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Sub-Committee of Experts on the
Transport of Dangerous Goods
(Twenty-fourth session, 1-10 December 2003,
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TRANSPORT OF GASES

Miscellaneous proposals to the requirements for Multi-Element Gas Containers (MEGCs)

Transmitted by the expert from the United States of America

Introduction

During the process of developing proposed amendments to the US Hazardous Materials Regulations to incorporate the requirements for MEGCs, the expert from the United States of America has found some issues that need to be addressed by the Working Group on Pressure Receptacles. This paper proposes several amendments to the requirements for MEGCs.

Proposals

1. It is proposed that paragraph 6.7.5.4.1 be amended as follows:

“One or more pressure relief devices shall be fitted on each element of a MEGC used for the transport of UN 1013 carbon dioxide and UN 1070 nitrous oxide. For all other gases, elements of MEGCs shall be fitted with one or more pressure relief devices consistent with 6.2.1.3.4. Pressure relief devices shall be as specified by the competent authority for the country of use.”

Justification:

The pressure relief device (PRD) requirements for the individual elements of a MEGC are contained in 6.2.1.3.4. Therefore, this paragraph should be referenced here. Currently paragraph 6.7.5.4.1 allows an individual PRD on a common manifold. This is not considered safe for a number of reasons such as:

- localized heating of an individual element such as a 8 metre tube may result in a rupture due to insufficient flow capacity or failure of the release mechanism to operate;
- if a non-reclosing release device is activated the entire content of all the elements would be released and this could intensify the resultant hazards;

- damage to the manifold that restricts flow;
- if the PRD is sized and set for the entire MEGC, many PRD types such as rupture disks that function due to the increased pressure may not operate properly in a small fire when only one of the elements of the MEGC is exposed to the fire;
- if the elements of a MEGC are equipped with shut-off valves, the PRD that is installed on the manifold may be isolated from the elements and result in catastrophic failure of the elements in a fire.

2. It is proposed to delete the first two sentences in paragraph 6.7.5.5.1 and add a new first sentence as follows:

“The relief capacity of a pressure relief device for each element of a MEGC shall be determined in accordance with the standard specified by the competent authority for the country of use consistent with 6.2.1.3.4.”

Justification:

The current text in paragraph 6.7.5.5.1 is inappropriate for establishing pressure relief device requirements applicable to MEGCs. While this text is appropriate for portable tanks, MEGCs do not normally have one large PRD that is used to relieve overpressure build-up resulting from fire or other operating conditions. This is not the general practice with MEGCs and is not in the interest of safety. On this basis, we propose to delete the first two sentences and add a sentence that addresses PRD requirements relevant to each element of a MEGC. Each element of a MEGC must be designed and constructed in accordance with Chapter 6.2, and contain a pressure relief device as specified by the technical code recognized by the competent authority. In most cases, if a PRD is installed on a MEGC, it would be on each element of the MEGC and must be designed in accordance with the standard prescribed for the pressure receptacle (e.g. CGA Pamphlet S-1.1-2002) which will address the number of PRD's and flow capacity required.

3. It is proposed to delete the current paragraph 6.7.5.6.1 and replace with a new paragraph 6.7.5.6.1 as follows:

“Each pressure relief device shall be marked in accordance with the standard specified by the competent authority for the country of use (see, for example, CGA S-1.1-2002).”

Justification:

The markings indicated currently in 6.7.5.6.1 are applicable for portable tank pressure relief devices (PRDs) but are not realistic for PRDs used on MEGCs or elements of MEGCs. CGA S-1.1-2002 provides sufficient information for marking PRDs.

4. It is proposed to delete all references to S-1.1-1994 and replace with S-1.1-2002.

Justification:

This proposal is necessary to update the reference to CGA Publication S-1.1.
