

ICS 25.040
CCS N 18



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

GB/T 42567.4-2025

**Reference conditions and procedures for testing industrial and
process measurement transmitters - Part 4: Specific
procedures for level transmitters
(English Translation)**

Issued on: January 24, 2025

Implemented on: August 1, 2025

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Preface
Introduction
1 Scope
2 Normative references
3 Terms and Definitions
3.1 Basic Definition
3.2 Definition of level transmitter
3.2.2 Definition of pressure-based level transmitter
3.2.4 Definition of float level transmitter
3.2.6 Definition of microwave/radar level transmitter
3.2.7 Definition of optical level transmitter
3.2.9 Definition of Capacitance and Admittance Level Transmitters
3.2.10 Definition of mechanical level transmitter
3.2.11 Definition of resistance level transmitter
3.3 Measurement parameters
3.4 Definition of influence quantity
3.5 Reference to the Common Data Dictionary (CDD)
4 Overview of the main level transmitter types
4.1 Overview
4.2 Pressure-based level transmitters
4.3 Microwave/radar level transmitter
4.3.1 Overview
4.3.2 Free space radar level transmitter
4.3.3 Guided wave radar level transmitter
5 Reference test conditions
5.1 Overview
5.2 Standard reference test conditions
5.2.1 Overview
5.2.2 Environmental test conditions
5.2.3 Power supply conditions
5.2.4 Load conditions
5.2.5 Test installation location

5.3 Reference test conditions for environmental and process influencing quantities

5.3.1 General

5.3.2 Process conditions

5.3.3 Ambient atmospheric conditions

5.3.4 Mechanical vibration

5.3.5 Impact, drop and tipping

5.3.6 Power supply

5.3.7 Electromagnetic compatibility (EMC)

5.4 Reference design criteria

5.4.1 Overview

5.4.2 Enclosure protection against solid objects, liquids (IP) and impacts (IK)

5.4.3 Protection of enclosures against corrosion and erosion

5.4.4 Electrical safety (insulation resistance, dielectric strength)

5.4.5 Hazardous environment (for explosive environment)

5.4.6 Functional safety

6 Test Procedure

6.1 General requirements

6.1.1 General

6.1.2 Specific test setup and procedures

6.2 Type test under standard reference test conditions

6.2.1 General

6.2.2 Accuracy and related factors

6.2.3 Static characteristics

6.2.4 Dynamic characteristics

6.3 Type test under working reference test conditions

6.3.1 General

6.3.2 Impact of ambient temperature

6.3.3 Effect of relative humidity

6.3.4 Impact of vibration

6.3.5 Impact, drop and tipping

6.3.6 Accelerated life test

6.3.7 EMC test

6.3.8 Attachment test procedure

6.3.9 Additional tests for digital transmitters

6.4 Routine test

6.5 Acceptance, integration, periodic and maintenance testing

6.5.1 Overview

6.5.2 Periodic verification

6.5.3 Periodic calibration

7 Test reports and technical documents

7.1 Test report

7.2 Technical Documentation

7.3 Total Probability Error (TPE)

7.3.1 Overview

7.3.2 Specific error

Appendix A (Informative) Main characteristics of level transmitter

A.1 Characteristics of level transmitters

A.1.1 Overview

A.1.2 Pressure-based level transmitters

A.1.3 Microwave/radar level transmitter

A.2 Product attributes

A.2.1 Attribute library used in device class

A.2.2 Attribute value list

Appendix B (informative) Example of TPE calculation based on 7.3 and MRU and MRE

B.1 Overview of parameters used for error calculation

B.2 Example of a test report for a pressure-based level transmitter

B.2.1 Overview

B.2.2 Test protocol

B.2.3 DUT characteristics

B.2.4 TPE calculation

B.2.5 MRU calculation

B.3 Subtest process

B.3.1 Inaccuracy test

B.3.2 Ambient temperature effect test

B.3.3 Process temperature effect test

B.3.4 Long-term stability test

References

Figure 1 Schematic diagram of time value and its meaning

Figure 2 Principle of pressure-based level transmitter

Figure 3 Free space radar level transmitter

Figure 4 Guided wave radar level transmitter

Figure 5 Schematic diagram of the pressure PMT (transmitter) test setup

Figure 6 Typical test setup for radar level transmitter

Figure 7 Experimental configuration for simulating targets and environments

Figure 8 Example of test configuration for wet test

Table 1 Environmental test conditions

Table 2 Influence of various level measurement principles

Table 3 Number of test cycles, number of test points and test points 16

Table 4 Example of maximum error statement

Table A.1 Pressure-based level transmitter

Table A.2 Free space radar level transmitter

Table A.3 Guided wave radar level transmitter

Table A.4 Attribute library used in device class

Table A.5 Attribute value list

Table B.1 Abbreviations

Table B.2 DUT characteristics

Table B.3 TPE calculation

Table B.4 MRU calculation

Table B.5 Reference test equipment for inaccuracy test

Table B.6 Reference test conditions for inaccuracy test

Table B.7 Test results of inaccuracy test

Table B.8 Reference test equipment for ambient temperature influence test

Table B.9 Reference test conditions for ambient temperature effect test

Table B.10 Test results of ambient temperature effect test

Table B.11 Reference test equipment for process temperature effect test

Table B.12 Reference test conditions for process temperature effect test

Table B.13 Test results of process temperature effect test

Table B.14 Reference test equipment for long-term stability test

Table B.15 Reference test conditions for long-term stability test

Table B.16 Test results of long-term stability test

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"