



CGA G-5.3—2024

8TH EDITION

COMMODITY SPECIFICATION FOR HYDROGEN



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Hydrogen Technology Committee

NOTE—Technical changes from the previous edition are underlined.

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1 Scope

This publication describes the specification requirements for gaseous and liquid hydrogen including hydrogen for fuel cell applications.

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 definitions

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 100-180; Transport Canada (TC); or the American Society of Mechanical Engineers (ASME) specifications [1, 2, 3].¹

3 Classification

3.1 Types

Gaseous hydrogen is denoted as Type I, and liquid hydrogen as Type II.

3.2 Total hydrogen percent

Common purity nomenclature for hydrogen can be referred to with respect to the number of nines, indicated as percent of purity as shown in Table 1. In addition to the quality verification levels (QVLs) shown in Table 2, hydrogen is sometimes specified by total hydrogen percent. Table 1 shows hydrogen of decreasing levels of total impurities.

3.3 Quality verification levels (QVLs)

Table 2 presents the component maxima in parts per million (ppm [v/v]) unless shown otherwise for the QVLs of hydrogen. A blank indicates no maximum limiting characteristic. The absence of a value in a listed QVL does not 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 3.

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