

ICS 17.120.10
CCS N 12



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

GB/T 45124-2024

**Measurement of liquid flow in closed conduits - Volumetric
method**

(English Translation)

Issued on: December 31, 2024

Implemented on: July 1, 2025

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

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Reference

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" Drafting.

This document is modified to adopt ISO 8316:1987 "Measurement of liquid flow in closed conduits - Volumetric trough liquid collection method".

Compared with ISO 8316:1987, this document has made the following structural adjustments.

- Appendix A corresponds to Appendix D in ISO 8316:1987;
- Appendix B corresponds to Appendix C in ISO 8316:1987;
- Appendix C corresponds to Appendix A in ISO 8316:1987;
- Appendix E corresponds to Appendix B in ISO 8316:1987;
- Appendix H corresponds to Appendix E in ISO 8316:1987.

The technical differences between this document and ISO 8316:1987 and their reasons are as follows.

- Deleted the statement that the device needs to be subject to regular verification (see Chapter 1), which conflicts with the existing standards in my country;
- Changed the symbol table (see 3.2) to comply with the latest provisions of ISO 5168;
- Added two typical flow device schematics of static volume method (see 4.1.1), and changed the flow device principle of dynamic volume method Figure (see 4.1.2) to better adapt to the current status of domestic device technology;
- The optimal uncertainty of the device (see 4.2.1) has been changed to better adapt to the current status of domestic device technology;
- Added the uncertainty table of standard devices (see Table 2) to better adapt to the current status of domestic device technology;
- Added two accurate measurement requirements (i) and (j) (see 4.2.2) to reduce the source of error;
- Changed the cross-sectional length of the commutator trickle, added three open commutators and one closed commutator structure schematic diagram (see 5.1) to better adapt to the current status of domestic commutator technology;
- Changed the commutation cycle reading scale value (see 5.2) because the commutation cycle scale value accuracy in the industry has been improved;
- The minimum change requirement of the liquid level has been deleted. Due to different settings of the working volume, the minimum change of the liquid level is not necessarily 1m (See 5.3 of ISO 8316:1987);
- Changed the residual liquid discharge waiting time (see 5.5), based on the waiting time of the metal measuring vessel in the dripping state;
- Added device software requirements (see 5.6), because existing standard devices in the industry basically have software;
- Changed the principle description of the static volume method and the dynamic volume method (see 6.1 and 6.2) to better adapt to the current status of volume method

technology;

- Changed the number of measurements for each measuring point (see 6.4) to be consistent with the existing standards in my country;
- The structure and content of Chapter 8 (see Chapter 8) have been changed to meet the uncertainty requirements in the existing standards of my country.

The following editorial changes were made to this document.

- In order to coordinate with the existing standards, the name of the standard is changed to "Volumetric method for measuring liquid flow in closed pipes";
- Added the one-way valve identification in the volume flow device schematic diagram of the static start-stop method (see A.1);
- Added measurement control system (see Appendix D);
- Changed the query table of pure water density under standard atmospheric pressure (see Appendix E);
- Added correction for density measurement using a densitometer (see Appendix F);
- Added uncertainty calculation examples (see Appendix G);
- Changed the t distribution table (see Appendix H);
- Deleted the reference to ISO 4185 and included the document as a reference.

1 Scope

This document describes a method for determining the flow rate of a liquid in a closed conduit by measuring the volume of liquid flowing into a working volume per unit time.

(hereinafter referred to as "volumetric method"), including principle, apparatus, implementation steps, flow calculation and measurement-related uncertainty assessment.

The method described in this document is applicable to liquids that meet the following conditions.

- a) The measuring medium is a low vapor pressure liquid (to ensure that any liquid evaporating from the working volume does not affect the required measurement accuracy).
accuracy);
- b) low viscosity (will not change or unduly delay the measurement of the liquid level in the working volume);
- c) Non-toxic and non-corrosive characteristics.

Theoretically, there is no limit to the application of this method, but for practical reasons this