ICS 23.020.30
J 74

中 华 人 民 共 和 国 国 家 标 准
NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 35544-2017

Fully-Wrapped Carbon Fiber Reinforced Cylinders with an Aluminum Liner for the On-Board Storage of Compressed Hydrogen as a Fuel for Land Vehicles
车用压缩氢气铝内胆碳纤维全缠绕气瓶

(English Translation)

Issued on 2017-12-29 **Implemented on 2018-07-01**

Jointly Issued by
General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China & Standardization Administration of the People's Republic of China

CONTENTS

Fully-Wrapped Carbon Fiber Reinforced Cylinders with an Aluminum Liner for the On-Board Storage of Compressed Hydrogen as a Fuel for Land Vehicles

1 SCOPE

This standard specifies the types and parameters, specifications, test methods, inspection rules, and marking, packaging, transportation and storage requirements with respect to the fully-wrapped carbon fiber reinforced cylinder with an aluminum liner for the on-board storage of compressed hydrogen as a fuel for land vehicles (hereinafter referred to as the “cylinders”).

This standard is applicable to the design and manufacture of the refillable cylinders that are fixed in road vehicles as fuel tanks to store compressed hydrogen, with a nominal working pressure ≤ 70MPa, a nominal water capacity ≤ 450L, and a working temperature ≥-40°C and ≤ 85°C.

Note: The manufacture and inspection of the gas cylinders for hydrogen supply intended for urban rail transit powered by hydrogen fuel cell, etc. may use this standard as a reference.

2 NORMATIVE REFERENCES

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 192	General purpose metric screw threads - Basic profile
GB/T 196	General purpose metric screw threads - Basic dimensions
GB/T 197	General purpose metric screw threads - Tolerances
GB/T 228.1	Metallic materials - Tensile testing - Part 1: Method of test at room temperature
GB/T 230.1	Metallic materials - Rockwell hardness test - Part 1: Test method (Scales A, B, C, D, E, F, G, H, K, N, T)
GB/T 231.1	Metallic materials - Brinell hardness test - Part 1: Test method
GB/T 232	Metallic materials - Bend test
GB/T 1458	Test method for mechanical properties of ring of filament-winding reinforced plastics
GB/T 3191	Aluminum and aluminum alloys extruded bars, rods
GB/T 3246.1	Inspection method for structure of wrought aluminum and aluminum alloy products - Part 1: Inspection method for microstructure
GB/T 3362	Test methods for tensile properties of carbon fiber multifilament
GB/T 3880.1	Wrought aluminum and aluminum alloy plates, sheets and strips for general engineering - Part 1: Technical conditions of delivery
GB/T 3880.2	Wrought aluminum and aluminum alloy plates, sheets and strips for general engineering - Part 2: Mechanical properties
GB/T 3880.3	Wrought aluminum and aluminum alloy plates, sheets and strips for general engineering - Part 3: Tolerances on forms and dimensions
GB/T 3934	Specification of gauges for general purpose screw threads
GB/T 4437.1	Aluminum and aluminum alloy extruded tubes - Part 1: Seamless tubes
GB/T 4612	Plastics - Epoxy compounds - Determination of epoxy equivalent
GB/T 6519	Ultrasonic inspection of wrought aluminum and magnesium alloy products

GB/T 7690.3 Reinforcements - Test method for yarns - Part 3: Determination of breaking force and breaking elongation for glass fiber

GB/T 7762-2014 Rubber, vulcanized or thermoplastic - Resistance to ozone cracking - Static strain test

GB/T 7999 Optical emission spectrometric analysis method of aluminum and aluminum alloys

GB/T 9251 Methods for hydrostatic test of gas cylinders

GB/T 9252 Method for pressure cycling test of gas cylinders

GB/T 11640 Seamless aluminum alloy gas cylinders

GB/T 12137 Method for leakage test of gas cylinders

GB/T 13005 Terminology of gas cylinders

GB/T 15385 Method for hydraulic burst test of gas cylinder

GB/T 17394.1 Metallic materials - Brinell hardness test - Part 1: Test method

GB/T 19466.2 Plastics - Differential scanning calorimetry (DSC) - Part 2: Determination of glass transition temperature

GB/T 20668 Unified screw threads - Basic dimensions

GB/T 20975 (all parts) Methods for chemical analysis of aluminum and aluminum alloys

GB/T 26749 Carbon fiber - Determination of tensile properties of resin-impregnated yarn

GB/T 30019 Carbon fiber - Determination of density

GB/T 33215 Pressure relief devices for gas cylinders

YS/T 67 Wrought aluminum and aluminum alloy columniform ingots

3 TERMS, DEFINITIONS AND SYMBOLS

3.1 Terms and Definitions

For the purposes of this document, the terms and definitions given in GB/T 13005 and the followings apply.

3.1.1 aluminum liner

The seamless aluminum alloy vessel over which the carbon fiber reinforced layer is wrapped to sealing gas, and which may or may not afford partial pressure load

3.1.2 fully-wrapped

A wrapping mode in which the carbon fiber with a resin impregnated matrix is wrapped continuously over the aluminum liner in spiral and circumferential pattern so as to reinforce the cylinder in circumferential and axial directions

3.1.3 fully-wrapped cylinder

A cylinder for which the carbon fiber reinforced layer is fully wrapped over the external surface of the aluminum liner and then subjected to heat-curing process

3.1.4 nominal working pressure

Limited filling pressure for the cylinder at a reference temperature of 15°C

3.1.5 autofrettage

The pressurization process, in which the aluminum liner is subjected to plastic deformation by applying internal pressure to the cylinder, so that the aluminum liner endures pressure stress and the carbon fiber endures tensile stress when the cylinder is at zero pressure

3.1.6 autofrettage pressure

ChinaAutoRegs
中国汽车标准译文库

The following pages are left blank intentionally.