DEPARTMENT OF TRANSPORTATION
RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION
WASHINGTON, D.C. 20590

DEPARTMENT OF TRANSPORTATION

Research and Special Programs Administration

49 CFR Parts 173 and 179

[Docket No. HM-174; Amdt. Nos. 173-145, 179-27]

Shippers; Specifications for Tank Cars

AGENCY: Materials Transportation Bureau, Research and Special Programs Administration.

ACTION: Final rule.

SUMMARY: This document changes the construction and maintenance standards for railroad tank cars used to transport hazardous materials so as to improve safety. The changes are as follows:

(1) Existing Specification 105 tank cars, those built before March 1, 1981, are to be retrofitted with a coupler vertical restraint system equivalent to that now required on Specification 112 and 114 tank cars over a one-year period ending on February 28, 1982;

(2) All other DOT specification tank cars are to be equipped with a coupler vertical restraint system equivalent to that now required on Specification 112 and 114 tank cars over a four-year period ending on February 28, 1985;

(3) After February 28, 1981, newly built Specification 105 tank cars are to be equipped with a coupler vertical restraint system equivalent to that now required on Specification 112 and 114 tank cars;

(4) After August 31, 1981, newly built Specification 105 tank cars transporting flammable gases, anhydrous ammonia and ethylene oxide are to be equipped with a tank head puncture resistance system equivalent to that now required on certain Specifications 112 and 114 tank cars;

(5) After August 31, 1981, newly built Specification 105 tank cars transporting flammable gases and ethylene oxide are to be equipped with a thermal protection system equivalent to that now required on certain Specification 112 and 114 tank cars; and

(6) After August 31, 1981, newly built specification 105 tank cars transporting flammable gases and ethylene oxide are to be equipped with safety relief valves sized according to the requirements for Specification 112 and 114 tank cars.

EFFECTIVE DATE: These rules will become effective on March 1, 1981.

FOR FURTHER INFORMATION CONTACT: Leavitt A. Peterson (Office of Safety), Federal Railroad Administration, 400 Seventh Street, SW., Washington, D.C. 20590, (202) 426-0897.

SUPPLEMENTARY INFORMATION: These amendments are the result of the joint efforts of the Federal Railroad Administration (FRA) and the Materials Transportation Bureau (MTB). In accordance with internal Department of Transportation (DOT) procedures, the FRA has developed the substantive provisions of this rule for review and issuance by the MTB.

The MTB proposed a series of revisions in a notice published on July 21, 1980 (45 FR 48671). Interested persons were requested to submit their views. Comments received were from individual shippers, shipper organizations, a railroad organization, a rail labor organization, the National Transportation Safety Board (NTSB), and tank car manufacturers. All of the comments have been carefully reviewed and fully considered during the formulation of the final rule set forth in this document.

With the exception of shelf couplers, the FRA and the MTB deliberately separated new car construction requirements under this rulemaking action from retrofit matters under Docket HM-175. This action allows the MTB to clearly state that the decisions reached in HM-175 are independent of the decisions that may be reached in HM-175.

Discussion of Comments

General. Several commenters expressed the opinion that the MTB was mandating changes without sufficient accident analysis. One commenter stated that a derailment accident history comparison between 112/114 and 105 tank cars for the period 1965 through mid-1979 shows that, on the basis of car-year exposure, the 105 car as a group is less vulnerable to head puncture, shell puncture, fitting damage, rupture, and lading loss than other tank car types. Although the source of this data is not stated, it apparently came from a study of the 105 tank car population and accident data published by the Railway Progress Institute and the Association of American Railroads (Report No. RA-17-1-43; August 1980). It should be recognized that conclusions based on the car accident data are dependent upon how the data are statistically normalized to reflect, among other things, that more than twice as much flammable gas is transported in 112/114 tank cars than in 105 tank cars.

In analyzing accident data over the last 25 years, the FRA has concluded that 105 tank cars have been involved in a number of train accidents with consequences similar to 112 and 114 tank cars dramatizing the importance of assuring that these tank cars are equipped with a level of safety protection consistent with the risk.

Several commenters also expressed the opinion that the MTB was mandating changes without sufficient testing of Specification 105 tank cars. Some commenters discussed the detailed testing of 112/114 tank cars and suggested that similar testing of 105 cars be performed prior to mandating changes in 105 tank cars. Over the last 10 years, the FRA has built test facilities and conducted numerous tests in cooperation with various industry groups. Researchers investigated the capability, feasibility and even the practical aspects of life cycle durability of tank car safety improvement options. An extensive portion of the resulting findings relate directly to puncture resistance, thermal protection and safety valve systems regardless of the particular application to a tank car type, whether it be a 112, 114 or 105.

The thrust of many commenters' arguments seems to be that the MTB should defer applying the HM-144 performance standards to the 105 tank cars until it determines the degree to which current 105 tank car designs meet those standards. The FRA and the MTB are confident that they have adequate information to proceed with this final rule without delay because:

(1) the data base resulting from earlier tests and experience with DOT Specification 112 and 114 tank cars is appropriate;

(2) in terms of the commenters' concerns, this rule applies only to new tank cars that, except for one additional commodity, will carry the same commodities covered in HM-144; and

(3) it is unrealistic to expect that all variations of the 105 tank car designs can or need to be tested as systems.

Furthermore, the FRA research program is not intended to identify all feasible options that satisfy the performance specifications promulgated in Docket HM-144 and which are being extended in this rule. The supply industry has the necessary expertise to develop any new options that they feel may be more cost effective than the existing options being used on 112 and 114 tank cars. Indeed, at the present time the FRA and the Railway Progress Institute are using FRA facilities to test various combinations of jacketed systems and thermal coatings. The FRA and the MTB believe that sufficient analysis and testing, including full scale testing of 112 tank cars, has been conducted in order to proceed with changes in new 105 tank car requirements. Some 105 tank cars which meet the head and thermal protection requirements of this rule are being built presently. Moreover, as was noted by many of the commenters, there is a great diversity of 105 tank car designs. Therefore, the FRA and the MTB believe that it would be a prohibitive burden to require that each 105 tank car design be subjected to full scale fire, impact, and valve testing. However, FRA has facilities at the Transportation Test Center where appropriate testing as previously established in HM-144 can be performed by any tank car builder or owner at reasonable expense.

Several commenters suggested that the DOT should be more concerned with the causes of rail accidents, such as poor track maintenance and operational problems, rather than mandating changes to 105 tank cars. FRA has research, regulatory, and Federal assistance programs underway to improve track maintenance, equipment maintenance and operating practices. In addition, the FRA recently completed a study, requested by Congress, on the relationship of the size, weight, and length of rail cars to the safety and efficiency of rail transportation that points the way for further improvements in freight car design. However, these efforts will not eliminate all accidents. FRA and the MTB believe that although the risk to the public from hazardous materials will be reduced by these efforts, there is still a need to improve the safety of tank cars that carry certain hazardous materials.

Many commenters gave examples of why commodities should be separately treated with respect to thermal and tank head protection. They believe it is not necessary to add safety requirements to tank cars used to transport certain commodities, for example, carbon dioxide. This particular commodity is not toxic and will not support a fire. Many commenters supported commodity specific tank car requirements in a general way and some provided more specific recommendations, such as:

—gives its acquiescence to the *present* HM-144 thermal and tank head protection systems only for flammable gases in new specification 105 cars as this acknowledges the reality of current car builder practices.

—agrees that new construction of 105 cars for these commodities should incorporate the same puncture and thermal protection requirements intended for 112 and 114 cars for transporting the same commodities.

There is substantial justification to limit added safety features only to tank cars transporting commodities that need extra protection as was prescribed by the HM-144 amendment.

Although there are administrative and operational advantages in specifying uniform safety protection requirements which would apply to every new 105 tank car, the MTB agrees with those commenters who suggested continuing the specific commodity and class designation approach of HM-144.

The information assembled in this proceeding has persuaded the MTB that higher levels of 105 tank car protection are called for with respect to the same kinds of commodities that earlier prompted the additional HM-144 requirements for 112 and 114 tank cars—flammable gases and anhydrous ammonia—plus one additional commodity having characteristics which approximate those of flammable gas—ethylene oxide. That information does not provide comparable justification for extending those requirements to 105 tank cars carrying other hazardous commodities. However, because FRA and MTB remain concerned with the adequacy of tank car puncture resistance and thermal protection for other hazardous commodities, we will continue to examine this question (e.g. HM-175) and initiate corrective regulatory action as necessary.

Specific Comments and Analysis of Major Issues

The following is a summary of the comments received and an explanation of the revisions made by the MTB in response to those comments.

Shelf Coupler Retrofit (§ 173.31). As proposed in the NPRM, paragraph (a)(6) of § 173.31 would require a coupler vertical restraint system (shelf couplers) to be installed on all 105 tank cars by December 31, 1981, and paragraph (a)(7) of § 173.31 would require the system on other DOT specification tank cars by December 31, 1984. The commenters supported overwhelmingly the idea that all 105 tank cars should be equipped with shelf couplers and noted that the requirement could be made effective immediately for new 105 tank car construction since it is already the practice. The only issues raised involved the time frame and priorities for the retrofit installation of couplers.

A majority of commenters requested that the final rule allow 18 months for retrofitting 105 tank cars. Several of these commenters noted that it is approximately 18 months from the publication of the NPRM (July 21, 1980) until the proposed date for retrofitting 105 tank cars (December 31, 1981), apparently presuming that the MTB intended an 18-month retrofit period. The specific reasons for requesting 18 months included perceived problems of availablility of the couplers and potential disruption of commerce due to shopping. The National Transportation Safety Board called for the expedited installation of shelf couplers on 105 tank cars, but declined to suggest an appropriate interval.

As to the other DOT specification tank cars, there was a similar general agreement that retrofit installation of shelf couplers is warranted. However, several commenters believe that the requirement should extend only to those other DOT specification tank cars that carry hazardous materials. On the other hand, other commenters stated that shelf couplers should be required to be installed on all new or rebuilt freight cars. There were differences among the commenters about priorities for retrofitting these tank cars as well as the appropriate time period to complete the process. The suggested interval ranged variously from an unspecified "expedited" basis to 48 months, 54 months, 60 months, 72 months, 78 months, 84 months, and even 108 months. The reasons advanced for time extensions included differing estimates as to: (1) the number of cars involved (2) the time required to locate, move and retrofit the cars, and (3) the availability of couplers. In addition, some commenters suggested that non-placarded cars be given additional time beyond the December 31, 1984, proposed date. Other commenters noted that whatever interval is chosen, the retrofit should focus first on those cars actually carrying hazardous materials; and one

commenter would accord priority to cars of 22,000 gallons or more.

One commenter believes that FRA underestimated the size of the total tank car fleet. However, AAR's *Yearbook of Railroad Facts* shows 178,069 tank cars in service at the end of 1979. FRA estimates that about 75 percent of the total tank car fleet carries placarded hazardous materials during all or part of its life. The 75 percent equates to the 135,000 DOT specification tank cars used as the starting figure in the economic evaluation. The estimate is supported by FRA analysis of tank car shipments and UMLER file data.

Based on analyses of total cars, performance on retrofits under HM-114 and coupler manufacturer capabilities and assurances, the MTB has set a February 28, 1982, completion date for the 105 tank car retrofit and a February 28, 1985, completion date for the retrofit of the other tank cars. The latter date provides a period of approximately 48 months from the effective date of the regulation. The four-year retrofit period is consistent with known industry capability and the established safety value of shelf couplers. Shelf coupler availability is not a limiting factor.

In the shelf coupler retrofit program for Specification 112 and 114 tank cars, it is estimated that more than 16,000 cars were equipped within six months. In the 112/114 tank car retrofit, arrangements were made with railroads and private shops to provide for application of couplers to many cars, with minimum delays, along major hazardous materials routes. Similar arrangements would be possible for the retrofit program required by this final rule. Other cars can be equipped during normal cyclical maintenance at the home shop. Although such a measure is not likely to be necessary given the experience of the 112/114 tank car retrofit, field application of couplers could be made if necessary.

As indicated in the NPRM, the FRA and the MTB estimate that of approximately 24,000 Specification 105 tank cars, 18,000 have not yet been equipped with shelf couplers. Of those tank cars bearing specifications other than 112/114 or 105, approximately 73,000 remain to be equipped.

The FRA and the MTB have established the key priority with respect to order of retrofit by requiring that all 105 tank cars be equipped during the first year. It would be both unnecessary and disruptive to specify a detailed order of retrofit for the remaining fleets based on car size, commodity carried, or annual mileage. The MTB believes that industry will utilize its specialized knowledge to assure that the tank cars carrying the most hazardous materials are retrofitted first. The incentive for industry to support such a program is economic. The incremental cost to retrofit tank cars carrying the most hazardous material first is minimal, if any, since the cars must be fitted within a limited time period under this rule. Industry will prefer under these conditions to achieve the greatest risk reduction. The benefit to industry is a decline in the potential of a serious accident and the accompanying costs. This approach by the MTB uses the free market system to get the best safety performance at the least cost to government and industry.

At the same time, the flexibility afforded by the final rule will permit intelligent planning by industry based on car availability and routine maintenance intervals. The FRA and the MTB believe that this flexibility will assure completion of the retrofit at an earlier date than would be the case if shippers and car owners were required to manage the logistics of equipping multiple groups of cars according to a rigid schedule.

Cars previously built to ICC or DOT specifications that are not in placarded hazardous materials service are not subject to this retrofit requirement unless and until they are placed in such service (see 49 CFR 179.1). However, shippers are cautioned that shelf couplers are "safety appurtenances" for which inspection will be required following the completion date of the respective retrofit periods (see 49 CFR 173.31(b)). Also, couplers may be changed at any time due to damage in the service environment; therefore, it is imperative that coupler type be ascertained at the time of loading to assure compliance with the regulations.

Compliance Reporting. Many commenters seemed to assume that a reporting system for the coupler vertical restraint retrofit is necessary, although none was proposed in the NPRM. The FRA and the MTB believe that it would be useful to measure compliance and are considering issuing an NPRM to require annual reports covering the DOT specification tank cars to be retrofitted by February 28, 1985. A suitable reporting procedure would help to measure progress and ensure that the deadline is met.

Requirements for Specific Commodities in Tank Cars

Sections 173.124, 173.314, and 173.354. These sections have been amended to require that certain new 105 tank cars meet the special requirements of § 179.106. Section 173.314 has also been amended to clarify that certain new and previously built 112 and 114 tank cars are required to meet the special requirements of § 179.105. The purpose of these changes is to alert readers of Part 173 to the changes in Part 179. Section 173.314 has been further amended to correct typographical errors in the table. These typographical errors occurred in the entries for difluoroethane; dimethylamine, anhydrous; monomethylamine, anhydrous; methyl chloride; trimethylamine, anhydrous; and liquified petroleum gas (pressure not exceeding 300 pounds per square inch at 105 degrees F).

Full Tank Head Puncture Resistance System Versus Lower Half System (§ 179.100-23)

As proposed in the NPRM, § 179.100-23 would require that each end of a DOT Specification 105, 112, and 114 tank car built after December 31, 1980, be equipped with a tank head puncture resistance system that covers the entire tank head. This was not proposed because of any inadequacy of the HM-144 tank head puncture resistance standard (lower half of the tank head). Indeed, the NPRM clearly stated that the "* * * HM-144 requirements represented a very satisfactory approach to the protection of pressure tank cars." Rather, full head system was proposed on the basis that "* * * human and economic losses resulting from individual accidents may dramatically exceed the levels previously anticipated." However, the dramatically higher costs only occur if there is an accident. The majority of commenters opposed the proposed full tank head system on the basis that the FRA did not identify any accident where a car equipped to the HM-144 standard (shelf couplers and half head) had failed to protect the tank head. The FRA and the MTB agree that there is not to date any specific accident data demonstrating that HM-144 tank head protection system is inadequate. The FRA and the MTB also agree that there is not to date any clearly identifiable additional margin of safety provided by a full tank head puncture resistance system that would warrant Federally mandating the full tank head protection system.

Several commenters representing major groups did support a full tank head puncture resistance system. Their comments did not contain an analysis of what additional protection would be provided by a full head system or any accident history of HM-144 equipped cars indicating a failure of the HM-144 system. In the absence of definitive accident data, and in light of benefits

attributed by the NTSB and other commenters to the combination of half head protection in conjunction with shelf couplers, the FRA and the MTB do not believe it is appropriate to impose rigid Federal requirements for a full tank head puncture resistance system. Accordingly, the MTB is not requiring full head protection for 105, 112, and 114 tank cars as proposed in the NPRM, but is instead extending the same HM-144 requirements to the 105 tank cars defined in § 179.106-2. Consequently, editorial changes in the title and text have been made in the final rule to clarify that this section is an alternative requirement for all tank cars required to satisfy the head puncture resistance requirements of § 179.105-5.

Even though not required by this rule, the FRA and the MTB note with approval some evidence of evolving voluntary industry practice to provide full head protection.

§ 179.106 Special Requirements for Specification 105 Tank Cars

§ 179.106-1 General. The 105 tank car special requirements are set forth in § 179.106. Several commenters objected to paragraph (b) of § 179.106-1. Paragraph (b) provides that AAR approval is not required for changes or additions to Specification 105 tank cars for compliance with § 179.106. The FRA and the MTB recognize that the existing car owner/rail carrier approval system which is set forth in AAR "Interchange Rules" may be continued by the AAR Tank Car Committee and that its approval for interchange may, therefore, be required by industry for all additions, modifications and repairs performed to comply with § 179.106. However, the FRA and the MTB to not believe that this approval needs to be imposed by regulation. These standards adopted for improved tank car safety are augmented by specific performance oriented design criteria (such as specified couplers, head shield designs and thermal protection systems) thereby affording tank car owners sufficient guidance to perform the modifications and additions required by this rule. For these reasons the MTB had not included a requirement for AAR Tank Car Committee approval in the rule.

New Car Requirements (§ 179.106-2). The requirements for new 105 tank cars are set forth in § 179.106-2. The requirements for coupler vertical restraint systems have previously been discussed. The analyses of the comments relating to the tank head puncture resistance systems, the thermal protection systems and the safety relief valve requirements are discussed separately.

The MTB has decided to allow more time before newly built tank cars must comply with this section. It has become apparent from comments submitted that the NPRM's effective compliance date of January 1, 1981, might cause unreasonable delays in the delivery of tank cars already ordered. The FRA and the MTB recognize the problems associated with lead times in construction procurements. The rule provides a six-month period from the effective date to the time when a newly built tank car must comply with this section. This period will give adequate time for car orders to be filled by the builder in accordance with this rule. In prescribing the September 1, 1981, date the FRA and the MTB considered, but rejected, numerous suggestions that the rule be based upon the date ordered. One commenter stated: "Because of shop backlogs of up to two years * * * any changes in specifications must be referenced to car order date rather than car built date." The FRA and the MTB decided that a "date ordered" basis would lead to delays in installing the safety systems of up to two years and confusion in identifying those newly built cars which must comply with the rule. It is worthwhile to mention that FRA has been advised that many new 105 tank cars that will carry flammable gases are already being constructed in compliance with the tank head and thermal requirements of this rule.

Tank Head Puncture Resistance System (§ 179.106-2). Several commenters supported full tank head puncture resistance requirements for all newly constructed 105, 112, and 114 tank cars. Several other commenters supported the HM-144 standard for head protection (lower half of the tank head) on all newly constructed 105 tank cars. One commenter supported the full head requirement for new 105 tank cars, while offering no opinion regarding the 112 and 114 tank cars. Most commenters supported commodity differentiation and were not opposed to the principle of mandating HM-144 standards on those 105 tank cars that carry the same commodities as the 112 and 114 tank cars (flammable gases and ammonia). One commenter noted that the industry has voluntarily installed head protection on 105 tank cars carrying flammable gases for several years.

The majority of commenters, however, were opposed to requiring either full or HM-144 equivalent head protection on all new 105 tank cars without regard to the commodity being carried. These commenters noted that commodity differentiation was an integral part of HM-144 requirements applicable to 112 and 114 tank cars. According to these many commenters, the wide variety of commodities carried in the 105 tank cars and the attendant cost of providing an all encompassing level of protection precludes mandating the same head and thermal protection system for every 105 tank car.

Other objections to the proposed tank head requirements for 105 tank cars were raised. Some commenters reiterated that the accident record indicates that the 105 tank car is superior to the 112 and 114 tank cars in its ability to survive an accident environment. Hence, they contend that there is not a similar justification for the additional requirements as there was in HM-144. In addition, a number of commenters stated that the incremental benefit of shelf couplers reduces the safety benefit of a tank head protection system to an unacceptably small level.

The MTB is extending HM-144 head puncture resistance requirements to new 105 tank cars that will carry the HM-144 commodities and ethylene oxide, notwithstanding the allegedly better safety record of 105 cars when compared to the unretrofitted 112 and 114 cars. A relatively better overall safety record is not at all suprising since 105 tank cars have some insulation and varying degrees of additional tank head puncture resistance. While the thermal insulation and head protection systems of many 105 tank cars do not meet the HM-144 standard, nevertheless, as a group, 105 tank cars do provide varying degrees of additional protection over the unretrofitted 112 and 114 tank cars. Having established a specified level of tank head puncture resistance and thermal requirement in HM-144 for certain commodities carried by 112 and 114 tank cars, the MTB has no hesitation about utilizing that same standard for 105 tank cars carrying these same commodities.

The FRA and the MTB do not agree with the argument that shelf couplers provide an adequate level of safety that eliminates the need for tank head protection. Essentially the same issue was raised and rejected in the HM-144 proceedings. Tests performed as early as 1976 at the Transportation Test Center in Pueblo, Colorado, demonstrated that shelf couplers will prevent tank head punctures during some overspeed switching impacts. However, for other impacts under differing conditions, shelf couplers were not fully effective in preventing tank head punctures while half head shields were effective in preventing most punctures. It was also found that a combination of shelf couplers and half

head shields was needed to prevent tank head punctures over the range of realistic impact conditions.

The FRA and the MTB have concluded that certain newly built 105 tank cars need a coupler restraint system and a tank head puncture resistance system. This dual protection, required for 112 and 114 tank cars in 1977, will significatly reduce tank punctures in derailments and switch yard accidents.

High Temperature Thermal Protection

§ *179.106–2 New Cars.* The level of thermal protection proposed for 105 tank cars is from § 179.105–4 (HM–144 thermal protection standard). Almost all the commenters opposed the NPRM proposal for thermal protection on all newly built DOT 105 tank cars. More than one-half of all commenters said that if thermal protection were to be required for all DOT 105 tank cars without regard to commodity, the rule should be deferred pending additional testing and data.

Several other objections were raised on various points. Most of these were aimed at the cost consequences of requiring added safety systems of marginal benefit for the transport of commodities where, these commenters contend, the accident history does not justify additional safety features.

The FRA has reviewed the accident history and has not found any justification for not requiring the same level of thermal protection in 105 tank care when they carry the identical hazardous commodities as 112 and 114 cars. On the other hand, there are some commodities presently authorized in 105 tank cars that pose a lower risk in fire environments.

The MTB has revised the NPRM proposal so that the final rule formally extends the thermal protection standards of § 179.105–4 to 105 cars transporting flammable gases and ethylene oxide. Ethylene oxide is included because it has properties comparable to flammable gases. Ethylene oxide has a very low flash point (less than 0 degrees F) and does not need oxygen for combustion. It is flammable over an unusually wide range of mixtures with air, from 2 percent through 100 percent. Additionally, it barely misses the temperature/pressure relationship for being classified as a flammable gas. Its vapor pressure is 38.5 psi absolute at 100 degrees F, which is extremely close to the pressure criterion of 40 psi absolute at 100 degrees F that is used to define a flammable gas under DOT regulation (49 CFR 173.300). (The UN recommendations and IMCO Code both classify ethylene oxide as a flammable gas.)

The MTB recognizes that some existing 105 tank cars have thermal protection systems that may already meet the thermal protection requirements. DOT has previously approved various thermal protection systems and maintains a list of those approved systems. Tank cars built with approved systems are excepted from the test verification requirements of paragraph (b) of § 179.105–4. Information on these systems is available in the Dockets Branch, Room 8426, Nassif Building, 400 Seventh Street, SW., Washington, D.C. 20590.

The MTB has established a September 1, 1981, date for the thermal protection system requirement. The six-month period after the effective date of this rule is included for the reasons discussed in the tank head puncture resistance section.

Safety Relief Valves (§ 179.106–2). Most commenters objected to the proposal for the larger flow capacity safety valve for all commodities authorized to be carried in DOT Specification 105 tank cars. Since the final rule for the larger safety valve applies only to those DOT Specification 105 tank cars which carry flammable gases and ethylene oxide, the justification for the larger valve is the same as that given in HM–144.

In summary, extensive research, conducted both before and after the rulemaking under HM–144, has indicated that:

(1) Since rail cars often overturn in accidents, the controlling condition in sizing for pressure relief is the liquid flow or upset car condition and not exclusively the vapor flow criterion used prior to HM–144; and

(2) Existing valve sizing equations underestimate the total heat flux inputs which can occur in accident environments.

Accordingly, the MTB has modified § 179.106–2 to specify that revised valve sizing is applicable only for new 105 tank cars carrying flammable gases and ethylene oxide. For the commodities covered by HM–144, valves with sufficient capacity have been satisfactorily used in extensive 112/114 tank car service and pose no real installation obstacles for new Specification 105 tank cars. As with the tank head puncture resistance system and the thermal protection system, MTB has established a September 1, 1981, date for the revised safety valve requirement.

§ *179.106–3 Previously Built Cars.* This section requires the retrofitting of shelf couplers on all existing 105 tank cars by February 28, 1982. The issues have been discussed under § 173.31.

§ *179.106–4 Stenciling.* Several commenters recognized the concept proposed in the NPRM for using the letter "J" to indicate full tank head and thermal protection, as logical. They went on to recommend a broader system to comprehend the several DOT 105 tank car designs already in service and to anticipate the possible regulatory changes that may affect some existing cars. For example, the following non-conflicting letters were suggested: "A" standard jacket head; "S" for ½ inch half high head shield; "T" for ½ inch half high head shield plus nonjacketed high temperature thermal protection; "U" for ½ inch half high head shield plus high temperature thermal protection under metal jacket; "H" for ½ inch full head shield; "K" for ½ inch full head shield and nonjacketed high temperature thermal protection; and "J" for ½ inch full head shield plus thermal protection under metal jacket. These commenters further offered that this scheme would facilitate record keeping for DOT 105 tank cars.

The FRA and the MTB do not agree that an elaborate lettering system that includes the variety of existing car designs is necessary at this time. Additional car categories may become necessary in the future because of further regulatory actions, but MTB does not believe it is appropriate to anticipate what those actions might include. Accordingly, the final rule adopts the letters A, S, and J for three categories of 105 tank cars. It provides an identification system that is consistent with the 112/114 tank car identification system.

Other Discussion

Economic Impact. The FRA included an economic evaluation for the docket when the NPRM was issued. That evaluation included cost figures for full head shields on all newly built 105, 112 and 114 tank cars. It also included cost figures for shelf couplers, thermal protection and safety valves as specified by HM–144 on all newly built 105 tank cars. The final rule requires that newly built 105 tank cars carrying flammable gases have lower half head protection, thermal protection and safety valves. The rule also requires shelf couplers, lower half head protection, thermal protection and safety valves for newly built 105 tank cars carrying ethylene oxide. Finally, the rule requires shelf couplers and lower half head protection for newly built 105 tank cars carrying anhydrous ammonia. These changes reduce the scope of the rule and the overall industry cost. The MTB believes

that the benefits identified in the earlier analysis will not be significantly reduced despite the reduced scope of the final rule since the commodities included in the final rule are the ones that have historically resulted in costly accidents. Accordingly, the MTB believes another economic evaluation is not warranted. A new economic evaluation taking into account the adjustments made in the final rule would continue to show that this regulation will not have a major adverse economic impact on industry, the public or government.

Several commenters expressed concern that the proposed safety modifications would add to the tank car weight. These commenters were concerned that the added weight would reduce the amount of commodity that could be transported in the car. This weight sensitive concern is not significant because of the limited scope of the final rule. FRA estimates that only a very small percent of the total volume of all hazardous commodities transported by railroads would be affected.

Beyond general expressions of negative cost/benefit from treating all 105 tank cars the same and from requiring full head shields, the commenters provided very little specific cost data. After a thorough review of initial calculations in the economic evaluation prepared for the NPRM, the FRA and the MTB conclude that the original estimates are accurate.

Finally, as previously mentioned, one commenter who did not provide supporting details, argued that the number of cars needing shelf couplers is much greater than the MTB estimate. The FRA has reexamined this issue. Based on the best data to which it has access, the FRA has found that the initial estimate is reasonably accurate for establishing that a four-year period provides sufficient time to complete the shelf coupler retrofit without severe economic penalty.

Editorial Changes

In addition to the substantive matters discussed above, the MTB has also made several editorial changes in Part 179 for the purpose of clarity. These changes do not result in any substantive change from the prior regulation or the proposal made in the Notice of Proposed Rulemaking and adopted in this amendment.

In consideration of the foregoing, Parts 173 and 179 of Title 49 Code of Federal Regulations are amended as follows:

PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS

1. In § 173.31 paragraph (a)(3) is amended by adding new paragraphs (vii) and (viii) and paragraphs (a) (6) and (7) are added to read as follows:

§ 173.31 Qualification, maintenance, and use of tank cars.

(a) * * *
(3) * * *

(vii) When a class DOT-105A tank car is prescribed, class DOT-105S and DOT-105J tank cars having equal or higher marked test pressures than those prescribed may also be used.

(viii) When class DOT-105S tank car tanks are prescribed, class DOT-105J tank cars having equal or higher marked test pressures than those prescribed may also be used.

* * * * *

(6) After February 28, 1982, each Specification 105 tank car shall be equipped with a coupler vertical restraint system in accordance with § 179.105-6 of this subchapter.

(7) After February 28, 1985, each DOT Specification tank car shall be equipped with a coupler vertical restraint system in accordance with § 179.105-6 of this subchapter.

2. In § 173.124, paragraph (a)(5) is amended by adding a new paragraph (ii) to read as follows:

§ 173.124 Ethylene oxide.

(a) * * *
(5) * * *

(ii) Each Specification 105 tank car built after August 31, 1982, used for the transportation of ethylene oxide, shall conform to DOT Specification 105J.

* * * * *

3. In § 173.314(c), the Table and Notes 23 and 24 are revised to read as follows:

§ 173.314 Requirements for compressed gases in tank cars.

* * * * *

(c) * * *

Kind of gas	Maximum permitted filling density, Note 1	Required tank car, see 173.31 (a)(2) and (3)
Anhydrous ammonia	50	DOT-106A500-X, Note 25.
	57	DOT-105A300W, Note 24.
	57	DOT-112S400F, 112S340-W, 114S340-W, Note 15.
	58.8	DOT-112S400F, 112S340-W, 114A340-W, Note 15.
* *	* *	* * *
Butadiene (pressure not exceeding 75 pounds per square inch at 105°F.) inhibited.	Notes 18 and 21	ICC-105A100 [1], 105A100-W, 111A100-W-4, Notes 4 and 23.
Butadiene (pressure not exceeding 255 pounds per square inch at 115°F.), inhibited.	Notes 18 and 21	DOT-112T340W, 112J340W, 114T340W, 114J340W, Notes 4 and 20.
Butadiene (pressure not exceeding 300 pounds per square inch at 115°F.), inhibited.	Notes 18 and 21	DOT-112T400W, 112J400W, 114T400W, 114J400W, Notes 4 and 20.
* *	* *	* * *
Difluoroethane	79	DOT-106A500X, 110A500-W, Note 25.
	79	DOT-112T400W, 112J400W.
	84	DOT-105A300-W, Note 23.
Difluoromonochloroethane, Note 13.	100	DOT-106A500X, 110A500W, Note 25. DOT-105A100W, Notes 4 and 23.
Dimethylamine, anhydrous	59	DOT-106A500X.
	62	DOT-105A300-W, Notes 4, 23 and 26.
	61	DOT-112T340W, 112J340W, Note 26.
Dimethyl ether	59	DOT-106A500X, 110A500-W.
	62	DOT-105A300W, Notes 4 and 23.
* *	* *	* *
Liquid hydrocarbon gas (pressure not exceeding 75 pounds per square inch at 105°F).	Note 21	ICC-105A100 [1], 105A100-W, 111A100-W-4, Notes 4 and 23.
Liquid hydrocarbon gas (pressure not exceeding 225 pounds per square inch at 105°F).	Note 21	DOT-105A300-W, Notes 4 and 23.
Liquid hydrocarbon gas (pressure not exceeding 300 pounds per square inch at 105°F).	Note 21	DOT-105A400-W, Notes 4 and 23.
Liquid hydrocarbon gas (pressure not exceeding 375 pounds per square inch at 105°F).	Note 21	DOT-105A500-W, Notes 4 and 23.
* *	* *	* *
Liquid hydrocarbon gas (pressure not exceeding 450 pounds per square inch at 105°F).	Note 21	DOT-105A600-W, Notes 4 and 23.

Kind of gas	Maximum permitted filling density, Note 1	Required tank car, see 173.31(a)(2) and (3)
Liquefied petroleum gas (pressures not exceeding 75 pounds per square inch at 105°F).	Note 18	ICC-105A100 [1], 105A100-W, 111A100-W-4, Notes 4 and 23.
Liquified petroleum gas (pressure not exceeding 150 pounds per square inch at 105°F).	Note 18	DOT-105A200-W, 105A200AL-W, Notes 4 and 23.
Liquefied petroleum gas (pressure not exceeding 225 pounds per square inch at 105°F).	Note 18	DOT-105A300-W, Notes 4, 20 and 23.
Liquefied petroleum gas (pressure not exceeding 225 pounds per square inch at 115°F).	Note 18	DOT-112T340-W, 112J340-W, 114T340W, 114J340-W, Notes 4 and 20.
* * * * * * *		
Liquefied petroleum gas (pressure not exceeding 300 pounds per square inch at 115°F).	Note 18	DOT-112T400-F, 112J400-F, 112T400-W, 112J400-W, 114T400-W, 114J400-W, Notes 4 and 20.
Liquefied petroleum gas (pressure not exceeding 375 pounds per square inch at 105°F).	Note 18	DOT-105A500-W, Notes 4, 20 and 23.
* * * * * * *		
Liquefied petroleum gas (pressure not exceeding 450 pounds per square inch at 105°F).	Note 18	DOT-105A600-W, Notes 4, 20 and 23.
Methylacetylene-propadiene, stabilized.	Note 22	DOT-105A300W, 112T340W, 112J340W, 114T340W, 114J340W, 106A500X, Notes 4, 9 and 23.
Methyl chloride	84	DOT-106A500X, Note 7.
	85	DOT-112T340W, 112J340W, Note 4.
	86	DOT-105A300W, Notes 4 and 23.
Methyl chloride-methylene chloride mixture.	Note 22	DOT-106A500X, Notes 7 and 14. DOT-105A300-W, Notes 4 and 23.
Methyl mercaptan	80	DOT-106A500X, Notes 7 and 14.
	82	DOT-105A300-W, Notes 4 and 23.
* * * * * * *		
Monomethylamine, anhydrous	60	DOT-106A500X.
	62	DOT-105A300W, Notes 4, 23 and 26.
	61	DOT-112T340W, 112J340W, Notes 4 and 26.
* * * * * * *		
Trifluorochloroethylene	115	DOT-106A500X, 110A500W, Note 25.
	120	DOT-105A300-W, Notes 4 and 23.
Trimethylamine, anhydrous	57	DOT-106A500X.
	59	DOT-105A300W, Notes 4, 23 and 26.
	58	DOT-112T340W, 112J340W, Notes 23 and 26.
Vinyl chloride, Note 9	84	DOT-106A500X, Note 7.
	87	DOT-105A200W, Notes 4, 16 and 23.
	86	DOT-112T340W, 112J340W, 114T340W, 114J340W, Note 4.
Vinyl fluoride, inhibited	58	DOT-105A600-W, Notes 17 and 23.
Vinyl methyl ether, Note 9	68	ICC-105A100 [1], 105A100W, Notes 4 and 23.
	68	DOT-106A500X, Note 7.

* * * * *

Note 23.—Each Specification 105 tank car built after August 31, 1981, shall conform to class DOT-105J.

Note 24.—Each Specification 105 tank car built after August 31, 1981, shall conform to class DOT-105S.

* * * * *

PART 179—SPECIFICATIONS FOR TANK CARS

§ 179.14 [Amended]

4. In § 179.14, paragraphs (a)(1), (2) and (4) are deleted; current paragraph (a)(3) is redesignated (a)(1) and current paragraph (a)(5) is redesignated (a)(2).

5. In § 179.100-23, the heading and paragraph (a) introdutory text is revised to read as follows:

§ 179.100-23 Alternative requirements for tank head puncture resistance systems.

(a) Tank cars required to have puncture resistance systems in accordance with § 179.105-5 may, as an alternative, be equipped with a head shield at each end of the car in accordance with the requirements of this section. The shield must be:

* * * * *

6. In § 179.102-12 the last sentence in paragraph (a)(2) is deleted and a new paragraph (a)(9) is added to read as follows:

§ 179.102-12 Ethylene oxide.

(a) * * *

(9) Each tank built after August 31, 1981, shall be constructed in accordance with class 105J.

7. In § 179.105-4, the last sentence of paragraph (c) is revised to read as follows:

§ 179.105.5 Thermal protection.

* * * * *

(c) * * * Information necessary to equip tank cars with one of these systems is available in the Dockets Branch, Room 8426 of the Nassif Building, 400 Seventh Street, SW., Washington, D.C. 20590, between the hours of 8:30 a.m. and 5:00 p.m., Monday through Friday.

* * * * *

8. New §§ 179.106—179.106-4 are added to read as follows:

§ 179.106 Special requirements for Specification 105 tank cars.

§ 179.106-1 General.

(a) In addition to the requirements of this section, each tank car built under Specification 105 shall meet the applicable requirements of §§ 179.100, 179.101, 179.102 and 179.104.

(b) Notwithstanding the provisions of §§ 179.3, 179.4, and 179.6, AAR approval is not required for changes in or additions to Specification 105 tank cars in order to comply with this section.

(c) Notwithstanding the provisions of § 173.8 of this subchapter, no Specification 105 tank car manufactured to specifications promulgated by the Canadian Transport Commission may be used after February 28, 1982, to transport hazardous materials in the United States unless it is equipped with a coupler vertical restraint system that meets the requirements of § 179.105-6.

(d) Notwithstanding the provisions of § 173.8 of this subchapter, no Specification 105 tank car manufactured after August 31, 1981, to specifications promulgated by the Canadian Transport Commission, may be used to transport hazardous materials in the United States unless it is equipped in accordance with § 179.106-2.

§ 179.106-2 New cars.

(a) Each Specification 105A tank car built after February 28, 1981, shall be equipped with a coupler restraint system that meets the requirements of § 179.105-6.

(b) Each Specification 105S tank car built after August 31, 1981, shall be equipped with:

(1) A coupler restraint system that meets the requirements of § 179.105-6; and

(2) A tank head puncture resistance system that meets the requirements of § 179.105-5.

(c) Each Specification 105J tank car built after August 31, 1981, shall be equipped with:

(1) A coupler restraint system that meets the requirements of § 179.105-6;

(2) A tank head puncture resistance system that meets the requirements of § 179.105-5;

(3) A thermal protection system that meets the requirements of § 179.105-4; and

(4) A safety relief valve that meets the requirements of § 179.105-7.

(d) Each Specification 105 tank car shall be stenciled as prescribed in § 179.106–4.

§ 179.106–3 Previously built cars.

After February 28, 1982, each Specification 105 tank car built before March 1, 1981, shall be equipped with a coupler restraint system that meets the requirements of § 179.105–6.

§ 179.106–4 Stenciling.

(a) Each Specification 105 tank car that is equipped with a coupler restraint system that meets the requirements of § 179.105–6 and a tank head puncture resistance system that meets the requirements of § 179.105–5 shall be stenciled by having the letter "S" substituted for the letter "A" in the specification marking.

(b) Each Specification 105 tank car that is equipped with a coupler restraint system that meets the requirements of § 179.105–6, a tank head puncture resistance system that meets the requirements of § 179.105–5, a thermal protection system that meets the requirements of § 179.105–6, and a safety relief valve that meets the requirements of § 179.105–7, shall be stenciled by having the letter "J" substituted for the letter "A" in the specification marking.

(49 U.S.C. 1803, 1804, 1806; 49 CFR 1.53, Appendix A to Part 1)

Note.—The Materials Transportation Bureau has determined that this document will not result in a major economic impact under the terms of Executive Order 12221 and DOT implementing procedures (44 FR 11034), nor require an environmental impact statement under the National Environmental Policy Act (49 U.S.C. 4321 et seq.). A regulatory evaluation and an environmental assessment are available for review in the docket.

Issued in Washington, D.C. on January 19, 1981.

L. D. Santman,

Director, Materials Transportation Bureau.

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