



Area of application: basic principles

Requirements relating to blow guns and compressed-air couplings for type examinations according to the Federal Law on Product Safety (PrSL)

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Contents

	Page
1 Introduction.....	4
2 Important terms used in Pressure Equipment Directive 2014/68/EU.....	4
3 Blow guns.....	5
4 Compressed-air couplings.....	8
5 Technical documentation and type.....	10
ANNEX I Diagram from the Pressure Equipment Directive (PED)	11
ANNEX II Air lines: determining the category according to the Pressure Equipment Directive (PED)	12

Requirements relating to blow guns and compressed-air couplings for type examinations according to the Federal Law on Product Safety (PrSL)

1. Introduction

The advertising and marketing of blow guns and compressed-air couplings in Switzerland are covered by the Federal Law on Product Safety (PrSL). This includes the Product Safety Ordinance (PrSO).

Blow guns and compressed-air couplings with a nominal diameter of ≤ 32 mm are within the scope of Pressure Equipment Directive 2014/68/EU (PED) or the relevant Pressure Equipment Ordinance (PEO).

While they need not meet the essential safety requirements as set forth in Annex I of the PED, they must be designed and manufactured in agreement with the sound engineering practice of the country concerned (recognised state-of-the-art and/or rules of technology).

This document describes the safety requirements specified for blow guns and compressed-air couplings for the granting of a type examination certificate in accordance with the Federal Law on Product Safety.

Type examination certificates are based on a maximum working pressure of 6 bar.

2. Important terms used in Pressure Equipment Directive 2014/68/EU

2.1 Pressure equipment

Containers, air lines, equipment with safety functions and pressure-maintaining components. Pressure vessels also include all elements that may be connected to pressure-maintaining parts, such as, for example, flanges, nozzles, couplings, supports, lifting lugs, etc.

2.2 Pressure-maintaining components

Devices with an operating function, which have pressurised housings.

3. Blow guns

Blow guns must satisfy the following safety objectives:

1. Avoidance of noise that can damage the hearing

The hearing of people working with compressed-air blow guns as well as the hearing of third parties must not be damaged.

2. Prevention of injuries caused by air entering the body

Air must not be able to enter the body via the skin when using the blow gun.

3. Prevention of injuries caused by parts being expelled from the blow gun

No parts of a blow gun may be expelled when using the blow gun with compressed air.

3.1 Specific requirement for the avoidance of noise that can damage the hearing

- The maximum permissible average sound pressure level L_{eq} is 85 dB(A) (Measuring conditions as set forth in §3.5).

Ways to achieve this requirement:

- The use of pressure reduction valves integrated into the blow gun. I.e. the blowing pressure is independent of the input pressure. A restrictor integrated into the blow gun (aperture restriction) is insufficient.
- The use of multi-hole nozzles. These separate the jet of air into individual jets.

3.2 Specific requirements for the prevention of air entering the body

At least **one** of the requirements listed must be met.

- The use of multi-hole nozzles, which separate the air output into individual jets of air. It must not be possible to close all the air holes simultaneously with one hand.
- Meaningful nozzle design. This prevents the full network pressure from impinging directly on the skin when the nozzle of the blow gun touches parts of the body.
- The use of pressure reduction valves integrated into the blow gun. I.e. the output pressure is independent of the input pressure. The maximum permissible blowing pressure is 3.5 bar.

3.3 Specific requirement for the prevention of parts of the blow gun being violently expelled

- Blow guns made of synthetic material must pass the burst test as set forth in §3.6, i.e. the blow gun itself together with its components must remain firmly connected together.
- All components, e.g. nozzles, tubes, etc., must be firmly connected to the blow gun (at least bonded together).

3.4 General requirements for blow guns

- Clearly identifiable (make and type designation) and durably affixed
- No sharp edges or clamping points
- Nozzle/tube firmly connected to the blow gun (at least bonded together)
- It must not be possible to close the air outlets of multi-hole nozzles simultaneously with the fingers of one hand
- Safety components (e.g. nozzles) must not be easily removable

3.5 Noise measurement conditions

Noise measurement must be conducted by an accredited test body at the choice of the manufacturer. Suva can carry out this measurement with the accredited acoustics test body of the Physics Department (STS 0192).

- Direct the blow gun nozzle at a distance of 100 mm at a circular surface with a diameter of 170 mm
- Position the noise meter 500 mm to the side, 550 mm in front of the surface at which the blow gun is being directed
- Dynamic network pressure of 6 bar, the final 2 m of the compressed-air line must have a minimum internal diameter of 11 mm
- Measurement no sooner than 10 seconds after fully opening the valve, duration of the measurement: 15 seconds
- The average sound pressure level L_{eq} is measured in dB(A)
The maximum permissible value is 85 dB(A)
- Measure each type of blow gun at least 3 times

3.6 Conditions for the burst test (blow guns made of synthetic material)

Burst tests must be carried out instead of ageing tests. Suva does not carry out any burst tests itself. Manufacturers must substantiate this with a report.

- With the blow gun's valve closed, water is pumped in through the connector.
- The pressure must be increased continuously up to 72 bar
- If any parts fail before the pressure of 72 bar is attained and the pressure can no longer be increased as a result, the test is aborted.
- The burst pressure is considered to have been passed if all components remain firmly connected to the blow gun. This will also apply if the maximum pressure of 72 bar could not be attained.
- A minimum of 3 blow guns must be tested.

4. Compressed-air couplings

Compressed-air couplings must satisfy the following safety objectives:

1. Nobody may be injured by a blowback when connecting and removing compressed-air hoses.

2. Avoidance of noise that can damage the hearing

The hearing of people working with compressed-air couplings as well as the hearing of third parties must not be damaged.

4.1 Ways to attain the safety objectives

- The use of couplings or nipples that prevent blowback.
- Safety-relevant arrangement
 - Maximum of 1.2 m above ground level
 - As vertical as possible or at an angle of max. 45° to the vertical
- Pressure reduction of ≤ 3.5 bar (insufficient for hose internal diameters of >10 mm and hose lengths of > 10 m)

N.B. A type examination certificate according to PrSL cannot be obtained merely on the basis of a safety-relevant arrangement or by reducing the pressure to 3.5 bar.

4.2 Specific requirements for the prevention of blowback when connecting and disconnecting compressed-air couplings

At least **one** of the requirements listed must be met.

- The supply of compressed air is interrupted by the action of uncoupling and the connection hose is vented. The coupling may only release the connection hose when the pressure in the hose has fallen to a safe value (≤ 1.5 bar) or a second action on the part of the operator is required for the release of the connection hose (e.g. pressing or twisting, i.e. a two-stage uncoupling process).
- Compressed-air couplings on which the connection hose can only be removed when it is not under pressure.
- Plug-in nipples that block and slowly reduce the pressure in the hose immediately when uncoupled.

4.3 Specific requirement to avoid noise that can damage hearing

- The maximum permissible average sound pressure level L_{eq} is 85 dB(A) (measurement conditions as set forth in §4.5.).

4.4 General requirements for compressed-air couplings

- Clearly identifiable (make and type designation) and durably affixed
- No sharp edges or clamping points
- The face must not be exposed to a powerful jet of air during normal uncoupling operations.
- When holding the coupling during the uncoupling process, no more than half of the air outlet apertures can be closed by the hand.

4.5 Noise measurement conditions

Noise measurement must be conducted by an accredited test body at the choice of the manufacturer. Suva can carry out this measurement with the accredited acoustics test body of the Physics Department (STS 0192).

- Noise meter 550 mm to the side of the coupling
- Dynamic network pressure of 6 bar, as close as possible to the coupling
- Measurement begins immediately on uncoupling, duration of measurement = 15 seconds
- The average sound pressure level L_{eq} is measured in dB(A)
The maximum permissible value is 85 dB(A)
- Each type of compressed-air coupling must be measured at least 3 times

5. Technical documentation and type

The following technical documentation and type must be submitted to the certification body for a type-examination certificate:

- Assembly drawings and safety-related, single-part drawings
- Operating and maintenance instructions as well as brochures in the official Swiss language of the part of the country in which the product is expected to be used (PrSO, Article 8)
- Test report (protocol with date and signature) confirming that the requirements set forth in this document have been met.
- A type corresponding to the technical documentation. A minimum of 1 unit must be submitted for each type.

ANNEX I

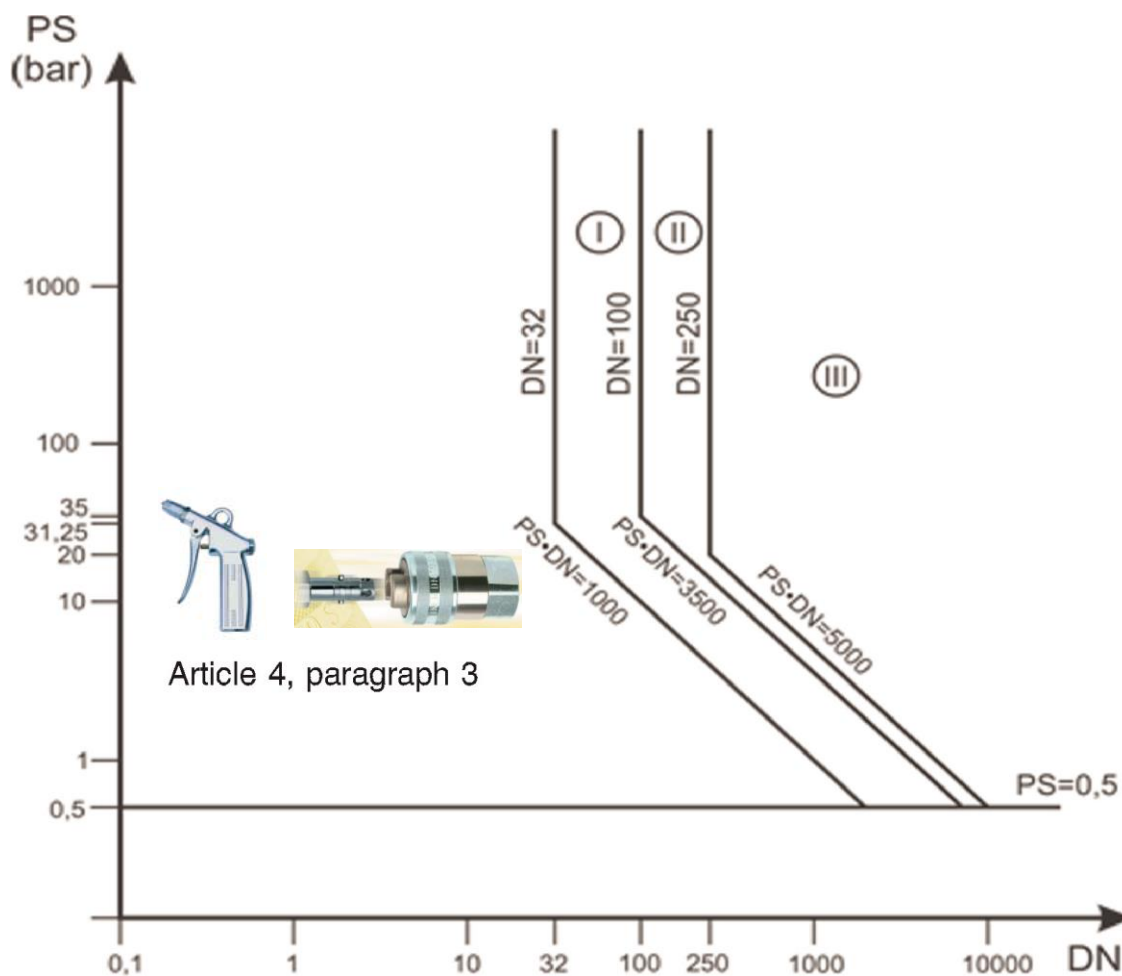
Pressure Equipment Directive (PED) 2014/68/EU, CONFORMITY ASSESSMENT TABLES, Annex II

The pressure accessories defined in point 5 of Article 2, and referred to in Article 4(1)(d), are classified on the basis of:

- their maximum allowable pressure PS and
- their volume V or their nominal size DN, as appropriate, and
- the group of fluids for which they are intended

The relevant diagram for containers and/or pipes applies for the specification of the conformity assessment classifications.

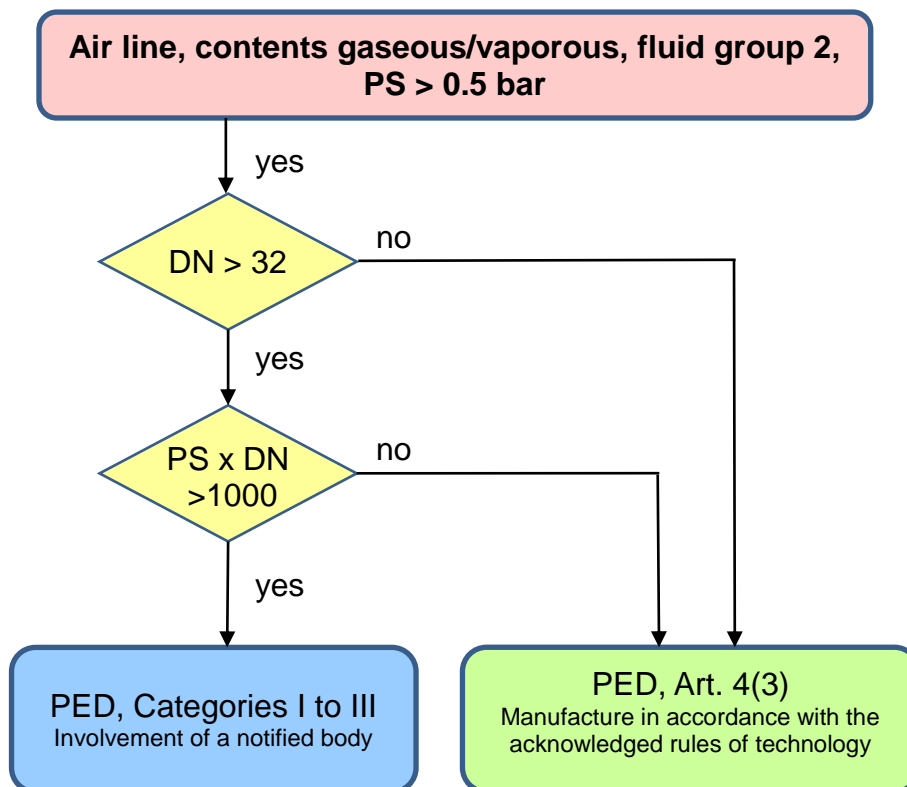
Diagram 7 from the Pressure Equipment Directive



DN = Nominal size (mm)

PS = Maximum allowable pressure (bar)

I, II, III = Categories

ANNEX II**Air lines: determining the category according to the Pressure Equipment Directive (PED)**

DN = Nominal size (mm)

PS = Maximum allowable pressure (bar)