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

GB/T 18442.4-2019

Replacing GB/T 18442.4-2011

**Static vacuum insulated cryogenic pressure vessels - Part 4:
Fabrication**

固定式真空绝热深冷压力容器 第4部分：制造

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1 Scope

GB/T 18442.4-2019 is the Chinese national standard on static vacuum insulated cryogenic pressure vessels - part 4: fabrication, in the field of fluid systems and general-purpose components. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 10 December 2019 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 10 December 2019. Classification: ICS 23.020.40, CCS J76. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This Part of GB/T 18442 specifies the basic requirements, such as material re- inspection, machining and forming, welding, nondestructive testing, cleaning, assembly, mark and identification, and exit-factory data, in the fabrication of static vacuum insulated cryogenic pressure vessels (hereinafter referred to as cryogenic vessels). This Part applies to cryogenic vessels, which simultaneously meet the following conditions.

- a) The working pressure of the inner vessel is not less than 0.1 MPa;
- b) The geometric volume is not less than 1 m³;
- c) The insulation method is vacuum powder insulation, vacuum composite insulation, or high vacuum multilayer insulation;
- d) The storage medium is a refrigerated liquefied gas with a standard boiling point of not lower than -196 °C. This Part does not apply to cryogenic vessels in the following scope.
 - a) The material of inner vessel and outer jacket is non-ferrous metal or non- metal;
 - b) HAVE a spherical structure;
 - c) Stacked insulation;
 - e) STORE refrigerated liquefied gas medium with standard boiling point below -196 °C;
 - f) The storage medium is toxic gas according to GB 12268;
 - g) Those with special requirements such as national defense and military equipment.

2 Normative references

The following documents are indispensable for the application of this document. For the dated references, only the editions with the dates indicated are applicable to this document. For the undated references, the latest edition (including all the amendments) are applicable to this document.

GB/T 150-2011 (all parts) Pressure vessels

GB/T 1804-2000 General tolerances - Tolerances for linear and angular dimensions without individual tolerance indications

GB/T 9969 General principles for preparation of instructions for use of industrial products

GB/T 18442.1 Static vacuum insulated cryogenic pressure vessels - Part 1. General requirements

GB/T 18442.3 Static vacuum insulated cryogenic pressure vessels - Part 3. Design

GB/T 25198 Heads for pressure vessels

3 Terms and definitions

The terms and definitions defined in GB/T 150, GB/T 18442.1, GB/T 18442.3 apply to this document.

4 General requirements

4.1 The fabrication of cryogenic vessels shall comply with the requirements of TSG 21, GB/T 150.4, this Part, and the design documents approved by the prescribed procedures.

4.2 When the pressure components (heads, forgings, etc.) and safety accessories, instruments, handling accessories, etc. are purchased and outsourced parts, the fabrication organization of the cryogenic vessel shall ensure that, the quality of the purchased and outsourced parts meets the requirements of the design documents and this Part, and can be used only after passing the inspection.

4.3 The limit deviation of the linear dimension of the machined surface and non-machined surface is in accordance with the requirements of grade m and grade c in GB/T 1804-2000, respectively.

5 Material re-inspection, division and mark transplantation

5.1 The re-inspection of the materials shall meet the requirements of TSG 21, GB/T 150.4, and design documents.

5.2 The materials, used to manufacture pressure components, shall have traceable marks.

In the fabrication process, if the original mark is cut or the material is divided, before the material is divided, the fabrication organization shall complete the mark transplantation.

5.4 For the pressure components of the inner vessel, embossing stamp shall not be used as material transplantation marks, welder marks, and other marks.

6.1 Forming

6.1.1 The cylinder and head can be processed into the desired shape using cold and hot forming methods.

6.1.4 The fabrication organization shall, according to the manufacturing process, determine the machining allowance. The thickness of the pressure component after forming shall not be less than the minimum forming thickness marked on the design drawing.

6.2 Surface polishing During the fabrication process, mechanical damage to the surface of the steel plate shall be avoided. Sharp flaws, local flaws and grooves and other defects on the surface of stainless steel shall be polished. The maximum slope of the polishing is 1:3.

6.3 Groove The surface quality of the groove shall comply with the provisions of GB/T 150.4.

6.4 Head

6.4.1 The head shall meet the requirements of GB/T 25198 and design drawings.

6.5 Cylinder and tank

6.5.1 The amount of the butt misalignment of type A and B welded joints and the edges and corners formed in the circumferential and axial directions of the welded joints shall comply with the provisions of GB/T 150.4.

6.5.2 The butt requirements for type B welded joints of unequal-thickness steel and type A welded joints between cylinders and spherical heads shall comply with the provisions of GB/T 150.4.

6.5.3 The straightness tolerance of cylinder shall comply with the provisions of GB/T 150.4.

6.6 Other assembly requirements

6.6.1 The main geometric dimensions and nozzle orientation of the tank shall meet the requirements of the design drawings.

6.6.2 The fabrication and assembly requirements of leg supports are in accordance with NB/T 47065.2.

6.6.5 The fabrication and assembly requirements of the skirt are in accordance with NB/T 47041.