ANSI B109.2
Approved
March 16, 2020

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

Secretariat

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

Catalog No. X62001

First Edition–1973
Second Edition–1986
Third Edition–1992
Fourth Edition–2000
Fifth Edition–2020

American Gas Association
400 North Capitol St., NW, 4th Floor
Washington, DC 20001
U.S.A.

Catalog No. X62001

Approved
AMERICAN NATIONAL STANDARDS INSTITUTE, INC.

TABLE OF CONTENTS

TABLE OF CONTENTS ..... **i**

DISCLAIMERS AND COPYRIGHT ..... **iii**

PREFACE ..... **v**

HISTORY OF THE DEVELOPMENT OF THIS STANDARD ..... **vi**

ACCREDITED STANDARDS COMMITTEE B109 ..... **vii**

SCOPE **1**

PART I **2**
DEFINITIONS **2**

PART II **7**
CONSTRUCTION REQUIREMENTS FOR QUALIFYING NEW-TYPE METERS **7**
2.1 SCOPE 7
2.2 CONNECTION DIMENSIONS 7
2.3 METER IDENTIFICATION 9
2.4 DIAPHRAGM IDENTIFICATION 10
2.5 INLET IDENTIFICATION 10
2.6 PROTECTION OF METERS 10
2.7 SEALING 10
2.8 METER INDEX 10
2.9 CORROSION AND CHEMICAL RESISTANCE OF INTERNAL PARTS 12
2.10 CORROSION AND CHEMICAL RESISTANCE OF EXTERNAL PARTS 12
2.11 METER INDEX WINDOW IMPACT RESISTANCE 13
2.12 METER INDEX WINDOW CLEARNESS TEST 13
2.13 TEMPERATURE AND THERMAL SHOCK RESISTANCE 13
2.14 STRENGTH OF METER CONNECTIONS 14

PART III **15**
PERFORMANCE REQUIREMENTS FOR QUALIFYING NEW-TYPE METERS **15**
3.1 SCOPE 15
3.2 METER CAPACITY CLASS 15
3.3 ACCURACY OF METERS 18
3.4 METER CASE PRESSURE TEST 19
3.5 PRESSURE AND LEAK TESTS 19
3.6 NOISE AND VIBRATION 19

PART IV **20**
IN-SERVICE PERFORMANCE **20**
4.1 SCOPE 20
4.2 TEST CONDITIONS 20
4.3 IN-SERVICE PERFORMANCE PROGRAMS 20
4.4 RECORDS 22

PART V **23**
METER INSTALLATION **23**
5.1 SCOPE 23
5.2 GENERAL 23
5.3 LOCATION 23
5.4 INSTALLATION 23
5.5 ON-SITE INSPECTION 24
5.6 SPECIAL SERVICE REQUIREMENTS 24

PART VI **25**
AUXILIARY DEVICES FOR GAS METERS **25**
6.1 SCOPE 25
6.2 PRESSURE SYSTEM 27
6.3 TEMPERATURE SYSTEM 28
6.4 VOLUME INDICATOR 30
6.5 INSTRUMENT CHART DRIVES 30
6.6 CIRCULAR CHARTS 31
6.7 RECORDERS 33
6.8 AUTOMATIC INTEGRATORS 35
6.9 CONSTANT-PRESSURE-COMPENSATING INDEX 35
6.10 REMOTE METER READING DEVICES 36
6.11 INSTRUMENT ADAPTOR PLATES 37
6.12 INSPECTION AND TESTING CLASSIFICATION 38

PART VII **41**
TEST METHODS AND EQUIPMENT **41**
7.1 SCOPE 41
7.2 MEASUREMENT REFERENCE BASIS 41
7.3 UNITS OF MEASURE 41
7.4 BASE CONDITIONS 41
7.5 METER TESTING SYSTEMS 42
7.6 CALIBRATION OF METER TESTING SYSTEMS 45

APPENDIX A **48**
CONNECTION DIMENSIONS, NOMINAL **48**

APPENDIX B **49**
THREAD SPECIFICATIONS **49**

APPENDIX C **50**
GENERAL SERVICE CAPACITY EQUATION **50**

APPENDIX D **52**
METER ACCURACY **52**

APPENDIX E **54**
PROVER BELL CALIBRATION BY PHYSICAL MEASUREMENT **54**

APPENDIX F **57**
BAR CODE FOR METERS AND AUXILIARY DEVICES **57**

AMERICAN GAS ASSOCIATION (AGA)
NOTICE AND DISCLAIMER

This document was developed through a voluntary consensus standards development process via the American National Standards Institute (ANSI) essential requirements for due process for American National Standards (Edition January 2018). While the American Gas Association (AGA) administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate or verify the accuracy or completeness of any information or the soundness of any judgments contained in this publication.

The AGA disclaims liability for any personal injury, property damages or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from this publication, the use of or reliance on this publication. The AGA also makes no guarantee or warranty as to the accuracy or completeness of any information published herein. The information contained therein is provided on an "as is" basis and AGA makes no representations or warranties including any expressed or implied warranty of merchantability or fitness for a particular purpose.

In issuing and making this document available, the AGA is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is the AGA undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances. Nothing contained in this Standard shall be viewed as an endorsement by ANSI/AGA of any particular manufacturer's product.

The AGA has no power, nor does it undertake, to police or enforce compliance with the contents of this document. Nor does the AGA list, certify, test or inspect products, designs or installations for compliance with this document. Any certification or other statement of compliance with the requirements of this document shall not be attributable to the AGA and is solely the responsibility of the certifier or maker of the statement.

The AGA does not take any position with respect to the validity of any patent rights asserted in connection with any items that are mentioned in or are the subject of this publication, and the AGA disclaims liability for the infringement of any patent resulting from the use of or reliance on it. Users of this publication are expressly advised that determination of the validity of any such patent rights and the risk of infringement of such rights is entirely their own responsibility.

Users of this publication should consult applicable federal, state, and local laws and regulations. The AGA does not, through this publication, provide legal advice for any purpose or intend to urge action that is not in compliance with applicable laws and this publication may not be construed as doing so.

Changes to this document may become necessary from time to time. If changes are believed appropriate by any person or entity, such suggested changes should be communicated to AGA in writing using the form found at the end of the document titled, Form For Proposals on ANSI B109.2 and sent to: American Gas Association, ATTN: Secretariat B109, 400 North Capitol Street, NW, Suite 450, Washington, DC 20001, U.S.A. Suggested changes must include: contact information, including name, address and any corporate affiliation; full name of the document; suggested revisions to the text of the document; the rationale for the suggested revisions; and permission to use the suggested revisions in an amended publication of the document.

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 500 cubic feet per hour capacity (14.16 m^3/h) and over 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 help 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 the Chairman of ANSI B109 Committee, Operating and Engineering Section, American Gas Association, 400 North Capitol Street, NW, 4th Floor, Washington, DC 20001, U.S.A.

Users of this document should consult applicable federal, state and local regulations. The American Gas Association (AGA) does not, by the publication of this document, intend to present specifications that are not in compliance with applicable rules, and this document may not be construed as doing so.

NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute, Inc. (ANSI) require that action be taken to reaffirm, revise or withdraw this standard no later than five years from the date of publication. When any revisions are deemed advisable, recommendations should be forwarded to the **American Gas Association.** A form is included for that purpose at the end of this standard. Purchasers of American National Standards may receive current information on all standards by writing to the American National Standards Institute, Inc., 25 West 43rd Street, 4th Floor, New York, NY 10036, U.S.A.; by calling (212) 642-4900; by faxing ANSI at (212) 398-0023; or by visiting ANSI's World Wide Web site at http://www.ansi.org. To purchase additional copies of this standard, visit Techstreet's website at http://www.techstreet.com/aga. or go to AGA's web page at https://www.aga.org/news/publications-store/

HISTORY OF THE DEVELOPMENT OF THIS STANDARD

Following approval in 1973 of the Standard for Gas Displacement Meters (Under 500 Cubic Feet per Hour Capacity), ANSI B109.1, a subcommittee was appointed to develop a standard covering gas displacement meters with capacities of 500 cubic feet per hour and over.

Six drafts of the standard were prepared and reviewed by the subcommittee before a final draft was prepared and submitted to American National Standards Committee B109 for its consideration on June 14, 1979. Subsequent to adoption by the committee, the first edition of the standard for gas displacement meters (500 cubic feet per hour capacity and over) was approved as an American National Standard by the American National Standards Institute, Inc., on April 14, 1980.

The second edition was approved on January 9, 1987 and included a new part on auxiliary devices for gas meters, plus an informative Appendix on bar coding.

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

In the fourth edition, several additions/deletions were made to avoid ambiguity, to make it more consistent with industry practices, and to improve upon some requirements. Several 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 in 2020, the B109.2 standard provides the basis for small commercial and larger diaphragm meters used within the natural gas industry. Additional review and documentation are planned to follow this publication to further update sections, as necessary, to reflect current trends and technological advances pertaining to meters covered by this standard. Substantive changes are shown by a bar [|] in the margin.