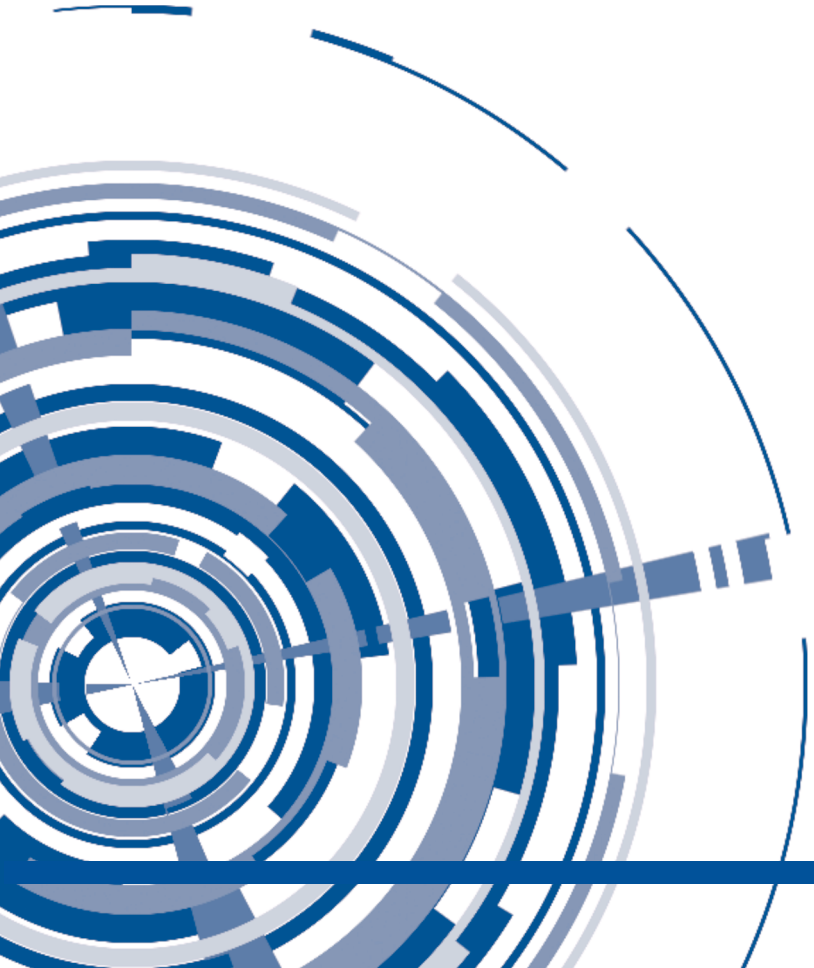
ASME PTB-11-2017

Guide for ASME BPVC Section I Stamp Holders



ASME
SETTING THE STANDARD

PTB-11-2017

GUIDE FOR ASME SECTION I STAMP HOLDERS

USE OF ASME BOILER & PRESSURE VESSEL CODE SECTION I TO MEET THE EUROPEAN UNION PRESSURE EQUIPMENT DIRECTIVE (2014/68/EU)

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FOREWORD

This Guide is a comprehensive review of the European Pressure Equipment Directive (PED) and the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPVC) Section I. It also addresses the recent revisions (alignment) of the PED in accordance with the European Union's new legislative framework.

ASME has received requests from all over the world to provide guidance to manufacturers who have been or will be impacted by the PED. This document provides that guidance. Manufacturers of BPVC Section I power boilers will find this document to be a useful tool when working with a notified body toward compliance with the PED and applying compliance marking to their products.

This document begins with an explanation of the new European approach and continues with the goals of the PED and a description of its scope of coverage. The document then offers an in-depth analysis of the PED concept of categories and the various combinations of conformity assessment modules that can be used for each category. Each of the PED essential safety requirements are then covered, including materials, use of notified bodies, and requirements for compliance marking.

The reader is presented next with a detailed comparison of the PED with BPVC Section I, followed by a modified version of Annex Z for BPVC Section I. This Annex Z provides instructions regarding what additional tasks must be completed to meet the administrative requirements of the PED. Visit https://ec.europa.eu/growth/sectors/pressure-gas/pressure-equipment/directive_en for more information.

The author acknowledges, with deep appreciation, the contributions of Anne Chaudouet of France, the review and comments by Peter Hanmore of the United Kingdom, the members of the ASME peer review group, and Luis Pulgarin of ASME ST-LLC in preparing this PED Guide.

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ABBREVIATIONS AND ACRONYMS

ACCP	ASNT Central Certification Program
ASME	American Society of Mechanical Engineers
ASNT	American Society for Nondestructive Testing
BPVC	ASME Boiler and Pressure Vessel Code
CE	Marking that indicates compliance with European Directives
CEN	European Committee for Standardization
DG	Directorate-General
EAM	European Approval of Materials
EC	European Commission or European Community
ESR	Essential Safety Requirements
EN	European Standards
EU	European Union
ISO	International Organization for Standardization
MAWP	Maximum Allowable Working Pressure
NB	Notified Body
NDE	Nondestructive Examination
NDT	Nondestructive Testing
PED	Pressure Equipment Directive
PMA	Particular Material Appraisal
QA	Quality Assurance
QC	Quality Control
RT	Radiographic Testing
RTPO	Recognized Third Party Organization
SEP	Sound Engineering Practice
USD	United States Dollars
UT	Ultrasonic Testing
WG	Working Group

1 INTRODUCTION

When the *EC Pressure Equipment Directive (PED) 97/23/CE* was adopted in May 1997, it became clear that pressure equipment designed and built to standards other than European standards could carry the compliance (CE) marking. This was made possible by the European Union (EU) approach, in which Essential Safety Requirements (ESR) were established in the PED, and standards are used to support them. The PED has now been aligned with the new legislative framework and replaced by Directive 2014/68/EU, issued 15 May 2014 [1]. The new PED 2014/68/EU becomes effective on July 19, 2016, and PED 97/23/EC is withdrawn on this date.

The new PED 2014/68/EU includes several important changes, which are discussed in this Guide. Some of these are listed below:

- All pressure equipment CE marked since June 1, 2015 must have its fluid group classification determined in accordance with Article 13 of the new PED.
- Annex I of the new PED requires the manufacturer to analyze hazards and risks as they apply to the pressure equipment.
- Module A1 has been replaced by Module A2, Module C1 has been replaced by Module C2, Module B1 has been replaced by Module B (design type), and Module B has been replaced by Module B (production type). The requirements in the new modules remain essentially the same as in the old Modules.

The purpose of this Guide is to update the previous ASME guide for BPVC Section I vessels in accordance with PED 2014/68/EU, to provide analysis of the PED, and to compare its requirements with the design, construction, and administrative requirements of BPVC Section I. The first portion of this Guide consists of Chapters 1 through 11, which provide an overview of the PED and important basic information on the entire directive, and identify specific issues of higher importance. The next major portion are Chapters 12 and 13, which provide a comparison of the PED and BPVC Section I requirements, including commentary on both the PED ESR (Annex I), and on BPVC Section I. Chapter 13 provides BPVC Section I users with additional considerations on how to augment their current practices to meet all ESRs of the PED. Chapter 14 provides comments on PED guidelines related to PED 2014/68/EU. Appendices A – I include information and discussion of other issues pertaining to the PED that are not included in previous sections of this Guide, including graphs of the various fluid categories.

It is the intent that this Guide will form the basis for an understanding between manufacturers and Notified Bodies (NBs) regarding the use of BPVC Section I as the basis for compliance with the PED. Having such a uniform approach will benefit not only manufacturers and NBs, but also users of pressure equipment.

Several PED information resource websites provide the latest information on the status of EU approval of materials, names, contact information for all NBs, and other valuable news and developments. These are:

- http://ec.europa.eu/enterprise/sectors/pressure-and-gas/documents/ped/index_en.htm
- http://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/pressure-equipment/index_en.htm
- http://ec.europa.eu/enterprise/newapproach/nando/index.cfm?fuseaction=directive.notifiedbody&dir_id=19

2 THE EUROPEAN CONTEXT

2.1 Main Concepts of New Directives

(a) Before 1985, there were very few European directives. They had to contain all technical requirements and had to be applied unanimously.

(b) In 1985, a *New Approach to Technical Harmonization and Standards* was established. The main objectives were to:

(1) Remove technical barriers to trade to permit free movement of goods throughout the EU
(2) Implement common regulations and common standards throughout the EU

(c) The fundamental principles of the *New Directives* are as follows:

(1) Directives are fully mandatory throughout the EU and supersede national regulations.
(2) Directives contain only ESR, which are defined in terms of general safety objectives to enforce a common high level of protection in the EU regarding the hazards inherent to the product. Only harmonized standards provide the presumption of conformity. There are numerous European Standards (ENs) that do not.
(3) ENs will be explicit and quantify ESR to achieve these safety objectives. Use of these ENs is not mandatory, but products complying with these standards are presumed to comply with the ESR of the PED.
(4) Each Directive sets out conformity assessment procedures to ensure that the product complies with all the requirements of the PED. These procedures are selected from European Council Decision No. 768/2008/EC of July 9, 2008 and are adapted to the products covered by each directive.
(5) Each product covered by a Directive must be in full conformity with its requirements and must be CE marked, which will ensure free movement throughout the EU.
(6) A product may be subject to several directives. The placing on the market and putting into service can only take place when the product complies with the provisions of all applicable directives. Additional comments on simultaneous application of European Directives are provided in Appendix I of this Guide.

2.2 Terms Used in European Directives

Appendix A: in this Guide gives a definition of the main terms used in the PEDs, and especially in the PED. These terms are identified in this Guide by an initial capital letter (notified body, marking, etc.). Other abbreviations are found in the “Abbreviations and Acronyms” table on page vii of this publication.

3 PED OVERVIEW

3.1 Introduction

3.1.1 General

Pressure components present inherent hazards due to the potential energy of their content, especially for gas. As a consequence, most industrial countries have regulated these products for many decades.

This is the case with the European countries that have developed national regulations, which often vary significantly. Some are very detailed (as in France), others contain only very general requirements (as in the UK), and some others have developed very detailed conformity assessment procedures for pressure equipment (as in Germany). This profusion of different regulations leads to technical barriers to trade. In 1989 the EU decided to establish a *Pressure Equipment Directive* to eliminate these problems.

3.1.2 Intent

The PED has the following intents:

(a) Adopt a common regulation for pressure equipment throughout EU.

(b) Eliminate the technical barriers to trade for this industrial sector and permit free movement of products throughout the EU.

(c) Ensure a high level of safety for pressure equipment throughout the EU.

The last intent is the most important in that the PED has been built on this concept of safety level with the implementation of four categories. The PED is more a hazard-oriented than a product-oriented directive. As a consequence, **the PED covers only the pressure hazard. Other directives may be applicable to cover other hazards.**

Manufacturers must not forget that when they affix the CE marking they implicitly declare that their equipment fully complies with all the directives that apply to it.

3.1.3 Manufacturers

The liberal principles of the *New Approach* applied to the PED will lead to more freedom than before. The manufacturers will be free to select:

(a) Their notified body: anywhere in the EU

(b) The conformity assessment procedure: adapted to their fabrication

(c) How they will comply with the ESRs, use of the European harmonized standard, or a national code.

3.1.4 Requirements

The PED, like any European directive, includes three types of requirements, which are:

(a) Legislative, as contained in PED Articles 1 to 52

(b) Devoted to conformity assessment procedures (detailed in PED Annex III), which concern the responsibilities of manufacturers and notified bodies

(c) Devoted to the equipment itself and are called ESRs (detailed in PED Annex I).

3.2 General Concepts

The PED was adopted on May 29, 1997 and published in the Official Journal of European Communities (OJEC) on July 9, 1997 under the reference 97/23/CE. The PED came into force in November 1999 and became fully mandatory in May 2002. The PED 97/23/CE has now been aligned with the new legislative framework and has implemented the change to Classification, Labelling and Packaging (CLP) for classification of fluids and has been replaced by Directive 2014/68/EU, issued 15 May 2014 and published in the OJEU on June 27, 2014.

The main purposes of the PED are as follows:

(a) Set up in all countries of the EU a common regulation for all pressure equipment to ensure a high level of safety throughout the EU.

(b) Allow the free movement of equipment in the EU to remove the technical barriers to trade.

3.2.1 Scope

The PED applies to all equipment (pressure vessels, piping, and boilers, unless specifically excluded) subject to a pressure greater than 0.5 bar.

(a) The application of the PED is fully mandatory in all countries of EU and has superseded national regulations.

(b) Any pressure equipment within the scope of the PED has to comply with it and bear the CE marking.

(c) The PED applies only to new equipment going into service in the EU for the first time. Equipment already in service is not subject to the PED, but will continue to meet the national regulations.

Despite several exclusions, such as the nuclear field, this scope is very wide as it covers small products (such as pressure-cookers) as well as large industrial equipment (such as chemical reactors or liquefied gas vessels). The PED applies only to new equipment.

3.2.2 Hazard Categories

Equipment that is above the thresholds specified by the PED is classified in four categories (I, II, III, IV) according to their hazards, based on:

(a) The nature of the fluid contained (more or less hazardous) fluid is gas or liquid. They are classified as more dangerous or less dangerous.

(b) The internal pressure (higher or lower)

(c) The internal volume (larger or smaller)

Equipment below these thresholds are not subject to the requirements summarized in paragraphs 3.2.3 through 3.2.6, below.

3.2.3 Conformity Assessment Procedures

Each pressure equipment must be subject to a conformity assessment procedure to verify that it complies with the specifications of the PED. For each category, one or several procedures are proposed to the manufacturer. These procedures are more stringent for the higher categories. Manufacturers who operate a quality assurance (QA) system may propose an alternative route based on QA. The QA route does not reduce the stringency; it is just an alternative.