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

GB/T 40541-2021

**Structural design requirements of metal pressure vessels for
space system**

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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 of Standardization Documents"

Drafting.

This document uses the redrafting method to amend and adopt ISO 14623.2003 "Design and Operation of Pressure Vessels and Pressure-bearing Structures for Space Systems" do".

Compared with ISO 14623.2003, this document has many adjustments in its structure. Appendix A lists the differences between this document and ISO 14623.2003.

A list of changes in chapter numbers.

Compared with ISO 14623.2003, there are technical differences between this document, and the clauses related to these differences have been passed on the outer margins.

The vertical single line (?) is marked, and a list of the corresponding technical differences and their reasons is given in Appendix B.

This document has made the following editorial changes.

---Modify the standard name to "Aerospace Metal Pressure Vessel Structure Design Requirements".

Introduction

Since entering the space age, hazard control has always been the primary consideration for manned or unmanned flight in outer space, space activities and related

The rapid development of technology requires continuous increase in the amount of energy. The structure of metal tank and pressure vessel is the main structure of aerospace products. Tank structure

It is a key technology that affects the quality of aerospace product structure design, and it is also a key basic technology for the pursuit of lightweight structure of rocket structures.
aerospace

The design and operation of pressure vessel structure and pressure-bearing components are of great significance. It is necessary to formulate special features for the design of metal pressure vessels and pressure-bearing components.

Do not require it in order to provide a standard and reliable pressure vessel structure for the aerospace industry. At present, my country's civil aerospace is in a period of vigorous development, and the establishment of

National standards in the field of aerospace metal pressure vessel structure design to standardize the structure design, manufacturing, testing and acceptance of aerospace metal pressure vessels

The methods and requirements to ensure product quality are also relatively important for improving the design and manufacturing level of metal pressure vessel structure products in the civil aerospace field.

Strong driving effect.

Structural design requirements for aerospace metal pressure vessels

1 Scope

This document specifies the general requirements and detailed requirements for the structural design of aerospace metal pressure vessels, including system analysis requirements, structural design and

Analytical requirements, material requirements, process control requirements, quality assurance requirements, operation and maintenance requirements, re-certification requirements, requirements for extension of service life

Please wait.

This document is applicable to the structural design of metal pressure vessels for launch vehicles and spacecraft.

2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. Among them, dated quotations

Only the version corresponding to that date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to this document.

document.

GB/T 150.1 Pressure Vessel Part 1.General Requirements

GB/T 150.2 Pressure Vessel Part 2.Materials

GB/T 150.3 Pressure Vessel Part 3.Design

GB/T 150.4 Pressure Vessel Part 4.Manufacturing, Inspection and Acceptance

GB/T 4337 Rotating bending method for fatigue test of metallic materials

GB/T 51218 Standard terminology for engineering design of mechanical industry

3 Terms and definitions

The terms and definitions defined in GB/T 150.1~GB/T 150.4, GB/T 4337, GB/T 51218, and the following terms and definitions apply to this document.

3.1

Pressurized system

A system composed of pressure vessels and other pressure components (such as pipes, fittings, valves and bellows, etc.)

In a stressful environment.

3.2

No-pressurized pressure vessel structure

The pressure vessel structure used to carry internal pressure.

Note. The non-axial load-bearing tanks and gas cylinders of the launch vehicle are typical non-supporting structures.

3.3

Pressurized structure

It is used for pressure vessel structures that need to carry the load of the carrier or spacecraft in addition to the internal pressure.

Note. The main propellant tank of the launch vehicle is a typical load-bearing structure.

3.4

Maximum expected operating pressure; MEOP

The pressure-bearing structure experiences the highest pressure difference during its service life and can maintain its functionality in the service environment.