International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Overview of the ASME Boiler and Pressure Vessels, U Stamps Certification for Pressure Vessels

Dabhade Roshan Megharaj

Professor, Matoshree College Nashik

Abstract

The American Society of Mechanical Engineers (ASME) Code and Sections are important for the design, manufacturing, and maintenance of mechanical systems and components. This paper will present importance of ASME U stamp certification which is crucial for ensuring Boiler and Pressure Vessels quality, safety, and compliance with industry standards. ASME U stamp certification which is accepted across the more than 100 nations. This paper also covers ASME U stamp requirements, Certificate duration, Certification processes, and application of U stamp and importance of Single Certification Mark for U stamp

Keywords: U stamp, Boiler, Pressure Vessel, ASME

1. Introduction

The American Society of Mechanical Engineers (ASME) is a professional organization that sets codes and standards for the design, manufacturing, and maintenance of mechanical systems and components. Established in 1880, ASME works to advance engineering knowledge and practice through standards development, certification, and education. ASME certification is a process through which an organization demonstrates that it meets specific standards set by the American Society of Mechanical Engineers (ASME) for various aspects of engineering and manufacturing. This certification is crucial for ensuring quality, safety, and compliance with industry standards.

Table 1: ASME Boiler and Pressure Vessel Code Sections.

Section I.	Rules for construction of power boilers
Section II.	Materials Part A – Ferrous material specifications Part B – Nonferrous material specifications Part C - Specifications for welding rods, Electrodes and filler materials Part D –Properties
Section III.	Rules for Construction of Nuclear Facility Components
Section IV.	Rules for construction of heating boilers
Section V.	Non-destructive Examination
Section VI.	Recommended Rules for the Care and Operation of Heating Boilers

Section VII.	Recommended Guidelines for the Care of Power Boilers
Section VIII.	Pressure Vessels
Section IX.	Qualification standard for welding and brazing producers, welders, bracers and welding and brazing operators
Section X.	Fibber-Reinforced Plastic Pressure Vessels
Section XI.	Rules for In-service Inspection of Nuclear Power Plant Components
Section XII.	Rules for Construction and Continued Service of Transport Tanks

SECTION VIII Pressure Vessels:

Division I provides requirements applicable to design, fabrication, Inspection, testing and certification of pressure vessel operating either internal or external pressure exceeding 15 psig. Such vessels may be fired or unfired. This pressure may be obtained from external source or by the application of heat from a direct or indirect source or combination of both. Division I provide additional guidelines for designing pressure vessels, explaining non-destructive examination methods and standards for accepting inspections. The section also outlines rules for using the ASME certification mark with the U, UM, and UV designators.

Table 2 :ASME BPVC Certificates of Authorization Validity of Certificates and AIA Agreement Requirements

BPVC Section	Certificates of Authorization	Certificate Valid For (In Years)	AIA Agreement Required (Yes/No)
Section VIII, Div. 1	U- Pressure Vessels	3	YES
	UM- Miniature Pressure Vessels	1	YES1
	UV- Pressure Vessel Pressure Relief Valves (Div. 1 and Div. 2)	3	No
	UD- Pressure Vessel Pressure Relief Devices (Div. 1 only)	3	No
	PRT- Parts Fabrication	3	Yes
Section VIII, Div. 2	U2-Pressure Vessels (Alternative Rules for Pressure Vessels)	3	Yes
Section VIII, Div. 3	U3- High Pressure Vessel	3	Yes
	UV3- High Pressure Vessel Pressure Relief Valves	3	No
	UD3- High Pressure Vessel Pressure Relief Devices	3	No

The ASME U Stamp is a certification mark issued by the American Society of Mechanical Engineers (ASME) for manufacturers of pressure vessels. It indicates that the manufacturer's processes and products comply with the ASME Boiler and Pressure Vessel Code (BPVC), specifically Section VIII, which governs the design and fabrication of pressure vessels. The U Stamp certifies that a pressure vessel has been designed and constructed according to the ASME BPVC. This includes ensuring the vessel meets all the safety, design, material, and testing standards required by the code.

2. ASME U Stamp requirements

The pressure vessels under ASME U stamp requirements are specifically inspected by a third-party authorized inspector. The inspector must review and approve the calculations as well as witness the ASME hydro test. Such inspectors are commissioned by the National Board of Boiler and Pressure Vessel Inspectors. A complete data report is furnished in form U-1 containing the signature of the authorized inspector. The manufacturers of such pressure vessels need to be registered with the National Board for the production of ASME U-stamped pressure vessels. Also, they need to maintain a permanent data record of all pressure vessels

3. ASME U stamp Pressure Vessel is manufactured as per latest edition of ASME Code which follows:

- Raw material must meet detail specifications and tested, inspected by AI before they can be used.
- Weld Material must meet detail specifications before they can be used.
- Welder must be trained and then ASME certified.
- Material thickness and vessel calculation must meet ASME controlled standards for required operating conditions
- Third Party Inspection Company do inspection of industry and inspect every vessel that is to be U stamped form initial phase to final phase and must sign off on each vessel.
- Recertification audit is necessary every 3 years by national board of pressure vessel.

4. Manufacturers who want to register for ASME U stamp Certification must undergo following steps.

- Preparation Stage: Applicant Company must give all requirements, and fill up all checklists.
- Application stage: Submit the complete application along with a signed Accreditation and Certification Agreement Form and the required fee.
- Assessment Stage: ASME review team will examine the design, manufacturing, inspection, and quality system of the applicant. Once the assessment is complete, the team will submit an evaluation report to the higher authority.
- Certification Stage: Once the applicant successfully demonstrates the implementation of quality programs in every stage of vessel manufacturing, he is entitled to the ASME certification. Upon receipt of the accreditation, the manufacturer can stamp the ASME mark on the vessel's surface or Name plates.

5. Single Certification Mark for U stamp

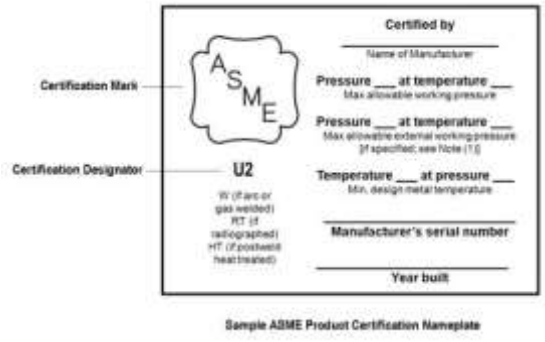

Figure 1 Single Certification Mark for U stamp Section VIII, Division 2

ASME provides 28 separate Certification Marks across the more than 100 nations in which these marks are currently used on products. In order to simplify ASME multiple marking processes and more effectively manage numerous global relationships, ASME has announced the introduction of a new single Certification Mark. Instead of 28 separate Certification Marks now there is single comprehensive mark. To maintain a link to the current marks, the new mark is used in conjunction with a "Certification Designator" to indicate the applicability of the certification. The image shows an example of how the new mark is used on a nameplate.

6. Benefits of ASME U stamped Pressure Vessels:

- Enhanced safety: The Primary objective of ASME is to ensure safety of Human, Equipment and environment and reduce risk of sudden failure, such as leakages rupture.
- Increase Reliability: high durability, long life and reliability, low maintenance cost and enhanced operational efficiency and reduce down time of pressure vessel.
- Regulatory Compliances: Many company and regulatory bodies make compulsory use of ASME U Stamp Pressure vessels.
- Global Acceptance and marketability: The ASME U stamp is accepted worldwide as symbol of quality and company. International market is open for ASME U Stamp registered companies.
- Customer satisfaction: Costumers search for company which are ASME U Stamp registered companies.

7. Application of ASME U Stamped Pressure Vessels

- Oil and Gas Industries
- Fertilizer and chemical processing plants
- Power generation plants
- Food and Beverage Industries
- Pharmaceutical Manufacturing

Conclusion:

The ASME U Stamp is a certification mark issued by the American Society of Mechanical Engineers (ASME) for manufacturers of pressure vessels. It indicates that the manufacturer's processes and products comply with the ASME Boiler and Pressure Vessel Code (BPVC), specifically Section VIII, which governs the design and fabrication of pressure vessels. To make simplicity Single Certification Mark for U stamp is used. Recertification of U stamp is necessary need to be done in every 3 years. U stamp is more beneficial for Enhanced safety, Increase Reliability, Regulatory Compliances and U stamp is Global Accepted more than 100 nations. By U stamp Customer satisfaction more in Oil and Gas Industries, Fertilizer and chemical, Pharmaceutical, Power generation etc. sector Industries.

References

1. The American Society of Mechanical Engineers (www.asme.org)
2. BPV Certification Program ASME BPV-Gui-02 Issue 1, Revision 7 10-15-2023
3. Boiler and Pressure Vessel Certificates of Authorization and the certification mark BPV-Guide-03 Issue 1, Rev. 2 05-12-2023

4. The National board & ASME Guide, NB -57, Rev. 13 (04/22)
5. ASME Manufacturer's data report forms, can be found: www.asme.org

Licensed under Creative Commons Attribution-ShareAlike 4.0 International License