

ICS 91.140
CCS P 47

CJ

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

CJ/T 434-2013

Ultrasonic water meter

超声波水表

(English Translation)

Issued on: January 1, 1970

Implemented on: January 1, 1970

**Issued by: Ministry of Housing and Urban-Rural Development of the
People's Republic of China**

Table of Contents

Preface
1 Scope
2 Normative references
3 Terms and definitions
4 Structure and classification
5 Measurement requirements
6 Technical requirements
7 Test method
8 Inspection rules
9 Marking, packaging, transportation and storage
Appendix A (Normative appendix) Accuracy rating at the factory
Appendix B (Normative Appendix) Repeatability Assessment

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard was proposed by the Standard Rating Institute of the Ministry of Housing and Urban-Rural Development.

This standard is under the jurisdiction of the Technical Committee of Water Supply and Drainage Products Standardization of the Ministry of Housing and Urban-Rural Development.

The organization responsible for drafting this standard. Hefei Dibey Instrument Technology Development Co., Ltd., Shenzhen Huaxu Technology Development Co., Ltd.

Participated in the drafting of this standard. Hefei Rena Meter Co., Ltd., Hunan Weiming Energy Technology Co., Ltd., Beijing Kangdeman Electronic Technology Co., Ltd., Xi'an Jingqi Electronics Co., Ltd., Beijing Times Minxin Technology Co., Ltd.

1 Scope

This standard specifies the terms and definitions, structure and classification, measurement requirements, technical requirements, test methods, inspection rules, marking, packaging, transportation and storage requirements of ultrasonic water meters.

This standard applies to the use of ultrasonic time difference method for flow measurement,

and meets the requirements of GB/T 778.1-2007, GB/T 778.3-2007 cold water meter and hot water meter.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

GB/T 191 Packaging, storage and transportation pictorial signs GB/T 778.1-2007 Measurement of water flow in closed full pipelines. Cold drinking water meters and hot water meters Part 1: Specification GB/T 778.3-2007 Measurement of water flow in closed full pipelines. Cold drinking water meters and hot water meters. Part 3: Test methods and test equipment GB/T 2423.1 Environmental testing of electric and electronic products Part 2: Test method Test A. Low temperature GB/T 2423.8 Environmental testing of electric and electronic products Part 2: Test method Test Ed. Free fall GB 4208 Shell protection grade (IP code) GB 4706.1 Safety of household and similar electrical appliances Part 1: General requirements GB/T 5080.7-1986 Equipment Reliability Test The verification test plan for failure rate and mean time between failures under the assumption of constant failure rate GB/T 13384 General technical conditions for packaging of mechanical and electrical products GB/T 15479-1995 Technical requirements and test methods for insulation resistance and insulation strength of industrial automation instruments GB/T 26831 Community Energy Metering and Collecting System Specification JB/T 9329 Basic environmental conditions and test methods for transportation and storage of instruments and meters

3 Terms and definitions

The following terms and definitions defined in GB/T 778.1-2007 and GB/T 778.3-2007 apply to this document.

Utilize the principle of ultrasonic flow measurement to measure, store and display the instantaneous and accumulated flow of water under rated working conditions.

Soundtrack

Ultrasonic propagation path.

Vocal tract angle

The angle between the ultrasonic propagation path and the pipe axis.

Velocity distribution coefficient the ratio of the average linear velocity of the fluid in the axial direction to the average velocity of the measured cross section.

Ultrasonic water meter with inseparable measuring sensor and calculator.

Ultrasonic water meter with separate measuring sensor and calculator.

Ultrasonic transducer A device that can produce ultrasonic signal output under electrical signal excitation and convert ultrasonic signal into electrical signal.

Mono ultrasonic water meter an ultrasonic water meter with only a pair of ultrasonic transducers.

Multi-channel ultrasonic water meter an ultrasonic water meter with two or more pairs of ultrasonic transducers.

3.10

The sampling period

The time interval between two adjacent water velocity measurements.

3.11

Body

Specially manufactured, a standard pipe section integrating ultrasonic transducers and other measuring components.

4.1 Structure

The structure of the ultrasonic water meter is integral or split.

4.2 Classification

4.2.1

The classification according to the applicable installation environment is as follows.

- a) Class B. Fixed installation indoors;
- b) Class C. Fixed installation outdoors.

4.2.2

The classification according to the electromagnetic environment is as follows.

- a) E1 level. residential, commercial and light industry;
- b) E2 level. industrial.

5.1 Measurement principle

Ultrasonic water meters should adopt the time difference method for flow measurement. The time difference method uses the time t_d of the ultrasonic pulse to travel downstream in the fluid the difference between the propagation time t_u and the countercurrent propagation

time t_u is used to measure the fluid velocity, thereby calculating the fluid flow in the pipeline. The basic measurement principle is shown in Figure 1.

5.2 Metrological characteristics

Should comply with the provisions of 5.1 in GB/T 778.1-2007, and Q_3/Q_1 should not be less than 125.

5.3 Maximum allowable error

It should meet the requirements of 5.2 in GB/T 778.1-2007, and the maximum allowable error in the low zone and the maximum allowable error in the high zone should meet the following regulations.

- a) When the water temperature is within the specified range of the rated working conditions, the maximum volume discharged at the flow rate between Q_1 and Q_2 (not including Q_2) the allowable error, according to the accuracy level, should meet the maximum allowable error in the low area of Table 1;
- b) When the water temperature is within the specified range of the rated working conditions, the maximum allowable error of the volume discharged at the flow rate between Q_2 (including Q_2) and Q_4 , According to the accuracy level, it should meet the maximum allowable error of the high zone in Table 1.

5.4 Repeatability error

It should not be greater than $1/3$ of the absolute value of the maximum allowable error value given in Table 1.

5.5 Zero flow reading

It shall meet the requirements of 5.3 of GB/T 778.1-2007.

5.6 Rated operating conditions (ROC)

It shall meet the requirements of 5.4 in GB/T 778.1-2007.

5.7 Other requirements

It shall meet the requirements of 5.6 in GB/T 778.1-2007.

6.1.1 Appearance

It should have a good surface treatment, free of burrs, scratches, cracks, rust, mildew and coating peeling. The protective cover on the display device should have Good transparency, no distortion of the reading and other defects that hinder the reading.