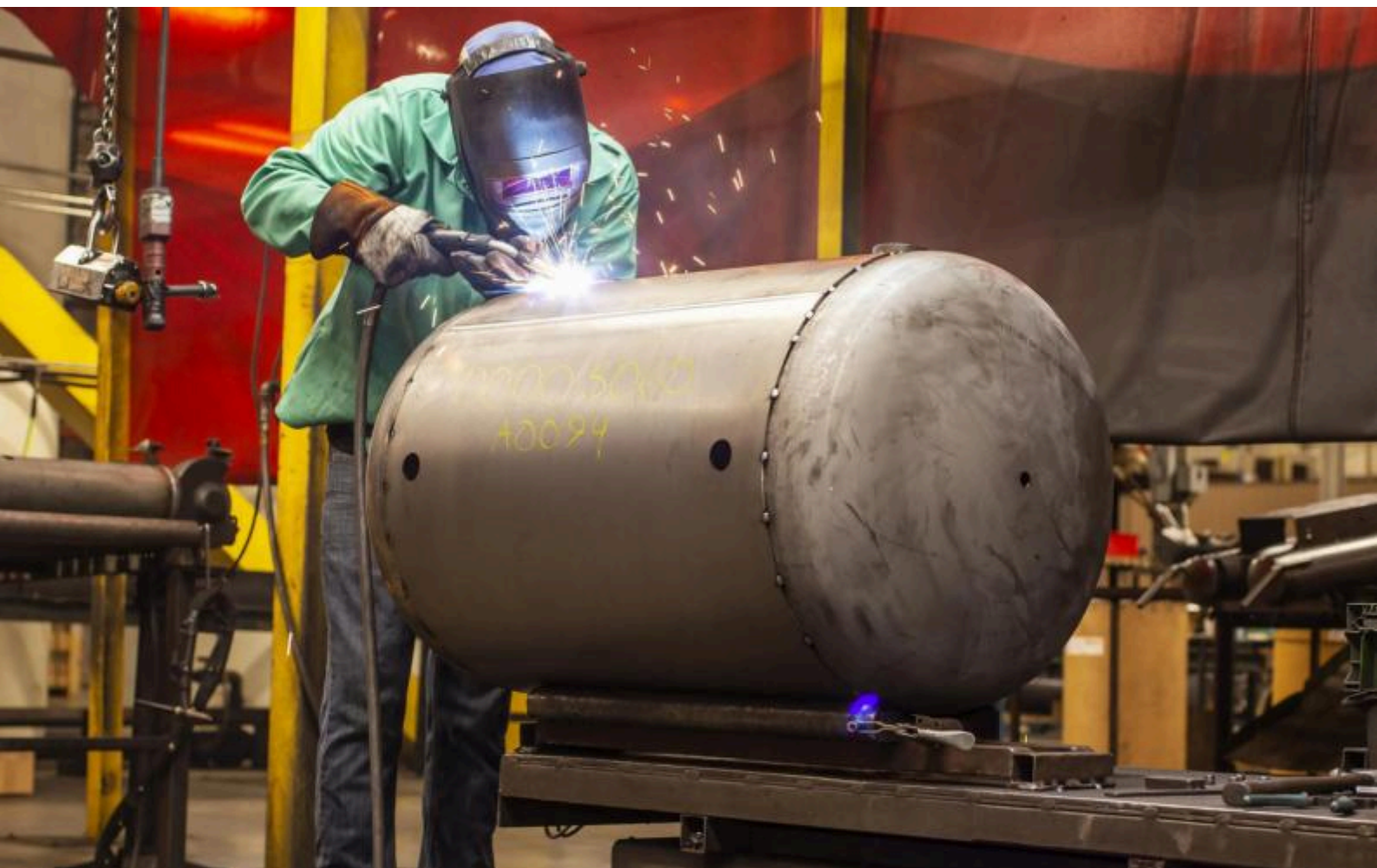


SPVD 2014/29/EU

Simple Pressure Vessels Directive

Complete Technical Guide for Simple Pressure Vessels, Conformity Assessment & CE Marking

***A Practical Guide for Manufacturers, Suppliers,
Purchasers & Engineering Professionals***



First Welding Certification Pvt Ltd (PRVÁ ZVÁRAČSKÁ, a.s.)
SPVD 2014/29/EU Conformity Assessment
Notified Body No. 2408
pzvar.in

INTRODUCTION TO SPVD

What is SPVD?

[Directive 2014/29/EU](#), commonly known as the Simple Pressure Vessels Directive (SPVD), establishes requirements for the making available on the European Union market of certain welded simple pressure vessels. The Directive establishes essential safety requirements and conformity assessment procedures intended to ensure that vessels within its scope are designed and manufactured to an appropriate level of safety. The Directive has applied from 20 April 2016 and replaced Directive 2009/105/EC. The SPVD applies specifically to simple pressure vessels satisfying the characteristics defined in Article 1.

The Directive covers:

- Design requirements
- Material requirements
- Manufacturing requirements
- Welding requirements
- Production checks
- Conformity assessment
- CE marking
- Technical documentation
- Instructions and safety information
- Responsibilities of economic operators

The current consolidated EU text should be used when determining applicable regulatory requirements.

SCOPE OF DIRECTIVE 2014/29/EU

2. Scope

SPVD applies to simple pressure vessels manufactured in series when all applicable conditions specified in Article 1 are satisfied.

The vessel must:

Be welded.

Be intended for an internal gauge pressure greater than 0.5 bar.

Contain air or nitrogen.

Not be intended to be fired.

Have pressure-strength parts manufactured from:

non-alloy quality steel; or

non-alloy aluminium; or

non-age-hardening aluminium alloys.

Have the specified cylindrical/dished-end configuration.

Have maximum working pressure $PS \leq 30$ bar.

Have $PS \times V \leq 10,000$ bar·L.

Have minimum working temperature not lower than -50 °C.

Have maximum working temperature not higher than:

300 °C for steel vessels

100 °C for aluminium or aluminium-alloy vessels.

All scope conditions should be assessed together. A vessel outside the defined scope cannot be treated as an SPVD vessel solely because it is a welded pressure vessel.

EXCLUSIONS AND KEY PARAMETERS

3. Exclusions

Article 1 identifies vessels that are excluded from the Directive.

SPVD does not apply to:

Vessels specifically designed for nuclear use where failure may cause radioactive emission.

Vessels specifically intended for installation in or propulsion of ships and aircraft.

Fire extinguishers.

4. Important Pressure Parameters

Maximum Working Pressure — PS

PS is the maximum working pressure for which the vessel is designed.

The SPVD scope requires:

$PS \leq 30 \text{ bar}$

Capacity — V

The vessel capacity is expressed in litres.

Pressure-Volume Product

The Directive uses:

$PS \times V$

as a key parameter for determining applicable requirements.

For vessels within SPVD scope:

$PS \times V \leq 10,000 \text{ bar}\cdot\text{L}$

The conformity assessment requirements become progressively different according to whether $PS \times V$ is:

$\leq 50 \text{ bar}\cdot\text{L}$

$50 \text{ to } \leq 200 \text{ bar}\cdot\text{L}$

$200 \text{ to } \leq 3,000 \text{ bar}\cdot\text{L}$

$3,000 \text{ bar}\cdot\text{L}$

Classification According to $PS \times V$

SPVD establishes different regulatory requirements according to the product of maximum working pressure and vessel capacity

$PS \times V$	Main requirement
$\leq 50 \text{ bar}\cdot\text{L}$	Sound engineering practice
$> 50 \text{ to } \leq 200 \text{ bar}\cdot\text{L}$	EU-type examination + applicable production conformity procedure
$> 200 \text{ to } \leq 3,000 \text{ bar}\cdot\text{L}$	EU-type examination + C1 or C2
$> 3,000 \text{ bar}\cdot\text{L}$	EU-type examination + C1

For vessels where $PS \times V$ exceeds $50 \text{ bar}\cdot\text{L}$, the essential safety requirements in Annex I apply. Vessels at or below $50 \text{ bar}\cdot\text{L}$ are designed and manufactured according to sound engineering practice in a Member State.

This distinction is important when establishing the conformity assessment route.

Example

A vessel has:

$PS = 10 \text{ bar}$

$V = 100 \text{ L}$

Therefore:

$PS \times V = 10 \times 100 = 1,000 \text{ bar}\cdot\text{L}$

The vessel falls into:

$> 200 \text{ and } \leq 3,000 \text{ bar}\cdot\text{L}$

The applicable route is therefore:

Module B + Module C1 or Module C2

subject to the requirements of Article 13.

ESSENTIAL SAFETY REQUIREMENTS

6. Annex I — Essential Safety Requirements

For vessels with $PS \times V$ greater than 50 bar·L, the vessel shall satisfy the essential safety requirements of Annex I.

The main Annex I requirements address:

6.1 Materials

Materials used for pressure parts must be suitable for the intended application.

They must be:

- Weldable
- Ductile
- Tough
- Resistant to detrimental ageing

Material selection must consider the minimum working temperature.

6.2 Welding Materials

Welding consumables shall be appropriate and compatible with the materials being welded.

6.3 Accessories

Accessories contributing to vessel strength must be compatible with the pressure-part materials and meet applicable mechanical property requirements.

6.4 Non-pressurised Parts

Non-pressure parts welded to the vessel must use compatible materials. These requirements form part of the fundamental safety basis of SPVD conformity.

MATERIAL REQUIREMENTS

7. Materials for Pressure Parts

Material selection is a fundamental design requirement.

Steel Vessels

Pressure-bearing components are required to use non-alloy quality steel within the scope specified by the Directive.

The steel requirements include requirements concerning:

- Weldability
- Ductility
- Toughness
- Chemical composition
- Condition of supply
- Mechanical properties

For steel vessels, the Directive specifies limitations for carbon, sulphur and phosphorus and requirements concerning the condition of the material.

Aluminium Vessels

For aluminium and aluminium-alloy vessels, the material must meet the applicable requirements of Annex I.

Material Documentation

Pressure-part materials shall be accompanied by the required material documentation/inspection slip specified by the Directive.

Material traceability should be maintained from receipt through manufacturing and final documentation.

Material Verification

The manufacturer should verify:

- Material grade
- Heat/batch identification
- Thickness
- Chemical properties where applicable
- Mechanical properties
- Material documentation

Traceability to vessel components

VESSEL DESIGN REQUIREMENTS

8. Vessel Design

The manufacturer shall define the intended use of the vessel and establish:

Minimum working temperature – T_{min}

Maximum working temperature – T_{max}

Maximum working pressure – P_S

The design must consider the pressure, temperature and material characteristics applicable to the intended service.

8.1 Vessel Configuration

The SPVD scope covers vessels formed from:

Configuration 1

A cylindrical part of circular cross-section closed by:
outwardly dished ends; and/or
flat ends

with the ends revolving around the same axis as the cylindrical part.

Configuration 2

Two dished ends revolving around the same axis.

The vessel geometry must therefore be checked before determining SPVD applicability.

DESIGN CALCULATION

9. Design Verification

The vessel design must demonstrate adequate resistance to the pressure and operating conditions.

The Directive provides design methods including:

Analytical Calculation Method

Wall thickness is determined using calculation requirements established by Annex I.

Design considerations include:

- Design pressure
- Vessel diameter
- Material strength
- Working temperature
- Joint efficiency
- Corrosion or other applicable allowances
- Geometry

Manufacturing method

Where a cylindrical portion has longitudinal welds made using a non-automatic welding process, the applicable thickness calculation is subject to the coefficient specified by Annex I.

Experimental Method

The experimental method requires the vessel to demonstrate the specified resistance under pressure.

The vessel must withstand, at ambient temperature, a pressure equal to at least:

$$5 \times PS$$

with the permanent circumferential deformation remaining within the specified limit.

The selected design method must be documented and technically justified

MANUFACTURING REQUIREMENTS

10. Manufacturing Processes

Manufacturing shall be controlled to ensure that the completed vessel satisfies its design requirements.

10.1 Preparation of Components

Operations such as:

- Cutting
- Forming
- Rolling
- Bending
- Chamfering
- Edge preparation

shall not introduce defects or changes in mechanical properties that could adversely affect vessel safety.

10.2 Forming

Forming operations shall maintain the required:

- Geometry
- Dimensions
- Wall thickness
- Material properties

10.3 Traceability

Manufacturing records should provide traceability between:

- Raw material
- Component
- Welding operation
- Welder/operator
- Inspection
- Testing
- Final vessel identification

10.4 Production Controls

Production checks shall be established according to the applicable conformity assessment procedure.

The manufacturer remains responsible for ensuring that series production continues to conform to the approved design and applicable requirements.

WELDING AND PERMANENT JOINING

11. Welding Requirements

Welding is a critical manufacturing process for simple pressure vessels.

Annex I requires welds on pressure parts to have characteristics similar to those of the welded materials and to be free from surface or internal defects detrimental to vessel safety.

11.1 Qualified Welders and Operators

Welds shall be performed by:

- Qualified welders; or
- Qualified welding operators

with the appropriate level of competence.

11.2 Approved Welding Processes

Welding shall be performed using approved welding processes.

The Directive specifically requires welding process approval and qualification of welders/operators through the applicable notified-body involvement.

11.3 Welding Procedure Qualification

The applicable welding procedure must be qualified in accordance with the relevant technical requirements.

Typical technical documentation may include:

- Welding Procedure Specification
- Welding Procedure Qualification Record
- Welder Qualification Certificate
- Welding consumable certificates
- Welding parameters
- Joint preparation details
- Preheat/interpass requirements where applicable

WELDING QUALITY AND INSPECTION

12. Weld Quality

The manufacturer shall ensure consistent weld quality during production.

Production controls may include:

Visual inspection

Dimensional inspection

Non-destructive testing

Destructive testing where applicable

Pressure testing

Review of welding records

The selected inspection regime shall correspond to the vessel design, manufacturing process and applicable technical requirements.

12.1 Welder Qualification

Welder qualifications shall demonstrate the welder's ability to produce acceptable welds under the applicable qualification conditions.

Relevant parameters may include:

- Welding process
- Parent material
- Thickness
- Welding position
- Joint type
- Consumable
- Weld type
- Diameter where applicable

12.2 Welding Records

Production records should identify:

Welder identification

- Welding procedure
- Welding date
- Welding process
- Consumable
- Welding parameters
- Inspection status

The records should maintain traceability to the individual vessel.

PRODUCTION TESTING

13. Production Testing

The manufacturer shall establish appropriate production checks to verify consistent manufacturing quality.

Possible Inspection Activities

Depending on the design and applicable requirements:

- Visual inspection
- Dimensional inspection
- Weld inspection
- Non-destructive testing
- Pressure testing
- Material verification
- Final inspection

Pressure Test

The vessel shall undergo the applicable pressure test specified by the design and conformity assessment requirements.

The test shall be performed using controlled and documented procedures.

Test Records

The pressure-test record should identify:

- Vessel identification
- Test pressure
- Test medium
- Test duration where applicable
- Test temperature where applicable
- Test equipment
- Equipment calibration status
- Test result
- Date
- Responsible personnel

All test results should be retained as part of the technical/manufacturing documentation.

CONFORMITY ASSESSMENT OVERVIEW

14. Conformity Assessment

Article 13 establishes the conformity assessment procedures for vessels where:

$PS \times V > 50 \text{ bar}\cdot\text{L}$

Before manufacture, these vessels are subject to **EU-type examination – Module B**.

Module B may be performed as:

Module B – Design Type

Assessment of the technical design through examination of technical documentation and supporting evidence without examination of a specimen.

Module B – Production Type

Assessment of the technical design through examination of technical documentation and supporting evidence together with examination of a prototype representative of the intended production.

For vessels not manufactured, or only partly manufactured, according to relevant harmonised standards, the production-type approach applies as specified by Article 13.

MODULE B

15. EU-Type Examination – Module B

Module B is the conformity assessment stage involving a Notified Body.

The Notified Body examines the technical design and verifies whether the design meets the applicable requirements of Directive 2014/29/EU.

Technical Documentation May Include

- General vessel description
- Design drawings
- Manufacturing drawings
- Design calculations
- Material specifications
- Material certificates
- Welding procedures
- Welder qualifications
- Manufacturing procedures
- Inspection procedures
- Test procedures
- Test reports

Applicable harmonised standards

Risk-related technical information

Supporting evidence

Module B – Design Type

No physical prototype examination is required under the design-type route where the applicable conditions are fulfilled.

Module B – Production Type

A prototype representative of the production envisaged is examined together with the technical documentation.

The result is documented by the applicable EU-type examination certificate.

MODULE C1, C2 AND C

16. Production Conformity Assessment

After Module B, the applicable production conformity procedure depends on $PS \times V$.

$PS \times V > 3,000 \text{ bar}\cdot\text{L}$

Module C1

Conformity to type based on internal production control plus supervised vessel testing.

$200 < PS \times V \leq 3,000 \text{ bar}\cdot\text{L}$

The manufacturer may choose:

Module C1, or

Module C2

$50 < PS \times V \leq 200 \text{ bar}\cdot\text{L}$

The manufacturer may choose:

Module C1, or

Module C

Module C1

Includes internal production control together with supervised vessel testing by the Notified Body as required by the Directive.

Module C2

Includes internal production control plus supervised vessel checks at random intervals.

Module C

Provides conformity to type based on internal production control under the conditions specified in Annex II.

The exact procedure must be selected according to Article 13 and Annex II.

17. Technical Documentation

The manufacturer shall establish technical documentation demonstrating conformity.

The documentation should allow the design, manufacture and conformity assessment of the vessel to be understood and evaluated.

Typical Documentation Structure

A. Product Identification

- Vessel type
- Model
- Serial number
- Batch number
- Capacity
- PS
- T_{min}
- T_{max}

B. Design

- General arrangement drawing
- Component drawings
- Design calculations
- Design specifications

C. Materials

- Material specifications
- Material certificates
- Material traceability

D. Welding

- Welding procedures
- Welding qualification records
- Welder qualification
- Welding consumable documentation

E. Inspection and Testing

- Inspection procedures
- NDT reports
- Pressure test reports
- Final inspection reports

F. Conformity Assessment

- Module B documentation
- Module C/C1/C2 documentation as applicable
- Notified Body certificates/reports

The manufacturer shall retain the technical documentation and EU Declaration of Conformity for the period specified by the Directive.

CE MARKING AND EU DECLARATION

18. CE Marking

Where conformity with the Directive has been demonstrated through the applicable procedure, the manufacturer shall affix the CE marking. The CE marking indicates that the vessel conforms to the applicable Union harmonisation legislation providing for the marking. Where a Notified Body is involved in the applicable conformity assessment procedure, its identification number is included where required by the applicable provisions.

18.1 Vessel Markings

The vessel shall bear the required identification and inscriptions specified in Annex III.

Typical identification information includes:

- Manufacturer identification
- Vessel type/model
- Serial or batch identification
- Maximum working pressure
- Capacity
- Minimum/maximum working temperature
- Applicable conformity information

18.2 EU Declaration of Conformity

The EU Declaration of Conformity shall state that fulfilment of the essential safety requirements has been demonstrated.

It includes:

- Vessel/model identification
- Manufacturer details
- Declaration of manufacturer responsibility
- Identification of the vessel
- Applicable Union legislation
- Harmonised standards or technical specifications
- Notified Body information where applicable
- Certificate information
- Place/date
- Name, function and signature
- The Directive provides the model structure in Annex IV.

MANUFACTURER AND ECONOMIC OPERATOR OBLIGATIONS

19. Manufacturer Responsibilities

The manufacturer has primary responsibility for ensuring that vessels placed on the EU market comply with the applicable SPVD requirements.

Manufacturer obligations include:

- Design and manufacture vessels according to applicable requirements.
- Establish technical documentation.
- Perform or arrange the applicable conformity assessment.
- Prepare the EU Declaration of Conformity where required.
- Affix CE marking where required.
- Maintain product identification and traceability.
- Provide instructions and safety information.
- Maintain required records.

- Take corrective action for non-conforming vessels.
- Cooperate with market surveillance authorities.

For vessels above 50 bar·L, the manufacturer must maintain the required technical documentation and conformity assessment evidence.

Importer

Importers have obligations concerning:

- Conformity verification
- Manufacturer documentation
- Product identification
- Their own identification
- Storage and transport conditions
- Corrective measures

Distributor

Distributors shall act with due care regarding conformity, documentation, marking and identification before making vessels available on the market.

CONFORMITY PROCESS AND REGULATORY REFERENCES

20. SPVD CONFORMITY ASSESSMENT SEQUENCE

Step 1 — Determine Applicability

Verify:

- Welded vessel
- Air/nitrogen
- Internal pressure > 0.5 bar
- Non-fired
- Applicable material
- Applicable geometry
- $PS \leq 30$ bar
- $PS \times V \leq 10,000$ bar·L
- Temperature limits
- No exclusion applies

Step 2 – Determine $PS \times V$

Calculate:

$PS \times V$

Step 3 – Determine Regulatory Route

$\leq 50 \text{ bar} \cdot \text{L}$

→ Sound engineering practice

$> 50 \text{ bar} \cdot \text{L}$

→ Essential Safety Requirements + conformity assessment

Step 4 – Module B

EU-type examination:

- Design type, or
- Production type

Step 5 – Production Conformity

Select the applicable procedure:

- C
- C1
- C2

according to Article 13.

Step 6 – Manufacturing

Complete controlled series production.

Step 7 – Inspection and Testing

- Perform required:
- Visual inspection
- Dimensional checks
- Weld inspection
- NDT where applicable
- Pressure testing
- Final inspection
- Records

Step 8 – Documentation

Compile:

- Technical documentation
- Certificates
- Inspection records
- Test reports
- Conformity assessment records

Step 9 – EU Declaration of Conformity

Issue the EU Declaration of Conformity.

Step 10 – CE Marking

Affix the CE marking and required vessel inscriptions.

Regulatory References

Primary reference:

Directive 2014/29/EU of the European Parliament and of the Council of 26 February 2014

Official EU text and current consolidated version:

EUR-Lex – Directive 2014/29/EU

The European Commission identifies Directive 2014/29/EU as the EU legislation applicable to simple pressure vessels and publishes information concerning harmonised standards and SPVD guidance.

Notified Body No. 2408

PRVÁ ZVÁRAČSKÁ, a.s. is notified as Notified Body No. 2408. Its official notification information identifies activities under Directive 2014/29/EU concerning conformity assessment of serially manufactured simple pressure vessels.

IMPORTANT REGULATORY NOTE

This technical guide is an informational summary of Directive 2014/29/EU and is not a replacement for the legally applicable EU legislation, harmonised standards, implementing national legislation or the current notification scope of a Notified Body. The official consolidated Directive and applicable harmonised standards shall be consulted when determining conformity for a specific vessel.

Primary legal reference: Directive 2014/29/EU.

Current consolidated EU text: 30 May 2026.

PRVÁ ZVÁRAČSKÁ, a.s.

Notified Body No. 2408