

Sub-Committee of Experts on the
Transport of Dangerous Goods
(Nineteenth session,
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TANKS

Miscellaneous proposals (Chapters 4.2 and 6.7)

Thermally activated closing mechanisms for internal valves on portable tanks

Transmitted by the expert from the United States of America

1. The issue of thermally activated closures for portable tanks was addressed in ST/SG/AC.10/C.3/2001/30. This INF paper provides a more comprehensive discussion of the issue and sets forth a revised proposal. Currently 6.7.3.5.4 and 6.7.4.5.2 require that the internal valve on portable tanks used for certain liquefied gases be fitted with a safety device that is capable of being closed in the event of unintended movement of the portable tank during filling or discharge or in an emergency such as fire engulfment. The expert from the United States of America believes that this safety feature should also apply for portable tanks (i.e. portable tanks constructed in accordance with the requirements of 6.7.2) that are used for the transportation of certain liquid products specifically; Class 3 flammable liquids; Division 4.2 pyrophoric liquids; Division 5.1 oxidizing liquids; and Division 6.1 toxic liquids. It is also believed that the requirements in each portable tank section (i.e. 6.7.2, 6.7.3 and 6.7.4) should be revised consistent with actual systems being used and commercially available. This proposal is intended to:

- require thermally activated remote closures for portable tanks used to transport Class 3 flammable liquids, Division 4.2 pyrophoric liquids, Division 5.1 oxidizing liquids and Division 6.1 toxic liquids;
- revise the current internal valve emergency remote shut-off device requirements in order to adopt more specific performance criteria and to make them consistent in 6.7.2, 6.7.3 and 6.7.4; and
- amend the requirements consistent with the capabilities of the devices that are currently commercially available and being used on portable tanks.

2. The current requirement in 6.7.3.5.4 states “*For filling and discharge bottom openings of portable tanks intended for the transport of flammable and/or toxic non-refrigerated liquefied gases the internal stop-valve shall be a quick closing safety device which closes automatically in the event of unintended movement of the portable tank during filling or discharge or fire engulfment. Except for portable tanks having a capacity of not more than 1 000 litres, it shall be possible to operate this device by remote control.*” The text in 6.7.4.5.2 is similar. There are a number of problems with this text. Explanations of the problems and proposed solutions are provided below.

3. The use of the wording “quick closing” is not satisfactory. This wording leaves the acceptable amount of time necessary for the valve to close open to wide interpretation. The minimum time in which the closure should be fully closed should be specified. It is proposed that the words “quick closing” be replaced with wording that specifies a minimum activation time such as “*the self-closing system shall close within 30 seconds of actuation.*”

4. The wording “self closing” needs to be revised because the closing mechanism requires activation by a person. It can not close by itself. The mechanism is actually “*a remotely actuated device*”.

5. The requirement that the shut-off device close automatically in the event of “unintended movement of the portable tank during filling or discharge ...” is not practical and does not reflect the capabilities of emergency remote shut-off devices that are currently being used or commercially available for portable tanks. This feature is not suitable for portable tanks. It is proposed that these words be deleted in paragraphs 6.7.3.5.4 and 6.7.4.5.2.

6. The remote actuation feature is vague. No minimum distance is specified for the remote actuation device. It is proposed that more specific wording be adopted as follows: *“The self-closing system shall include a remotely actuated means of closure located more than 3 meters from the filling or discharge opening where the length of the portable tank allows, or on the end of the portable tank farthest away from the filling or discharge opening. The remote feature is not required for small portable tanks less than 1,000 litres capacity.”*

7. It is proposed that a requirement be included to require that if the actuating system is accidentally damaged or sheared off during transport, each filling or discharge bottom opening must remain securely closed and capable of retaining contents of the portable tank. This requirement is consistent with the capabilities of current systems.

8. It is proposed that the requirement for a thermally activated safety shut-off be applied to portable tanks that are used for the transportation of certain flammable, pyrophoric, oxidizing, or toxic liquids.

Proposal

9. On the basis of the previous discussion it is proposed to amend 6.7.2.6.3(a)(iv), 6.7.3.5.4 and 6.7.4.5.2 as follows:

6.7.2.6.3(a)(iv) Except for small portable tanks with a capacity of not more than 1,000 litres, the internal valve shall be fitted with an emergency closing mechanism that can be activated from a remote location that is located more than 3 meters from the discharge opening where the length of the portable tank allows, or on the end of the portable tank farthest away from the filling or discharge openings. For portable tanks used for the transport of Class 3 flammable liquids, Division 4.2 pyrophoric liquids, 5.1 oxidizing liquids and Division 6.1 toxic liquids, the emergency shut-off mechanism shall be capable of being thermally actuated at a temperature of not more than 121 °C. The means by which the self-closing system is thermally actuated shall be located as close as practicable to the primary discharge connection and shall be fully closed within 30 seconds of actuation. If the actuating mechanism is thermally actuated or accidentally damaged or sheared off during transport, each internal valve shall remain securely closed and capable of retaining the contents of the portable tank.

6.7.3.5.4 Except for small portable tanks with a capacity less than 1 000 litres, the internal shut-off valve for each filling and discharge opening located below the liquid level of portable tanks intended for the transport of flammable or toxic non-refrigerated liquefied gases shall be fitted with an emergency closing mechanism. The emergency closing mechanism shall be capable of being actuated from a remote location that is located more than 3 meters from the discharge opening where the length of the portable tank allows, or on the end of the portable tank farthest away from the filling or discharge opening. It shall also be capable of being thermally actuated at a temperature of not more than 121 °C. The means by which the self-closing system is thermally actuated shall be located as close as practicable to the primary discharge connection and shall be fully closed within 30 seconds of actuation. If the actuating mechanism is thermally actuated or accidentally damaged or sheared off during transport, each internal valve shall remain securely closed and capable of retaining the contents of the portable tank.

6.7.4.5.2 Each filling and discharge opening in portable tanks used for the transport of flammable refrigerated liquefied gases shall be fitted with at least three mutually independent shut-off devices in series, the first being a shut-off valve situated as close as reasonably practicable to the jacket, the second being a stop-valve and the third being a blank flange or equivalent device. The shut-off device closest to the jacket shall be fitted with an emergency closing mechanism. The emergency closing mechanism shall be capable of being actuated from a remote location that is located more than 3 meters from the discharge opening where the length of the portable tank allows, or on the end of the portable tank farthest away from the filling or discharge opening. It shall also be capable of being thermally actuated at a temperature of not more than 121 °C. The means by which the self-closing system is thermally actuated shall be located as close as practicable to the primary discharge connection and shall be fully closed within 30 seconds of actuation. If the actuating mechanism is thermally actuated or accidentally damaged or sheared off during transport, the valve shall remain securely closed and capable of retaining the contents of the portable tank.
