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1 Scope

This publication provides guidelines for the safe siting, installing, and operating of bulk storage systems (oxygen, nitrogen, argon, carbon dioxide, nitrous oxide or hydrogen) in courts where reduced airflow can create an oxygen-deficient or oxygen-enriched atmosphere. This publication applies to bulk cryogenic storage systems, not to gaseous compressed gas storage systems.

NOTE—Carbon dioxide and nitrous oxide are technically not considered cryogenic liquids, but their liquid storage systems are covered by this document.

For the purpose of this publication a bulk liquid storage system is defined by NFPA 55, *Compressed Gases and Cryogenic Fluids Code* or NFPA 99, *Standard for Health Care Facilities* [1, 2].¹

For the purpose of this publication, a court is defined as an open, uncovered, unoccupied space, unobstructed to the sky, bounded on three or more sides by exterior building walls, or freestanding walls [1].

2 Bulk storage system requirements

Some authorities having jurisdiction (AHJ) may require that bulk storage systems be located within courts either for aesthetics or for protection from weather conditions (e.g., hurricanes or tornadoes) and the subsequent flying debris. The current codes and standards for bulk storage systems have some basic requirements but do not cover all possible conditions, nor do they provide methods for improving site access issues.

Some of the issues are:

- The codes do not include all potential cases (e.g., walls in proximity but not connected to each other);
- The codes do not provide specific rules for locating bulk systems in courts; and
- The codes contain no provisions for methods to verify or increase air circulation and reduce the hazards of courts to a level equivalent to or less than that of an open outdoor area.

3 Types of installations

3.1 General

It is preferable to locate bulk storage systems outdoors, aboveground, and not diked. The location shall not expose the system to radiant heat that can create a hazard to equipment or personnel. There are three classes of installations: outdoor, courts, and indoors. Outdoor installations shall meet the requirements of NFPA 55 and CGA P-18, *Standard for Bulk Inert Gas Systems* (where applicable) [1, 3]. Installations in courts shall meet the requirements in 3.3 of this publication. Indoor installations shall meet the requirements of NFPA 55 and CGA P-18 (where applicable).

3.2 Outdoor installations

3.2.1 General requirements

The following requirements are for locating bulk systems within walled or other ventilation restricted areas (e.g. bulk sites with solid fencing) without roofs such as courts. Figures 1, 2, and 3 show examples of how these requirements apply. A site that meets these requirements shall be considered an outdoor installation and shall also comply with the requirements of the following:

- for liquid nitrogen, helium, and argon systems see CGA P-18 [3];
- for all other bulk storage systems see NFPA 55 [1]; or
- for health care facilities NFPA 99 [2].

¹ References are shown by bracketed numbers and are listed in order of appearance in the reference section.