ASME PVHO-2–2025
(Revision of ASME PVHO-2–2019)

Safety Standard for Pressure Vessels for Human Occupancy: Post-Construction Requirements

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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FOREWORD

In 1998 a PVHO Task Group was formed to investigate the need for In-Service Rules and Guidelines for Pressure Vessels for Human Occupancy. Simultaneously, a Sub Task Group was formed to investigate the issue of acrylic window design life versus service life. The design life is based on the PVHO window being exposed to the maximum allowable working pressure (MAWP), at the maximum rated temperature, for the maximum number of (design) cycles, in an outdoor weathering environment. The majority of PVHOs are not operated to such extremes, and service life may indeed be longer than design life. Conversely, if a window is not properly cared for (i.e., becomes exposed, either operationally or nonoperationally, to other detrimental factors that are not, and cannot be, factored into the design life), then the actual service life could be much shorter than the design life. Thus, the recommendation was made that design life and service life be addressed as two different subjects. In 1999 the In-Service Task Group became a PVHO subcommittee, with the most immediate task being the establishment of in-service criteria for PVHO windows and viewports.

This Standard provides the necessary in-service criteria to supplement Section 2, Viewports, of ASME PVHO-1, which applies to new construction only. By comparison, this Standard applies to all ASME PVHO-1 acrylic windows, regardless of their date of manufacture. This Standard consists of both technical criteria and guidelines. They are intended to provide guidance to the user and the jurisdictional authority in regard to the establishment of potential service life, and the necessary care, inspection, and repair during that service life—depending on the actual service conditions to which the PVHO and windows have been, or will be, exposed.

Finally, this Standard was prepared as a "stand-alone" document. All forms additional to those normally supplied with the window in accordance with ASME PVHO-1, which may be necessary throughout the service life of the window, are provided herein. Similarly, all necessary ASME PVHO-1 technical data applicable to service and repair (if required) are also provided in this Standard.

The 2019 edition of ASME PVHO-2 further develops and clarifies the in-service guidelines for PVHOs. The requirements for in-service pressure testing gauge calibration have been updated. Nonmandatory Appendix A, covering checklists and logs for PVHO operation, has been deleted, and the text under this appendix has been integrated into the general requirements of Section 1. New testing criteria for increasing the 40,000-hr design life of acrylic windows have been incorporated under Section 2. Additionally, new forms have been added, and some of the existing forms have been updated.

Sections on the following topics are in development are in development and may be included in future editions: quality assurance for PVHO manufacturers, piping systems, medical hyperbaric systems, diving systems, and submersibles.

Previous editions of this Standard were issued in 2003, 2012, 2016, and 2019.

The 2025 edition of this Standard was approved by the American National Standards Institute as an American National Standard on May 7, 2025.

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In addition, the committee may post errata on the committee web page. Errata become effective on the date posted. Users can register on the committee web page to receive email notifications of posted errata.

This Standard is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number, the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

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(a) The most common applications for cases are

(1) to permit early implementation of a revision based on an urgent need

(2) to provide alternative requirements

(3) to allow users to gain experience with alternative or potential additional requirements prior to incorporation directly into the Standard

(4) to permit the use of a new material or process

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(c) A proposed case shall be written as a question and reply in the same format as existing cases. The proposal shall also include the following information:

(1) a statement of need and background information

(2) the urgency of the case (e.g., the case concerns a project that is underway or imminent)

(3) the Standard and the paragraph, figure, or table number

(4) the editions of the Standard to which the proposed case applies

(d) A case is effective for use when the public review process has been completed and it is approved by the cognizant supervisory board. Approved cases are posted on the committee web page.

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ASME PVHO-2–2025
SUMMARY OF CHANGES

Following approval by the ASME PVHO Standards Committee and ASME, and after public review, ASME PVHO-2–2025 was approved by the American National Standards Institute on May 7, 2025.

The title of ASME PVHO-2–2025 has been revised. In addition, ASME PVHO-2–2025 includes the following changes identified by a margin note, **(25)**.

Page	*Location*	*Change*
1	1-1	Subparagraph (a) revised in its entirety
2	1-3.4	Revised in its entirety
3	1-7	Revised
3	1-7.1	Revised in its entirety
3	1-7.2	Second paragraph revised
7	2-4.4	Revised
11	2-7.1	General Note (b) revised
24	Mandatory Appendix I	Definition of *PVHO system boundary* added
27	Mandatory Appendix II	Updated
33	Table IV-1-2(a)	Title revised
34	Table IV-1-2(b)	Title revised
44	Nonmandatory Appendix A	Deleted
45	B-3.1	Subparagraph (i) revised
46	B-4	First sentence revised
46	B-5.1.3	Revised

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Section 1
General

(25) 1-1 INTRODUCTION AND SCOPE

(a) This Standard provides requirements for the operation and maintenance of PVHOs and PVHO systems that were designed, constructed, and tested in accordance with ASME PVHO-1.

(b) This Standard provides technical criteria for the user to establish the serviceability of a PVHO acrylic window under its specific environmental service conditions. Windows in protected environments as well as those in severe environments are addressed. Judicious use of this Standard will allow the user and the jurisdictional authority, if applicable, to determine when a PVHO acrylic window requires replacement.

1-2 RESPONSIBILITIES AND JURISDICTIONAL CONSIDERATIONS

1-2.1 User's Responsibilities

The PVHO and PVHO systems user shall provide the designer with information regarding the service conditions that the PVHO and PVHO systems may encounter during their service life. The user shall protect the PVHO and its systems from hazards, and ensure they are used within their design limitations. It is the user, and not the designer or fabricator, who is responsible for determining the safe service life in accordance with the technical criteria and guidelines herein. The user is responsible for retaining all documentation for each PVHO and its associated systems, and shall establish a program of periodic inspection to determine the need for repair or replacement of any part, in accordance with the requirements listed in this Standard. For window repair and replacement requirements, refer to Section 2.

1-2.2 Jurisdictional Considerations

The operation of each PVHO is typically governed under specific rules of the jurisdiction in which it is operated. (Examples include, but are not necessarily limited to, the state, the U.S. Food and Drug Administration, and the U.S. Coast Guard.) This Safety Standard is intended to complement the jurisdictional requirements (i.e., to provide guidance to both users and jurisdictional authorities in regard to in-service requirements for the PVHO, acrylic windows, and PVHO systems). The responsibility for compliance with jurisdictional in-service requirements, which may become invoked as a result of the technical criteria and guidelines as set forth herein, lies with the user.

1-3 IN-SERVICE EVALUATIONS, REPAIRS, AND MODIFICATION OF PVHOs

1-3.1 In-Service PVHO Evaluation and Testing

The owner shall be responsible for performing periodical pressure testing of the PVHO pressure boundary, pressurized systems, and PVHO operational systems. Test pressures shall be at maximum operating pressure and not exceed the maximum allowable working pressure of the components or systems being tested. These tests shall be performed and documented at a periodicity established by the user, manufacturer, and applicable jurisdiction.

Pressure testing shall be performed on any valve, fitting, and piping or tubing that penetrate the PVHO pressure boundary following reassembly or replacement. The test boundary shall include the first stop valve both upstream and downstream of the reassembled or replaced component.

Pressure testing after pressure vessel or piping weld repairs shall be a hydrostatic or pneumatic test and shall follow the applicable pressure vessel or system component code or standard.

New pressure boundary components (i.e., valve, piping, and windows) shall be hydrostatically or pneumatically tested in accordance with the applicable pressure vessel or system component code or standard.

1-3.2 PVHO Windows and Viewports

The owner shall be responsible for ensuring that in-service viewport evaluations, window replacements, and inspections are performed in accordance with this Standard.

(a) PVHO acrylic windows shall be evaluated and, if necessary, repaired per subsections 2-4 through 2-6.

(b) The service life of acrylic windows shall be determined in accordance with para. 2-4.4 and subsection 2-7.

(c) Replacement windows shall meet PVHO design requirements for the viewport.