

CGA G-9.1— 2018

9TH EDITION

REAFFIRMED 2024

COMMODITY SPECIFICATION FOR HELIUM

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Work Item 23-042
Specialty Gases Committee

NOTE—No technical information has been changed from the 2018 edition. This reaffirmed edition may include minor editorial changes.

REAFFIRMED: 2024
NINTH EDITION: 2018
EIGHTH EDITION: 2014
SEVENTH EDITION: 2009
SIXTH EDITION: 2004

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1 Scope

This publication describes specification requirements for gaseous and liquid helium.

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 Definitions

For the purpose of this publication, the following definitions apply.

2.1 Publication terminology

2.1.1 Shall

Indicates that the procedure is mandatory. It is used wherever the criterion for conformance to specific recommendations allows no deviation.

2.1.2 Should

Indicates that a procedure is recommended.

2.1.3 May

Indicates that the procedure is optional.

2.1.4 Will

Is used only to indicate the future, not a degree of requirement.

2.1.5 Can

Indicates a possibility or ability.

2.2 Technical definition

2.2.1 Container

Portable compressed gas cylinders and liquid containers made in accordance with Title 49 of the U.S. *Code of Federal Regulations* (49 CFR) Parts 100-199; Transport Canada's (TC) *Transportation of Dangerous Goods Regulations*; or the 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, multiple-element gas containers, and other pressure receptacles for the transport of dangerous goods, Class 2* [1, 2, 3, 4, 5].¹

3 Classification

3.1 Types

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

3.2 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.

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

3.3 Quality tests

The supplier ensures by standard practice the QVL of helium. If otherwise required, alternative control procedures are described in 4.3.1, 4.3.2, and Sections 5 and 6. Other control procedures not listed in this publication are acceptable if agreed upon between the supplier and the customer.

WARNING: Helium is an asphyxiant and displaces life-supporting oxygen, see CGA P-9, The Inert Gases: Argon, Nitrogen, and Helium [6].

Table 1—Directory of limiting characteristics of helium

Limiting characteristics	QVLs (grades)					
	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
Air %		1				
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			15	3	1.5	
Dew point °F °C			−72 −57.8	−92 −68.9	−101 −73.9	
Buoyancy	Yes					
Identity		Yes				
NOTES						
1 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's 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.						

Table 2—Typical uses for helium

QVL	Typical uses
H	Balloons
J	Helium USP, Food Chemicals Codex (FCC), food and beverage applications
L	Welding, blanketing, heat treating
N	Cooling, purging, leak detection, analytical, diving/respiratory applications
P	Cooling (magnetic resonance imaging [MRI]), analytical, fiber optics
G	Semiconductor manufacturing, fiber optics
NOTE—Uses listed in this table are not all inclusive.	