Designation: D7323 – 13

Standard Practice for Handling, Transportation, and Storage of IG-100 (Nitrogen)[1]

This standard is issued under the fixed designation D7323; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers guidance and direction to suppliers, purchasers, and users in the handling, transportation, and storage of IG-100 (nitrogen).

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *CGA Standards:*[2]

C-1 Methods for Pressure Testing Compressed Gas Cylinders

C-6 Standards for Visual Inspection of Steel Compressed Gas Cylinders

C-7 Guide to Preparation of Precautionary Labeling and Marking of Compressed Gas Containers

P-1 Safe Handling of Compressed Gases in Containers

2.2 *U.S. Government Standards, Code of Federal Regulations (CFR):*[3]

CFR Title 40, Part 82.106 Environmental Protection Agency, Warning Statement Requirements

CFR Title 49, Part 172 U.S. Department of Transportation (DOT), Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

CFR Title 49, Part 172.101 U.S. DOT, Tables of Hazardous Materials and Special Provisions

CFR Title 49, Part 173 U.S. DOT Specification, Shippers-General Requirements for Shipping and Packaging

CFR Title 49, Part 178 U.S. DOT Specifications, Specifications for Packaging

CFR Title 49, Part 180 U.S. DOT, Continuing Qualification and Maintenance of Packagings

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *containers*—storage vessels for IG-100.

3.1.2 *cylinders*—containers of IG-100.

3.1.3 *IG-100 (nitrogen)*—compound used to inert or suppress a fire or explosion hazard.

3.1.4 *insulated*—placed in an isolated situation to protect and prevent the transfer of damage.

4. Significance and Use

4.1 This practice provides requirements for the handling, transportation, and storage of IG-100 encountered in distribution through both commercial and military channels. It is intended to ensure that IG-100 is handled, transported, and stored in such a way that its physical property virtues are not degraded. Transport may be by various means, such as, but not limited to, highway, rail and water.

5. Practice

5.1 To ensure safe handling, loading, unloading, storing, and transporting of material, personnel shall be trained in the CGA publications and CFR regulations as listed in Sections 2.1 and 2.2, respectively.

5.2 *Handling:*

5.2.1 Handling shall be in accordance with CGA P-1.

5.2.1.1 Personnel who handle or store, or both, cylinders of IG-100 shall be trained properly to recognize and identify the characteristics of the product and the proper methods of safely handling full, partially full, and empty cylinders.

5.2.2 IG-100 handling shall be in nonsmoking, heater-free, ventilated areas to preclude product accumulation. Provisions shall be made to ensure that service areas limit IG-100 concentrations to not exceed 52 % (10 % Sea Level Oxygen equivalency) for 30 s and 7 % (19.5 % Sea Level Oxygen equivalency) for 8 h.

[1] This practice is under the jurisdiction of ASTM Committee D26 on Halogenated Organic Solvents and Fire Extinguishing Agents and is the direct responsibility of Subcommittee D26.09 on Fire Extinguishing Agents.

Current edition approved March 15, 2013. Published April 2013. Originally approved in 2007. Last previous edition approved in 2007 as D7323 – 07. DOI: 10.1520/D7323-13.

[2] Available from Compressed Gas Association.

[3] Available from U.S. Government Printing Office, Superintendent of Documents, Washington, DC 20036.

5.2.3 Cylinders shall not be overfilled. Filling density requirements are specified in CFR Title 49, Part 173 (173.302).

5.2.4 Cylinders shall be free of dirt and contamination that would contribute to or would cause deterioration of product during shipment or storage. Precautions should be taken to prevent the entry of oil, water, or any other foreign matter into containers. Unique coatings or preservatives applied prior to shipment to protect the containers are not considered contamination.

5.3 *Transportation:*

5.3.1 Transportation shall be as specified in accordance with DOT regulations of CFR Title 49 .

5.3.1.1 The minimum design pressure requirements shall be as indicated in CFR Title 49, Part 173.301. The pressure inside the container at 70°F (21°C) shall not exceed the service pressure for which the container is marked. The pressure inside the container at 130°F (54°C) shall not exceed 5/4 times the service pressure for which the container is marked. Fig. 1 and Fig. 2 illustrate the effect of temperature on cylinders filled with IG-100.

5.3.2 Transportation shall be by suitable vehicles to preclude cylinder damage by excessive mechanical vibration, shock, freezing, or deleterious high temperatures throughout the entire transport route.

5.3.2.1 If cylinders are expected to be subjected to unacceptable transport conditions, the cylinders should be placed under insulated conditions.

5.3.3 Compressed gas cylinder permanent marking requirements shall be as specified under CFR Title 49 Part 178 and must be maintained in legible condition as required by CFR Title 49, Part 173. Warning labels shall be affixed to cylinders conforming to requirements of CFR Title 40, Part 82.106.

5.4 *Storage:*

5.4.1 Storage shall be in accordance with CGA P-1, in qualified cylinders in accordance with CFR Title 49, Part 173 and 178.

5.4.2 Cylinders should be stored in areas that will protect vessels from physical and environmental damage and tampering from unauthorized personnel.

5.4.2.1 Facilities should be of construction and orientation so that safety requirements are fulfilled for the storage of pressurized cylinders.

5.4.3 Storage cylinders shall be fitted with pressure release mechanisms to limit vessel pressure to not more than the rated working pressure of the IG-100 container in use at any particular time.

5.4.3.1 Periodic hydrostatic testing and reinspection of cylinders used for IG-100 shall comply with CFR Title 49, Part 180.

5.4.4 Insulation shall be placed on pallets or shoring, and provisions should be made to prevent excessive shock or thermal fluctuations to cylinders.

5.4.5 Cylinders shall be stored in a manner that will prevent contamination from external sources.

6. Keywords

6.1 clean agents; fire suppression; IG-100; inert gas; nitrogen; N_2; NN100; storage; transportation

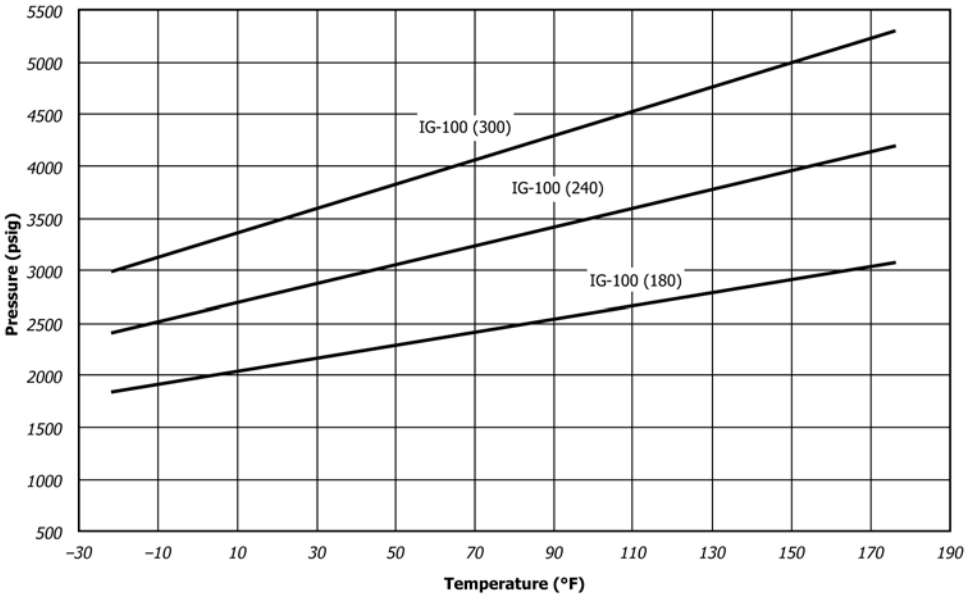

FIG. 1 Isometric Diagram of IG-100 (inch-pound units)

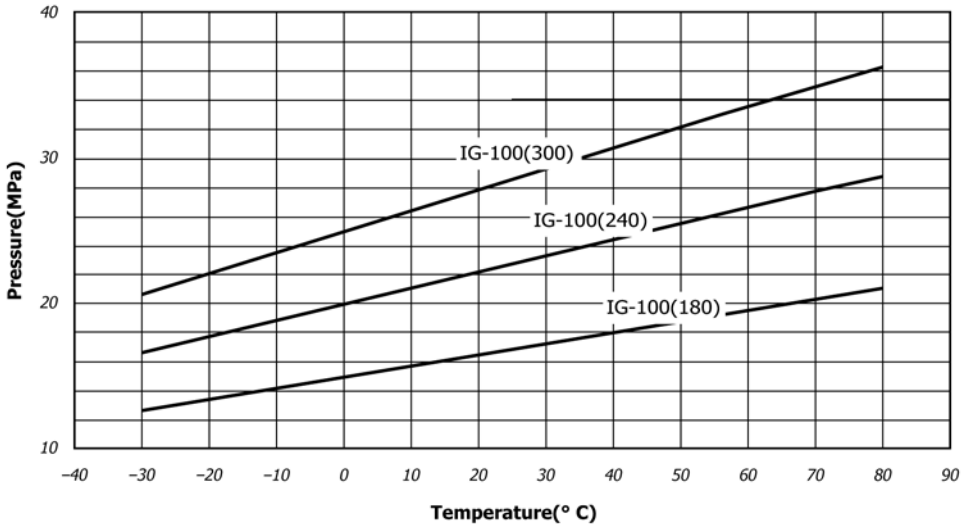

FIG. 2 Isometric Diagram of IG-100 (SI units)