



U.S. Department
of Transportation
**Research and
Special Programs
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

AUG - 9 2000

Mr. David Fellows
Design Certifying Engineer
904 Hawks Hollow
Delafield, Wisconsin 53018

Ref. No. 00-0190

Dear Mr. Fellows:

This responds to your letter, dated July 5, 2000, concerning cargo tank specification requirements in the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180). Specifically, you ask about a design modification to DOT 406 and 407 specification cargo tanks to equip them with an internal agitation system.

Your letter describes a design for an internal agitator that consists of a large rotating shaft installed through the rear bulkhead of a cargo tank. The design depends on a non-metallic packing gland, or seal, to guarantee lading retention capability of the cargo tank. In your opinion, the design does not conform to § 178.345-9(h), which prohibits the use of non-metallic pipes, valves, or connections on DOT 406 and 407 cargo tanks unless they are outboard of the product retention system.

You are correct that the HMR do not specifically prohibit a design modification of the type you describe. It is difficult for us to evaluate the merits of the specific design in question without seeing a picture or design specification. However, as you describe it, it appears that the non-metallic seal is part of the tank wall. As defined in § 178.320(a), "cargo tank wall" means those parts of the cargo tank that make up the primary lading retention structure. Thus, under § 178.345-9(h), use of a nonmetallic seal or packing gland that is not as strong and heat resistant as the material used for construction of the cargo tank is prohibited. You are correct that one way to overcome this design deficiency is to provide a secondary containment device.

I hope this information is helpful. If you have further questions, please do not hesitate to contact this office.

Sincerely,

Thomas G. Allan
Senior Transportation Regulations Specialist
Office of Hazardous Materials Standards



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July 5, 2000

Mr. James K. O' Steen
Hazardous Materials Technology DHM 20
Research and Special Programs Administration
U. S. Department of Transportation
400 Seventh Street S.W.
Washington DC. 20590-0001

Dear Mr. O' Steen,

As you are aware I have spent quite a few years involved in the design, manufacture and sales of Specifications cargo tanks. Currently I am still regularly involved in the Cargo Tank Industry as a consultant and as a design certifying engineer.

I am writing you to express my concern with, what I believe is, an error of omission in the Hazardous Materials Specifications for flammable liquids cargo tanks, specifically Specification DOT 406 and 407.

Some background information may be helpful. The need to process hazardous waste materials brought on by the desire to clean up our environment in the last twenty years has created new industries to deal with these products.

The firing of cement mills with a variety of waste flammable liquids is one example. The type of burners used, in addition to handling a variety of differing solvents, is also capable of handling waste fuels containing as much as fifty percent of waste solids. This creates an ingenious system of ridding society of a variety of undesirable waste materials. As an example dry cleaning paper filters contaminated with perchloroethylene are ground up and suspended in perhaps contaminated MEK.

In order to keep these mixtures of solids and liquids suspended during transport or at unloading, Specification cargo tanks are equipped with a variety of internal agitators. Some are vertical inserted through the top of the tank, others are horizontal and constructed completely within the cargo tank.

Some of these designs are well thought out and are successful. They are installed in such a way as to assure the structural integrity and lading retention capability of the Specification tank in which they are installed.

My concern is with a design that brings a large rotating shaft through the rear bulkhead of the cargo tank. The design depends on the packing gland to guarantee the lading retention capability of the cargo tank. The Specifications make no mention of such a design, so since this feature is not specifically mentioned, it is thought, not to be prohibited.

It is my opinion, that such a design seriously compromises the lading retention capability of the cargo tank. Paragraph 178.345-9(h) prohibits the use of nonmetallic pipes, valves or connections in DOT-406 & 407 cargo tanks, unless it is outboard of the product retention system.

In the case of the design with the packing gland in the rear head, nonmetallic material is part of the "tank wall", and it is also a part of the containment system. This seems inconsistent with Paragraph 178.345-9(h).

If there is merit to having the agitator driven from a source outside the cargo tank, necessitating a packing gland, it would be consistent with the regulations to provide a means of secondary containment in the event of a failure of the packing gland.

My experience has been that leaks in cargo tanks seem to occur at very inappropriate times and at very inconvenient locations.

If the Research and Special Programs Administration has a concern about the lading retention capability of this design, I believe there is logic in the Specifications to either not allow it, or to require a secondary containment device.

I am sending a copy of this memo to Bill Quade at the Federal Motor Carrier Safety Administration in the event that they also may have a concern with this design. They may determine that the Specifications, as written, precludes the use of nonmetallic materials as apart of the tank wall.

Thank you for reviewing my opinions and concerns. I am interested in knowing your opinion.

Very truly yours,



David Fellows
Design Certifying Engineer, CT-5132

c.c. Mr. William A. Quade, Chief
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