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

GB/T 4272-2024

**General principles of thermal insulation technique for
equipment and pipes**

设备及管道绝热技术通则

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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. This document replaces GB/T 4272-2008 "General Technical Rules for Thermal Insulation of Equipment and Pipelines". Compared with GB/T 4272-2008, except for the structure In addition to adjustments and editorial changes, the main technical changes are as follows: Changed the scope (see Chapter 1, Chapter 1 of the.2008 edition);

- a) The definition of thermal insulation has been changed (see 3.1, 3.1 of the.2008 edition);
- b) Added anti-freezing requirements (see 4.2);
- c) Added fire protection requirements (see 4.3);
- d) Added the requirement that insulation should not be used (see 4.5);
- e) The general requirements for material properties have been changed (see 5.1, 7.4 of the.2008 edition);
- f) Added performance requirements for thermal insulation materials used for fire protection (see 5.1.5);
- g) The performance requirements for thermal insulation materials have been modified (see 5.2, 5.2 of the.2008 edition);
- h) Added performance requirements for pads and bracket materials (see 5.2.3);
- i) The maximum allowable heat loss value for seasonal operating conditions has been changed (see Table 1, Table 1 of the.2008 edition);

1 Scope

China's national general principles for the thermal insulation of equipment and piping. It specifies the overall requirements, the material performance requirements and the design provisions. Insulation on industrial plant does several distinct jobs and the design has to know which one governs: conserving heat, which is an economic optimisation between the cost of the insulation and the value of the energy saved; keeping process fluid within a temperature range, which is a process requirement; protecting people from surfaces hot enough to burn; and preventing condensation on cold lines, which is a corrosion and dripping problem rather than an energy one. The thickness that satisfies each is different, and the one that satisfies economics is usually the least. The failure that dominates practice is corrosion under insulation - water entering through a damaged cladding cannot dry, and the pipe corrodes invisibly beneath a covering that looks intact.

This document specifies the overall requirements, material performance requirements, insulation design, insulation structure, construction and inspection of equipment and pipeline insulation projects. Collection, testing of insulation engineering effects, operation and maintenance, and safety regulations. This document is applicable to insulation projects with external surface temperature of equipment, pipelines and accessories between -196°C and 850°C. For other temperature ranges, please refer to This document is implemented. This document does not apply to equipment and pipelines with special requirements in nuclear energy, aviation, aerospace and other systems.

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. in this document.

GB/T 4132 Thermal insulation terminology

GB/T 8174 Testing and evaluation of thermal insulation effect of equipment and pipelines

GB/T 8175 Guidelines for thermal insulation design of equipment and pipelines

GB 8624-2012 Classification of combustion performance of building materials and products

GB 50126 Industrial equipment and pipeline insulation engineering construction specification

GB/T 50185 Industrial equipment and pipeline insulation construction quality acceptance standard

3 Terms and definitions

The terms and definitions defined in GB/T 4132 and the following apply to this document.

3.1 Thermal insulation In order to reduce or prevent the equipment, pipelines and their accessories from radiating or absorbing heat to the surrounding environment, an additional insulation layer is installed on the outer surface. measure.

Note. According to the direction of heat flow, it can be divided into thermal insulation and cold insulation.

3.2 Economic thickness The calculated thickness of the insulation layer is when the sum of the annual heat dissipation (cold) loss cost after insulation and the annual amortized cost of insulation investment is the minimum.

4 General requirements

4.1 Equipment, pipelines and their accessories with any of the following working conditions should be insulated. The outer surface temperature is higher than 323 K (50 °C) and the heat loss needs to be reduced;

- a) In process production, it is necessary to reduce the temperature of the medium or delay the condensation of the medium;
- b) Equipment, pipelines and accessories that do not require insulation during process production, but whose outer surface temperature exceeds 333 K (60 °C) and cannot be used Other measures to prevent burns. c)