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**Petroleum drilling and production equipment - Electromagnetic  
telemetry measurement while drilling**

石油天然气钻采设备 电磁波传输随钻测量系统

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## Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents". Drafting.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

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Electromagnetic wave transmission while drilling for oil and gas drilling equipment  
Measurement system

## 1 Scope

This document specifies the composition, model designation method, technical requirements, inspection rules, marking, and accompanying equipment of electromagnetic wave transmission measurement-while-drilling systems.

The document outlines the packaging, transportation, and storage procedures, and describes the corresponding testing methods.

This document applies to the design, manufacture, and inspection of electromagnetic wave transmission measurement-while-drilling systems.

## 2 Normative references

GB/T 223.3

GB/T 223.72

GB/T 228.1

GB/T 229

GB/T 231.1

GB/T 3452.5

GB/T 3836.1

GB/T 3836.2

GB/T 4336

GB/T 6463

GB 8897.4

GB/T 22512.2

GB/T 35690

## 3 Terms and Definitions

The following terms and definitions apply to this document.

### **3.1 The system**

During drilling, electromagnetic waves are used as signal carriers, and the formation and drill string are used as transmission mediums to transmit real-time acquired and processed data to the surface.

### **3.2 Surface antenna**

A device used to receive electromagnetic wave signals emitted by downhole equipment and convert them into electrical signals.

### **3.3**

An instrument that processes electromagnetic wave signals received from downholes by a ground antenna and acquires downhole data.

### **3.4 Insulation short section gapsub**

It has high resistance characteristics and is a special drill collar used to connect the upper and lower drill strings to form a downhole antenna.

### **3.5**

The component that modulates downhole measurement data into electromagnetic wave signals and outputs them to the downhole antenna.

### **3.6**

A component for real-time measurement of well inclination angle, azimuth angle, and tool face angle parameters.

### **3.7 4 Composition and Model Designation Method**

Components that provide power to downhole equipment.

Note. Includes battery packs and/or power generation units.

### **4.1 Composition**

The electromagnetic wave transmission measurement-while-drilling system consists of a surface unit and a downhole unit. The surface unit comprises a surface antenna, a surface receiver, and a driller's display.

The system consists of an indicator, a computer, and related software; a schematic diagram is shown in Figure A.1 of Appendix A. The downhole device comprises an insulating short section, an electromagnetic wave transmitting unit, and a directional...

The system consists of a measurement unit and an underground power supply unit, as shown in Figure A.2.

## 4.2 Model Designation Method

The model designation method for electromagnetic wave transmission measurement-while-drilling systems is as follows. EM-MWD ----- Electromagnetic wave transmission measurement while drilling system name code The outer diameter of downhole equipment, in millimeters (mm).

Downhole instruments temperature resistance, unit is degrees Celsius (°C). 125, 150, 175

Downhole instrument pressure resistance, unit is megapascal (MPa). 70, 105, 140

Example. EM-MWD121-125-70 indicates an electromagnetic wave transmission measurement while drilling system with an outer diameter of 121mm, a temperature resistance of 125°C, and a pressure resistance of 70MPa.

### 5.1.1 Orientation Measurement Unit

The technical specifications of the orientation measurement unit should meet the requirements of Table 1.