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

GB/T 18442.1-2019

Replacing GB/T 18442.1-2011

**Static vacuum insulated cryogenic pressure vessels - Part
1: General requirements**

固定式真空绝热深冷压力容器 第1部分:总则

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Foreword

GB/T 18442 "Static vacuum insulated cryogenic pressure vessels" is divided into the following 7 parts. - Part

1 Scope

GB/T 18442.1-2019 is the Chinese national standard on static vacuum insulated cryogenic pressure vessels - part 1: general requirements, 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 for static vacuum insulated cryogenic pressure vessels (hereinafter referred to as "cryogenic vessels"). The cryogenic vessels specified in GB/T 18442 include tanks, pipelines, safety accessories, instruments, loading-unloading accessories, supports, pressure build coils, and carburetors, etc. Note

1. The tank is defined as follows:

a) The groove end face of the first girth joint of the welded connection between the tank and

the external pipeline; the end face of the first threaded joint of the threaded connection; the first flange sealing surface of the flange connection;

b) End caps and fasteners in the opening of the tank;

c) Attachment weld between tank and non-pressure component. Note

2. The pipeline includes all the pipes and fittings, which may come into contact with the medium, of the cryogenic vessel. Note

3. The main pressure components include inner vessel barrel, inner vessel head; and tube socket, flange, craft manhole barrel, craft manhole head, etc. in contact with the medium. 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;

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 (all parts) Pressure vessels

GB/T 18442.2 Static vacuum insulated cryogenic pressure vessels - Part 2. Materials

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

GB/T 18442.4 Static vacuum insulated cryogenic pressure vessels - Part 4. Fabrication

GB/T 18442.5 Static vacuum insulated cryogenic pressure vessel - Part 5. Inspection and test

GB/T 18442.6 Static vacuum insulated cryogenic pressure vessel - Part 6. Safety device requirements

GB/T 18442.7 Static vacuum insulated cryogenic pressure vessels - Part 7. Rules of pressure strengthening for inner vessels

GB/T 26929 Terminology for pressure vessels TSG

21 Supervision Regulation on Safety Technology for Stationary Pressure Vessel TSG

07 Regulation for Production and Filling Licensing of Special Equipment

3 Terms and definitions

The terms and definitions defined in GB/T 150 and GB/T 26929 and the following ones apply to this document.

3.1 Annular space A closed space formed between the inner vessel and the outer jacket.

3.2 Tank A pressure vessel composed of an inner vessel, an outer jacket, and an insulation layer, etc.

3.3 Inner vessel An inner container which stores refrigerated liquefied gas and can withstand working pressure.

3.4 Outer jacket A sealed vessel which forms and protects a vacuum insulated space.

3.5 Refrigerated liquefied gas A gas which is partially liquid due to low temperature during storage. The critical temperature is generally not higher than $-50\text{ }^{\circ}\text{C}$.

3.6 Vacuum insulated cryogenic pressure vessel The pressure vessel used to store refrigerated liquefied gas, which consists of a liquid storage inner vessel and an outer jacket that maintains a vacuum insulated space, and has a complete set of safety accessories, instrumentation and systems meeting the operation requirements.

4 General requirements

4.1 General In addition to meeting this Part and GB/T 18442.2~GB/T 18442.7, the materials, design, fabrication, inspection and test, safety device requirements, and inner vessel pressure strengthening of cryogenic vessels shall also comply with the relevant laws, regulations, and safety technical specifications promulgated by the state.

4.2 Qualifications and responsibilities

4.2.1 Qualifications The design and fabrication organizations shall, in accordance with the provisions of TSG 07 and TSG 21, obtain the corresponding qualification certificates issued by the relevant national authorities.

4.3 Classification of welded joints

4.3.1 The welded joints between the tank and pipeline pressure components are divided

into four classes, A, B, C, and D; as shown in Figures 1 to

3. The classification requirements are as follows:

6 Safety device requirements; - Part

7. Rules of pressure strengthening for inner vessels. This Part is Part 1 of GB/T 18442. This Part is drafted in accordance with the rules given in GB/T 1.1-2009. This Part replaces GB/T 18442.1-2011 "Static vacuum insulated cryogenic pressure vessel - Part

1. General requirements". Compared with GB/T 18442.1-2011, the main technical changes of this Part are as follows: - Modify the scope of application and the scope of non-application; - Delete 8 terms and definitions such as vacuum fiber insulation and vacuum insulation; ADD 6 terms and definitions such as annular space, tank, and inner vessel; REVISE 4 terms and definitions such as vacuum insulated cryogenic pressure vessel and high vacuum multilayer insulation; - ADD the responsibilities of the design client; modify the qualifications and responsibilities of the design organization and fabrication organization; - Delete the requirements of design documents and general design drawings and adjust them to the design part of GB/T 18442.3; - MOVE the classification content of welded joints of tank pressure components in GB/T 18442.4-2011 to this Part; and, add the classification diagram of welded joints of outer jacket and pipeline. Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The issuing authority of this document shall not be held responsible for identifying any or all such patent rights. This Part was proposed by and shall be under the jurisdiction of China Standardization Committee on Boilers and Pressure Vessels (SAC/TC 262). Drafting organizations of this Part. Shanghai Gas Industry Association, Zhangjiagang CIMC Sanctum Cryogenic Equipment Co., Ltd., China Special Equipment Inspection and Research Institute, Zhangjiagang Branch of Special Equipment Safety Supervision Inspection Institute of Jiangsu Province, East China University of Science and Technology, Machinery Industry Shanghai Lanya Petrochemical Equipment Testing Institute Co., Ltd., Air Liquide (China) Holding Co., Ltd., Shanghai Huayi Group Equipment Engineering Co., Ltd. Main drafters of this Part. Zhou Weiming, Luo Xiaozhong, Chen Zhaohui, Wang Fei, Teng Junhua, Gao Jie, Hui Hu, Zhang Yufu, Chen Qinjian, Wei Yongbiao. The previous editions of the standard replaced by this Part were released as follows: - GB/T 18442.1-2011; - GB 18442-2001. Static vacuum insulated cryogenic pressure vessels - Part