CGA

Compressed Gas Association

The Standard For Safety Since 1913

CGA C-21—2015

STANDARD FOR DESIGN, QUALIFICATION, AND TESTING OF PRESSURE VESSELS FOR PORTABLE, REVERSIBLE METAL HYDRIDE SYSTEMS

THIRD EDITION

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Work Item 14-012
Cylinder Specifications Committee

NOTE—Technical changes from the previous edition are underlined.

THIRD EDITION: 2015
SECOND EDITION: 2008
FIRST EDITION: 2007

Contents **Page**

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1 Introduction

The need to provide a safe storage containment system for hydrogen absorbed in portable, reversible metal hydrides requires a design standard for the container.

2 Scope

This publication specifies requirements for the design, manufacture, testing, marking, inspection, and approval of a cylindrical pressure vessel component in excess of 4 fl oz (120 mL) internal capacity of a portable, reversible metal hydride storage system.

3 Definitions

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

3.1 Publication terminology

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

3.1.2 Should
Indicates that a procedure is recommended.

3.1.3 May
Indicates that the procedure is optional.

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

3.1.5 Can
Indicates a possibility or ability.

3.2 Technical definitions

3.2.1 Design stress
Sum of the stresses on the pressure vessel wall caused by hydrogen gas at maximum developed pressure, the equivalent service pressure (ESP), the metal hydride material at rated capacity, and other mechanical loadings.

3.2.2 Equivalent service pressure (ESP)
Calculated pressure of an inert gas that results in a cylinder wall stress equivalent to the stress measured during hydrogen filling at the prescribed maximum fill pressure and rated hydrogen capacity.

3.2.3 Marking
Means by which permanent required information is applied to the pressure vessel.

3.2.4 Maximum developed pressure
Highest pressure reached for a fully charged metal hydride storage system at equilibrium and maximum service temperature.

3.2.5 Metal hydride storage system
Hydrogen storage system consisting of a pressure vessel, any internal or external features or components, the hydride material, and a closure device.