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COMMITTEE OF EXPERTS ON THE TRANSPORT
OF DANGEROUS GOODS

Sub-Committee of Experts on the Transport
of Dangerous Goods
(Fifteenth session, Geneva, 29 June-10 July 1998)

PROPOSED AMENDMENTS TO THE MODEL REGULATIONS ON THE
TRANSPORT OF DANGEROUS GOODS

Portable tanks - Chapters 4.2 and 6.6

Transmitted by the expert from Spain

At the Sub-Committee's fourteenth session, several delegations said, in connection with document ST/SG/AC.10/C.3/1997/36, that instead of prohibiting the use of frangible disks, it would be better for pressure release devices fitted with frangible disks to be so designed that the disk fragments were vented with the discharge from the pressure release device.

Consequently, the expert from Spain proposes the following:

1. **PORTABLE TANKS FOR THE TRANSPORT OF SUBSTANCES OF CLASSES 3, 4, 5, 6, 7, 8
AND 9**

(a) 6.6.2.11 Frangible disk

Amend 6.6.2.11.1 to read:

"6.6.2.11.1 Except as specified in 6.6.2.8.3, frangible disks shall be set to rupture at a nominal pressure equal to the test pressure throughout the design temperature range. Particular attention shall be given to the requirements of paragraphs 6.6.2.5.1, 6.6.2.8.3 and **4.2.1.13.8** if frangible disks are used."

(b) 4.2.1.13.8

Amend to read:

"The emergency-relief devices may be of the spring-loaded or frangible types, or a combination of the two, designed to vent all the decomposition products and vapours evolved during a period of not less than one hour of complete fire-engulfment as calculated by the following formula:" (remainder unchanged).

(c) 6.6.2.12.2

Replace the third sentence by the following:

"These devices may be fusible, spring-loaded or frangible disk components, or a combination of spring-loaded and frangible disk devices"

(d) For the reasons stated at the end of this document, it is also proposed that a new paragraph 6.6.2.11.2 should be added to take account of the effect of the vacuum in the tank on the frangible disk, to read:

"6.6.2.11.2 The elasticity and strength of frangible disks shall be appropriate for the vacuum which may be produced in the portable tank during discharge of the product."

2. PORTABLE TANKS FOR THE TRANSPORT OF NON-REFRIGERATED LIQUEFIED GASES

(a) Add the following to paragraph 6.6.3.7.1:

"If frangible disks are used, account must be taken in particular of the provisions of paragraphs 6.6.3.5.1 and 6.6.3.7.3."

(b) Add the following to paragraph 6.6.3.7.1:

"The elasticity and strength of frangible disks shall be appropriate for the vacuum which may be produced in the portable tank during discharge of the product."

(c) Amend the second sentence of paragraph 6.6.3.8.1. to read:

"Spring-loaded relief devices or a combination of spring-loaded devices and frangible disks shall be used to achieve the full relief capacity prescribed."

JUSTIFICATION OF MEASURES TO COMPENSATE FOR THE EFFECT OF THE VACUUM

In the case of both liquefied gases and liquids in general transported in portable tanks, the need for specifications ensuring the strength and elasticity of frangible disks in the vacuum conditions that can occur during discharge is justified by experience of discharge operations.

It is common to use suction pumps to discharge portable tanks in order to speed up the operation and enable the liquid to be transferred to storage units above the level of the portable tank.

If the discharge crew are not careful, suction can continue for the very short time that it takes to stop the pump, thus damaging or even bursting the frangible disks if they are not designed to have sufficient strength and elasticity to withstand the vacuum produced.

A repetition of the discharge practices described above can be very damaging for frangible disks by causing them to burst or adversely affecting their performance.

In practice, most frangible disks are fitted with "anti-vacuum" supports or are designed to have sufficient elasticity and strength to withstand severe vacuum conditions.

This can be verified in the technical documentation on the various frangible disks available commercially throughout the world.
