



PRVÁ ZVÁRAČSKÁ, a. s.
FIRST WELDING Inc.

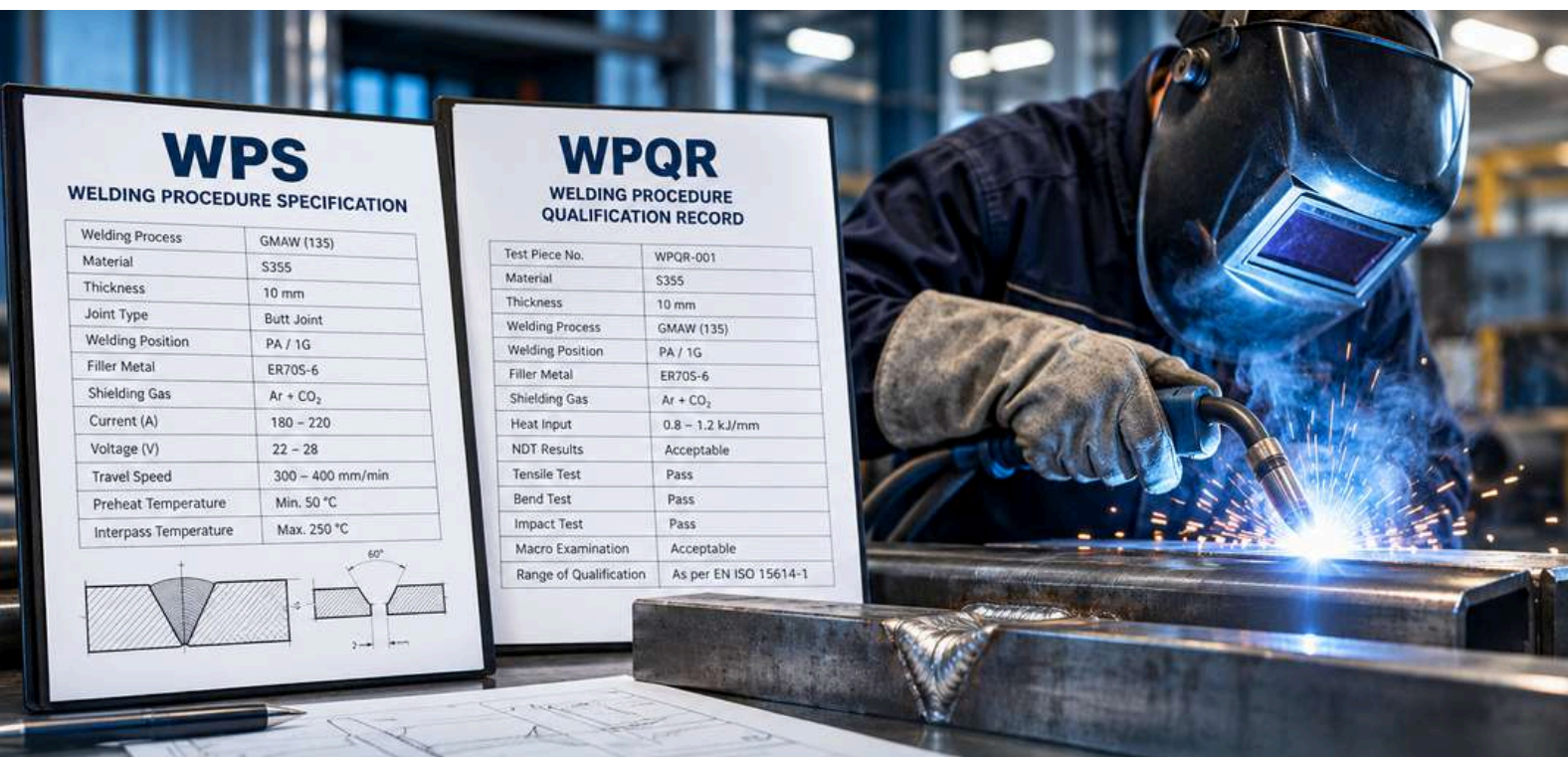
PED 2014/68/EU

PRESSURE EQUIPMENT DIRECTIVE

Technical Requirements and Conformity Assessment

Technical Handbook for Pressure Equipment Manufacturers

Directive 2014/68/EU • Scope & Applicability • PS & TS • Fluid Groups • PED Classification • SEP • Essential Safety Requirements • Design • Materials • Manufacturing • Welding & Permanent Joining • NDT • Pressure Testing • Conformity Assessment Modules • Technical Documentation • CE Marking



For Pressure Equipment Manufacturers, Fabricators, Engineering Companies & Quality Professionals
First Welding Certification Pvt Ltd (PRVÁ ZVÁRAČSKÁ, a. s.)

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ABOUT DIRECTIVE 2014/68/EU

1. Introduction

Directive [2014/68/EU](#) establishes requirements for the design, manufacture and conformity assessment of pressure equipment and assemblies with a maximum allowable pressure greater than 0.5 bar.

The Directive establishes:

- Essential Safety Requirements
- Pressure equipment classification
- Conformity assessment procedures
- Requirements for manufacturers
- Requirements for permanent joining
- Requirements for materials
- Requirements for final assessment
- Requirements for marking
- Requirements for EU Declaration of Conformity
- Requirements concerning notified bodies

The Directive applies to pressure equipment and assemblies within its defined scope.

The conformity assessment route depends principally on the category assigned to the pressure equipment.

2. Regulatory Objective

The [PED](#) framework establishes a harmonised regulatory approach for pressure equipment placed on the European Union market.

The essential safety requirements address:

- Design & Materials
- Manufacturing
- Permanent joining
- Non-destructive testing
- Final assessment
- Protection against exceeding allowable limits
- Safety accessories
- Pressure testing, Marking and information

3. Scope

Directive 2014/68/EU applies to pressure equipment and assemblies with a maximum allowable pressure greater than 0.5 bar.

Pressure equipment includes, according to the Directive:

Vessels

Equipment designed and manufactured to contain fluids under pressure.

Examples include:

- Pressure vessels
- Storage vessels
- Process vessels
- Gas vessels

Piping

Components intended for the transport of fluids when connected together for integration into a pressure system.

- Steam or Hot-Water Generators
- Equipment designed to generate steam or superheated water under pressure.
- Pressure Accessories
- Devices having an operational function and having pressure-bearing components.
- Safety Accessories
- Devices designed to protect pressure equipment against exceeding allowable limits.
- Assemblies

Several pieces of pressure equipment assembled by a manufacturer to constitute an integrated and functional whole.

For a detailed overview of the latest PED 2014/68/EU requirements, pressure equipment classification, design standards, welding requirements, inspection, conformity assessment and CE marking, read our [**Latest PED 2014/68/EU pressure vessel requirements guide**](#).

4. Principal Parameters

PED classification uses several important technical parameters.

PS – Maximum Allowable Pressure

PS is the maximum pressure for which the equipment is designed, as specified by the manufacturer.

TS – Maximum/Minimum Allowable Temperature

TS represents the maximum and/or minimum temperatures for which the equipment is designed.

V – Volume

For vessels, the internal volume is expressed in litres.

DN – Nominal Size

For piping and associated equipment, the nominal diameter is used where applicable.

Fluid

The contained or transported substance must be identified and classified according to the PED fluid groups.

Equipment Type

Classification differs depending on whether the equipment is:

- Vessel
- Piping
- Steam/hot-water generator
- Pressure accessory
- Safety accessory
- Assembly

Manufacturers should first establish whether their pressure equipment falls within the scope of PED 2014/68/EU before selecting the applicable classification and conformity assessment route.

[PED pressure equipment classification and certification requirements](#)

FLUID CLASSIFICATION

5. Fluid Groups

PED Annex II divides fluids into Group 1 and Group 2.

Group 1

Group 1 contains substances and mixtures classified as hazardous according to the criteria specified by the Directive.

This includes applicable categories of:

- Explosive substances
- Flammable substances
- Oxidising substances
- Toxic substances
- Other hazardous substances defined by the Directive

The exact classification shall be determined according to the applicable European Union legislation and PED definitions.

Group 2

Group 2 consists of substances and mixtures that do not fall within Group 1.

Examples may include certain:

- Water systems
- Compressed air systems
- Inert gases
- Non-hazardous fluids

The classification of the actual fluid shall be established from its applicable legal and technical classification.

PED CLASSIFICATION

6. Classification of Pressure Equipment

Pressure equipment within Article 4(1) is classified according to an ascending level of hazard.

The main PED categories are:

SEP

Sound Engineering Practice

SEP

Sound
Engineering
Practice

Category I

Lower-risk pressure equipment subject to the applicable conformity assessment requirements.

SEP

Sound
Engineering
Practice

Category II

Intermediate category with additional conformity assessment requirements.

SEP

Sound
Engineering
Practice

Category III

Higher-risk pressure equipment requiring involvement of a notified body through the applicable conformity assessment module.

SEP

Sound
Engineering
Practice

Category IV

Highest PED category, subject to the most extensive conformity assessment requirements.

SOUND ENGINEERING PRACTICE

7. Sound Engineering Practice — SEP

Certain pressure equipment falling within the limits specified in Article 4(3) is designed and manufactured in accordance with Sound Engineering Practice.

For such equipment:

- The applicable sound engineering principles shall be followed.
- Adequate technical documentation shall be established.
- The equipment shall be designed and manufactured to ensure safe use.
- The manufacturer shall provide adequate operating instructions.
- The equipment is not subjected to the PED conformity assessment categories applicable to Article 4(1).

Pressure equipment classified under Article 4(3) shall not bear the CE marking specifically on the basis of PED.

The exact applicability of Article 4(3) must be established from the equipment parameters and the relevant PED requirements.

ESSENTIAL SAFETY REQUIREMENTS

8. Annex I — Essential Safety Requirements

Pressure equipment covered by Article 4(1) and assemblies covered by Article 4(2) shall satisfy the applicable Essential Safety Requirements of Annex I.

The principal areas include:

8.1 General

Pressure equipment shall be designed to ensure safety during reasonably foreseeable conditions.

8.2 Design

The equipment shall be designed using appropriate engineering principles and technical methods.

8.3 Protection against Pressure

The equipment shall be designed to prevent unacceptable risks resulting from pressure.

8.4 Design for Loading

Relevant loading conditions shall be considered, including:

- Internal pressure
- External pressure
- Temperature
- Weight
- Wind
- Seismic effects where applicable
- Reaction forces
- Fatigue
- Corrosion
- Erosion

8.5 Manufacturing

Manufacturing processes shall be controlled to ensure conformity with the approved design.

DESIGN REQUIREMENTS

9. Design of Pressure Equipment

PED Annex I contains requirements concerning pressure-resistant design.

9.1 Design Calculation

Where calculation is used, the design shall take into account the applicable loading conditions and material properties.

The calculation shall establish adequate safety against:

- Plastic deformation
- Rupture
- Buckling
- Fatigue
- Excessive deformation
- Other relevant failure modes

9.2 Experimental Design Method

Where applicable, the Directive permits an experimental design method subject to its defined conditions.

9.3 Safety Factors

The design shall incorporate appropriate safety factors based on:

- Material characteristics
- Manufacturing process
- Failure mechanisms
- Operating conditions
- Applicable design methodology

9.4 Design Documentation

Technical documentation may include:

- General arrangement drawings
- Fabrication drawings
- Design calculations
- Material specifications
- Welding details
- Inspection requirements
- Testing requirements
- Operating limitations

MATERIAL REQUIREMENTS

10. Materials for Pressure Equipment

Materials used for pressure equipment shall be suitable for the intended application.

The material selection shall consider:

- Pressure
- Temperature
- Corrosion
- Mechanical properties
- Compatibility with the contained fluid
- Manufacturing processes
- Welding
- Service conditions

Material Documentation

The manufacturer shall demonstrate conformity of materials with the applicable specifications.

Material routes may include:

- Harmonised material standards
- European approval for pressure equipment materials
- Particular Material Appraisal (PMA)

For pressure equipment in Categories III and IV, particular requirements apply where a Particular Material Appraisal is used.

Material Certificates

For main pressure-bearing parts of applicable Categories II, III and IV, the Directive establishes requirements concerning material certification.

The applicable material certificate type shall be determined according to the PED requirements and conformity assessment procedure.

MANUFACTURING REQUIREMENTS

11. Manufacturing

Manufacturing processes shall ensure that the finished pressure equipment conforms to the design and Essential Safety Requirements.

Manufacturing activities may include:

- Material identification
- Cutting
- Forming
- Machining
- Heat treatment
- Welding
- Brazing
- Assembly
- Inspection
- NDT
- Pressure testing
- Final assessment

Traceability

The manufacturer shall establish appropriate procedures for material identification and traceability.

Traceability may cover:

- Material heat number
- Material certificate
- Component identification
- Welding records
- Welder identification
- NDT records
- Heat treatment records
- Pressure test records

The level of traceability shall correspond to the applicable PED requirements and manufacturing specification.

PERMANENT JOINING / WELDING

12. Permanent Joining

Permanent joining is specifically addressed in Annex I, Section 3.1.2.

Permanent joints and adjacent zones shall be free from surface or internal defects detrimental to the safety of the equipment.

The properties of permanent joints shall meet the required material properties unless other values have been specifically considered in the design.

For pressure equipment, permanent joining of components contributing to pressure resistance shall be performed:

- By suitably qualified personnel
- Using suitable operating procedures

Categories II, III and IV

For pressure equipment in Categories II, III and IV, the applicable permanent joining procedures and personnel shall be approved by a competent third party.

The competent third party may be:

- A notified body; or
- A recognised third-party organisation as permitted by the Directive.

PRVÁ ZVÁRAČSKÁ, a.s. is notified under PED as Notified Body No. 2408 and its published scope includes approval of permanent joining procedures and personnel for applicable Category II, III and IV pressure eq

NDT AND PERSONNEL

13. Non-Destructive Testing

PED Annex I Section 3.1.3 establishes requirements for permanent joining and non-destructive testing.

For pressure equipment in Categories III and IV, personnel performing non-destructive tests on permanent joints shall be appropriately qualified or approved by a competent third party recognised by a Member State.

Typical NDT methods may include:

- Visual Testing — VT
- Radiographic Testing — RT
- Ultrasonic Testing — UT
- Magnetic Particle Testing — MT
- Penetrant Testing — PT

The applicable NDT method and extent shall be determined from:

- PED requirements
- Equipment category
- Design specification
- Harmonised standards
- Applicable technical documentation

PRVÁ ZVÁRAČSKÁ, a.s. publishes its competent-third-party activity for approval of personnel performing NDT of permanent joints for applicable Category III and IV pressure equipment.

The PED category must be established before selecting the conformity assessment module. For manufacturers, understanding how PS, V, DN, fluid group and equipment type affect classification is an important part of the PED compliance process. Read our [**PED classification and conformity assessment guide.**](#)

14. Final Assessment

PED Annex I requires final assessment before pressure equipment is placed on the market.

Final assessment includes applicable:

Final Inspection

Verification that the equipment conforms to the design and applicable requirements.

Proof Test

A pressure test shall be performed where required by the Directive and applicable technical requirements.

The proof test normally consists of a hydrostatic pressure test.

Where hydrostatic testing is harmful or impractical, other recognised methods may be considered under the applicable requirements.

Safety Devices

Where applicable, safety accessories shall be examined to verify conformity with the specified requirements.

Documentation

Relevant records may include:

- Inspection reports
- Pressure test report
- NDT reports
- Material certificates
- Welding records
- Heat treatment records
- Final inspection records

CONFORMITY ASSESSMENT MODULES

15. PED Conformity Assessment Procedures

Article 14 establishes the conformity assessment procedures according to pressure equipment category.

Category I

Module A

Internal Production Control

Category II

One of:

- Module A2
- Module D1
- Module E1

Category III

One of:

- Module B + D
- Module B + F
- Module B + E
- Module B + C2
- Module H

Category IV

One of:

- Module B + D
- Module B + F
- Module G
- Module H1

The manufacturer may select an applicable procedure among those permitted for the category, subject to the conditions of the Directive.

CONFORMITY ASSESSMENT MODULE DETAILS

16. Principal PED Modules

Module A

Internal Production Control

The manufacturer takes responsibility for conformity through internal production control.

Module A2

Internal production control with supervised pressure equipment checks at random intervals.

Module B

EU-Type Examination

A notified body examines the technical design or representative specimen according to the applicable Module B type.

Module C2

Conformity to type based on internal production control plus supervised pressure equipment checks at random intervals.

Module D

Conformity to type based on quality assurance of the production process.

Module E

Conformity to type based on pressure equipment quality assurance.

Module F

Conformity to type based on pressure equipment verification.

Module G

Conformity based on unit verification.

Module H

Conformity based on full quality assurance.

Module H1

Full quality assurance plus design examination and special surveillance of final assessment.

NOTIFIED BODY ACTIVITIES

17. Notified Body No. 2408

PRVÁ ZVÁRAČSKÁ, a.s.

Notified Body: 2408

PRVÁ ZVÁRAČSKÁ, a.s. has notified-body status under Directive 2014/68/EU.

The published PED activities include specific third-party activities concerning permanent joining and applicable pressure equipment.

Permanent Joining Approval

For applicable Category II, III and IV pressure equipment:

- Approval of permanent joining procedures
- Approval of personnel performing permanent joining

These activities correspond to the requirements of PED Annex I, Section 3.1.2.

NDT Personnel

For applicable Category III and IV pressure equipment:

- Approval of personnel performing non-destructive testing of permanent joints

This corresponds to PED Annex I, Section 3.1.3.

Pressure Equipment

The published NB 2408 information also identifies notified activities concerning pressure equipment manufactured from specified ferritic and austenitic materials within the stated operating-temperature ranges and using specified design methods. The exact current notification scope should always be verified against the official EU notification record before publication.

TECHNICAL DOCUMENTATION

18. Technical Documentation

The manufacturer shall establish technical documentation demonstrating conformity with the applicable requirements. Depending on the equipment and conformity assessment procedure, the documentation may contain:

General Documentation

- Equipment description
- Product identification
- Design drawings
- Manufacturing drawings
- Component drawings
- Piping diagrams
- Design specifications

Design Documentation

- Design calculations
- Pressure calculations
- Stress calculations
- Fatigue assessment
- Material specifications
- Safety calculations
- Risk analysis

Manufacturing Documentation

- Manufacturing procedures
- Welding procedures
- Welder qualification records
- NDT procedures
- NDT personnel qualifications
- Heat treatment records
- Inspection plans
- Test reports

Final Documentation

- Final inspection report
- Pressure test report
- Certificate of conformity where applicable
- EU Declaration of Conformity
- Operating instructions
- CE marking information

The exact documentation depends on the equipment, category and conformity assessment module.

CE MARKING AND EU DECLARATION

19. CE Marking

Where required by the PED, pressure equipment or assemblies that satisfy the applicable requirements shall bear the CE marking.

Where a notified body is involved in the applicable conformity assessment procedure, the notified body's identification number may accompany the CE marking as required.

For PRVÁ ZVÁRAČSKÁ, a.s., the notified body identification number is:

2408

EU Declaration of Conformity

The manufacturer shall draw up an EU Declaration of Conformity where required.

The declaration confirms that the fulfilment of the applicable Essential Safety Requirements has been demonstrated.

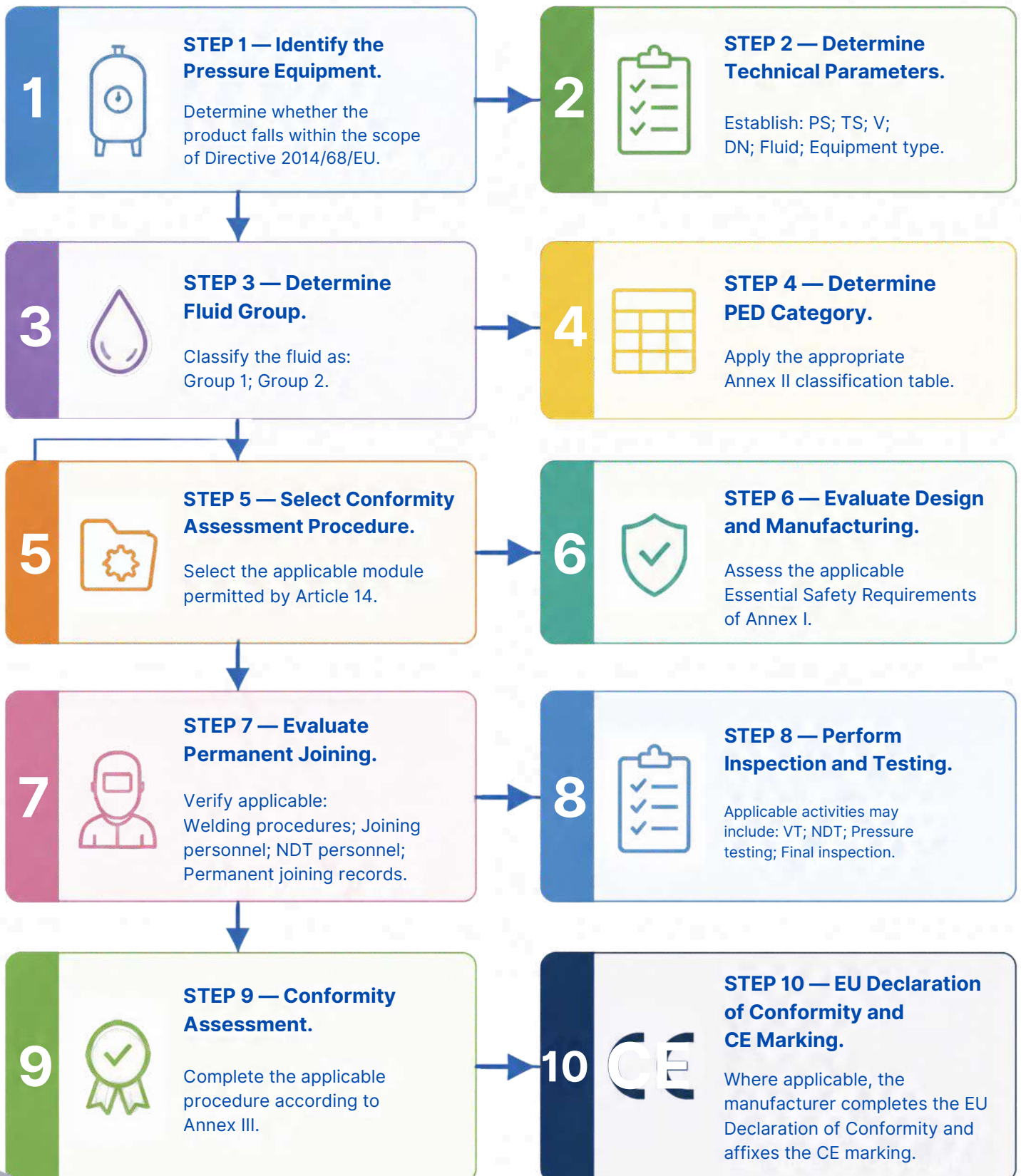
The declaration shall identify:

- Pressure equipment or assembly
- Applicable Union legislation
- Applicable conformity assessment procedure
- Applicable standards/specifications
- Manufacturer
- Identification information

PED COMPLIANCE PROCESS & REFERENCE

20. PED Conformity Assessment Sequence

A typical PED conformity assessment sequence can be represented as:



REGULATORY REFERENCES

Principal Reference

Directive 2014/68/EU of the European Parliament and of the Council of 15 May 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment.

Key provisions include:

- Article 4 – Technical requirements
- Article 12 – Presumption of conformity
- Article 13 – Classification of pressure equipment
- Article 14 – Conformity assessment procedures
- Article 17 – EU Declaration of Conformity
- Annex I – Essential Safety Requirements
- Annex II – Conformity assessment tables
- Annex III – Conformity assessment procedures
- Annex IV – EU Declaration of Conformity

Official EUR-Lex text of Directive 2014/68/EU

PRVÁ ZVÁRAČSKÁ, a.s.

Notified Body No. 2408

The published PRVÁ ZVÁRAČSKÁ information identifies the organisation as a notified body under PED 2014/68/EU and describes its relevant notified activities.

PRVÁ ZVÁRAČSKÁ – Notified Body No. 2408