC 302, MC 303 or MC 305 cargo tank, to conform with a Specification MC 306 cargo tank (See §§ 178.341–10 and 178.341–11 of this subchapter).

(ii) A Specification MC 304 cargo tank, to conform with a Specification MC 307 cargo tank (See §§ 178.342–10 and 178.342–11 of this subchapter).

(iii) A Specification MC 310 or MC 311 cargo tank, to conform with a Specification MC 312 cargo tank (See §§ 178.343–10 and 178.343–11 of this subchapter).

(iv) A Specification MC 330 cargo tank, to conform with a Specification MC 331 cargo tank (See §§ 178.337–8 and 178.337–9 of this subchapter).

(d) *MC 338 cargo tanks.* The owner of a cargo tank that conforms to and was used under an exemption issued before October 1, 1984, that authorizes the transportation of a cryogenic liquid shall remove the exemption number stenciled on the cargo tank and stamp the specification plate (or a plate placed adjacent to the specification plate) "DOT MC 338" followed by the exemption number, for example, "DOT MC 338–E ****". (Asterisks to be replaced by the exemption number.) The cargo tanks must be re-marked prior to the expiration date of the exemption. During the period the cargo tank is in service, the owner of a cargo tank that is re-marked in this manner must retain at its principal place of business a copy of the last exemption in effect. No new construction of cargo tanks pursuant to such exemptions is authorized.

(1) The holding time must be determined, as required in § 178.338–9 of this subchapter, on each cargo tank or on at least one cargo tank of each design. Any subsequent cargo tank manufactured to the same design, if not individually tested, must have the optional test regimen performed during the first shipment (see §§ 178.338.9 (b) and (c) of this subchapter). For the purpose of performing the holding time test, the term "same design" means cargo tanks having the same manufacturer, same drawings, same dimensions (of length, diameter, and volume), same materials of construction, and the same insulation system.

(2) the holding time determined by test for one authorized cryogenic liquid may be used as the basis for establishing the holding time for the other authorized cryogenic liquids.

(e) *MC 331 cargo tanks.* The owner of a MC 331 (§ 178.337 of this subchapter) cargo tank that conforms to and was used under an exemption issued before October 1, 1984, that authorizes the transportation of ethane, refrigerated liquid; ethane-propane mixture, refrigerated liquid; or hydrogen chloride, refrigerated liquid shall remove the exemption number stenciled on the cargo tank and stamp the exemption number on the specification plate (or a plate placed adjacent to the specification plate), immediately after the DOT Specification, for example, "DOT MC 331–E****". (Asterisks to be replaced by the exemption number.) The cargo tank must be re-marked prior to the expiration date of the examption. During the period the cargo tank is in service, the owner of a cargo tank that is re-marked in this manner must retain at its principal place of business a copy of the last exemption in effect.

(f) *MC 306, MC 307, MC 312 cargo tanks.* An Authorized Inspector 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 (effective date of final rule) that authorizes a condition

specified in paragraph (f)(1) of this section must determine and certify that the cargo tank motor vehicle conforms with the exemption and the specification in effect at time of manufacture.

(1) The determination must indicate conformance with each of the following conditions that apply:

(i) A vacuum-loaded cargo tank constructed after August 1, 1981, or the date specified in the applicable exemption, must have an ASME Code stamped specification plate indicating a minimum internal design presure of 25 psig, and a minimum external design pressure of 15 psig.

(ii) A cargo tank having an outlet equipped with an external self-closing stop valve must have the stop valve and associated piping protected within the vehicle's rear-end tank protection device, the vehicle frame or an equally adequate accident damage protection device (See § 178.340–8 of this subchapter.) The external self-closing stop valve must be equipped with a remotely actuated means of closure consisting as follows:

(A) For a cargo tank used in other than corrosive service, the remote means of closure must be activated for closure by manual or mechanical means and, in case of fire, by an automatic heat activated means.

(B) For a cargo tank used in corrosive service, the remote means of closure may be actuated by manual or mechanical means only.

(iii) A cargo tank having an unreinforced portion of the shell exceeding 60 inches must have the circumferential reinforcement located so that the thickness and tensile strength of shell material in combination with the frame and circumferential reinforcement produces a structural integrity at least equal to that prescribed in § 178.340–4 of the specification in effect at time of manufacture.

(iv) A cargo tank having a projection from the tank shell or head that may contain lading in any tank position is authorized, provided such projection is as strong as the tank shell or head and is located within the motor vehicle's rear-end tank protection or other appropriate accident damage protection device.

(v) A cargo tank constructed of nickel, titanium, or other ASME sheet or plate material in accordance with an exemption.

(2) The owner of a cargo tank for which a determination had been made that the cargo tank is in conformance with paragraph (f)(1) of this section shall complete a written certification, in English, signed by the owner and an Authorized Inspector, containing at least the following information:

(i) A statement certifying that each cargo tank conforms with paragraph (f)(1) of this section;

(ii) The applicable DOT exemption number, the applicable specification number and the owner's and manufacturer's serial number for the cargo tank;

(iii) A statement setting forth any modifications made to bring the cargo tank into conformance with paragraph (f)(1) of this section, or the applicable specification;

(iv) A statement identifying the person certifying the cargo tank and the date of certification.

(3) The owner of a certified cargo tank shall remove the exemption number stenciled on the cargo tank and must durably mark the specification plate (or a plate placed adjacent to the specification plate) "DOT MC +++ E****####" (where "+++" is to be replaced by the applicable specification number, "* * * *" by the exemption number and "# # # #" by the alloy.)

(4) During the period the cargo tank is in service, and for one year thereafter, the owner of a cargo tank that is certified and re-marked in this manner must retain on file at its principal place of business a copy of the certificate and the last exemption in effect.

(g) *Cargo tank manhole closures.* (1) On or before (5 years after effective date of final rule), each owner of a cargo tank authorized for the transportation of a hazardous material must have the cargo tank equipped with a secure closure on each manhole. The manhole closure must be structurally capable of withstanding for at least 5 minutes, without leakage or permanent deformation, a static internal fluid pressure of at least 36 psig or the cargo tank test pressure, whichever is greater.

(2) The owner of a cargo tank requiring retrofit of the manhole closure must retrofit at least 20 percent of the affected cargo tanks each year beginning in 198X.

(h) *Flammable cryogenic liquids.* Each cargo tank used to transport a flammable cryogenic liquid must be examined after each shipment to determine its actual holding time. (See § 173.318(g)(4) of this subchapter.)

(i) A specification cargo tank that no longer meets the applicable specification may not be used to transport hazardous materials unless the cargo tank is repaired and retested in accordance with §§ 180.313 and 180.307 prior to being returned to hazardous materials service. If the cargo tank is not brought into conformance with the applicable specification requirements, but it conforms with § 173.24 of this subchapter, it may be used to transport a material not required by this subchapter to be in a DOT specification cargo tank; however, in this event, the specification plate on the cargo tank must be removed, obliterated or covered in a secure manner with the blue non-specification plate described in § 178.340–14(b)(2)(ii) of this subchapter.

(j) *DOT specification cargo tanks with no marked design pressure or a marked design pressure of less than 3 psig.* (1) An MC 300, MC 301, MC 302, MC 303, MC 305, MC 306 or MC 312 cargo tank manufactured before (effective date of final rule),

(i) Which has a pressure relief system set at 3 psig, may be marked or re-marked with a design pressure of not greater than 3 psig; or

(ii) May be marked or re-marked with a design pressure based on the design requirements contained in § 178.340–1(1) of this subchapter.

(2) An MC 310 or MC 311 cargo tank manufactured before (effective date of final rule), may be marked or re-marked with a design pressure based on the design requirements contained in § 178.340–1(1) of this subchapter.

§ 180.407 Requirements for test and inspection of cargo tanks.

(a) *General.* (1) A cargo tank constructed in accordance with a DOT specification for which a test or inspection specified in this section has become due, may not be filled and offered for shipment unit the test or inspection has been successfully completed. This paragraph does not apply to any cargo tank filled prior to the test or inspection due date.

(2) Except during a pressure test, a cargo tank may not be subjected to a pressure greater than its design pressure.

(3) A person witnessing or performing a test or inspection specified in this section must meet the minimum qualifications prescribed in § 180.409.

(4) Each cargo tank which has successfully passed a test or inspection specified in this section must be marked in accordance with § 180.415.

(5) A cargo tank that fails a prescribed test or inspection must:

(i) Be repaired and retested in accordance with § 180.413; or

(ii) Be removed from hazardous materials service and the specification plate removed, obliterated or covered in a secure manner with the blue non-

specification plate specified in § 178.340-14(f)(2) of this subchapter.

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

(1) The cargo tank shows evidence of bad dents, corroded or abraded areas, leakage, or any other condition that might render it unsafe for transportation.

(2) The cargo tank has been in an accident and has been damaged to an extent that may adversely affect its lading retention capability.

(3) The cargo tank has been out of hazardous materials transportation service for a period of one year or more.

(4) The cargo tank has been modified from its orginal design specification.

(5) The Department so requires based on the existence of probable cause that the cargo tank is in an unsafe operating condition.

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

Test or inspection	Period	Cargo tank specification	Configuration (see Note 1)	Service (see Note 2)
Inspections:				
External Visual and Testing	1 year	All	All	All.
Internal Visual	1 year	All except MC 330, MC 331, MC 338.	Insulated, baffles or internal stiffening rings.	All.
	1 year	All	All	Lading corrosive to tank.
	5 years	All except MC 338	All	All.
Lining	1 year	All	Lined	Lading corrosive to tank.
Tests:				
Leakage	1 year	All except MC 338	All	All.
Pressure (hydrostatic or pneumatic)	1 year	All except MC 338	Insulated with no manhole or insulated and lined.	All.
	2 years	MC 330, MC 331	All	Chlorine.
	5 years	All others	All	All.
Thickness over entire tank	2 years	All except MC 338	Unlined	Lading corrosive to tank.

Note 1.—"Configuration" means the internal and external design of a DOT Specification cargo tank.

Note 2.—"Service" means the hazardous materials being transported in a DOT Specification cargo tank.

(d) *External visual inspection and testing.* (1) The external visual inspection and testing must include as a minimum the following:

(i) The tank shell and heads must be inspected for corroded or abraded areas, dents, distortions, defects in welds and any other conditions, including leakage, that might render the tank unsafe for transportation service;

(ii) The piping, valves, and gaskets must be carefully inspected for corroded areas, defects in welds, and other conditions, including leakage, that might render the tank unsafe for transportation service;

(iii) All devices for tightening manhole covers must be operative and there must be no evidence of leakage at manhole covers or gaskets;

(iv) All emergency devices and valves including self-closing stop valves and excess flow valves, must be free from corrosion, distortion, erosion and any damage that will prevent safe operation. Remote closure devices for controlling self-closing stop valves must be inspected for corrosion or defects and functioned to demonstrate proper operation;

(v) Missing bolts, nuts and fusible links must be replaced, and loose bolts and nuts must be tightened;

(vi) All required markings on the cargo tank must be legible;

(vii) The cargo tank motor vehicle must conform with Part 393 of this title (the Federal Motor Carrier Safety Regulations) and, where appropriate, Part 571 of this title (the Federal Motor Vehicle Standards);

(viii) All major appurtenances on the cargo tank including, but not limited to, the fifth wheel assembly, suspension system attachments, and connecting structures, must be inspected for any corrosion or damage which might prevent safe operation.

(2) All spring-loaded pressure relief valves must be removed from the cargo tank for inspection and testing. Each spring-loaded pressure relief valve must open and reseat to a leak-tight condition at the pressure prescribed in the applicable cargo tank specification.

(3) Corroded or abraded areas must be thickness tested in accordance with the procedures set forth in paragraphs (i) (2), (3), (4), (6) and (7) of this section.

(4) The inspector must record the results of the external visual examination as specified in § 180.417(b).

(e) *Internal visual inspection.* (1) The internal visual inspection must include as a minimum the following:

(i) The tank shell and heads must be inspected for corroded and abraded areas, dents, distortions, defects in welds, and any other condition that might render the tank unsafe the transportation service.

(ii) If lined, the lining material must be inspected for defects. Tank liners must be inspected as specified in § 180.407(f).

(2) Corroded or abraded areas must be thickness tested in accordance with paragraphs (i) (2), (3), (4), (6) and (7) of this section.

(3) Degraded or defective areas of the tank liner must be removed and the tank shell or head below the defect must be inspected. Corroded areas must be thickness tested in accordance with § 180.407(i).

(4) The inspector must record the results of the internal visual inspection as specified in § 180.417(b).

(f) *Lining inspection.* The integrity of the lining on all lined cargo tanks must be verified at least once each year as follows:

(1) Rubber lining must be tested in accordance with the RMA Protection Bulletin 13.

(2) Linings made of other than rubber must be tested using equipment and procedures prescribed by the lining manufacturer.

(g) *Pressure retest.* (1) All pressure bearing portions of a cargo tank heating system employing a medium such as, but not limited to, steam or hot water for heating the lading must be hydrostatically pressure tested at least once every five years. The test pressure must be at least one and one-half times the heating system design pressure and must be maintained for five minutes. A heating system employing flues for heating the lading must be tested to ensure against lading leakage into the flues or into the atmosphere.

(2) *Test Prodecure.* (i) As part of the pressure test, the Authorized Inspector must perform an external and internal visual inspection, except that on MC 338 cargo tank an internal inspection is not required.

(ii) Each cargo tank must be tested hydrostatically or pneumatically to the minimum internal pressure specified in the following table:

Specification	Test pressure
MC 300, 301, 302, 303, 305, 306.	3 psig.
MC 306 (manufactured after the effective date of the final rule).	5 psig or 1.5 times the design pressure, whichever is greater
MC 304, 307	40 psig or 1.5 times the design pressure, whichever is greater.

Specification	Test pressure
MC 310, 311, 312	5 psig or 1.5 times the design pressure, whichever is greater.
MC 330, 331	1.5 times either the design pressure or the re-rated pressure, whichever is applicable.
MC 338	1.25 times either the design pressure or the re-rated pressure, whichever is applicable.

(iii) Each owner of DOT Specification cargo tanks that must be pressure tested every five years must pressure test at least 20 percent of the cargo tanks in his ownership each year beginning in 198X.

(iv) Each cargo tank of a multi-tank cargo tank motor vehicle must be tested with the adjacent cargo tanks empty and at atmospheric pressure.

(v) All closures except pressure relief devices must be in place during the test. All prescribed loading and unloading venting devices rated at less than test pressure may be removed during the test. If retained, the devices must be rendered inoperative by clamps, plugs, or other equally effective restraining devices. Restraining devices may not prevent detection of leaks or damage the venting devices and must be removed immediately after the test is completed.

(vi) *Hydrostatic test method.* Each cargo tank, including its domes, must be filled with water or other liquid having similar viscosity, at a temperature not exceeding 100 °F. The cargo tank must then pressurized to not less than the pressure specified in paragraph (g)(2)(ii) of this section. The pressure must be gauged at the top of the cargo tank. The cargo tank must hold the prescribed test pressure for at least 10 minutes during which time it shall be inspected for leakage, bulging or any other defect.

(vii) *Pneumatic test method.* The cargo tank must be pressurized with air or a similar gas. The pneumatic test pressure in the cargo 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 design pressure, which must be maintained during the time the entire cargo 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. When a pneumatic test is performed, suitable safeguards should be provided to protect employees and other persons should a failure occur.

(3) When testing an insulated cargo tank, the insulation and jacketing need not be removed unless it is otherwise impossible to reach test pressure and maintain a condition of pressure equilibrium after test pressure is reached, or the vacuum integrity cannot be maintained in the insulation space. If an MC 338 cargo tank used for the transportation of a flammable gas or oxygen, refrigerated liquid is opened for any reason, the cleanliness must be verified prior to closure using the procedures contained in § 178.338–15 of this subchapter.

(4) Each MC 330 and MC 331 cargo tank constructed of quenched and tempered steel (Part UHT of the ASME Code), or constructed of other than quenched and tempered steel but without postweld heat treatment, used for the transportation of anhydrous ammonia, liquefied petroleum gas, or any other hazardous material that may cause corrosion stress cracking, must be internally inspected by the wet fluorescent magnetic particle method immediately prior to and in conjunction with the performance of the pressure test prescribed in this section. The wet fluorescent magnetic particle inspection must be in accordance with section V of the ASME Code and CGA Technical Bulletin TB–2. This paragraph does not apply to cargo tanks that do not have manholes. (See § 180.417(c) for reporting requirements.)

(5) *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 usafe for transportation service, may not be returned to service.

(6) The inspection must record the results of the pressure test as specified in § 180.417(b).

(h) *Leakage test.* (1) Each cargo tank shall be leak tested on an annual basis, The cargo tank, with all valves and accessories in place and operative, must be tested at not lest than 80 percent of the tank design pressure. The pressure must be maintained for at least 5 minutes.

(2) Where applicable, the Environmental Protection Agency's "Method 27—Determination of Vapor Tightness of Gasoline Delivery Tank Using Pressure-Vacuum Test," 40 CFR Part 60 Appendix A, is an acceptable alternate test.

(3) A cargo tank that fails to retain test pressure may not be returned to service as a specification cargo tank.

(4) The inspector must record the results of the leakage test as specified in § 180.417(b).

(i) *Thickness testing.* (1) The shell and head thickness of all unlined cargo tanks used for the transportation of a material 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 0.002 of an inch.

(3) Any person performing ultrasonic thickness testing must be qualified as a NDT Level II Technician in acoordance with the ASNT Recommended Practice SNT–TC–IA.

(4) Ultrasonic testing must be performed in accordance with section V (SE–114) of the ASME Code for ultrasonic testing.

(5) Thickness testing must be performed on the following areas, as a minimum:

(i) Areas of the tank shell and heads and any piping that retains lading;

(ii) Areas of high shell stress such as the bottom center of the tank;

(iii) Areas near openings;

(iv) Joints;

(v) Shell reinforcements;

(vi) Appurtenance attachments;

(vii) Fifth wheel assembly attachments;

(viii) Suspension system attachments and connecting structures; and

(ix) Known thin areas in the tank shell and nominal liquid level lines.

(6) An owner of a cargo tank that no longer conforms with the minimum prescribed thickness 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 with the blue non-specification plate described in § 178.340–14(f)(2) of this subchapter.

(7) The inspector must record the results of the thickness test as specified in § 180.417(b).

§ 180.409 Minimum qualifications for inspectors and testers.

(a) *Visual inspection and test.* Persons performing or witnessing the prescribed inspections and tests must be familiar with the cargo tank and skillful in the use of the inspection and testing equipment needed.

(b) *Thickness test.* Persons performing thickness testing must be qualified in accordance with ASNT Level II for ultrasonic testing.

(c) *Pressure test.* Persons performing the pressure test must be trained and experienced in ASME Code testing. If the person performing such a test is not an Authorized Inspector, the test must be witnesed and certified by an Authorized Inspector.

§ 180.411 Acceptable results of tests and inspections.

(a) *Corroded or abraded areas.* The minimum thickness may not be less than that prescribed in the applicable specification.

(b) *Dents, cuts, digs and gouges.* (See CGA Pamphlet C–6 for evaluation procedures.)

(1) For dents at welds or that include a weld, the maximum allowable depth is ¼ inch. For dents away from welds, the maximum allowable depth is 1/10 of the greatest dimension of the dent, but in no case may the depth exceed one inch.

(2) No cut, dig or gouge may be greater than 4 inches in length. The minimum thickness remaining beneath the cut dig or gouge may not be less than that prescribed in the applicable specification.

(c) *Weld or structural defects.* Any cargo tank with a weld defect or a structural defect must be taken out of hazardous materials service until repaired.

(d) *Leakage.* All sources of leakage must be properly repaired prior to returning a tank to hazardous materials service.

(e) *Relief valves.* Any pressure relief valve that fails to open and reclose at the prescribed pressure must be repaired or replaced.

(f) *Liner integrity.* Any defect shown by the test must be properly repaired.

(g) *Pressure test.* Any tank that fails to meet the acceptance criteria as found in the individual specification that applies must be properly repaired.

§ 180.413 Repair or modification of a cargo tanks.

(a) Any repair or modification of a cargo tank must be performed in conformance with the requirements of this section.

(b) *Repair.* A cargo tank that fails a prescribed test or inspection contained in § 180.407 may be repaired, provided that repairs are made in accordance with the following:

(1) All cracks and other defects that are found must be repaired as follows:

(i) MC 306, MC 307 and MC 312 cargo tanks must be repaired in accordance with the specification requirements in effect at the time of manufacture or at the time of repair;

(ii) MC 300, MC 301, MC 302, MC 303 and MC 305 cargo tanks must be repaired in accordance with the original specification or with the MC 306 specification in effect at the time of repair;

(iii) MC 304 cargo tanks must be repaired in accordance with the original specification or with the MC 307 specification in effect at the time of repair;

(iv) MC 310 and MC 311 cargo tanks must be repaired in accordance with the original specification or with the MC 312 specification in effect at the time of repair;

(v) MC 338, cargo tanks must be repaired in accordance with the specification requirements in effect at the time of manufacture or at the time of repair; and

(vi) MC 330 and MC 331 cargo tanks must be repaired in accordance with the repair procedures described in CGA Technical Bulletin TB–2 and section VIII of the ASME Code under which the cargo tank was built. Each cargo tank having cracks and defects requiring welded repairs must meet all of the requirements of § 178.337–16 of this subchapter, except that postweld heat treatment after minor weld repairs is not required. When any repair is made of defects revealed by the wet fluorescent magnetic particle inspection, including those by grinding, 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.

(2) Prior to any repair work the cargo tank must be emptied of any hazardous material lading. Cargo tanks containing flammable or toxic lading must be purged.

(3) No cargo tank may be repaired in a manner to cause leakage or cracks or the likelihood of leakage or cracks; for example, cracks may result from areas of stress concentration due to sharp fillets, reversal of stresses or shrinkage of cooling metal in welding operations.

(4) All repairs on a cargo tank involving welding on the shell or head must be certified by an Authorized Inspector in accordance with the following:

(i) All ASME Code "U" stamped cargo tanks, cargo tanks manufactured after (the effective date of the final rule), and all other DOT Specification cargo tanks with a design pressure of 15 psig or greater, must be in accordance with the National Board Inspection Code.

(ii) All DOT Specification cargo tanks with a design pressure of less than 15 psig, which were manufactured before (the effective date of the final rule), must be repaired:

(A) By a cargo tank manufacturer holding a valid ASME Certificate of Authorization for the use of the ASME "U" stamp;

(B) By a repair facility holding a valid National Board Certificate authorizing the use of the "R" stamp; or

(C) Under the direct supervision of an Authorized Inspector, provided the Authorized Inspector witnesses the repair and subsequent testing of the repair and then certifies the repair as being acceptable.

(5) The suitability of any repairs affecting the structural integrity of the cargo tank must be determined by the testing prescribed in the applicable specification.

(6) Each owner of a cargo tank must retain at its principal place of business all records of repairs made to each tank during the time the tank is in service and for one year thereafter.

(c) *Repair or replacement of piping, valves, hoses or fittings.* In the event of repair or replacement, any piping, valve, or fitting must be tested in accordance with the provisions of the applicable specification before the cargo tank is returned to hazardous materials service. Piping, valves and fittings must be tested after installation; hoses may be tested either before or after installation on the cargo tank.

(d) *Modification, stretching and rebarrelling.* Modification, stretching or rebarrelling of a cargo tank is authorized if:

(1) The modification, stretching or rebarrelling conforms with the requirements of the specification in effect at the time of such work. Modification, stretching, or rebarrelling must be performed as follows:

(i) For Specification MC 300, MC 301, MC 302, MC 303 and MC 305 cargo tanks in accordance with Specification MC 306;

(ii) For Specification MC 304 cargo tanks in accordance with Specification MC 307;

(iii) For Specification MC 310 and MC 311 cargo tanks in accordance with Specification MC 312;

(iv) For Specification MC 330 cargo tanks in accordance with Specification MC 331.

(2) The person performing the modification, stretching or rebarrelling must:

(i) Have knowledge of the original design concept, particularly with respect to structural design analysis, material and welding procedures;

(ii) Assure compliance with the rebuilt cargo tank's venting and accident damage protection requirements;

(iii) Assure compliance with all applicable Federal Motor Carrier Safety

regulations for any newly installed safety equipment;

(iv) Have a current certificate of authorization from the ASME for section VIII (Division 1) pressure vessel construction, or a current certificate from the National Board;

(v) Pressure retest each cargo tank in accordance with § 180.407(g);

(vi) Change the existing specification plate to reflect the cargo tank as modified, or remove the existing specification plate and attach a new specification plate to the cargo tank;

(vii) On a variable specification cargo tank, install a new variable specification plate; and

(viii) Certify that the modified, rebarrelled or stretched cargo tank has been designed, constructed and tested in accordance with the applicable specification by issuing a new manufacturer's certificate.

§ 180.415 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. The inspector or Authorized Inspector must durably and legibly mark, in English, each cargo tank 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 near the specification plate. 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; 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 passed the prescribed pressure retest, external visual inspection and test, and the lining inspection.

§ 180.417 Reporting and record retention requirements.

(a) *Vehicle certification.* (1) Each owner of a cargo tank shall retain the manufacturer's data report or certificate and related papers certifying that the cargo tank identified in the documents was manufactured and tested in accordance with the applicable specification. The owner shall retain the documents throughout his ownership of the cargo tank and for one year thereafter. In the event of change of ownership, the prior owner shall retain non-fading photo copies of these documents for at least one year.

(2) Each motor carrier who uses a specification cargo tank must obtain a copy of the manufacturer's certificate and related papers or the alternative report authorized in paragraph (a)(3) (i) or (ii) of this section and retain the documents as specified in this paragraph. A motor carrier who is not the owner of a cargo tank must retain a copy of the vehicle certification report at its principal place of business for as long as the cargo tank motor vehicle is used by that carrier and for one year thereafter. Upon a written request to, and with the approval of, the Regional Director, Office of Motor Carrier Safety, Federal Highway Administration, for the region in which a motor carrier has its principal place of business, a motor carrier may retain the certificate and related papers required by this paragraph at a regional or terminal office. The addresses and jurisdictions of the various Regional Motor Carrier Safety Offices are provided in § 390.40 of this title. The provisions of this section do not apply to a motor carrier leasing a cargo tank for less than 30 days.

(3) *DOT Specification cargo tanks manufactured before (effective date of final rule)*—(i) *Non-ASME Code stamped cargo tanks.* If an owner does not have a manufacturer's certificate for a cargo tank and he wishes to certify it as a specification cargo tank, the owner must perform appropriate tests and inspections, under the direct supervision of an Authorized Inspector, to determine if the cargo tank conforms with the applicable specification. Both the owner and the Authorized Inspector must certify that the cargo tank fully conforms with the applicable specification. The owner must retain the certificate, as specified in this section.

(ii) *ASME Code stamped cargo tanks.* If the owner does not have the manufacturer's certificate and data report required by the specification, the owner may contact the National Board for a copy of the manufacturer's data report, if the cargo tank was registered with the National Board, or copy the information contained on the cargo tank's identification and ASME Code plates. Additionally, both the owner and the Authorized Inspector must certify that the cargo tank fully conforms with the specification. The owner must retain such documents, as specified in this section.

(b) *Test or inspection reporting.* Each cargo tank which is tested or reinspected as specified in § 180.407 must have a written report, in English, prepared in accordance with this paragraph.

(1) The test or inspection report must include the following:

(i) Type of test or inspection performed and a listing of all items either tested or inspected (a checklist is acceptable);

(ii) Owner's and manufacturer's serial numbers;

(iii) DOT Specification;

(iv) Test Date (Month and year);

(v) Location of defects found and method used to repair each defect;

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

(vii) Disposition statement, such as "Cargo tank returned to service" or "Cargo tank withdrawn from service"; and

(viii) Dated signature of inspector and owner.

(2) The owner and the motor carrier, if not the owner, must each retain a copy of the test and inspection reports until the next test or inspection of the same type is successfully completed. This requirement does not apply to a motor carrier leasing a cargo tank for less than 30 days.

(c) *Additional requirements for Specification MC 330 and MC 331 cargo tanks.* (1) After completion of the pressure test specified in § 180.407(g)(4), each motor carrier operating a Specification MC 330 or MC 331 cargo tank in anhydrous ammonia, liquefied petroleum gas, or any other service that may cause corrosion stress cracking, must make a written report containing the following information:

(i) Carrier's name, address of principal place of business, and telephone number;

(ii) Complete identification plate date required by Specification MC 330 or MC 331, including data required by ASEM Code;

(iii) Carrier's equipment number;

(iv) A statement indicating whether or not the tank was stress relieved after fabrication;

(v) Name and address of the person performing the test and the date of the test;

(vi) A statement of the nature and severity of any defects found, if any. In particular, information must be furnished to indicate the location of defects detected, such as in weld, a heat-affected zone, the liquid phase, the vapor phase, or the head-to-shell seam. If no defect or damage was discovered, that fact must be reported;

(vii) A statement indicating the methods employed to make repairs, who made the repairs, and the date they were completed. Also, a statement of weather or not the tank was stress relieved after repairs and, if so, whether full or local stress relieving was performed;

(viii) A statement of the disposition of the cargo tank, such as "cargo tank

scrapped" or "cargo tank returned to service", and

(ix) A statement of whether or not the cargo tank is used in anhydrous ammonia, liquefied petroleum gas, or any other service that may cause corrosion stress cracking. Also, if the cargo tank has been used in anhydrous ammonia service since the last report, a statement indicating whether each shipment of ammonia was certified by its shipper as containing 0.2 percent water by weight.

(2) A copy of the report must be retained by the carrier at its principal place of business during the period the tank is in the carrier's service and for one year thereafter. Upon a written request to, and with the approval of, the Director, Regional Officer of Motor Carrier Safety, Federal Highway Administration for the region in which a motor carrier has its principal place of business, the carrier may maintain the reports at a regional or terminal office.

(3) The requirement in paragraph (c)(1) of this section does not apply to a motor carrier leasing a cargo tank for less than 30 days.

(d) *Supplying reports.* Each carrier offering a DOT Specification cargo tank for sale or lease must make available for inspection a copy of the most recent report made under this section to each purchaser or lessee. Copies of such reports must be provided to the purchaser, or the lessee if the cargo tank is leased for more than 30 days.

Subpart F—[Reserved]

Issued in Washington, D.C. on September 9, 1985. Under authority delegated in 49 CFR Part 106, Appendix A.

Alan I. Roberts,

Associate Director for Hazardous Materials Regulation, Materials Transportation Bureau.

[FR Doc. 85-21821 Filed 9-16-85; 8:45 am]

BILLING CODE 4910-60-M