



ANSI/AWWA **B130-23**

(Revision of ANSI/AWWA B130-18)

AWWA Standard

Membrane Bioreactor Systems

Effective date: May 1, 2024.

First edition approved by Board of Directors Jan. 20, 2013.

This edition approved Oct. 23, 2023.

Approved by American National Standards Institute Sept. 25, 2023.



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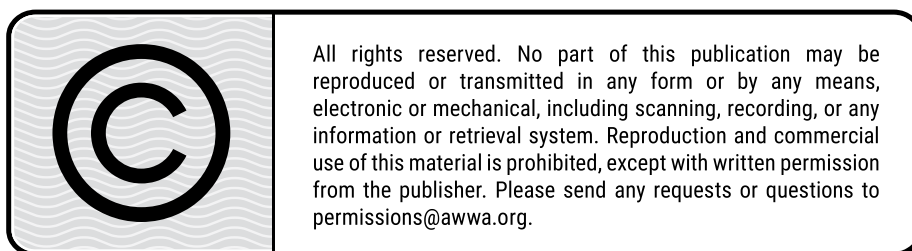
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ISBN-13, print: 978-1-64717-162-9

ISBN-13, electronic: 978-1-61300-691-7

DOI: <http://dx.doi.org/10.12999/AWWA.B130.23>

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Printed in USA

Committee Personnel

The AWWA Standards Subcommittee on Membrane Bioreactors, which reviewed and approved this standard, had the following personnel at the time:

Scott D. Levesque, *Chair*

General Interest Members

D.R. Brown, CDM Smith, Louisville, Colo.

G.V. Crawford, Toronto, Ont., Canada

F.G. Edwards, University of Arkansas Department of Civil Engineering, Fayetteville, Ark.

V.S. Frenkel, Greeley and Hansen, San Francisco, Calif.

J. Hrdlicka (*liaison, nonvoting*), Standards Engineer Liaison, AWWA, Denver, Colo.

S.D. Levesque, Jacobs, Atlanta, Ga.

M.L. Pellegrin, HDR Engineering Inc., Tampa, Fla.

Producer Members

K.P. Lange-Haider, Nanostone Water Inc., Waltham, Mass.

M. Singh, Koch Membrane Systems, Wilmington, Mass.

M.T. Sparks, Kruger Inc., Cary, N.C.

User Members

H. Seah, Public Utilities Board, Singapore

A. Zamarro, Evoqua Water Technologies, Tewksbury, Mass.

The AWWA Standards Committee on Membranes, which reviewed and approved this standard, had the following personnel at the time:

Russell R. Ferlita, *Chair*

General Interest Members

D.R. Brown, CDM Smith, Louisville, Colo.

S.D.N. Freeman, Membrane Medic, Madison, Wis.

R.R. Ferlita, Mead & Hunt, Tampa, Fla.

V.S. Frenkel, Greeley and Hansen, San Francisco, Calif.

M. Graves, Weston Solutions, Austin, Tex.

J. Hrdlicka (*liaison, nonvoting*), Standards Engineer Liaison, AWWA, Denver, Colo.
R.S. Hughes (*liaison, nonvoting*), Standards Council Liaison, Audubon, Pa.
D.J. Paulson, Water Think Tank LLC, Minnetonka, Minn.
A.J. Slotterback, Burns & McDonnell Engineering, Kansas City, Mo.
H. Steiman, Consultant, Newton, Mass.
T. Walker, Hazen and Sawyer, Tempe, Ariz.

Producer Members

S. Dewitt, Arkema, King of Prussia, Pa.
P.M. Gallagher, Evoqua, Tewksbury, Mass.
F. Knops, Pentair, Enschede, Netherlands
W.P. Kosar Jr., Arkema Inc., King of Prussia, Pa.
K.P. Lange-Haider, Nanostone Water Inc., Waltham, Mass.
B. Mack, Consultant, Natick, Mass.
J. Swiezbin, Pall Corporation, Port Washington, N.Y.

User Members

A.M. Bankston, Minneapolis Water Works, Minneapolis, Minn.
J.T. Morris, Metropolitan Water District of Southern California, San Marino, Calif.
D. Schwartz, City of Waynesboro, Waynesboro, Va.
H. Seah, Public Utilities Board, Singapore
T.M. Smith, Otay Water District, Spring Valley, Calif.
T. Suydam, San Diego County Water Authority, Escondido, Calif.

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Foreword

This foreword is for information only and is not a part of ANSI/AWWA B130.

I. Introduction.

I.A. *Background.* The purpose of ANSI/AWWA B130 is to provide purchasers with a standard for the purchase and installation of membrane bioreactor (MBR) membrane equipment systems.

A wealth of information about MBRs and their design is available from various sources, including *Journal AWWA, Design of Water Resource Recovery Facilities*,* *Membrane Bioreactors*,† and other references listed in Appendix A.

I.B. *History.* The MBR process was introduced by the late 1960s, as soon as commercial-scale ultrafiltration (UF) and microfiltration (MF) membranes were available. The concept of replacing the settling tank of the conventional activated-sludge process with a filtration membrane was attractive, but it was difficult to justify the use of such a process because of the high cost of membranes, low economic value of the product (tertiary effluent), and the potentially rapid loss of performance caused by membrane fouling.

The breakthrough for the MBR came in 1989 with the idea of submerging membranes in the bioreactor (Yamamoto et al.). Until then, MBRs generally had the separation device located external to the reactor (side-stream MBR).

Regulatory concerns may or may not be the primary driver for the use of MBR treatment systems, but in all cases the regulations must be assessed for applicability.

This MBR standard is intended to aid purchasers in the selection and procurement of MBR membrane equipment systems and in the regulatory permitting process. This standard should be considered as a guideline with minimum requirements to ensure the required elements of planning, procurement, selection, construction, and commissioning of an MBR-based treatment system. However, its proper application requires it to be coupled with a thorough professional review of the specific water treatment case and site-specific conditions.

The AWWA Standards Council authorized a new AWWA standard for membrane biological treatment systems on March 2, 2009, and assigned the task of development to the AWWA Standards Committee on Membrane Standards.

* *Design of Water Resource Recovery Facilities*, 6th edition, MOP 8. Water Environment Federation. (2018).

† *Membrane Bioreactors*, MOP 36. Water Environment Federation. (2011).

The first edition of the new standard ANSI/AWWA B130-13, Membrane Bioreactor Systems, was approved by the AWWA Board of Directors on January 20, 2013. The standard was approved and promulgated during the activities of the AWWA Standards Committee on Membrane Standards. The last edition was approved on January 20, 2018. This edition was approved on October 23, 2023.

II. Special Issues.

This standard has no applicable information for this section.

III. Use of This Standard. It is the responsibility of the user of an AWWA standard to determine that the products described in that standard are suitable for use in the particular application being considered.

III.A. Purchaser Options and Alternatives. The following information should be provided by the purchaser:

1. Standard used—that is, ANSI/AWWA B130, Membrane Bioreactor Systems, of latest revision.
2. Details of federal, state, provincial, territorial, and local requirements (Sec. 4.1.1).
3. Required spare parts (Sec. 4.6.6.1).
4. Repair, replacement, and retesting requirements (Sec. 5.1).
5. Plant inspection requirements (Sec. 5.2.2).
6. Request for a copy of a written quality control and inspection practices (Sec. 5.2.3).
7. Installation requirements (Sec. 5.2.5).
8. Definition of responsibilities during startup (Sec. 5.3.1.1).
9. Demonstration testing requirements (Sec. 5.5.3)
10. Performance testing requirements (Sec. 5.5.4).
11. Performance test report requirements (Sec. 5.5.5).
12. Affidavit of compliance requirements (Sec. 6.3).

III.B. Modification to Standard. Any modification to the provisions, definitions, or terminology in this standard must be provided by the purchaser.

IV. Major Revisions. Major revisions made to the standard in this edition include the following:

1. Several revisions and additions to definitions in Sec. 3.
2. Revisions to equipment requirements in Sec. 4.2.
3. Revisions to performance criteria requirements in Sec. 4.5.1.
4. Revisions to component types, materials, chemicals, and cleaning requirements in Sec. 4.6.

V. Comments. If you have any comments or questions about this standard, please call AWWA Engineering & Technical Services at 303.794.7711; write to the department at 6666 West Quincy Avenue, Denver, CO 80235-3098; or email at standards@awwa.org.

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ANSI/AWWA B130-23
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AWWA Standard

Membrane Bioreactor Systems

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard sets minimum requirements for membrane bioreactor (MBR) membrane equipment systems for water reclamation, water recovery, and/or wastewater treatment systems.

Sec. 1.2 Purpose

The purpose of this standard is to provide a minimum set of requirements for MBR membrane systems used for water reclamation, water recovery, and/or wastewater treatment systems. This standard is intended to assist with the design, procurement, installation, and commissioning of MBR membrane equipment systems.

Sec. 1.3 Application

This standard can be referenced for design, procurement, installation, and commissioning of MBR membrane equipment systems used for water reclamation, water recovery, and/or wastewater treatment systems.

SECTION 2: REFERENCES

This standard references the following document. In its latest edition, it forms a part of this standard to the extent specified within the standard. In any case of conflict, the requirements of this standard shall prevail.

US Environmental Protection Agency.* 2005. *Membrane Filtration Guidance Manual*. EPA 815-R-06-009. Washington, DC: Office of Water.[†]

SECTION 3: DEFINITIONS

The following definitions shall apply in this standard:

1. *Activated sludge*: The biologically active solids in the process.
2. *Activated sludge process*: A biological treatment process in which flocculated microorganisms are suspended in wastewater to facilitate the removal of organic matter and nutrients.
3. *Aerobic*: Condition in which oxygen is the primary electron acceptor in a microbial process.
4. *Aerobic solids retention time (SRT)*: The dwell time for solids in the containment vessel (e.g., activated sludge tank, digester, fermenter) in an aerobic treatment process. See also *Solids retention time* for total SRT.
5. *Air scour*: Aeration on or to the feedwater side of the membrane used to reduce the deposition or formation of membrane foulants.
6. *Anaerobic*: Condition characterized by the absence of oxygen, nitrate, or nitrite as available electron acceptors. Also condition in which enhanced biological phosphorus removal can occur.
7. *Anoxic*: Condition in which nitrate or nitrite is the primary electron acceptor. Also condition in which denitrification can occur.
8. *Backwash (BW)*: Pumping filtrate water or a mixture of chemical and filtrate water through the membrane in the reverse direction of flow.
9. *Biofilm*: An accumulation of microbial growth on the surface of an object.

* Environmental Protection Agency, 1200 Pennsylvania Avenue, N.W., Washington, DC 20460.

[†] The manual is for the treatment and production of drinking water. It is referenced for technical concepts that are described in the manual related to membrane filtration system designs and membrane integrity testing methods.