



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

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**Petroleum and natural gas industries - Materials selection for  
high content CO<sub>2</sub> for casing, tubing and downhole equipment**

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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.

The translation method used in this document is equivalent to ISO 17348.2016 ``Casing, tubing and wells for high CO<sub>2</sub> environments in the oil and gas industry

Material selection of the following tools.

The Chinese documents that have consistent correspondence with the normatively cited international documents in this document are as follows.

---GB/T 19830-2017 Oil and gas industry oil and gas well casing or tubing steel pipe (ISO 11960.2014, IDT);

---GB/T 20972.1-2007 Materials used in hydrogen sulfide environment in oil and gas exploitation in the petroleum and natural gas industry Part 1.

General principles for selecting anti-crack materials (ISO 15156-1.2001, IDT);

---GB/T 20972.2-2008 Materials used in hydrogen sulfide-containing environments in oil and gas exploitation in the petroleum and natural gas industry Part 2.

Anti-cracking carbon steel, low alloy steel and cast iron (ISO 15156-2.2003, MOD);

---GB/T 20972.3-2008 Materials used in hydrogen sulfide environment in oil and gas exploitation in the petroleum and natural gas industry Part 3.

Anti-cracking and corrosion-resistant alloys and other alloys (ISO 15156-3.2003, MOD);

---GB/T 23802-2015 Corrosion-resistant alloy seamless pipe delivery technology for casing, tubing and coupling blanks in the oil and gas industry

Conditions (ISO 13680.2010, MOD);

---GB/T 34903.1-2017 Non-metallic materials in contact with media related to oil and gas extraction in the petroleum, petrochemical and natural gas industries

Part 1.Thermoplastics (ISO 23936-1.2009, MOD);

---GB/T 34903.2-2017 Non-metallic materials in contact with media related to oil and gas extraction in the petroleum, petrochemical and natural gas industries

Part 2.Elastomers (ISO 23936-2.2011, IDT).

## 1 Scope

This document specifies CO<sub>2</sub> gas injection wells and gas production under high pressure and high CO<sub>2</sub> (content greater than 10% and partial pressure greater than 1MPa) environment

The guidelines and requirements for material selection of seamless casing and tubing for wells and downhole tools are not within the scope of this document for production wells. This document only considers materials and

Environmental compatibility.

The contents of this document are as follows.

---Corrosion evaluation;

---material selection;

---Corrosion control.

This document applies to wells with high CO<sub>2</sub> content, and many requirements also apply to wells with low CO<sub>2</sub> content.

Material selection is affected by a variety of factors and mutual synergy, and should be carried out by materials engineers or corrosion engineers.

## 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 the date is applicable to this document; the latest version (including all amendments) of the undated reference standard is applicable to

This document.

ISO 11960 Oil and gas industry oil and gas well casing or tubing steel pipe (Petroleum and natural gas industries-

Steel pipes for use as casing or tubing for wells)

ISO 13680 Technical Delivery Conditions of Corrosion-resistant Alloy Seamless Pipe for Casing, Tubing and Coupling Blanks in the Petroleum and Natural Gas Industry

(Petroleum and natural gas industries-Corrosion-resistant alloy seamless tubes for use as casing, tubing and coupling stock-Technical delivery conditions)

ISO 15156 (all parts) Materials (Petroleum and

natural gas industries-Materials for use in H<sub>2</sub>S-containing environments in oil and gas production)

ISO 23936-1 Non-metallic materials in contact with media related to oil and gas production in the petroleum, petrochemical and natural gas industries-Part 1. Thermal

Plastic (Petroleum, petrochemical and natural gas industries-Non-metallic materials in contact with

media related to oil and gas production-Part 1. Thermoplastics)

ISO 23936-2 Non-metallic materials in contact with media related to oil and gas extraction in the petroleum, petrochemical and natural gas industries-Part 2. Projectiles

Elastomers (Petroleum, petrochemical and natural gas industries-Non-metallic materials in contact with

media related to oil and gas production-Part 2. Elastomers)

### **3.1 Terms and definitions**

The following terms and definitions apply to this document.

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