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# NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

# GB/T 31104-2024

## Steel dryers used in paper machinery

造纸机械用钢制烘缸

**Issued on: October 26, 2024** **Implemented on: May 1, 2025**

**Issued by: State Administration for Market Regulation;**
**Standardization Administration of the PRC**

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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. This document replaces GB/T 31104-2014 "Technical Specifications for Steel Drying Cylinders for Papermaking Machinery" and is consistent with GB/T 31104-2014. In addition to structural adjustments and editorial changes, the main technical changes are as follows:

a) The scope of application of the document has been changed (see Chapter 1, Chapter 1 of the.2014 edition);

b) "Terms and Definitions" has been modified (see Chapter 3, Chapter 3 of the.2014 edition);

c) Added two chapters. "Symbols" and "Classification and Structure" (see Chapters 4 and 5);

d) The material standards for manufacturing drying cylinders have been changed (see Table 1, Table 1 of the.2014 edition);

e) The requirements for the use of Q235B and Q235C steel plates (see

5.3 of the.2014 edition) have been deleted;

f) Changed the ultrasonic testing quality level requirements for cylinder blocks and cylinder heads with a thickness greater than 30 mm (see 6.6,.2014 edition). 5.7);

g) Added requirements for the thickness direction properties of carbon steel and low alloy steel plates (see 6.7);

h) Added requirements for studs (including bolts) (see

i) Changed "General Principles" to "Design", and modified the contents of "General Requirements", "Loads" and "Structural Design" (see Chapter 7,.2014 Edition). Chapter 4);

j) Deleted the calculation of support ring (see

4.3.2.3 of the.2014 edition);

## 1 Scope

China's national standard for the steel drying cylinders used in paper machines, and the current edition of GB/T 31104, replacing the 2014 edition. It specifies the terms and definitions, the symbols, the classification and structure, the materials, the design, the manufacture, the acceptance, and the coating, marking, packaging, transport and storage of these cylinders, with a normative annex covering the hybrid structure dryer. A dryer cylinder is a large steam-heated pressure vessel that rotates: the paper web is pressed against its outer surface and dries by conduction, and a paper machine contains dozens of them in series. It is therefore two things at once, and the standard has to treat it as both. It is a pressure vessel, containing steam at working pressure with a shell that must be

designed, welded, heat treated, non-destructively examined and pressure tested accordingly. And it is a rotating machine element turning continuously at speed for years, so it must be balanced, its shaft ends and journals must carry the load, and its shell must not distort - because a shell that is not concentric or not uniform in thickness makes a paper machine vibrate and marks the web. The 2024 revision is substantial. It changes the scope, adds chapters on symbols and on classification and structure, changes the material standards for cylinder manufacture and removes the permission to use Q235B and Q235C plate, revises the ultrasonic testing quality level for shells and heads thicker than 30 mm, adds through-thickness property requirements for carbon and low alloy steel plate, adds requirements for studs and bolts, restructures the design clause around loads and structural design, and revises the manhole and handhole construction. Issued on 26 October 2024 and in force since 1 May 2025.

This document defines the relevant terms, definitions and symbols, and stipulates the classification and Structure, material, design, manufacture, acceptance, coating, marking, packaging, transportation and storage, and the corresponding test methods are described. This document is applicable to steel drying cylinders used for heat transfer in papermaking machinery, where the internal working medium is water vapor. This document is also applicable to other industries. Similar working conditions, such as food drying, printing and dyeing textile drying, leather processing, wood processing, etc. The outer diameters and design pressures of the steel drying cylinders to which this document applies are as follows:

---When the outer diameter of the drying cylinder is not greater than 8000mm, the design pressure shall not exceed 1.2MPa;

---When the outer diameter of the drying cylinder is less than 3000mm, the design pressure is less than 1.6MPa.

## 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 150-2024 (all parts) Pressure Vessels GB/T 151 Heat Exchangers

GB/T 191 Pictorial markings for packaging, storage and transportation

GB/T 699 High-quality carbon structural steel

GB/T 700 Carbon Structural Steel

GB/T 713.2 Steel plates and strip for pressure equipment Part

## 3 Formula method

GB/T 5117 Welding rods for non-alloy steel and fine grain steel

GB/T 5118 Heat-resistant steel welding rods

GB/T 5293 Classification requirements for solid welding wires, flux-cored welding wires and wire-flux combinations for non-alloy steel and fine-grained steel for submerged arc welding

GB/T 5310 Seamless steel tubes for high-pressure boilers

GB/T 5313-2023 Thickness properties of steel plates

GB/T 6479 Seamless steel pipe for high-pressure fertilizer equipment

GB/T 7659 Steel castings for welded structures

GB/T 8110 Solid welding wire for non-alloy steel and fine grain steel for gas metal arc welding

## 7 Stainless steel and heat-resistant steel

GB/T 985.1 Recommended grooves for gas welding, arc welding, gas shielded welding and high energy beam welding

GB/T 985.2 Recommended groove for submerged arc welding

GB/T 1220 Stainless steel bars

GB/T 3077 Alloy Structural Steel

GB/T 3087 Seamless steel tubes for low and medium pressure boilers

GB/T 3274 Hot-rolled carbon structural steel and low-alloy structural steel plates and strips

GB/T 3280 Stainless steel cold-rolled steel sheet and strip

GB/T 4272 General technical rules for thermal insulation of equipment and pipelines

GB/T 4732.3 Analysis and design of pressure vessels Part