ANSI B109.1
Approved
April 15, 2019

DIAPHRAGM-TYPE GAS DISPLACEMENT METERS
(Under 500 Cubic Feet Per Hour Capacity)

Secretariat

400 North Capitol Street, NW – 4th Floor
Washington, DC 20001
U.S.A.

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TABLE OF CONTENTS

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PREFACE

This publication represents a basic standard for safe operation and substantial and durable construction for diaphragm-type gas displacement meters having a gas flow rating of under 500 cubic feet per hour ($14.2 m^3/h$) at 0.5 inch water column (125 Pa) differential pressure at base conditions. This work is the result of years of experience, supplemented by extensive research. The standard is designed to ensure efficient performance and substantial construction of equipment.

It is recognized that during any transition period to the metric system, sizes and dimensions need to be expressed in either the metric system or the inch-pound system or in both. In this document, both systems are used, with the inch-pound units given preference. A soft conversion from existing inch-pound values is shown. Soft conversion implies a change in nomenclature only; in this document, the alternative nomenclature (metric) is shown by using parentheses.

Nothing in this standard is to be considered as in any way indicating a measure of quality beyond compliance with the provisions it contains. It is designed to allow the construction and performance of displacement meters that may exceed the various provisions specified in any respect. In its preparation, recognition was intended to be given to the possibility of improvement through ingenuity of design. As progress takes place, revisions may become necessary. When they are believed desirable, recommendations should be forwarded to: American Gas Association, ATTN: Secretariat B109, 400 North Capitol Street, NW, SUITE 450, Washington, DC 20001, U.S.A.

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HISTORY OF THE DEVELOPMENT OF STANDARDS FOR DIAPHRAGM-TYPE GAS DISPLACEMENT METERS

In response to an expressed need within the industry for standardization of diaphragm-type gas displacement meters, the American Gas Association late in 1966 requested the establishment of a project within the American National Standards Institute for development of suitable standards for such meters. At a General Conference held on January 31, 1967, at ANSI headquarters, approval of the project scope was obtained, which was subsequently endorsed by the Mechanical Standards Board of ANSI.

The organizational meeting of ANSI Committee B109 was held on November 30, 1967, at which time five subcommittees were established to develop various sections of the standard. The first draft standard was issued in June 1970 for review and comment. This was followed by three additional drafts, each incorporating modifications made in the light of comments received.

To ensure that the standard as published would have wide acceptance, the fourth draft was distributed on an industry-wide basis and to all known interested parties. Comments received on the fourth draft were reviewed by the various subcommittees and indicated revisions were made in two additional drafts. Draft Six was reviewed by Committee B109 at its May 4, 1973, meeting and the standard approved for submittal to ANSI for endorsement as an American National Standard.

Throughout all stages of development of this standard, consideration has been given to the work done by the Task Committee on Standardization of Meter Purchase Specifications of the Operating Section of the American Gas Association as published in Gas Meter Specifications (OP-58-2, 1963).

The first edition of the diaphragm-type gas displacement standard (B109.1) was endorsed as an ANSI standard by the American National Standards Institute, Inc., on November 27, 1973. An addendum (B109.1a) was published in 1980. Separate standards were also published in 1980 for larger gas displacement meters (500 cubic feet per hour capacity and over)—B109.2 and for rotary type gas displacement meters—B109.3.

In the second edition, auxiliary devices relating only to larger capacity meters were deleted from this standard and added to other appropriate standards. Soft metric conversions and informative appendices on prover bell calibration and bar coding were added to this standard. The second edition was approved by ANSI on January 9, 1987.

In the third edition, minor editorial changes and a title correction were made. The third edition was approved by ANSI on November 12, 1992.

In the fourth edition, minor editorial changes and reaffirmation of the standard was approved by ANSI on April 13, 2000. The document was reaffirmed by ANSI on April 16, 2008 without any change to the document.

During the 2018 review cycle, the standard went through a thorough review and update. The review and reaffirmation period exceeded the five year period and ANSI withdrew the standard from publication on 4/28/2018. Work on the update continued and the standard was re-introduced with extensive changes and updates. Published as the fifth edition, the B109.1 standard provides the basis for residential diaphragm meters for the natural gas industry. Additional review and documentation are planned following this publication to further update sections to reflect current trends and technological advances pertaining to meters covered by this standard. Substantive changes have been shown by a bar [|] in the margin.

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SCOPE

This standard applies to diaphragm-type gas displacement meters, designed for revenue measurement of fuel gas, having a flow rating of less than 500 cubic feet per hour (14.16m^3/h) capacity at 0.5 inch water column (125 Pa) differential pressure at base conditions.

Part I comprises a list of definitions and terms used throughout the standard.

Part II covers the construction requirements for qualifying new-type meters in the designated flow-rate ranges.

Part III covers the performance requirements for qualifying new-type meters in the designated flow-rate ranges.

Part IV covers the “in-service” performance requirements for diaphragm-type meters in the designated flow-rate ranges.

Part V addresses installation requirements for these meters.

Part VI pertains to auxiliary devices used with gas meters covered by this standard.

Part VII covers test methods and equipment.