CGA G-9.1—2014

COMMODITY SPECIFICATION FOR HELIUM

EIGHTH EDITION

CGA
Compressed Gas Association
The Standard For Safety Since 1913

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Work Item 13-011
Specialty Gases Committee

NOTE—Technical changes from the previous edition are underlined.

EIGHTH EDITION: 2014
SEVENTH EDITION: 2009
SIXTH EDITION: 2004
FIFTH EDITION: 1998

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Tables

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1 Scope

This publication describes specification requirements for gaseous and liquid helium.

The term container as used in this publication shall refer to portable compressed gas cylinders and liquid containers made in accordance with Title 49 of the U.S. *Code of Federal Regulations* (49 CFR) Parts 100-180; Transport Canada's (TC) *Transportation of Dangerous Goods Regulations*; ASME *Boiler & Pressure Vessel Code*, Section VIII, Div 1; UN *Recommendations on the Transportation of Dangerous Goods—Model Regulations* P200 Tables 1 and 2 (UN Model Regulations); and applicable tables in Canadian Standards Association's (CSA) B342, *Selection and use of UN pressure receptacles and multiple element gas containers for the transport of dangerous goods, Class 2* [1, 2, 3, 4, 5].[1]

NOTE—This publication does not attempt to recommend or establish end usage designations for specific types or grades of products. Users requiring this kind of information should contact individual gas suppliers.

2 Classification

2.1 Types

Gaseous helium is denoted as Type I and liquid helium as Type II.

2.2 Quality verification levels (grades)

Table 1 presents the component maxima in parts per million (ppm [v/v]) unless otherwise shown for quality verification levels (QVLs) of helium. A blank indicates no maximum limiting characteristic. The absence of a listed QVL does not mean to imply that the limiting characteristic is or is not present but merely indicates that the test is not required for compliance with the specification. Typical uses are listed in Table 2.

Table 1—Directory of limiting characteristics of helium

QVLs (grades)						
Limiting characteristics	**Maxima for gaseous helium [1), 2)]**					
	H	**J**	**L**	**N**	**P**	**G**
Helium minimum %	97.5	99.0	99.995	99.997	99.999	99.9999
Carbon dioxide					Sum = 0.5 ppm	Sum of all these impurities is less than 1 ppm
Carbon monoxide		10				
Hydrogen				1	1	
Neon				23	2	
Nitrogen + argon				5 [3)]	5	
Odor		None				
Oxygen			5	3	1	
Total hydrocarbon content (as methane)				1	0.5	
Water Dew point °F °C			15 –72 –57.8	3 –92 –68.9	1.5 –101 –73.9	
Buoyancy	Yes					
Identity		Yes				

NOTE—Units in ppm (v/v) unless otherwise shown.

1) These QVLs apply only to gaseous helium. Impurity limits for liquid helium are not specified since sufficient technical data and analytical procedures are not available to warrant a definitive quantitative specification. The requirement for ensuring that the loaded fluid in a container is liquid helium can be satisfied by analyzing the shipping container vent gas or by demonstrating that the temperature of the loaded fluid is below the hydrogen triple point (13.8 K).

2) Permanent particulates in the liquid can be reduced by using a filter assembly of 10 μ m or less installed in the transfer line as the liquid enters the transport container.

3) Maximum 5 ppm nitrogen only.

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