DEPARTMENT OF TRANSPORTATION

Research and Special Programs Administration

49 CFR Parts 171, 173, 178, and 180

[Docket No. HM-183C; Amdt. Nos. 171-129, 173-240, 178-105, 180-7]

RIN 2137-AC37

Cargo Tanks; Miscellaneous Requirements

AGENCY: Research and Special Programs Administration (RSPA), DOT

ACTION: Final rule.

SUMMARY: RSPA is amending certain requirements for the manufacture, qualification and maintenance of cargo tank motor vehicles. These regulatory actions are based on petitions for rulemaking, exemptions, National Transportation Safety Board recommendations, and RSPA initiative. The intended effect of these actions is to relax certain regulatory requirements and to reduce unnecessary economic burdens on industry where there will be no adverse effect on safety.

DATES: *Effective date:* January 5, 1995.

Compliance date: Compliance with the regulations, as amended herein, is authorized immediately.

Incorporation by reference: The incorporation by reference of certain publications listed in this final rule is approved by the Director of the Office of the Federal Register as of January 5, 1995.

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SUPPLEMENTARY INFORMATION:

I. Background

On March 3, 1993, RSPA published in the **Federal Register** a notice of proposed rulemaking (NPRM) [Docket No. HM-183C, Notice No. 93-7; 58 FR 12316] proposing to amend certain requirements for the manufacture, qualification and maintenance of cargo tank motor vehicles. Most issues raised in the NPRM relate to requirements that were adopted in final rules published under Docket No. HM-183/HM-183A (June 12, 1989, 54 FR 24982; May 22, 1990, 55 FR 21035; September 7 1990, 55 FR 37028; June 17 1991, 56 FR 27872). The final rules established three new cargo tank specifications designated as DOT 406, DOT 407 and DOT 412, and revised the structural design requirements for MC 331 and MC 338 cargo tanks. Voluntary compliance for manufacture of cargo tanks to these new or revised specifications was authorized beginning on October 1, 1990.

As manufacturers began modifying their manufacturing operations to construct cargo tanks to the new requirements, they encountered certain technical problems which caused them to question changes they had endorsed several years ago. They raised issues relating to structural integrity, accident damage protection, use of dual function pressure relief devices, and certification by the American Society of Mechanical Engineers (ASME). Also RSPA received several petitions for rulemaking addressing certain issues not previously raised. In the NPRM, RSPA pointed out these concerns and other issues based on petitions for rulemaking, exemptions, and National Transportation Safety Board (NTSB) recommendations. The NPRM also announced a public meeting that was held in Chicago on March 24 and 25, 1993, to address issues raised in the NPRM.

On March 8, 1993, RSPA published a final rule [Docket HM-183, 58 FR 12904] granting an extension until April 21, 1994, for the continued construction of cargo tank motor vehicles to the MC 306, MC 307 MC 312, MC 331, and MC 338 specifications. This action was granted to allow additional time for RSPA and industry to address certain technical issues concerning the manufacture of cargo tank motor vehicles to the DOT 406, DOT 407 and DOT 412 specifications, and to resolve certain concerns about the structural design requirements in the MC 331 and MC 338 specifications.

At the March 24-25 public meeting, several significantly different views of design engineers and cargo tank manufacturers were identified. Additionally preliminary results were presented of an advanced structural evaluation (using finite element analysis) of the MC 331 cargo tank which raised questions in regard to stress levels in areas of concentrated loadings.

On January 12, 1994, RSPA published a final rule [Docket HM-183, 58 FR 1784] granting another extension until August 31, 1995, for continued construction of cargo tank motor vehicles to the MC specifications. The final rule also announced a public meeting in Washington, D.C. on February 7-8, 1994.

At the February public meeting, RSPA obtained clarification of certain comments received in response to the NPRM and also obtained additional supporting data on certain alternate proposals offered by industry. In addition, RSPA sought information to resolve the remaining issues on structural integrity, accident damage protection, use of dual function pressure relief devices, and ASME certification of low pressure cargo tank motor vehicle manufacturers.

II. Summary of Comments

RSPA received over 50 written comments in response to the proposals contained in the NPRM from trade associations, cargo tank manufacturers and repairers, manufacturers of cargo tank parts and equipment, and Federal, State and local agencies. RSPA has considered all comments, public meeting transcripts and petitions in the development of this final rule.

In the NPRM, RSPA informed industry that the following items would be open for discussion at the March public meeting:

1. Application of the ASME Code to DOT 400-series specification cargo tank motor vehicles.

a. The feasibility of citing all sections of the ASME Code that must be met in construction of DOT specification cargo tank motor vehicles as opposed to citing only those sections that do not apply.

b. The development of a consensus standard containing procedures for quality control, welding and design as an alternative to the procedures contained in the ASME Code.

2. The progress of the industry on development and testing of dual function vents, reclosing pressure relief devices capable of reseating with the loss of less than one gallon of lading, and self-closing systems for vacuum-loaded hazardous waste tanks.

3. The regulatory proposals contained in the NPRM.

Most commenters supported application of the ASME Code. One commenter stated that his company which had initially opposed becoming ASME certified, has benefited from the expertise of the National Board inspector.

The ASME Code is an internationally recognized consensus standard for the design and construction of pressure vessels. It is also the only proven quality control standard for pressure vessels and cargo tanks.

The Cargo Tank Manufacturing Association (CTMA) submitted a draft quality control manual for review. CTMA recommended that RSPA recognize the manual, which includes

quality control procedures, as an alternative to requiring manufacturers to have an ASME "U" stamp or National Board "R" stamp. The use of the alternative standard recommended by CTMA is not equivalent in scope and detail to the ASME Code and is not included in this final rule.

It has also been brought to RSPA's attention that some "U" stamp and "R" stamp holders may believe they are not required to apply all provisions of the ASME or National Board quality control program for work on non-ASME DOT specification cargo tanks. When the regulations requiring cargo tank manufacturers and repair facilities to hold "U" and "R" stamps were promulgated, RSPA stated in the preamble discussions of the final rules and at public meetings that major provisions of the ASME or National Board quality control programs would apply to all work on DOT specification cargo tanks. Such provisions include welder qualifications, welding techniques, and quality control procedures. For instance, refer to the preamble discussions in the following final rules: "B. Cargo Tank: Manufacturer Qualification, Registration, Quality Control, and Certification," (June 12, 1989, 54 FR 24984); "Section 180.413 (Repair, Modification, Stretching, and Rebarrelling)," (September 7 1990, 55 FR 37044).

One commenter stated that specifying all applicable sections of the ASME Code, rather than providing exceptions to sections that are not applicable, would provide greater assurance to engineers and designers that they have not overlooked an obscure section of the ASME Code. The commenter did not provide RSPA with any suggested wording for implementation of the recommendation.

The National Propane Gas Association (NPGA) submitted a report on the structural integrity of the MC 331 specification cargo tank. NPGA recommended uniformity in design loading requirements for all DOT specification cargo tanks. RSPA will consider the design loading requirements for MC 331 and MC 338 specification cargo tanks in a future rulemaking. The report is available for review in the public docket.

III. Section-by-Section Review

This review by section discusses only significant comments received to the proposals in the NPRM, changes made based on alternative proposals offered by commenters, and clarifications to certain provisions based on RSPA's initiatives. For those provisions that are adopted as proposed, readers are referred to the preamble discussion in the NPRM.

Section 171.7

The Truck Trailer Manufacturers Association (TTMA) submitted a petition for rulemaking (P–1236) requesting RSPA to incorporate by reference the latest editions of the ASME Code from the 1986 Edition and Addenda through 1985 to the 1992 edition and Addenda through 1993, and to update the National Board inspection Code from the 1983 Edition to the 1992 Edition. RSPA has reviewed these updated standards and agrees the latest editions should be referenced. The table in paragraph (a)(3) has been revised accordingly.

Section 173.33

Consistent with changes made in § 180.405(h) in this final rule, a new sentence is added to paragraph (d) stating that the venting requirements of the original DOT cargo tank specification must be met whenever a pressure relief valve is modified to a more recent specification. See preamble discussion for § 180.405(h). Similarly in view of changes made in §§ 178.337–11 and 178.338–11 in this final rule, a new paragraph (h) is added to inform shippers that certain MC 331 and MC 338 cargo tanks manufactured after August 31, 1995, must have remotely controlled, internal, self-closing stop valves. See preamble discussion for § 178.337–11.

Section 173.225

Commenters supported the proposal to revise paragraph (e)(2) to authorize the use of MC 307 and DOT 407 cargo tank motor vehicles for certain organic peroxides. However, one commenter opposed allowing the use of MC 307 cargo tanks for all organic peroxides. This commenter misunderstood the proposal. Note 14 to the § 173.225(b) Table authorizes bulk packagings for only a few organic peroxides. Therefore, paragraph (e)(2) is adopted as proposed in the NPRM.

Section 173.315

For cargo tank motor vehicles in chlorine service, changes in requirements for hose, piping or tubing to be carried on the vehicle and in requirements for testing angle valves, as proposed in the NPRM, are adopted as paragraphs (o)(1) and (o)(2) respectively.

Section 178.337–1

Paragraphs (a)(3) and (e)(1) are revised to correct certain section references and paragraph (e)(2) is revised to authorize the use of ceramic fiber/fiberglass insulation for cargo tanks in chlorine service as proposed in the NPRM.

Section 178.337–9

As proposed in the NPRM, the restriction is removed against mounting or carrying on a cargo tank motor vehicle any hose, piping or tubing used in loading or unloading; paragraphs (b)(7) (ii) and (iii) are redesignated as (b)(7) (i) and (ii) respectively.

Section 178.337–11

In response to NTSB recommendation H–90–91 dealing with release of sulfur dioxide from an MC 331 cargo tank during unloading, RSPA proposed revision of requirements for remotely controlled self-closing stop valves on liquid or vapor discharge lines on newly constructed MC 331 cargo tank motor vehicles. Currently found at paragraph (a)(2), this requirement applies only to equipment intended for transportation of a flammable liquid, a flammable compressed gas, hydrogen chloride (refrigerated liquid) or anhydrous ammonia. RSPA proposed to broaden the requirement to include all compressed gases. This revision also was proposed for MC 338 cargo tanks.

Both the NTSB and the Compressed Gas Association (CGA) commented on RSPA's proposal to require remotely controlled internal self-closing stop valves. While supportive of RSPA's proposal, NTSB stated:

> Although the Safety Board is aware that MC 331 cargo tanks are predominantly used for the transportation of flammable and nonflammable compressed gases, the hazardous materials regulations (49 CFR Parts 171 through 180) do authorize these tanks to be used for the transportation of other classes of hazardous materials such as flammable liquids and poisons. The Safety Board believes that remote controls for internal shut-off valves should be required for any hazardous material that is authorized to be transported in an MC 331 cargo tank. Further the Safety Board believes that all MC 331 and MC 338 cargo tanks currently in hazardous materials service, and not just newly constructed tanks, should also be equipped with remote controls for the internal shut-off valves. The Safety Board has consistently urged the DOT to eliminate "grandfathering" clauses that permit hazardous materials to be transported indefinitely in containers or vehicles that fail to meet current minimum safety standards. The Safety Board believes that RSPA should require all MC 331 and MC 338 highway cargo tanks in hazardous materials service to be equipped with remote controls for internal shut-off valves by a specific date.

On the other hand, the CGA believes that remotely controlled shut-off valves should not be required for nonflammable ladings. CGA stated that

"operating experience for the nonflammable compressed gases does not warrant the addition of this restriction which would add cost without providing additional safety benefit."

After consideration of both comments, RSPA has revised the wording in §§ 178.337–11 and 178.338–11 to require the use of remotely controlled internal self-closing stop valves on any cargo tank motor vehicle certified after August 31, 1995, that is intended for the transportation of hazardous materials other than argon, carbon dioxide, helium, krypton, neon, nitrogen, and xenon. RSPA has excepted these particular gases because they pose a lesser degree of risk to public health, safety and the environment in the event of their release during transportation. Many of the nonflammable refrigerant gases presently transported in cargo tanks are ozone depleters; some other nonflammable gases are toxic or noxious. RSPA will address the retrofit of existing cargo tanks with remotely controlled internal self-closing stop valves in a separate rulemaking action.

Section 178.338–9

As proposed in the NPRM and adopted in this final rule, paragraph (c)(2) is amended by removing the definition of "same design" and by adding a reference to the definition of "same design" contained in § 178.320. By referencing the definition in § 178.320, minor design variations are allowed for MC 338 cargo tanks.

Section 178.338–11

NTSB and CGA submitted comments to this section which were similar to their comments to proposed § 178.337–11. As stated in the preamble discussion to § 178.337–11 above, RSPA has revised the wording in §§ 178.337–11 and 178.338–11 to require the use of remotely controlled internal self-closing stop valves on any MC 338 cargo tank motor vehicle certified after August 31, 1995, that is intended for the transportation of hazardous materials other than argon, carbon dioxide, helium, krypton, neon, nitrogen, and xenon.

Section 178.345–1

In paragraph (c), definitions for "normal operating loading" and "extreme dynamic loading" are added. These terms are used in revised § 178.345–3 in this final rule.

Paragraph (i)(2) requires that the void space within the connecting structure of a cargo tank motor vehicle composed of multiple cargo tanks must be vented to the atmosphere by a drain of at least 1 inch in diameter. In the NPRM, RSPA proposed to remove the drain hole size restriction. RSPA also solicited information on suitable dimensional controls for these drains, how often these areas need to be inspected, the conditions revealed during such inspections, and the availability of equipment for inspecting these areas.

Commenters expressed diverse views on the need to inspect these areas. The California Highway Patrol (CHP) strongly supported the need for periodic inspection of the connecting structures on cargo tanks used to transport all hazardous materials. CHP related information about three separate catastrophic failures of molten sulfur trailers that occurred due to fatigue cracking in the void space. All three cargo tank motor vehicles had been insulated, thus preventing any external visual inspection for shell cracks. CHP believes that if an internal visual inspection of the void space had been performed, evidence of cracking may have been detected prior to the catastrophic failures. CHP noted that equipment, such as fiber optics, borescopes and video cameras, is readily available for inspecting closed areas and is being used for pipeline, aircraft, oil well, and boiler inspections. Also, numerous contractors offering inspection and non-destructive testing services are available throughout the U.S.

NTSB also concurred that regular and effective inspections of void spaces are essential. NTSB, however, expressed concern that HM–183C did not address the configuration of other appurtenances that could conceal corrosion that might lead to a failure of the tank wall. The NTSB recommendation H–83–30 called for periodic external visual inspection of surfaces obscured by appurtenances, structural members, etc.

Several commenters who opposed inspecting these areas stated that double bulkheads and void spaces on MC 306 or DOT 406 cargo tanks in non-corrosive service do not experience the same degree of deterioration as MC 312 or DOT 412 cargo tanks in corrosive service. They stated that cargo tanks in non-corrosive service should not be subject to the same inspections. One commenter submitted to RSPA samples taken from bulkheads adjacent to void spaces of two scrapped MC 306 carbon steel cargo tanks used in gasoline service for 14 and 15 years. The commenter stated that neither tank showed evidence of corrosion at this location; the samples confirm this statement.

TTMA stated there is little possibility of corrosion occurring in the void space of any tank, except on carbon steel cargo tanks in corrosive service. TTMA recommended that the connecting structure on self-supporting cargo tanks be thickness tested every two years for signs of corrosion. Several other commenters supported TTMA's comments. One commenter also suggested that the wording be revised to eliminate reference to the inspection opening but continue to provide for a drain. The commenter stated that the minimum acceptable size of any drain opening should be 0.5 inches diameter, which is large enough to insert a borescope or equivalent device.

RSPA agrees with commenters that there has been no evidence of corrosion occurring in the void space of any tank, except a carbon steel cargo tank in corrosive service. Corrosion in connecting spaces has serious structural implications for self-supporting cargo tanks. The failure reported in the NTSB investigative report, containing recommendation H–83–30, involved a carbon steel MC 312 cargo tank semi-trailer carrying hydrochloric acid; the failure occurred due to severe corrosion in the tank shell under a circumferential reinforcing ring. Therefore, paragraph (i)(2) is revised to require that the connecting structure in a carbon steel, self-supporting multi-tank cargo tank motor vehicle must have a single drain of at least 1.0 inch diameter, or two or more drains of at least 0.5 inches diameter, 6 inches apart, one of which is located on the bottom centerline. In addition, § 180.407(i) is revised to require thickness testing of these areas as suggested by TTMA.

RSPA believes that NTSB recommendation H–83–30, which calls for periodic external visual inspection of cargo tank surfaces obscured by appurtenances and structural attachments, is adequately addressed in current § 180.407(d). Paragraph (d) requires that a periodic external visual inspection must be conducted of all major appurtenances and structural attachments on a cargo tank to detect signs of corrosion or damage.

Section 178.345–3

Commenters expressed concern over the lack of flexibility in calculating compressive stresses for non-ASME DOT 400-series cargo tanks. They recommended that RSPA provide alternatives to ASME Code Section VIII, Division 1 UG–23(b) for calculating the maximum allowable compressive buckling stress in tank walls for low pressure cargo tanks. The static design and construction of all DOT 400-series

cargo tanks must be in accordance with Section VIII of the ASME Code. Any DOT 400-series cargo tank which is required to be certified to the ASME Code also must be designed in accordance with the Code's requirements for dynamic loading, including UG–23(b). This applies to DOT 407 cargo tanks with a MAWP greater than 35 psig and each tank designed to be loaded by vacuum, and to DOT 412 cargo tanks having a MAWP greater than 15 psig.

TTMA stated manufacturers believe the requirements in § 178.345–3(b) should be modified to allow several methods of analysis as appropriate for the cargo tank under consideration. Using the methods outlined in the ASME Code produces lower allowable compressive stress values, resulting in substantially thicker sheets for the DOT 400-series tanks as compared with the MC 300-series cargo tanks.

One commenter stated that while the UG–23(b) calculations may be appropriate for DOT 407 cargo tank with MAWP ratings between 25 and 35 psig, this formula will rarely yield reasonable results for DOT 406 or DOT 412 cargo tanks having a MAWP of 15 psig or less. Commenters recommended two alternatives to the ASME UG–23(b) design calculations, both of which are formulas from engineering texts. One is from the "Alcoa Structural Handbook," 1960, page 156 and Table 23; the other is from "Formulas for Stress and Strain," Fifth Edition, by Roark and Young, pages 554 and 555 and Table 35. The "Alcoa Structural Handbook" formula is as follows:

$$S_c = \frac{S_{bA}}{1.5} = \frac{\left(\frac{\pi}{4}\right)^2 E}{1.5\left(\frac{R_i}{t_s}\right)\left(1+\frac{\left(\frac{R_i}{t_s}\right)^{1/2}}{35}\right)^2}$$

where:

R_i/t_s is greater than 200

E = modulus of elasticity of material at design temperature

R_i = inside radius of the shell (largest radius of non-circular cross-section)

t_s = minimum thickness of shell less corrosion allowance

S_{bA} = critical compressive buckling stress per the Alcoa formula

S_c = allowable compressive stress due to static bending loads

The Roark and Young formula is as follows:

$$S_c = \frac{S_{bY}}{1.5} = \frac{Et_s}{(1.5)2(3)^{1/2}\left[1-v^2\right]^{1/2}R_i}$$

where:

R_i/t_s is greater than 10

S_{bY} = critical compressive buckling stress per Roark and Young

v = Poisson's ratio

Other symbols are the same as in the Alcoa formula, above.

Based on the merit of these comments, RSPA is revising paragraph (b) to allow alternative methods for determining compressive buckling stress for DOT 400-series cargo tanks which are not required to be certified in accordance with the ASME Code. This allows manufacturers more freedom in the design of DOT 400-series cargo tank motor vehicles, particularly the DOT 406 cargo tank.

RSPA solicited information on the structural integrity of cargo tanks and, in particular, the loading combinations that may be encountered during operation of cargo tank motor vehicles as prescribed in paragraph (c). Information was received from several commenters which indicated that the loadings from normal operating conditions are different from loadings experienced in extreme dynamic events. The normal operating loadings are more frequent in occurrence, but much lower than the extreme dynamic loadings.

The requirement contained in current paragraph (c) only specifies extreme dynamic loadings. A cargo tank designer must determine which loadings, if any, should be considered as acting simultaneously. TTMA stated it is unlikely that extreme dynamic loadings will occur and highly unlikely that such loadings will occur at the same time. TTMA reported that if the extreme dynamic loadings are considered by the cargo tank designer as acting simultaneously, the resulting weight of a DOT 406 cargo tank would increase significantly. TTMA went on to state that such an increase in tank weight would have an adverse effect on public safety because it would cause a decrease in the number of gallons delivered each trip, increasing the number of trips and miles driven, thus increasing the probability of more accidents, personal injuries and fatalities.

During discussions on structural integrity issues at the February 1994 public meeting, the potential for changes in loading due to liquid movement was addressed. Commenters generally agreed that while significant lading movement can occur during partially loaded conditions and that such movement cannot be disregarded by cargo tank designers and vehicle operators, the variables involved are more than can be comprehensively dealt with at this time. The general agreement was that the highest stress conditions on most cargo tank configurations occur when the cargo tanks are full. Discussions on how to combine the loadings in calculating the structural integrity requirements have been going on for a number of years. RSPA agrees with commenters that the loadings currently in the HMR are based on extreme conditions that would be realized only on a rare occasion, if ever. Thus, based on recent information presented at the public meetings and written comments received in response to the NPRM, RSPA concludes that, for the design and construction of cargo tanks, it is best to consider separately the effects of normal operating loadings, which are known to act in combination, and the effects of extreme dynamic loadings, which are not expected to act in combination with each other. Therefore, in this final rule, RSPA is revising paragraph (c) to provide structural design requirements that will be more reflective of conditions encountered by cargo tank motor vehicles. These revisions will require cargo tank designers to consider normal operating loadings to be acting simultaneously except that longitudinal acceleration and deceleration cannot occur at the same time. Also, extreme dynamic loadings must be considered in separate calculations; these loadings may be considered to be acting independently.

Paragraph (d) prescribes design calculations that should be considered to account for stresses due to impact in an accident. For consistency, the accident damage requirements contained in current paragraph (d) are moved to § 178.345–8(e) where other accident damage protection requirements appear. Also, consistent with other changes made to this section, paragraphs (a) (1) and (3) are amended by removing the reference to paragraph (d) of this section.

Paragraph (e) is editorially revised, for clarity and consistency, by changing the word "wall" to read "shell and heads" and paragraphs (e) through (g) are redesignated as paragraphs (d) through (f).

Section 178.345–5

Commenters supported the proposed change in paragraph (b) that all fittings and devices mounted on a manhole cover must withstand the same static internal fluid pressure as that required for the manhole. However, commenters requested a revision to clarify that fitting and device manufacturers are

responsible for testing and certifying the structural integrity of their products. RSPA agrees with the commenters that the fitting and device manufacturers should be responsible for ensuring the integrity of their components. Therefore, the proposed provision is revised for clarity and added as new paragraph (f).

Another commenter suggested that paragraph (e) be revised to require that each manhole cover must be marked with the date of certification. RSPA will consider this comment in a future rulemaking action.

Section 178.345–6

A minor editorial change is adopted as proposed in the NPRM.

Section 178.345–8

Commenters recommended several changes to the accident damage protection requirements. They requested that all accident damage protection devices be designed so that calculated stress under the conditions prescribed not exceed the ultimate strength of the material of construction. They pointed out certain inconsistencies in the design criteria specified in this section. For example, in paragraph (d), the design stress for accidents involving longitudinal deceleration is based on "the lesser of the yield strength or 75 percent of the ultimate strength"; the general requirement for accident damage protection in paragraph (a)(3), is based on "75 percent of the ultimate strength"; while bottom damage and rollover damage protection, in paragraphs (b) and (c), both are based on the "ultimate strength. RSPA agrees there is merit in using the same criteria whenever possible. Therefore, in this final rule, the design of all accident damage protection devices is based on the ultimate strength of the material of construction.

The primary purpose of accident damage protection is to prevent the release of hazardous lading from a cargo tank in the event of an accident. For example, during an accident involving the maximum level of longitudinal deceleration expected, if the front head of a cargo tank experiences stress levels above the yield point of the material of construction, the head will bulge or distort. However, if that deformed head continues to contain the lading, the intent of this requirement has been met. In a practical sense, good engineering practice provides for factors of safety when analytical methods are not well established and when safety considerations call for reducing the probability of failures.

When an accident imposes loads on the cargo tank wall, the material of the wall, however, must be stronger than the accident damage protection device. For example, in a rollover accident, the portion of the cargo tank wall to which a rollover protection device is attached should not fail before the rollover protection device fails. The design stresses in the protection device itself can be based on the ultimate strength of the material, but the loads transmitted to the cargo tank wall must be based on a more conservative value. This can be achieved by use of factors of safety.

Accordingly paragraph (a)(3) is revised to base design stresses on the ultimate strength of the material with a 1.3 safety factor (i.e., the reciprocal of 0.75 times ultimate, rounded).

Commenters have stated that most impacts on bottom damage protection devices in accidents occur directly from the side of the vehicle. TTMA has stated that any piping at the bottom of a tank is protected fore and aft by the running gear of the cargo tank motor vehicle or its towing vehicle. Contending that reduced forces of impact can be expected from front and rear, TTMA petitioned for a reduction from 155,000 pounds to 27,000 pounds fore and aft along the longitudinal axis of the vehicle. RSPA believes, however, that the possibility of impacts from the front is very real for trailers; for example, during turning maneuvers, or in the event that the towing vehicle rides over an obstacle such as a guard rail. On the other hand, impacts from the rear are less likely on trailers because of the rear suspension. Therefore, RSPA has revised paragraph (b)(1) to recognize that suspension components and structural mounting members can provide all, or part, of bottom damage protection. Additionally, in paragraph (b) introductory text, a second sentence is added to clarify that a single protection device may be used to protect outlets, projections and piping grouped or clustered together.

Commenters stated that in the general rollover damage protection requirements, in paragraph (c), the wording "enclosed inside" could be misunderstood to require that closures and fittings must be protected from rollover damage on all sides—front, sides, rear and top. They also suggested that the protection devices be located no more than 48 inches from the closure or fitting. RSPA never intended to require that the component being protected be fully enclosed by the protective device. Also, RSPA does not agree with adding a dimensional location requirement. Rather than dimensional controls, one of RSPA's overall objectives is to provide performance requirements when appropriate. Therefore, paragraph (c) is revised to clarify the ambiguous wording.

Commenters requested that in paragraph (c)(1), the tangential design load for rollover protection be reduced from 2 "g" to 0.5 "g" or 1 "g." A commenter stated that "neither industry nor government have any data to support what this rollover protection device strength should be" contending that MC 306 accident damage protection has performed well, even considering findings of the NTSB study of overturn accidents. A commenter provided analytical data that indicated the internal bulkheads would be overstressed under 2 "g" tangential loads using the current MC 306 design.

A February 4, 1992 NTSB investigation report on rollover accidents involving MC 306 and MC 312 cargo tanks recommended several actions by both RSPA and the Federal Highway Administration (FHWA). The NTSB report supported the earlier RSPA decision to increase the rollover design load in the horizontal plane from one-half the weight of the loaded cargo tank motor vehicle prescribed in the MC 306, MC 307 and MC 312 specifications, to twice the weight of the loaded cargo tank motor vehicle prescribed in the DOT 406, DOT 407 and DOT 412 specifications. NTSB also noted that at this time, test results are not available to support this four-fold increase, but limited testing performed under RSPA and FHWA sponsorship for studies of release from dome covers indicate forces can easily exceed 2 "g" Additionally NTSB questioned whether the load specified for the DOT 406, DOT 407 and DOT 412 specifications are adequate in a typical rollover accident.

RSPA agrees with comments that in some rollover accidents, cargo tank rotation is limited to 120 degrees or less, so that these horizontal forces do not come into play unless a roadside obstacle is struck. In such incidents, the side of the cargo tank absorbs most of the energy of the rollover. However, in other rollover incidents, cargo tank motor vehicles have rotated 180 degrees or more and rollover protection devices have failed.

RSPA performed simple calculations to estimate the forces that would be expected to bring a sliding overturned cargo tank motor vehicle to a halt, at a variety of speeds and stopping distances. From the calculations performed regarding stopping distances, RSPA concludes that the design loads should not be decreased. FHWA will initiate a study aimed at developing a more refined understanding of the forces involved in cargo tank rollover accidents.

For these reasons, RSPA rejects requests to lower the tangential design load. In many cases, manufacturers will find it necessary to develop new designs for overturn protection devices, perhaps with associated short-term increased cost, but with enhanced safety benefits. Several manufacturers already have developed satisfactory protection devices which meet these design criteria. In addition, RSPA has made several minor editorial revisions in paragraph (c)(1) to improve clarity.

Paragraph (d)(3) prescribes that each cargo tank rear-end protection device and its attachment to the vehicle must be designed to satisfy the conditions specified in paragraph (d)(1) when subject to an impact of the cargo tank at rated payload, at a deceleration of 2 "g" Such an impact must be considered as being uniformly applied in a horizontal plane at an angle of 30 degrees or less to the longitudinal axis of the vehicle. Commenters requested elimination of the 30 degree angle for this impact load. They stated that most rear-end collisions of trucks and trailers involve other vehicles and are "in line" i.e., the longitudinal centerlines of the two vehicles are parallel at impact. TTMA pointed out that the National Highway Traffic Safety Administration (NHTSA) published a notice of proposed rulemaking [Docket No. 1–11, Notice 9; January 3, 1992], containing a proposal for rear impact guards and protection. The NHTSA proposal specified an impact only in the direction of the longitudinal centerline of the struck vehicle; it did not address angular impact. NHTSA's rear impact requirements are intended for the design of underride guards that will minimize impacts in occurrences where automobiles underride (i.e., slide under) the rear-end of large trucks and trailers. These requirements are intended to protect passenger occupants while RSPA's requirement for cargo tank rear-end protection is intended to prevent impacts to lading retention components that could result in the loss of hazardous material lading. Upon further review, RSPA agrees that requiring rear-end protection devices to withstand impacts at an angle of 30 degrees to the longitudinal axis of the vehicle is excessive. Therefore, paragraph (d)(3) is revised to reduce the angle of impact to 10 degrees.

A requirement contained in current paragraph (d) of § 178.345–3 specifying design stress for accidents involving longitudinal deceleration is revised and moved to new paragraph 178.345–8(e) in this final rule. The specified design stress is based on the ultimate strength of the material with a factor of safety of 1.3 (i.e., the reciprocal of 0.75 times ultimate, rounded). The use of 2 "g" as a reasonable maximum level for longitudinal deceleration in accident situations generally has been accepted by industry but commenters have stated that the reliability of strain gauge testing and finite element analysis is questionable when structures are loaded above the yield point. For this reason, cargo tank manufacturers who choose to design at this level may use performance testing to prove that tank heads and shell can withstand this 2 "g" loading condition. Alternate analytical methods or combinations of test and analysis may be used if they are accurate and verifiable.

Section 178.345–10

This section specifies requirements for the pressure relief and vacuum systems on DOT 400-series cargo tank motor vehicles. It also specifies lading retention requirements for the pressure relief system in the event of an overturn. Numerous commenters suggested alternative provisions for pressure relief systems on DOT 400-series cargo tanks. Pressure relief valve manufacturers stated that they have found it very difficult to attain "no loss of lading" with valve designs capable of withstanding the characteristic dynamic pressure surge required by the regulation, especially at low design pressures.

For these reasons, commenters requested that RSPA allow the loss of one liter of lading. If adopted, a properly functioning pressure relief valve could be expected to release no more than one liter of hazardous material in an overturn accident. This amount of liquid would be so widely dispersed by the motion of the vehicle as to cause minimal danger of fire or environmental damage.

Cargo tank shipments of poisonous-by-inhalation (PIH) materials in Hazard Zones A and B are subject to special provisions which result in high working pressures, thicker tank walls and thermal insulation. Insulation moderates thermal gain, thus increasing the pressure differential between valve pressure settings and dynamic pressure; also, it cushions the impact of accidents. The net effect of these features makes it unlikely that even small releases of PIH lading will occur.

RSPA believes allowing a minute release of other types of ladings in overturn accidents has greater safety benefits when compared with possible loss of an entire cargo tank load. Therefore, paragraph (b)(3)(ii) is revised to specify that after August 31, 1995, DOT 400-series cargo tanks must be equipped with a pressure relief valve that will release no more than one liter of lading in an emergency situation before reclosing to a leak-tight position. In addition, editorial changes are made in paragraph (b)(3)(i) for clarity.

Section 178.345–13

A paragraph heading, "*Leakage test.* is added to paragraph (c) as proposed in the NPRM.

Section 178.345–14

This section specifies cargo tank marking requirements. The California Highway Patrol recommended several substantial changes throughout this section that were not proposed in the NPRM. While RSPA believes some of these changes may have merit, they will have to be considered in a future rulemaking.

Proposed paragraph (d) is revised to clarify that each cargo tank on a multi-tank cargo tank motor vehicle must have a separate nameplate, unless each cargo tank is made by the same manufacturer with the same materials, manufactured thickness, and minimum thickness.

Section 178.345–15

RSPA proposed to add a new paragraph (e) to allow affixing a metal certification plate to cargo tanks which do not meet all of the applicable specification requirements. This would be indicated by not stamping a compliance date on the plate. A commenter pointed out that the proposed wording does not specifically require the Registered Inspector to stamp the date of compliance on the specification plate when the cargo tank is brought into full conformance with the specification. RSPA agrees with the commenter and has clarified the requirement.

Another commenter requested a revision to clarify that, for ASME tanks, the cargo tank motor vehicle manufacturer must furnish a manufacturer's data report to the cargo tank owner as required by the ASME Code, in addition to other required documents. The ASME Code requires a cargo tank manufacturer to prepare a manufacturer's data report for each tank. RSPA agrees with the commenter and has added a provision in paragraph (b)(2) specifying that the manufacturer must supply the cargo tank owner with a copy of the manufacturer's data report, at the time of delivery.

Section 178.346–1

RSPA proposed to add a new paragraph (d)(9) specifying provisions for the use of a single full fillet lap weld joint without plug welds for

longitudinal seams on the top 25 percent of the cargo tank. For the most part, commenters agreed in principal with the proposal; however, they recommended that the use of single fillet weld lap joint not be limited to the top one-fourth of the cargo tank.

Several manufacturers stated that they have used single full fillet lap welded joints for longitudinal seams on both the top and bottom areas of thousands of low-pressure cargo tank motor vehicles. They stated their service experience with these joints over many years of operations has been very good.

Advantages cited by the manufacturers for using this type of weld include the ability to achieve excellent fit between the shell and head flanges, and reduction in the amount of time personnel must work in confined spaces. However, because the ASME Code does not recognize this joint configuration, it may not be used on ASME certified vessels.

Industry submitted reports of tensile tests of the typically used single full fillet lap joints to RSPA. Test results indicate that failure occurs at stress levels of about 70 to 75 percent of the ultimate strength of adjacent material. One commenter opposed the use of such joints but provided no supporting test data.

RSPA believes the satisfactory performance of these joints over the years serves as a persuasive argument for their continued use on DOT 406 cargo tank motor vehicles. However, because a major reason for establishing the DOT 400-series specifications is enhanced quality assurance, the joints may be used only when subject to certain conditions. Therefore, new paragraph (d)(9) specifies the conditions for use of these joints in longitudinal seams, requirements for periodic compliance testing, and design requirements for determining weld joint efficiency. In addition, a new paragraph (d)(10) is added to clarify that requirements of paragraph UW-9(d), of Section VIII, Division 1, ASME Code do not apply.

Section 178.346-2

Minor editorial changes are made to paragraph (a).

Section 178.346-10

Valve manufacturers stated that, during prototype testing, they have encountered substantial problems in obtaining adequate flow under emergency conditions with pressure relief valves designed for the comparatively low MAWP levels typical of DOT 406 cargo tank motor vehicles. These problems have been resolved for current valves; however, the valve manufacturers continue to believe the emergency flow capacities, which are permitted to release up to one gallon of lading under the dynamic pressure surges characteristic of rollover accidents, are still marginal in some cases. Because of the problems encountered by valve manufacturers, RSPA will allow an additional year for product development and manufacturing start-up. This extension is added in a new paragraph (b)(3).

RSPA proposed to revise paragraph (c)(1) to permit DOT 406 cargo tanks to have the same set pressure and test pressure as allowed in § 178.345-10(d)(1), and as prescribed for DOT 407 and 412 cargo tanks except that the reclosing pressure would remain at no less than MAWP Commenters stated that while the proposed language would be helpful in increasing the venting capacity to a limited extent and providing a similar difference between opening and closing pressures over a range of MAWP values, it would not eliminate the need for supplementary venting capacity. Commenters requested that the flow rate be determined at a higher pressure, specifically at 125 percent of the tank test pressure. This would provide more pressure differential across the valve seat and provide higher venting capacities. As discussed in the preamble for 178.346-10(b) above, pressure relief valve manufacturers reported that they have found it difficult to obtain adequate emergency flow capacities in valves designed for DOT 406 cargo tank motor vehicles.

Based on comments received, RSPA believes the problem can be relieved by implementing two measures. The first measure is to increase the tolerance on the valve set pressure to allow the valve to begin opening at a lower set pressure and to be fully open at a higher pressure. The second measure is to increase the venting capacity rating pressure to 125 percent of the tank test pressure, and not greater than 3 psi above the tank's MAWP Because the pressure relief valves are required to be removed from the cargo tank during periodic pressure testing, the tank itself will not be exposed to pressures above its normal test pressure [see § 180.407(g)(1)(i)]. This increase in the venting capacity rating pressure will still provide a satisfactory margin of safety with respect to tank bursting pressure, even in the event of exposure to fire. The combined effect of these changes can be expected to significantly raise the pressure differential across the valve seat, thus increasing flow. Accordingly, both paragraphs (c)(1) and paragraph (d)(1) have been revised to include these two measures.

Section 178.346-13

In the NPRM, RSPA proposed to increase the emergency flow capacity of DOT 406 pressure relief valves by raising the test pressure of the cargo tank. This was intended to alleviate problems reported by valve manufacturers by increasing the differential pressure across the valve seat, thus increasing flow. However, commenters requested that RSPA not make this change because of the increased danger of deformation of heads at pressure levels above 5.0 psig, especially for internal heads in which the pressure is applied to the convex side. One commenter stated that pressures above 5.0 psig would require increased head thickness or bracing, thus increasing the weight of the tank resulting in lower payload and higher manufacturing cost.

As an alternative means of increasing emergency flow, commenters suggested that the set pressure and the flow rating pressure of the pressure relief valve itself be changed while retaining the existing tank test pressure. RSPA agrees with this alternative. Therefore, RSPA has revised paragraphs 178.346-10(c)(1) and (d)(1) instead of revising the tank test pressure requirements.

Shortly before publication of the NPRM, TTMA petitioned RSPA to use the Environmental Protection Agency (EPA) test for vapor-tightness for all DOT 406 cargo tanks. TTMA requested that Method 27 be authorized for all DOT 406 cargo tanks, regardless of whether they are: (a) used in gasoline delivery, (b) fitted with vapor collection equipment, or (c) subject to this test under EPA rules. Method 27 is found in appendix A. to 40 CFR Part 60. Section 1.1 of Method 27 is applicable for the determination of vapor tightness of a gasoline delivery tank which is equipped with vapor collection equipment. Requirements for applying the initial pressure-vacuum and test criteria are contained in 40 CFR Part 60, Subpart XX—Standards of Performance for Bulk Gasoline Terminals. In § 60.501, the definition of vapor tight gasoline tank truck reads:

> Vapor-tight gasoline tank truck means a gasoline tank truck which has demonstrated within the 12 preceding months that its product delivery tank will sustain a pressure change of not more than 750 pascals (75 mm of water) within 5 minutes after it is pressurized to 4,500 pascals (450 mm of water). This capability is to be demonstrated using the pressure test procedure specified in Reference Method 27

It should be noted that 750 pascals = 0.109 psi = 3.0 inches of water and 4,500 pascals = 0.653 psi = 18.1 inches of water. Similar provisions for benzene are prescribed in 40 CFR Part 60, Subpart BB—National Emission Standard for Benzene Emissions from Benzene Transfer Operations, at § 60.601.

RSPA authorized this alternative leakage test in the June 12, 1989 final rule published under HM–183 to relieve burdens of duplicate test requirements for cargo tanks intended for use in locations where, based on established standards of air quality, EPA has decided that release of gasoline vapors constitutes a hazard to the environment. TTMA stated that a cargo tank motor vehicle manufacturer may not know the local air pollution requirements to which the motor vehicle may be subject. RSPA recognizes TTMA's concerns and is permitting this alternative test when a cargo tank is equipped with vapor recovery equipment without qualification regarding the materials transported. RSPA also has revised paragraph (c) and § 180.407(h)(2) to reference appropriate acceptance criteria in EPA's regulation contained in 40 CFR 60.

Section 180.403

Commenters supported the proposal to add a definition for the term "replacement of a barrel." TTMA recommended that, in the definition of "replacement of a barrel" the wording "unused tank" should be clarified to mean a "new tank." RSPA agrees and the word "new" is added parenthetically after the word "unused."

Commenters also supported the proposal to revise the definition of rebarrelling. However, for the reasons contained in the preamble discussion for § 180.413 the proposed revision is not being adopted in this final rule. A commenter recommended that the definition of "repair" be modified to include the replacement of components such as valves, vents and fittings. RSPA believes this suggested change would be confusing because a "repair" is specifically defined to mean "any welding done to the cargo tank wall to return it to the original specification or a later equivalent specification." Replacement of valves, vents and fittings is considered maintenance. Therefore, the current definition is retained.

Section 180.405

Minor editorial changes are made in subparagraphs (f)(1)(iii) and (f)(4) as proposed in the NPRM.

In paragraph (g)(2), RSPA proposed to clarify that fittings and devices mounted on a manhole cover are part of the manhole assembly and must meet all performance standards required for the manhole cover. A commenter stated that the current requirement is adequate and recommended that RSPA not adopt the proposed change. The commenter stated that any concern or problem is due to a lack in verifying the continued proper securement of these fittings and devices to the manhole cover. The commenter said that the annual leakage test and inspection requirements in § 180.407 should be sufficient to assure that these in-service fittings and devices remain securely mounted and properly sealed on in-service manholes. RSPA agrees with the commenter and the proposed changes are not adopted in this final rule.

Another commenter recommended that paragraph (g)(2)(i) be revised to add "month and year" to the certification marking on manhole assemblies. Although RSPA believes that such a requirement may have merit, an opportunity should be provided for public comment; therefore, it will be considered in a future rulemaking action.

Paragraph (h) specifies that replacement for any reclosing pressure relief valve must be capable of re-seating to a leak-tight condition after a pressure surge. Section 180.405(c) authorizes modifying the reclosing pressure relief valves of an MC 306 cargo tank by installing the dual function pressure relief valves which are required for DOT 406 cargo tank motor vehicles. Commenters pointed out that this replacement could result in an MC 306 cargo tank having lower emergency venting capacity than its specification requires; because it is difficult to produce a valve that achieves the comparatively high flow rates of the MC 306 units, withstands the pressure surges specified in the DOT 406 specification, and recloses with minimal loss of lading. A reduced flow capacity is less likely to be encountered in fitting an MC 307 with a DOT 407 valve replacement, and in fitting an MC 312 with a DOT 412 valve replacement, because of the larger pressure differentials which are commonly used in these cargo tanks. Regardless of the equipment installed, the venting requirements specified in the particular cargo tank specification must be met whenever a pressure relief valve is replaced. For this reason, in this final rule, RSPA is authorizing replacement of defective MC 306 pressure relief valves with new or refurbished MC 306 pressure relief valves until August 31, 1998. After this date, any valve replacements must be the surge resistant pressure relief valves required for DOT 400-series cargo tanks. This allows three years for implementation of this safety approvement.

Section 180.407

In the table in paragraph (c), chlorine cargo tanks must be leakage tested annually These cargo tanks are also required to be pressure tested every two years. Based on a comment, RSPA has extended the frequency for conducting the leakage test to two years to coincide with the pressure test. Certain minor editorial changes are made in paragraph (d)(1)(i) for clarity. Paragraph (e)(1) is revised to clarify that when a particular tank design such as a cargo tank with a lining, coating or internal baffles, precludes an internal visual inspection, the tank must be hydrostatically or pneumatically tested. Paragraph (e)(4), which is duplicative with the requirements in paragraph (f)(3), is removed as proposed in the NPRM.

RSPA proposed to revise paragraph (g)(1)(iv), covering the pressure test of specification cargo tanks for consistency with the proposed changes to § 178.346–10; however, commenters who initially sought this change recommended that the proposal be withdrawn and the current provisions retained. Therefore, no change is made in this final rule.

Paragraph (h)(2) is revised to permit the use of the EPA Method 27 vapor tightness test on any cargo tank fitted with a vapor recovery system and used in gasoline or benzene service, as discussed earlier under the preamble discussion to § 178.346–13(c)(2). A commenter suggested that paragraph (h)(2) require the use of oil or soap to detect leaks in cargo tank seams, piping, valves and accessories when performing the Method 27 test. RSPA believes that oil or soap can be very useful in locating leaks, but that it would be an unnecessary burden if required for all Method 27 tests. Accordingly RSPA has not adopted the suggested change.

Paragraph (i) prescribes that the heads and shell of all unlined cargo tanks used for the transportation of materials corrosive to the tank must be thickness tested. Consistent with changes made to § 178.345–1(1)(2) in this final rule, a new paragraph (i)(4)(x) is added to specify that thickness testing must be performed on connecting structures of a carbon steel, self-supporting multi-tank cargo tank motor vehicle.

Requirements for continuing qualification and maintenance of cargo tank motor vehicles include periodic measurement of the thickness of heads and shells. This has focused attention

on interpretation of specification requirements for minimum thickness, especially of specification MC 306, MC 307 MC 312 cargo tanks and their predecessors.

In the specifications for MC 306, MC 307 and MC 312 cargo tanks constructed of steel, minimum thickness requirements for heads and shells were expressed in terms of U. S. Standard Gauges for sheet material or, for some MC 312 units where plate material was specified, in terms of fractions of an inch. These data were found at Table I and Table II in specifications for each of the respective types. Although not explicitly stated in the regulatory text, the tabulated values were the minimum nominal sheet and plate sizes permitted for these cargo tanks. For aluminum, values in Table I and Table II were the minimum nominal thickness expressed in decimals. The tolerances on mill thickness and the minimum thickness after forming were not covered. Although major steel purchase orders and steel mill production controls for sheet stock and thin plate are based on specific thicknesses and tolerances rather than on standard gauges, manufacturing tolerances have been established by the American Society for Testing and Materials (ASTM) for standard gauges and plate. For example, ASTM A480/A480M provides general specifications for stainless steels and heat-resisting steel plate, sheet and strip; Tables A1.2 and A1.17 in this specification are of special interest to manufacturers of DOT specification cargo tanks. For MC 307 and MC 312 cargo tanks which were required to be designed and constructed in accordance with the ASME Code, minimum mill undertolerances are set forth in Section VIII, Division 1 at UG–16(c). The ASME values are more restrictive than those of ASTM A480/A480M.

In January 1991, the National Tank Truck Carriers, Inc. (NTTC) published a revision to their "Cargo Tank Maintenance Manual" which included a table of minimum thicknesses for U.S. steel gauges ranging from 3 through 30. The accompanying narrative stated that the basic information was "provided by DOT A table, contained in § 173.24(c)(2) of the 1990 edition of the HMR was cited for gauges 12 through 30 with extrapolation being used to complete the other gauges. The values presented in that table were intended for relatively severe cold-working operations such as those experienced in forming the top and bottom chimes of steel drums, not for cargo tank construction. However, since adopting 49 CFR 180 Subpart E—Qualification and Maintenance of Cargo Tanks, the values published in the NTTC manual have been used for thickness testing as required by § 180.407(i). In the NPRM, RSPA proposed to add a new paragraph (i)(5) containing a minimum thickness table for steel and aluminum for the sizes of sheet and plate which have been authorized for MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307 MC 310, MC 311, and MC 312 heads and shells. The way in which minimum thickness has been set forth over the years has varied. For example, steel thicknesses generally have been expressed in terms of U.S. Standard Gauge (USSG), but, in the case of the MC 303 specification, both USSG values and decimal values were used. Thickness values for aluminum more often have been expressed in decimals. However, in the case of the MC 302 specification, both USSG values and decimal values were tabulated; and in the case of the MC 304 specification, the values for aluminum were required to be calculated by multiplying the USSG values listed for mild steel by a factor of 1.44.

TTMA suggested several changes to the table for clarity. TTMA also recommended that the table be divided into two separate tables: one for steel and one for aluminum. RSPA agrees with TTMA's recommendation. Therefore, in this final rule, current paragraphs (i)(5) through (1)(7) are redesignated as paragraphs (i)(6) through (i)(8), and a new paragraph (i)(5) containing two minimum thickness tables has been added. The tables include all thicknesses found in the eleven specifications cited above, plus USSG number 7 which has been used by a number of manufacturers. For steel, nominal thicknesses range from USSG number 19 to 3/8" plate; for aluminum, nominal thicknesses range from 0.078" to 0.540"

Section 180.413

RSPA proposed to revise requirements on the repair, modification, stretching or rebarrelling of cargo tanks. A commenter requested a revision to the record requirements contained in proposed paragraph (b) to require that the National Board "R–1" report be completed for all repairs on ASME Code stamped cargo tanks. The commenter stated that completing the document will ensure that the repair and method of repair conforms to the National Board Inspection Code and is approved by an Authorized Inspector. RSPA believes this revision is unnecessary because § 180.413 requires that any repair or modification involving welding on the tank head must be certified by a Registered Inspector, and that any repair or modification to an ASME Code "U" stamped cargo tank must be in accordance with the National Board Inspection Code. The National Board requires the use of the "R–1" forms for repairs and modifications. Therefore, this commenter's recommendation is not adopted in this final rule.

RSPA proposed to require that any repair, modification, stretching or rebarrelling of an ASME Code-stamped cargo tank must be performed by a repair facility holding a National Board "R" stamp. The National Board allows a facility other than a National Board "R" stamp holder to make repairs and modifications to ASME Code cargo tanks when authorized within a governmental jurisdiction. Jurisdictional authorization is only recognized within state boundaries where the repair facility is located. Therefore, because most cargo tank motor vehicles are operated in interstate commerce, RSPA has adopted the proposal requiring repairs on DOT specification cargo tanks certified to the ASME Code to be performed only by a facility holding a valid "R" stamp.

Based on a letter from TTMA stating that the regulations provide no distinction between a "100 percent rebarrel" and the manufacture of a new cargo tank, RSPA proposed to clarify the rebarrelling requirements and to differentiate between "rebarrelling a cargo tank" and "manufacturing a cargo tank" It was never RSPA's intent to imply that a repair facility holding only a National Board "R" stamp would be allowed to manufacture a new cargo tank or to perform a "100 percent rebarrel" of a cargo tank. Such work can be performed only by a manufacturer who is registered with DOT and holds an ASME "U" stamp. RSPA proposed adding a provision disallowing a repair facility from replacing an entire cargo tank by performing a "100 percent rebarrel.

However, based on comments received in the proposed clarification, the reference to a "100 percent rebarrelled cargo tank" has also caused confusion. Therefore, the proposed change is not adopted in this final rule, but RSPA will seek to clarify this provision in a future rulemaking.

CGA urged RSPA to add a new paragraph (e)(3)(v) specifying that modifications of MC 338 cargo tanks must conform to the specification in effect at the time of manufacture or at the time of modification. CGA pointed out that many cryogenic cargo tanks were operating under DOT exemption prior to adoption of the MC 338 cargo tank specification. Some of these units

do not conform to the design criteria in §§ 178.338–3 and 178.338–10. CGA stated that engineering and manufacturing costs to upgrade these cargo tanks to this new design criteria would be too restrictive. Yet, CGA also stated that "to encourage continuous modification and improvement, modifications to MC 338 cargo tanks must be performed in accordance with the specifications in effect at the time of manufacture or at the time of modification."

Proposed § 180.413 provides for a cargo tank to be modified in accordance with a current specification in effect at the time the work is done. For example, a feature on an MC 305 cargo tank may be modified in accordance with the MC 306 specification until August 31, 1995, and after that date in accordance with the DOT 406 specification; an MC 330 cargo tank may be modified in accordance with the MC 331 specification. Similarly a cargo tank authorized under an exemption issued before October 1, 1984 for transportation of a cryogenic liquid must be marked as a "DOT MC 338" cargo tank in accordance with § 180.405(d). The only cryogenic cargo tank specification is the MC 338. Thus, no feature of an MC 338 cryogenic cargo tank can be modified in accordance with any other specification. However, an MC 338 cryogenic cargo tank may be repaired in accordance with either its original design specified in the exemption under which it was manufactured or the MC 338 specification requirements in effect at the time of the repair. Therefore, CGA's suggested change is not adopted in this final rule.

CGA recommended a revision to paragraph (e)(6) to clarify that a cargo tank manufacturer who welds attachments and appurtenances which have no affect on the structural integrity or lading retention capability of a tank is not required to have a National Board "R" or ASME "U" stamp. CGA also suggested a revision to paragraph (e)(7) to clarify that mounting specifications should be governed by welding to the cargo tank "shell and head" rather than the cargo tank "wall" RSPA agrees and paragraphs (e)(6) and (e)(7) are revised for clarity.

IV Docket HM–183D

On September 3, 1993, RSPA published an interim final rule that amended requirements concerning the registration of Registered Inspectors and Design Certifying Engineers for certification of cargo tank motor vehicles. RSPA extended the closing of the registration period from December 31, 1991 to December 31, 1995. This action was in response to a petition for rulemaking, P–1167 filed by NTTC. RSPA stated in the rule that although an opportunity for public comment had not been provided, RSPA was seeking public comment to the action. RSPA further stated that any comments received would be addressed along with comments received to the NPRM under Docket HM–183C. The effective date of this rule was September 3, 1993. The comment period closed on October 13, 1993; RSPA received no comments in regard to this action. Therefore, that extension remains in effect.

V Rulemaking Analyses and Notices

1. Executive Order 12866 and DOT Regulatory Policies and Procedures

This final rule is not considered a significant regulatory action under section 3(f) of Executive Order 12866 and was not reviewed by the Office of Management and Budget. The rule is not considered significant under the Regulatory policies and Procedures of the Department of Transportation (44 FR 11034). A regulatory evaluation is available for review in the docket.

2. Executive Order 12612

This final rule has been analyzed in accordance with the principles and criteria contained in Executive Order 12612 ("Federalism"). Federal law expressly preempts State, local, and Indian tribe requirements applicable to the transportation of hazardous material that cover certain subjects and are not "substantively the same" as the Federal requirements. 49 U.S.C. 5125(b)(1). These covered subjects are:

(A) the designation, description, and classification of hazardous material;

(B) the packing, repacking, handling, labeling, marking, and placarding of hazardous material;

(C) the preparation, execution, and use of shipping documents related to hazardous material and requirements respecting the number, contents, and placement of those documents;

(D) the written notification, recording, and reporting of the unintentional release in transportation of hazardous material; or

(E) the design, manufacturing, fabricating, marking, maintenance, reconditioning, repairing, or testing of a packaging or a container which is represented, marked, certified, or sold as qualified for use in transporting hazardous material.

This final rule addresses the design, manufacturing, repairing, and other requirements for packages represented as qualified for use in the transportation of hazardous material. Therefore, this final rule preempts State, local, or Indian tribe requirements that are not "substantively the same" as Federal requirements on these subjects. Section 5125(b)(2) of Title 49 U.S.C. provides that when DOT issues a regulation concerning any of the covered subjects after November 16, 1990, DOT must determine and publish in the **Federal Register** the effective date of Federal preemption. The effective date may not be earlier than the 90th day following the date of issuance of the final rule and no later than two years after the date of issuance. RSPA has determined that the effective date of Federal preemption of this final rule will be 90 days after publication in the **Federal Register**.

Because RSPA lacks discretion in this area, preparation of a federalism assessment is not warranted.

3. Regulatory Flexibility Act

I certify that this final rule will not have a significant economic impact on a substantial number of small entities. There are no direct or indirect adverse economic impacts for small units of government, businesses, or other organizations.

4. Paperwork Reduction Act

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

5. Regulation Identifier Number (RIN)

A regulation identifier number (RIN) is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN number contained in the heading of this document can be used to cross-reference this action with the Unified Agenda.

List of Subjects

49 CFR Part 171

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

49 CFR Part 173

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

49 CFR Part 178

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

49 CFR Part 180

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

In consideration of the foregoing, title 49, chapter I of the Code of Federal Regulations, is amended as set forth below:

PART 171—GENERAL INFORMATION, REGULATIONS, AND DEFINITIONS

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

Authority: 49 U.S.C. 5101–5127; 49 CFR 1.53.

2. In § 171.7 in paragraph (a)(3) table, the first entry for the ASME Code and the entry for the National Board Inspection Code are revised to read as follows:

§ 171.7 Reference material.

(a)

(3) *Table of material incorporated by reference.*

Source and name of material	49 CFR reference
American Society of Mechanical Engineers:	
ASME Code, Sections II (Parts A and B), V, VIII (Division 1), and IX of 1992 Edition of American Society of Mechanical Engineers Boiler and Pressure Vessel Code and Addenda through December 31, 1993.	173.32; 173.306; 173.315; 173.318; 173.420; 178.245; 178.255; 178.270; 178.271; 178.272; 178.337; 178.338; 178.345; 178.346; 178.347; 178.348; 179.400; 180.407; 180.417
National Board of Boiler and Pressure Vessel Inspectors:	
National Board Inspection Code, A Manual for Boiler and Pressure Vessel Inspectors, NB–23, 1992 Edition	180.413

PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS

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

Authority: 49 U.S.C. 5101–5127 49 CFR 1.53.

4. In § 173.33, a new paragraph (h) is added to read as follows:

§ 173.33 Hazardous materials in cargo tank motor vehicles.

(h) Each liquid or vapor discharge opening in an MC 330 or MC 331 cargo tank and each liquid filling and liquid discharge line in an MC 338 cargo tank must be provided with a remotely controlled internal self-closing stop valve, except when an MC 330 or MC 331 cargo tank is marked and used exclusively to transport carbon dioxide, or except when an MC 338 is used to transport argon, carbon dioxide, helium, krypton, neon, nitrogen, and xenon. However, if the cargo tank motor vehicle was certified before January 1, 1995, this requirement is applicable only when an MC 330 or MC 331 cargo tank is used to transport a flammable liquid, flammable gas, hydrogen chloride (refrigerated liquid), or anhydrous ammonia; or when an MC 338 cargo tank is used to transport flammable ladings.

§ 173.33 [Amended]

5. In addition, in § 173.33, in paragraph (d)(3), a second sentence is added at the end of the text preceding the table to read "The venting capacity requirements of the original DOT cargo tank specification must be met whenever a pressure relief valve is modified."

§ 173.225 [Amended]

6. In § 173.225, in paragraph (e)(2), the phrase "MC 310, MC 311, MC 312 and DOT 412" is revised to read "MC 307 MC 310, MC 311, MC 312, DOT 407 and DOT 412"

7 In § 173.315, paragraph (o)(1) and the first sentence in paragraph (o)(2) are revised to read as follows:

§ 173.315 Compressed gases in cargo tanks and portable tanks.

(o)

(1) Any hose, piping, or tubing used for loading or unloading that is mounted or carried on the motor vehicle may not be attached to any valve and must be capped at all ends to prevent the entry of moisture, except at the time of loading or unloading. Except at the time of loading and 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 every 2 years when performing the required periodic retest in § 180.407(c) of this subchapter.

*

PART 178—SPECIFICATIONS FOR PACKAGINGS

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

Authority: 49 U.S.C. 5101–5127 49 CFR 1.53.

9. In § 178.337–1, paragraph (e)(2) is amended by revising the last sentence to read as follows:

§ 178.337–1 General requirements.

(e)

(2) Insulating material used on tanks for chlorine must be corkboard or polyurethane foam, with a minimum thickness of 4 inches, or 2 inches minimum thickness of ceramic fiber/fiberglass of 4 pounds per cubic foot minimum density covered by 2 inches minimum thickness of fiber.

§ 178.337–1 [Amended]

10. In addition, in § 178.337–1, the following changes are made:

a. In paragraph (a)(3), the reference "173.33(i)" is revised to read "178.337–1(e)(2)" and the reference "173.315(a) Table Note 11" is revised to read "173.315(a) Table".

b. In paragraph (e)(1), the reference "173.315(a) Table, Note 11" is revised to read "173.315(a) Table"

§ 178.337–9 [Amended]

11. In § 178.337–9, paragraph (b)(7)(i) is removed, and paragraphs (b)(7)(ii) and (b)(7)(iii) are redesignated as paragraphs (b)(7)(i) and (b)(7)(ii), respectively.

12. In § 178.337–11, paragraph (a)(2) introductory text is revised to read as follows:

§ 178.337–11 Emergency discharge control.

(a)

(2) Except for a cargo tank marked "For carbon dioxide only" each liquid or vapor discharge opening in a cargo tank must be equipped with a remotely controlled internal self-closing stop valve. This requirement does not apply to a cargo tank motor vehicle certified before January 1, 1995, unless intended for use to transport a flammable liquid, flammable gas, hydrogen chloride, refrigerated liquid, or anhydrous ammonia. For cargo tanks intended for use in chlorine service, see paragraph (a)(4) of this section.

13. In § 178.338–9, paragraph (c)(2) is revised to read as follows:

§ 178.338–9 Holding time.

*

(c)

(2) *Same design.* The term "same design" as used in this section means cargo tanks made to the same design type. See § 178.320(a)(3) for definition of "design type"

14. In § 178.338–11, in the introductory text in paragraph (c), the first sentence is removed and two new sentences are added to read as follows:

§ 178.338–11 Discharge control devices.

(c) Except for a cargo tank used to transport the following refrigerated liquids: argon, carbon dioxide, helium, krypton, neon, nitrogen, and xenon; each liquid filling and liquid discharge line must be provided with a remotely controlled internal self-closing stop valve. This requirement does not apply to a cargo tank motor vehicle certified before January 1, 1995, unless intended for use to transport flammable ladings. *

15. In § 178.345–1, in paragraph (c), definitions for "Extreme dynamic loading" and "Normal operating loading" are added, in appropriate alphabetical order and paragraph (i)(2) is revised to read as follows:

§ 178.345–1 General requirements.

(c)

Extreme dynamic loading means the maximum single-acting loading a cargo tank may experience during its expected life, excluding accident loadings.

Normal operating loading means the loading a cargo tank may be expected to experience routinely in operation.

*

(i)

(2) The strength of the connecting structure joining multiple cargo tanks in a cargo tank motor vehicle must meet the structural design requirements in § 178.345–3. Any void within the connecting structure must be vented to the atmosphere and have a drain located on the bottom centerline. Each drain must be accessible and must be kept open at all times. The drain in any void within the connecting structure of a carbon steel, self-supporting cargo tank may be either a single drain of at least 1.0 inch diameter, or two or more drains of at least 0.5 inch diameter, 6.0 inches apart, one of which is located on the bottom centerline.

16. In § 178.345–3, paragraphs (b) and (c) are revised to read as follows:

§ 178.345–3 Structural integrity.

(b) *ASME Code design and construction.* The static design and construction of each cargo tank must be in accordance with Section VIII, Division 1 of the ASME Code. The tank design must include calculation of stresses generated by the MAWP the weight of the lading, the weight of structures supported by the cargo tank wall and the effect of temperature gradients resulting from lading and ambient temperature extremes. When dissimilar materials are used, their thermal coefficients must be used in the calculation of thermal stresses.

(1) Stress concentrations in tension, bending and torsion which occur at pads, cradles, or other supports must be considered in accordance with Appendix G of Section VIII, Division 1 of the ASME Code.

(2) Longitudinal compressive buckling stress for ASME certified vessels must be calculated using paragraph UG–23(b), Section VIII, Division 1 of the ASME Code. For cargo tanks not required to be certified in accordance with the ASME Code, compressive buckling stress may be calculated using alternative analysis methods which are accurate and verifiable. When alternative methods are used calculations must include both the static loads described in this paragraph and the dynamic loads described in paragraph (c) of this section.

(c) *Shell design.* Shell stresses resulting from static or dynamic loadings, or combinations thereof, are not uniform throughout the cargo tank motor vehicle. The vertical, longitudinal, and lateral normal operating loadings can occur simultaneously and must be combined. The vertical, longitudinal and lateral extreme dynamic loadings occur separately and need not be combined.

(1) *Normal operating loadings.* The following procedure addresses stress in the tank shell resulting from normal operating loadings. The effective stress (the maximum principal stress at any point) must be determined by the following formula:

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

Where:

(i) S = effective stress at any given point under the combination of static and normal operating loadings that can occur at the same time, in psi.

(ii) S_y = circumferential stress generated by the MAWP and external pressure, when applicable, plus static head, in psi.

(iii) S_x = The following net longitudinal stress generated by the following static and normal operating loading conditions, in psi:

(A) The longitudinal stresses resulting from the MAWP and external pressure, when applicable, plus static head, in combination with the bending stress generated by the static weight of the fully loaded cargo tank, all structural elements, equipment and appurtenances supported by the cargo tank wall;

(B) The tensile or compressive stress resulting from normal operating longitudinal acceleration or deceleration. In each case, the forces applied must be 0.35 times the vertical reaction at the suspension assembly, applied at the road surface, and as transmitted to the cargo tank wall through the suspension assembly of a trailer during deceleration; or the horizontal pivot of the tractor or converter dolly fifth wheel, or the drawbar hinge on the fixed dolly during acceleration; or anchoring and support members of a truck during acceleration and deceleration, as applicable. The vertical reaction must be calculated based on the static weight of the fully loaded cargo tank, all structural elements, equipment and appurtenances

supported by the cargo tank wall. The following loadings must be included:

(1) The axial load generated by a decelerative force;

(2) The bending moment generated by a decelerative force;

(3) The axial load generated by an accelerative force; and

(4) The bending moment generated by an accelerative force; and

(C) The tensile or compressive stress generated by the bending moment resulting from normal operating vertical accelerative force equal to 0.35 times the vertical reaction at the suspension assembly of a trailer; or the horizontal pivot of the upper coupler (fifth wheel) or turntable; or anchoring and support members of a truck, as applicable. The vertical reaction must be calculated based on the static weight of the fully loaded cargo tank, all structural elements, equipment and appurtenances supported by the cargo tank wall.

(iv) S_S = The following shear stresses generated by the following static and normal operating loading conditions, in psi:

(A) The static shear stress resulting from the vertical reaction at the suspension assembly of a trailer, and the horizontal pivot of the upper coupler (fifth wheel) or turntable; or anchoring and support members of a truck, as applicable. The vertical reaction must be calculated based on the static weight of the fully loaded cargo tank, all structural elements, equipment and appurtenances supported by the cargo tank wall;

(B) The vertical shear stress generated by a normal operating accelerative force equal to 0.35 times the vertical reaction at the suspension assembly of a trailer; or the horizontal pivot of the upper coupler (fifth wheel) or turntable; or anchoring and support members of a truck, as applicable. The vertical reaction must be calculated based on the static weight of the fully loaded cargo tank, all structural elements, equipment and appurtenances supported by the cargo tank wall;

(C) The lateral shear stress generated by a normal operating lateral accelerative force equal to 0.2 times the vertical reaction at each suspension assembly of a trailer, applied at the road surface, and as transmitted to the cargo tank wall through the suspension assembly of a trailer, and the horizontal pivot of the upper coupler (fifth wheel) or turntable; or anchoring and support members of a truck, as applicable. The vertical reaction must be calculated based on the static weight of the fully loaded cargo tank, all structural elements, equipment and appurtenances supported by the cargo tank wall; and

(D) The torsional shear stress generated by the same lateral forces as described in paragraph (c)(1)(iv)(C) of this section.

(2) *Extreme dynamic loadings.* The following procedure addresses stress in the tank shell resulting from extreme dynamic loadings. The effective stress (the maximum principal stress at any point) must be determined by the following formula:

$$S = 0.5(S_y + S_x) \pm [0.25(S_y \quad S_x)^2 + S_S^2]^{0.5}$$

Where:

(i) S = effective stress at any given point under a combination of static and extreme dynamic loadings that can occur at the same time, in psi.

(ii) S_y = circumferential stress generated by MAWP and external pressure, when applicable, plus static head, in psi.

(iii) S_x = the following net longitudinal stress generated by the following static and extreme dynamic loading conditions, in psi:

(A) The longitudinal stresses resulting from the MAWP and external pressure, when applicable, plus static head, in combination with the bending stress generated by the static weight of the fully loaded cargo tank, all structural elements, equipment and appurtenances supported by the tank wall;

(B) The tensile or compressive stress resulting from extreme longitudinal acceleration or deceleration. In each case the forces applied must be 0.7 times the vertical reaction at the suspension assembly, applied at the road surface, and as transmitted to the cargo tank wall through the suspension assembly of a trailer during deceleration; or the horizontal pivot of the tractor or converter dolly fifth wheel, or the drawbar hinge on the fixed dolly during acceleration; or the anchoring and support members of a truck during acceleration and deceleration, as applicable. The vertical reaction must be calculated based on the static weight of the fully loaded cargo tank, all structural elements, equipment and appurtenances supported by the cargo tank wall. The following loadings must be included:

(1) The axial load generated by a decelerative force;

(2) The bending moment generated by a decelerative force;

(3) The axial load generated by an accelerative force; and

(4) The bending moment generated by an accelerative force; and

(C) The tensile or compressive stress generated by the bending moment resulting from an extreme vertical accelerative force equal to 0.7 times the vertical reaction at the suspension assembly of a trailer, and the horizontal pivot of the upper coupler (fifth wheel) or turntable; or the anchoring and support members of a truck, as applicable. The vertical reaction must be calculated based on the static weight of the fully loaded cargo tank, all structural elements, equipment and appurtenances supported by the cargo tank wall.

(iv) S_S = The following shear stresses generated by static and extreme dynamic loading conditions, in psi:

(A) The static shear stress resulting from the vertical reaction at the suspension assembly of a trailer, and the horizontal pivot of the upper coupler (fifth wheel) or turntable; or anchoring and support members of a truck, as applicable. The vertical reaction must be calculated based on the static weight of the fully loaded cargo tank, all structural elements, equipment and appurtenances supported by the cargo tank wall;

(B) The vertical shear stress generated by an extreme vertical accelerative force equal to 0.7 times the vertical reaction at the suspension assembly of a trailer, and the horizontal pivot of the upper coupler (fifth wheel) or turntable; or anchoring and support members of a truck, as applicable. The vertical reaction must be calculated based on the static weight of the fully loaded cargo tank, all structural elements, equipment and appurtenances supported by the cargo tank wall;

(C) The lateral shear stress generated by an extreme lateral accelerative force equal to 0.4 times the vertical reaction at the suspension assembly of a trailer, applied at the road surface, and as transmitted to the cargo tank wall through the suspension assembly of a trailer, and the horizontal pivot of the upper coupler (fifth wheel) or turntable; or anchoring and support members of a truck, as applicable. The vertical reaction must be calculated based on the static weight of the fully loaded cargo tank, all structural elements, equipment and appurtenances supported by the cargo tank wall; and

(D) The torsional shear stress generated by the same lateral forces as described in paragraph (c)(2)(iv)(C) of this section.

§ 178.345–3 [Amended]

17 In addition, in § 178.345–3, the following changes are made:

a. In paragraph (a)(1), the phrase at the beginning of the sentence "Except as provided in paragraph (d) of this section, the" is removed and replaced with the word "The"

b. In paragraph (a)(3), the wording "paragraphs (b), (c), and (d) of this section" is revised to read "paragraphs (b) and (c) of this section" each place it appears.

c. Paragraph (d) is removed.

d. Paragraphs (e) through (g) are redesignated as paragraphs (d) through (f), and in redesignated paragraph (d) the wording "cargo tank wall" is revised to read "cargo tank shell and heads"

18. In § 178.345–5, a new paragraph (f) is added to read as follows:

§ 178.345–5 Manhole assemblies.

(f) All fittings and devices mounted on a manhole cover, coming in contact with the lading, must withstand the same static internal fluid pressure and contain the same permanent compliance markings as that required for the manhole cover. The fitting or device manufacturer shall verify compliance using the same test procedure and frequency of testing as specified in § 178.345–5(b).

§ 178.345–6 [Amended]

19. In § 178.345–6, in paragraphs (a) and (b), the second sentence of each paragraph is revised to read "The design calculations of the support elements must include the stresses indicated in § 178.345–3(b) and as generated by the loads described in § 178.345–3(c)."

20. In § 178.345–8, paragraphs (a)(3), (b) introductory text, (b)(1), (c) introductory text, (c)(1), and (d)(3) are revised; and a new paragraph (e) is added to read as follows:

§ 178.345–8 Accident damage protection.

(a)

(3) Accident damage protection devices attached to the wall of a cargo tank must be able to withstand or deflect away from the cargo tank the loads specified in this section. They must be designed, constructed and installed so as to maximize the distribution of loads to the tank wall and to minimize the possibility of adversely affecting the lading retention integrity of the cargo tank. Accident induced stresses resulting from the appropriate accident damage protection device requirements in combination with the stresses from the tank operating at the MAWP may not result in a tank wall stress greater than the ultimate strength of the material of construction using a safety factor of 1.3. Deformation of the protection device is acceptable provided the devices being protected are not damaged when loads specified in this section are applied.

(b) Each outlet, projection or piping located in the lower ⅓ of the tank circumference (or cross section perimeter for non-circular tanks) that could be damaged in an accident that may result in the loss of lading must be protected by a bottom damage protection device, except as provided by paragraph (a)(1) of this section and § 173.33(e) of this subchapter. Outlets, projections and piping may be grouped or clustered together and protected by a single protection device.

(1) Any bottom damage protection device must be able to withstand a force of 155,000 pounds (based on the ultimate strength of the material) from the front, side, or rear, uniformly distributed over each surface of the device, over an area not to exceed 6 square feet, and a width not to exceed 6 feet. Suspension components and structural mounting members may be used to provide all, or part, of this protection. The device must extend no less than 6 inches beyond any component that may contain lading in transit.

(c) Each closure for openings, including but not limited to the manhole, filling or inspection openings, and each valve, fitting, pressure relief device, vapor recovery stop valve or lading retaining fitting located in the upper ⅔ of a cargo tank circumference (or cross section perimeter for non-circular tanks) must be protected by being located within or between adjacent rollover damage protection devices, or by being 125 percent of the strength that would be provided by 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 loads equal to twice the weight of the loaded cargo tank motor vehicle applied as follows: normal to the tank shell (perpendicular to the tank surface); and tangential (perpendicular to the normal load) from any direction. The stresses shall not exceed the ultimate strength of the material of construction. These design loads may be considered to be uniformly distributed and independently applied. If more than one rollover protection device is used, each device must be capable of carrying its proportionate share of the required loads and in each case at least one-fourth the total tangential load. The design must be proven capable of carrying the required loads by calculations, tests or a combination of tests and calculations.

(d)

(3) The structure of the rear-end protection device and its attachment to the vehicle must be designed to satisfy the conditions specified in paragraph (d)(1) of this section when subjected to an impact of the cargo tank motor vehicle at rated payload, at a deceleration of 2 "g" Such impact must be considered as being uniformly applied in the horizontal plane at an angle of 10 degrees or less to the longitudinal axis of the vehicle.

(e) *Longitudinal deceleration protection.* In order to account for stresses due to longitudinal impact in an accident, the tank shell and heads must be able to withstand the load resulting from the design pressure in combination with the dynamic pressure resulting from a longitudinal deceleration of 2 "g" For this loading condition, the allowable stress value used may not exceed the ultimate strength of the material of construction using a safety factor of 1.3. Performance testing, analytical methods, or a combination thereof, may be used to prove this capability provided the methods are accurate and verifiable. For cargo tanks with internal baffles, the decelerative force may be reduced by 0.25 "g" for each baffle assembly but in no case may the total reduction in decelerative force exceed 1.0 "g"

21. In 178.345–10, paragraphs (b)(3)(i) and (ii) are revised to read as follows:

§ 178.345–10 Pressure relief.

(b)

(3)

(i) Each pressure relief device must be able to withstand dynamic pressure surge reaching 30 psig above the design set pressure and sustained above the set pressure for at least 60 milliseconds with a total volume of liquid released not exceeding one gallon before the relief device recloses to a leak-tight condition. This requirement must be met regardless of vehicle orientation. This capability must be demonstrated by testing. An acceptable test procedure is outlined in TTMA RP No. 81—"Performance of Spring Loaded Pressure Relief Valves on MC 306, MC 307 and MC 312 Tanks," May 24, 1989 edition.

(ii) After August 31, 1995, each pressure relief device must be able to withstand a dynamic pressure surge reaching 30 psig above the design set pressure and sustained above the design set pressure for at least 60 milliseconds with a total volume of liquid released not exceeding one liter before the relief valve recloses to a leak-tight condition. This requirement must be met regardless of vehicle orientation. This

capability must be demonstrated by testing. TTMA RP No. 81, cited in paragraph (b)(3)(i) of this section, is an acceptable test procedure.

* *

§ 178.345–13 [Amended]

22. In § 178.345–13, a heading is added to paragraph (c) to read "*Leakage test.*"

§ 178.345–14 [Amended]

23. In § 178.345–14, in paragraph (d), the following changes are made:

a. The paragraph heading "*Multi-cargo tank cargo tank motor vehicle*" is revised to read "*Multi-tank cargo tank motor vehicle*"

b. At the end of the second sentence, the phrase "unless all of the cargo tanks are identical" is revised to read "unless all cargo tanks are made by the same manufacturer with the same materials, manufactured thickness, minimum thickness and to the same specification"

24. In § 178.345–15, a sentence is added in the beginning of paragraph (b)(2) and a new paragraph (e) is added to read as follows:

§ 178.345–15 Certification.

*

(b)

(2) For each ASME tank, a tank manufacturer's data report as required by the ASME Code. *

(e) *Specification shortages.* If a cargo tank is manufactured which does not meet all applicable specification requirements, thereby requiring subsequent manufacturing involving the installation of additional components, parts, appurtenances or accessories, the cargo tank manufacturer may affix the name plate and specification plate, as required by § 178.345–14 (b) and (c), without the original date of certification stamped on the specification plate. The manufacturer shall state the specification requirements not complied with on the manufacturer's Certificate of Compliance. When the cargo tank is brought into full compliance with the applicable specification, the Registered Inspector shall stamp the date of compliance on the specification plate. The Registered Inspector shall issue a Certificate of Compliance stating details of the particular operations performed on the cargo tank, and the date and person (manufacturer, carrier, or repair organization) accomplishing the compliance.

25. In § 178.346–1, new paragraphs (d)(9) and (10) are added to read as follows:

§ 178.346–1 General requirements.

(d) *

(9) Single full fillet lap joints without plug welds may be used for arc or gas welded longitudinal seams without radiographic examination under the following conditions:

(i) For a truck-mounted cargo tank, no more than two such joints may be used on the top half of the tank and no more than two joints may be used on the bottom half. They may not be located farther from the top and bottom centerline than 16 percent of the shell's circumference.

(ii) For a self-supporting cargo tank, no more than two such joints may be used on the top of the tank. They may not be located farther from the top centerline than 12.5 percent of the shell's circumference.

(iii) *Compliance test.* Two test specimens of the material to be used in the manufacture of a cargo tank must be tested to failure in tension. The test specimens must be of the same thicknesses and joint configuration as the cargo tank, and joined by the same welding procedures. The test specimens may represent all the tanks that are made of the same materials and welding procedures, have the same joint configuration, and are made in the same facility within 6 months after the tests are completed. Before welding, the fit-up of the joints on the test specimens must represent production conditions that would result in the least joint strength. Evidence of joint fit-up and test results must be retained at the manufacturers' facility.

(iv) *Weld joint efficiency.* The lower value of stress at failure attained in the two tensile test specimens shall be used to compute the efficiency of the joint as follows: Determine the failure ratio by dividing the stress at failure by the mechanical properties of the adjacent metal; this value, when multiplied by 0.75, is the design weld joint efficiency.

(10) The requirements of paragraph UW–9(d), of Section VIII, Division 1, ASME Code do not apply.

§ 178.346–2 [Amended]

26. In § 178.346–2, the paragraph (a) designation is removed; the phrase "DOT 406 cargo tanks" is revised to read "DOT 406 cargo tank motor vehicles" and in Table II, the heading "Rated capacity (gallons)" in the first column is revised to read "Cargo tank motor vehicle rated capacity (gallons)"

27 In § 178.346–10, the word "and" at the end of paragraph (b)(1) is removed, the period at the end of paragraph (b)(2) is removed and "; and" is added in its place, a new paragraph (b)(3) is added and paragraphs (c)(1) and (d)(1) are revised to read as follows:

§ 178.346–10 Pressure relief.

(b)

(3) Notwithstanding the requirements in § 178.345–10(b), after August 31, 1996, each pressure relief valve must be able to withstand a dynamic pressure surge reaching 30 psig above the design set pressure and sustained above the set pressure for at least 60 milliseconds with a total volume of liquid released not exceeding one liter before the relief valve recloses to a leak-tight condition. This requirement must be met regardless of vehicle orientation. This capability must be demonstrated by testing. TTMA RP No. 81, cited at § 178.345–10(b)(3)(i), is an acceptable test procedure.

(c)

(1) Notwithstanding the requirements in § 178.345–10(d), the set pressure of each primary relief valve must be not less than 110 percent of the MAWP or 3.3 psig, whichever is greater, and not more than 138 percent of the MAWP The valve must close at not less than the MAWP and remain closed at lower pressures.

*

(d) *

(1) Notwithstanding the requirements in § 178.345–10 (e) and (g), the primary pressure relief valve must have a venting capacity of at least 6,000 SCFH, rated at not greater than 125 percent of the tank test pressure and not greater than 3 psig above the MAWP The venting capacity required in § 178.345–10(e) may be rated at these same pressures.

*

28. In § 178.346–13, paragraph (c) is revised to read as follows:

§ 178.346–13 Pressure and leakage tests.

*

(c) *Leakage test.* Cargo tanks equipped with vapor collection equipment may be leakage tested in accordance with the Environmental Protection Agency's "Method 27—Determination of Vapor Tightness of Gasoline Delivery Tank Using Pressure-Vacuum Test," as set forth in 40 CFR Part 60, Appendix A. Acceptance criteria are found at 40 CFR 60.501 and 60.601.

PART 180—CONTINUING QUALIFICATION AND MAINTENANCE OF PACKAGINGS

29. The authority citation for part 180 continues to read as follows:

Authority: 49 U.S.C. 5101–5127 49 CFR 1.53.

30. In § 180.403, a new definition "Replacement of a barrel" is added, in the appropriate alphabetical order, to read as follows:

§ 180.403 Definitions.

Replacement of a barrel means to replace the existing tank on a motor vehicle chassis with an unused (new) tank. For the definition of *tank*, see § 178.345–1(c), § 178.337–1, or § 178.338–1 of this subchapter, as applicable.

31. In § 180.405, paragraph (h) is revised to read as follows:

§ 180.405 Qualification of cargo tanks.

(h) *Pressure relief system.* Properly functioning reclosing pressure relief valves and frangible or fusible vents need not be replaced. However, replacement of reclosing pressure relief valves on MC-specification cargo tanks is authorized subject to the following requirements:

(1) Until August 31, 1998, the owner of a cargo tank may replace a reclosing pressure relief device with a device which is in compliance with the requirements for pressure relief devices in effect at the time the cargo tank specification became superseded. If the pressure relief device is installed as an integral part of a manhole cover assembly the manhole cover must comply with the requirements of paragraph (g) of this section.

(2) After August 31, 1998, replacement for any reclosing pressure relief valve must be capable of reseating to a leak-tight condition after a pressure surge, and the volume of lading released may not exceed one liter. Specific performance requirements for these pressure relief valves are set forth in § 178.345–10(b)(3) of this subchapter.

(3) As provided in paragraph (c)(2) of this section, the owner of a cargo tank may elect to modify reclosing pressure relief devices to more recent cargo tank specifications. However, replacement devices constructed to the requirements of § 178.345–10 of this subchapter must provide the minimum venting capacity required by the original specification to which the cargo tank was designed and constructed.

§ 180.405 [Amended]

32. In addition, in § 180.405 the following changes are made:

a. In paragraph (f)(1)(iii), the phrase "prescribed in § 178.345–3 of the specification" is revised to read "prescribed in § 178.345–3 of this subchapter or the specification"

b. In paragraph (f)(4) introductory text, the phrase "and an outlet is equipped" is revised to read "and except that an outlet is equipped"

33. In § 180.407 in the table in paragraph (c), immediately under the subheading "Leakage Test" in the first column, the following entry is added and the wording "All cargo tanks except MC 338" is revised to read "All other cargo tanks except MC 338"; paragraph (e)(1) is revised; paragraph (h)(2) is revised; paragraphs (i)(5) through (i)(7) are redesignated as paragraphs (i)(6) through (i)(8), respectively; the word "and" is removed at the end of paragraph (i)(4)(viii); the period at the end of paragraph (i)(4)(ix) is removed and "; and" is added in its place; and new paragraphs (i)(4)(x) and (i)(5) are added, to read as follows:

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

(c)

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

Test or inspection (cargo tank specification, configuration, and service)	Date by which first test must be completed (see note 1)	Interval period after first test
[Add]		
Leakage Test:		
MC 330 and MC 331 cargo tanks in chlorine service	Sept. 1, 1991	2 years

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

(e) (1) When the cargo tank is not equipped with a manhole or inspection opening, or the cargo tank design precludes an internal inspection, the tank shall be hydrostatically or pneumatically tested in accordance with 180.407(c) and (g).

*

(h)

(2) Cargo tanks equipped with vapor collection equipment may be leakage tested in accordance with the Environmental Protection Agency's "Method 27—Determination of Vapor Tightness of Gasoline Delivery Tank Using Pressure-Vacuum Test," as set forth in 40 CFR Part 60, Appendix A. Acceptance criteria are found at 40 CFR 60.501 and 60.601.

(i)

(4)

(x) Connecting structures joining multiple cargo tanks of carbon steel in a self-supporting cargo tank motor vehicle.

(5) Minimum thicknesses for MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307 MC 310, MC 311, and MC 312 cargo tanks are shown in the tables below. The columns headed "Specified Manufactured Thickness" tabulate the minimum values required for new construction, generally found in Tables I and II of each specification. "In-Service Minimum Thicknesses" are based on 90 percent of the manufactured thickness as specified in the DOT specification, rounded to three places.

TABLE I.—MINIMUM THICKNESS FOR MC 300, MC 303, MC 304, MC 306, MC 307 MC 310, MC 311 AND MC 312 SPECIFICATION CARGO TANKS CONSTRUCTED OF STEEL AND STEEL ALLOYS

Specified manufactured thickness (US gauge or inches)	Nominal decimal equivalent for reference (inches)	In-service minimum thickness (inches)
19	0.0418	0.038
18	0.0478	0.043
17	0.0538	0.048
16	0.0598	0.054
15	0.0673	0.061
14	0.0747	0.067
13	0.0897	0.081
12	0.1046	0.094
11	0.1196	0.108
10	0.1345	0.121
9	0.1495	0.135
8	0.1644	0.148
7	0.1793	0.161
3/16	0.1875	0.169
1/4	0.2500	0.225
5/16	0.3125	0.281
3/8	0.3750	0.338

TABLE II.—MINIMUM THICKNESS FOR MC 301, MC 302, MC 304, MC 305, MC 306, MC 307 MC 311 AND MC 312 SPECIFICATION CARGO TANKS CONSTRUCTED OF ALUMINUM AND ALUMINUM ALLOYS

Specified manufactured thickness (inches)	In-service minimum thickness (inches)
0.078	0.070
0.087	0.078
0.096	0.086
0.109	0.098
0.130	0.117
0.141	0.127
0.151	0.136
0.172	0.155
0.173	0.156
0.194	0.175
0.216	0.194
0.237	0.213
0.270	0.243
0.360	0.324
0.450	0.405
0.540	0.486

§ 180.407 [Amended]

34. In addition, in § 180.407 the following changes are made:

a. In paragraph (d)(1)(ii), the wording "and the cargo tank is not equipped" is revised to read "or the cargo tank is not equipped"

b. In paragraph (e)(2)(ii), the wording "as specified § 180.407(f)." is revised to read "as specified in § 180.407(f)."

c. Paragraph (e)(4) is removed, and paragraph (e)(5) is redesignated as paragraph (e)(4).

d. In paragraph (g)(1)(iv), the word "minimum" is removed.

35. Section 180.413 is revised to read as follows:

§ 180.413 Repair, modification, stretching, or rebarrelling of cargo tanks.

(a) *General.* For purposes of this section, "stretching" is not considered a "modification" and "rebarrelling" is not considered a "repair." Any repair, modification, stretching, or rebarrelling of a cargo tank must be performed in conformance with the requirements of this section.

(b) *Repair*—(1) *Non-ASME Code stamped cargo tanks.* Any work involving repair on an MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307 MC 310, MC 311, or MC 312 cargo tank that is not ASME Code stamped must be performed by:

(i) A cargo tank manufacturer holding a valid ASME Certificate of Authorization for the use of the ASME "U" stamp and registered with DOT or

(ii) A repair facility holding a valid National Board Certificate of Authorization for the use of the National Board "R" stamp and registered with DOT

(2) *ASME Code stamped cargo tanks.* Any work involving repair on any ASME Code stamped cargo tank must be performed by a repair facility holding a valid National Board Certificate of Authorization for the use of the National Board "R" stamp and registered in accordance with subpart F of part 107 of subchapter B of this chapter.

(3) The following provisions apply to cargo tank repairs:

(i) DOT 406, DOT 407 and DOT 412 cargo tanks must be repaired in accordance with the specification requirements in effect either at the time of manufacture or at the time of repair;

(ii) MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 cargo tanks must be repaired in accordance with either the original specification or with the DOT 406 specification in effect at the time of repair;

(iii) MC 304 and MC 307 cargo tanks must be repaired in accordance with either the original specification or with the DOT 407 specification in effect at the time of repair;

(iv) MC 310, MC 311, and MC 312 cargo tanks must be repaired in accordance with either the original specification or with the DOT 412 specification in effect at the time of the repair;

(v) MC 338 cargo tanks must be repaired in accordance with the specification requirements in effect either 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 the National Board Inspection Code—Provisions for Repair of Pressure Vessels. Each cargo tank having cracks or other defects requiring welded repairs must meet all of the requirements of § 178.337–16 of this subchapter (in effect at the time of the repair), 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 affected area of the cargo tank must again be examined by the wet fluorescent magnetic particle method after hydrostatic testing to assure that all defects have been removed.

(4) 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.

(5) Any repair of a cargo tank involving welding on the shell or head must be certified by a Registered Inspector. Any repair of an ASME Code "U" stamped cargo tank must be in accordance with the National Board Inspection Code.

(6) The suitability of any repair affecting the structural integrity of the cargo tank must be determined by testing as prescribed in § 180.407

(c) *Maintenance or replacement of piping, valves, hoses or fittings.* In the event of repair, maintenance or replacement, any piping, valve, or fitting must be properly installed in accordance with the provisions of the applicable specification before the cargo tank is returned to hazardous materials service. After maintenance or replacement which does not involve welding on the cargo tank wall, the repaired piping, valves or fittings, the replaced segment of the piping must be leak tested. After repair or replacement of piping, valves or fittings which involves welding on the cargo tank wall, the entire cargo tank, including the repaired or replaced piping, valve or fitting, must be pressure tested in accordance with the applicable specification. Hoses permanently attached to the cargo tank must be tested either before or after installation.

(d) *Modification, stretching, or rebarrelling.* Modification, stretching or rebarrelling of a cargo tank must conform to the following provisions:

(1) *Non-ASME Code stamped cargo tanks.* If the modification, stretching, or rebarrelling will result in a design type change, then it must be approved by a Design Certifying Engineer. Any work involving modification, stretching, or rebarrelling on an MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307 MC 310, MC 311, or MC 312 cargo tank that is not ASME stamped must be performed by:

(i) A cargo tank manufacturer holding a valid ASME Certificate of Authorization for the use of the ASME "U" stamp and registered with DOT, or

(ii) A repair facility holding a valid National Board Certificate of Authorization for the use of the National Board "R" stamp and registered with DOT

(2) *ASME Code stamped cargo tanks.* The modification, stretching, or rebarrelling on any ASME Code stamped cargo tank must be performed by a repair facility holding a valid National Board Certificate of Authorization for the use of the National Board "R" stamp and registered in accordance with subpart F of part 107 of subchapter B of this chapter. If the modification, stretching, or rebarrelling will result in a design type change, then it must be approved by a Design Certifying Engineer.

(3) All new material and equipment, and equipment affected by the modification, stretching or rebarrelling must conform with requirements of the specification in effect at the time of such work. In addition, the modification, stretching or rebarrelling must be performed such that the cargo tank, as modified, stretched or rebarrelled, meets the applicable structural integrity requirements (§ 178.337–3, § 178.338–3, or § 178.345–3 of this subchapter) of the specification in effect at the time of such work. The work must conform to the requirements of the applicable specification as follows:

(i) For specification MC 300, MC 301, MC 302, MC 303, MC 305 and MC 306 cargo tanks, the provisions of either specification MC 306 or DOT 406 until August 31, 1995 and, thereafter to specification DOT 406 only.

(ii) For specification MC 304 and MC 307 cargo tanks, the provisions of either specification MC 307 or DOT 407 until August 31, 1995 and, thereafter to specification DOT 407 only;

(iii) For specification MC 310, MC 311, and MC 312 cargo tanks, the provisions of either specification MC 312 or DOT 412 until August 31, 1995 and, thereafter to specification DOT 412 only; and

(iv) For specification MC 330 cargo tanks, the provisions of specification MC 331.

(4) 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 structural integrity, venting, and accident damage protection requirements;

(iii) Assure compliance with all applicable Federal Motor Carrier Safety Regulations for any newly installed safety equipment;

(iv) Perform all retest procedures on each cargo tank in accordance with the applicable specification and § 180.407.

(v) Change the existing specification plate to reflect the cargo tank as modified, stretched or rebarrelled. This must include the name of the person doing the work, his DOT registration number, date, retest information, etc. A supplemental specification plate may be installed immediately adjacent to the existing plate(s), or the existing specification plate may be removed and replaced with a new plate; and

(vi) On a variable specification cargo tank, install a supplemental or new variable specification plate, and replace the specification listed on the original specification plate with the words "see variable specification plate"

(5) The design of the modified, stretched, or rebarrelled cargo tank must be approved by a Design Certifying Engineer registered in accordance with subpart F of part 107 of subchapter B of this chapter. The Design Certifying Engineer must certify that the modified, stretched, or rebarrelled cargo tank meets the structural integrity requirements of the applicable specification. The person performing the modifying, stretching or rebarrelling and a Registered Inspector must certify that the cargo tank is in compliance with this section and the applicable specification by issuing a supplemental manufacturer's certificate. The registration number of the Registered Inspector and the person performing the modification, stretching, or rebarrelling must be entered on the certificate. When a cargo tank is rebarrelled, it must be designed, constructed and certified in accordance with a cargo tank specification currently authorized for construction in Part 178 of this subchapter.

(6) If the mounting of the cargo tank on the cargo tank motor vehicle involves welding on the cargo tank head or shell, then the mounting must be performed as follows:

(i) *Non-ASME Code stamped cargo tanks.* For a non-ASME Code stamped cargo tank—

(A) By a cargo tank manufacturer holding an ASME "U" stamp, registered with DOT and under the direction of a Design Certifying Engineer; or

(B) By a repair facility holding an ASME "U" stamp or a National Board "R" stamp, registered with DOT, and under the direction of a Design Certifying Engineer.

(ii) *ASME Code stamped cargo tank.* For an ASME Code stamped cargo tank, by a repair facility holding a National Board "R" stamp, registered in accordance with subpart F of part 107 of subchapter B of this chapter, and approved by a Design Certifying Engineer.

(7) If the mounting of a cargo tank on a cargo tank motor vehicle does not involve welding on the cargo tank head or shell, or a change or modification of the methods of attachment, then the mounting shall be in accordance with the original specification or with the specification in effect at the time of the mounting. If the mounting involves any change or modification of the methods of attachment, then the mounting must be approved by a Design Certifying Engineer.

(8) Prior to any modification, stretching, or rebarrelling a cargo tank must be emptied of any hazardous material lading. Cargo tanks containing flammable or toxic lading must be purged.

(9) Any modification, stretching, or rebarrelling on the cargo tank involving welding on the shell or head must be certified by a Registered Inspector. Any repair of an ASME Code "U" stamped cargo tank must be in accordance with the National Board Inspection Code.

(10) The suitability of modification, stretching, or rebarrelling affecting the structural integrity of the cargo tank must be determined by testing as prescribed for new manufacture in the applicable specification.

(e) *Records.* Each owner of a cargo tank must retain at its principal place of business all records of repair, modification, stretching, or rebarrelling made to each tank during the time the tank is in service and for one year thereafter. Copies of these records must be retained by a motor carrier, who is not the owner of the cargo tank, at its principal place of business during the period the tank is in the carrier's service. The seller of a cargo tank shall provide the purchaser a copy of the cargo tank Certificate of Compliance, and all repair, inspection and test

reports upon sale as an MC or DOT cargo tank.

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D.K. Sharma,

Administrator, Research and Special Programs Administration.

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