



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

13792

[49 CFR Parts 170-189]

[Docket No. HM-70]

**TRANSPORTATION OF HAZARDOUS
MATERIALS**

**Hydrogen Sulfide Gas in Cargo Tank
Trucks and Tank Cars; Notice of
Board Action**

On December 12, 1970, the Hazardous Materials Regulations Board published a notice of proposed action, Docket No. HM-70 (35 F.R. 18919), with respect to the transportation of hydrogen sulfide gas in cargo tank trucks and tank cars.

In that notice, the Board expressed its view that the tank trucks and tank cars authorized by DOT special permits for bulk shipment of hydrogen sulfide did not provide a margin of transportation safety equivalent to the container which is prescribed by the regulations for that commodity, viz, the DOT Specification 105A800X tank. Based upon this view, the Board proposed rescission of those special permits and requested public comment on the proposal, including a specific request for alternative methods by which to ship bulk quantities of hydrogen sulfide.

Many comments were received on the proposal and two meetings were held with the permit holders and other interested persons. All comments and a summary of the meetings are available for inspection and copying in the public files of the Secretary of the Hazardous Materials Regulations Board.

The Board has concluded, on the basis of the comments received and technical reevaluation of the containers in question, that the permits for shipment of hydrogen sulfide in the DOT Specification 105A600W tank car should be continued as originally written, and that the permits for shipment of the gas in DOT Specification MC 331 tank trucks may be continued with significant revision of the provisions of those permits. The authorization for use of MC 330 tank trucks will be terminated October 1, 1971. The bases for the Board's conclusions follow:

The 105A600W tank car actually in use under permit, while basically conforming to the DOT specifications for that car,

exceeds the requirements of that specification in several respects. It is constructed to an Association of American Railroads' standard especially designed for hydrogen sulfide. In addition, the car actually in use has a minimum tank shell thickness of 1½ inches, which is thicker than the AAR specification. Other factors required by the AAR hydrogen sulfide car specification and considered by the Board to be particularly significant are the insulation of the car, the controlled hardness of the steel used in the tank, the two semiannual and then annual visual inspections of the inside of the tank, the good low-temperature impact properties of the tank material, and the quality control exercised during construction of the tank.

To elaborate, the Board believes that insulation of the tank shell provides a safeguard against heat transfer to the tank in an accident situation. This aids in keeping the commodity at a temperature low enough to preclude or significantly delay undesired relief valve venting or possible tank rupture due to increased vapor pressure, as could occur in an unprotected, uninsulated tank exposed to intense heat. The hardness of the steel of the shell is carefully controlled in construction of the tank in order to provide ductility and to avoid the phenomenon of hydrogen embrittlement, more frequently encountered in harder steels. All tank steel is normalized, and the tank is subjected to post-weld heat treating to assure evenness of the stresses present in the steel. More frequent inspections of the interior of the completed tank are required in order to detect any impairment of the integrity of the tank. Quality control during construction of the tank requires that all specimens tested meet the standard of the specification and not just the average of those tested, as is usually the case. The puncture resistance of the tank is enhanced by the insulation, the increased tank shell thickness, and the excellent impact-resistance properties of the tank material. The Department is unaware of any instance of puncture of the DOT Specification 105A600W tank car, and no failure of these specially built cars has occurred, despite exposure to an accident environment.

The DOT Specification MC 331 tank trucks presently used in hydrogen sulfide service also have a greater tank thickness than required by the specification and consequently have a higher design pressure, 500 p.s.i. versus 460 p.s.i. required by the specification. This gives a test pressure comparable to that of the DOT Specification 106A800X tank. Like the tank car, only normalized steel is used in the cargo tank and the tank is subjected to postweld heat treatment. A hydrogen probe is installed to detect conditions that would lead to hydrogen embrittlement of the tank steel.

The MC 331 cargo tanks already authorized are being continued in use, but must be retrofitted with insulation comparable to the tank car by January 1, 1973. In addition, the permits have been revised to include the following new immediate requirements:

1. Insulation on all new tanks.
2. Two drivers on each trip.
3. Vehicles must be equipped with a self-contained breathing apparatus for each driver.
4. Compliance with revised Part 397 of the Motor Carrier Safety Regulations (38 F.R. 4874 and 9780), as that part pertains to the transportation of Class A explosives. This includes requirements relating, among other things, to attendance and surveillance of motor vehicles, parking locations, selection of routes, periodic tire inspection, and the documents and instructions to be given to the drivers.
5. A speed limit of 55 m.p.h. or that posted, whichever is lower.

The Board is of the opinion that these additional requirements will serve to provide the public with a margin of safety comparable to that of the tank car and the Specification 106A800X tank.

The tank wall thickness of the two Specification MC 330 cargo tanks authorized under special permits is the minimum prescribed by that tank specification for the pressure involved. In addition, new construction of cargo tanks under this specification is no longer authorized. It is the Board's position that

these tanks would present an unacceptable hazard potential over a long period of time. Therefore, these MC 330 cargo tanks will be taken out of hydrogen sulfide service after October 1, 1971.

One commenter supported the proposed rescission of the special permits, noting as did the Board that hydrogen sulfide is a commodity of extreme hazard, and that great danger would be involved in the unintentional release of a bulk quantity of the gas. After weighing this aspect of the proposal with particular care, giving full consideration to the actual hazard potential, the Board has concluded, in this instance, that the greater number of smaller containers that would be necessary to move the same volume of hydrogen sulfide would provide a greater hazard to the public than a lesser number of carefully controlled bulk shipments in these specially designed cargo tank trucks and tank cars. With bulk shipments, the number of containers exposed to the environment and to the public is less, the number of loading-unloading operations which are so frequently dangerous is less, the number of valves which could leak is less, and the likelihood of accident of abuse leading to a failure of the container is less because there are fewer individual containers involved. Thus, given the need to move hydrogen sulfide in interstate commerce, the Board is continuing authorization to ship it under the controlled conditions of special permits.

This action is taken under the authority of 18 U.S.C. 831-835 and section 9 of the Department of Transportation Act (49 U.S.C. 1657).

Issued in Washington, D.C., on July 20, 1971.

MAC E. ROGERS,
*Board Member, for the
Federal Railroad Administration.*

ROBERT A. KAYE,
*Board Member, for the
Federal Highway Administration.*

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