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

GB/T 47569-2026

Technical specification for steel bends

钢制弯管技术规范

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Foreword

The following symbols apply to this document. D. Outer diameter, in millimeters (mm); d. Inner diameter, in millimeters (mm); D_{max}. The maximum outer diameter of the cross-section of the curved section, in millimeters (mm); D_{min}. The minimum outer diameter of the cross-section of the curved section, in millimeters (mm); D₂, D

4. Outer diameters of two adjacent crests in the curved section, in millimeters (mm); D

3. Outer diameter of the trough between two adjacent crests in the curved section, in millimeters (mm); D_n. A dimension designation related to the nominal size DN or NPS, in millimeters (mm); f. Wave spacing, in millimeters (mm); h. waviness, in millimeters (mm); L

1 Scope

GB/T 47569-2026 is the Chinese national standard covering the induction-formed or cold-bent pipe bend - the wall thinning on the outside of the bend and the ovality, the mechanical properties after the heat of forming, and the non-destructive examination of a

component that carries the same pressure as the straight pipe with less wall. First edition, 19,000 words, in force since 1 November 2026. It was issued on 30 April 2026 and takes effect on 1 November 2026, as a first edition. The document is under the responsibility of the China Machinery Industry Federation. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

2. Thickness of the outer arc sidewall, in millimeters (mm); U. Flatness of the bevel end, in millimeters (mm); Delta. Flatness of the bend, in millimeters (mm); alpha. Bending angle, in degrees (°); epsilon. forming strain rate, %.

5. Order details The purchaser shall provide the necessary information for procuring steel pipe bends (hereinafter referred to as "bends") in the order. The order shall include at least the following information.

- Material standards and grades;
- Nominal size (or outer diameter);
- Nominal wall thickness;
- Bending radius;
- Bending angle;
- Length of straight pipe section;
- Type (seamless or seamed);
- Document number;
- Additional requirements.

2 Placement of longitudinal weld seam in bend pipe

9.4 During the bending process, the steel pipe should not come into contact with corrosive media or low-melting-point metals.

9.5 When using hot bending to manufacture bent pipes, the bending process should be continuous, and the heating temperature, heating range, and cooling rate should be controlled.

9.6 When manufacturing bent pipes using cold bending forming methods, the dimensions of the steel pipe should match the mold, and there should be no gaps that could cause loosening, to avoid causing damage to the bent pipe. Any dimensional deviations or defects.

9.7 If the geometric dimensions of the bent pipe are out of tolerance after forming, the bent

pipe can be cold-formed. Cold forming should be carried out before heat treatment.

9.8 Before formal production of bent pipes, the manufacturer shall conduct a bending process evaluation in accordance with the provisions of Appendix D, and mass production can only begin after the process is confirmed to be qualified.

6 Shape and basic dimensional parameters

6.1 Shape The shape of the bend is shown in Figure 1.

6.2 Basic Dimensional Parameters The outer diameter and end wall thickness of the bend should conform to the requirements of GB/T 28708. Commonly used dimensions are shown in Appendix A. The supplier and buyer can customize the dimensions according to design requirements. Please use dimensions other than those in Appendix A.

7 Design

7.1 The bend should be designed to have the same internal pressure resistance as the steel pipe of the same specification, material and wall thickness to which it is connected.

7.2 The design of bends shall be carried out according to one of the following methods.

- a) Calculate the wall thickness according to GB/T 20801.1 or other relevant standards.
- b) Conduct design verification tests as specified in Appendix B, and determine the wall thickness of the inner and outer arcs of the bend accordingly. If necessary, provide relevant documentation. The test reports and records are provided for verification.

8 Materials

8.1 The raw materials used to manufacture pipe bends shall have quality certificates, and their chemical composition and mechanical properties shall conform to relevant material standards or design documents. The manufacturer shall conduct chemical composition analysis on the raw materials used according to the furnace number, and the analysis method shall comply with GB/T 223 (all parts). The chemical composition shall comply with GB/T 4336, GB/T 11170, etc., and the permissible deviation shall conform to the provisions of GB/T 222.

8.2 Commonly used raw materials for pipe bending are shown in Table

1. Materials other than those in Table 1 may also be selected through negotiation between the supplier and the buyer, but the materials used should meet the following requirements. In accordance with the requirements of GB/T 20801.1 or other relevant standards, and structural steel pipes should not be used to manufacture bends.

9 Manufacturing

9.1 The hot bending or cold bending forming method for pipe bending shall be determined according to factors such as material, specifications, and bending radius. Pipe bending shall not produce harmful defects.

9.2 The wall thickness of the straight pipe before bending can be selected with reference to the values given in Appendix C.

9.3 When straight seam welded pipe is used to manufacture bent pipe, the longitudinal weld should be placed within 10° from the neutral plane, as shown in Figure 2. Figure

10 Heat Treatment

10.1 Except as specified in 10.3, 10.4, and 10.5, the bending of pipes by hot bending and cold bending shall be based on factors such as material, wall thickness, forming process, and forming strain rate. Choose the appropriate heat treatment method. Table 2 shows the commonly used heat treatment methods and hardness requirements for pipe bending.

10.3 Carbon steel bends may not require heat treatment when the following conditions are met.

- a) Hot-bent pipes with a final forming temperature of 750°C ~ 950°C and a wall thickness not exceeding 20mm;
- b) The pipe is formed by cold bending of raw materials that have been heat-treated at the factory, with a cold bending strain rate of less than 5%.

10.4 Unless otherwise specified, heat treatment is not required when the strain rate of cold bending of alloy steel pipe is less than 5%.

10.5 Austenitic stainless steel bends shall be solution treated as required by the technical documents; if the technical documents do not require such treatment, heat treatment is not required.

10.6 After the bent tubes are loaded into the furnace, a furnace loading layout diagram should be drawn. After the tubes are unloaded, the integrity of the markings should be checked. If any are damaged, they should be replaced in time.

10.7 During the heat treatment of bent pipes, the heating temperature inside the heat treatment furnace should be monitored. The heat treatment furnace should be equipped with an automatic temperature recording device. Complete records are available. During heat treatment, the furnace temperature difference in the effective heating zone should be controlled within $\pm 14^\circ\text{C}$.

10.8 After the heat treatment of the bent pipe is completed, the heat treatment record should be organized and properly kept.