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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 44457-2024

**Hydrogen storage pressure vessels used in hydrogen refuelling
stations**

加氢站用储氢压力容器

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1. Structure and drafting rules for standardization documents" Drafting is required. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document is proposed and coordinated by the National Technical Committee for Standardization of Boilers and Pressure Vessels (SAC/TC 262). This document was drafted by: Zhejiang University, China Special Equipment Testing and Research Institute, Hefei General Machinery Research Institute Co., Ltd., Shijiazhuang An Ruike Gas Machinery Co., Ltd., Lanzhou Lanshi Heavy Equipment Co., Ltd., Sinoma Technology (Suzhou) Co., Ltd., Sinopec Engineering Construction Co., Ltd., CSSC Shuangrui (Luoyang) Special Equipment Co., Ltd., China Huanqiu Engineering Co., Ltd. Beijing Branch, Jiaying Changsan Jiao Hydrogen Safety Research Center, Dalian Jinzhong Machinery Group Co., Ltd., Sinopec Guangzhou Engineering Co., Ltd., Air Products and Chemicals (China) Investment Co., Ltd., Foshan Nanhai District South China Hydrogen Safety Promotion Center, Sichuan Special Equipment Inspection Institute, Dongfang Boiler Co., Ltd. of Dongfang Electric Group LIMITED. The main drafters of this document are. Zheng Jinyang, Chen Zhiwei, Cui Jun, Ma Kai, Li Jun, Wang Hongxia, Qiao Xiaoli, Yuan Shaoyun, Yuan Zhuowei, Jia Xiaoliang, Deng Xin, Li Xiang, Zhang Guoxin, Jiang Xiaowen, Bo Ke, Ge Song, Zhang Wenyong, Zhang Ruiming, Ji Fang, Li Shuangquan, Gan Bing, Ji Mindong. Hydrogen storage pressure vessels for hydrogen refueling stations

1 Scope

China's national standard for the hydrogen storage pressure vessels used at refuelling stations. A station stores hydrogen at pressures above those in the vehicles it fills - typically

in a cascade of vessels at increasing pressure so that a car's tank can be filled to seventy megapascals by successive equalisation rather than by compression at the point of use. Those vessels present a combination that pressure vessel engineering finds difficult. Hydrogen embrittles steel, and the effect is worse at high pressure, so the material must be chosen for compatibility rather than for strength alone. The vessels are cycled - filled and partly emptied several times a day - so fatigue governs rather than static strength. And they are on a forecourt, adjacent to the public, which sets the requirements for protection, for leak detection and for the separation distances that determine whether a station fits its site at all.

This document specifies the materials, design, manufacturing, inspection and acceptance of hydrogen storage pressure vessels (hereinafter referred to as "hydrogen storage vessels") for hydrogen refueling stations. Require. This document applies to hydrogen storage containers that meet the following conditions.

- a) The design temperature is not lower than -40 °C and not higher than 85 °C;
- b) Spun seamless hydrogen storage vessels with a design pressure greater than 41 MPa but less than 100 MPa; 100 MPa austenitic stainless steel lined hydrogen storage vessel.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB/T 150.1 Pressure vessels Part

4 Manufacturing, inspection and acceptance

GB/T 196 Basic dimensions of common threads

GB/T 197 General thread tolerances

GB/T 222 Permissible deviation of chemical composition of finished steel products

GB/T 223 (all parts) Iron, steel and alloys

GB/T 226 Acid etching test method for macrostructure and defects of steel

GB/T 228.1 Tensile test of metallic materials Part

5 Elastic-plastic analysis methods

GB/T 4732.6 Analysis and design of pressure vessels Part

6 Manufacturing, inspection and acceptance

GB/T 6394 Determination of average grain size of metals

GB/T 7307 55° non-sealed pipe thread

GB/T 8335 Special threads for gas cylinders

GB/T 8923.1 Surface preparation of steel substrates before coating - Visual assessment of surface cleanliness - Part

1. Uncoated steel substrates Rust level and treatment level of steel surface after surface and complete removal of existing coatings

7 Stainless steel and heat-resistant steel

GB/T 1954 Method for measuring ferrite content in chromium-nickel austenitic stainless steel welds

GB/T 1979 Structural steel macrostructure defect rating chart

GB/T 4336 Determination of multi-element content of carbon steel and medium and low alloy steel Spark discharge atomic emission spectrometry (conventional method)

GB/T 4732.1 Analysis and design of pressure vessels Part