
**Gas welding equipment — Acetylene
manifold systems for welding, cutting and
allied processes — General requirements**

*Matériel de soudage aux gaz — Centrales de détente pour la distribution
d'acétylène pour le soudage, le coupage et les techniques connexes —
Exigences générales*

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to member bodies for voting. Publication as an International Standard requires approval by at least 75 % of member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 14114 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO Technical Committee TC 44, *Welding and allied processes*, Subcommittee SC 8, *Equipment for gas welding, cutting and allied processes*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this standard, read "...this European Standard..." to mean "...this International Standard...".

Annexes A and B form a normative part of this International Standard. Annex ZA is for information only.

Annex ZA provides a list of corresponding International and European Standards for which equivalents are not given in the text.

Contents

	Page
Foreword	iv
1 Scope	1
2 Normative references	1
3 Definitions	1
4 Design and materials	2
4.1 Design / schematic construction	2
4.2 Materials of construction	3
4.3 High pressure flexible hoses	3
5 Tests	3
5.1 Strength test	3
5.2 Gas tightness test	3
6 Marking	4
7 Instructions for use	4
Annex A (normative) Configurations of acetylene manifold systems	5
Annex B (normative) Pressure actuated shut-off valves	10
Annex ZA (informative) Bibliography	11

Foreword

The text of EN ISO 14114:1999 has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS, in collaboration with Technical Committee ISO/TC 44 "Welding and allied processes".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2000, and conflicting national standards shall be withdrawn at the latest by January 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This standard is applicable to acetylene cylinder manifold systems extending from the cylinder valve or the bundle outlet connections to the connection of the flame arrestor. It specifies requirements for design, materials and testing of cylinder manifold systems for the supply of acetylene for use in welding, cutting and allied processes.

This standard applies to acetylene cylinder manifold systems in which up to 16 acetylene single cylinders or two acetylene bundles are coupled for collective gas withdrawal.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 730

Gas welding equipment – Equipment used in gas welding, cutting and allied processes, safety devices for fuel gases and oxygen or compressed air – General specifications, requirements and tests

EN 961

Gas welding equipment – Manifold regulators used in welding, cutting and allied processes up to 200 bar

EN 29090

Gas tightness of equipment for gas welding and allied processes (ISO 9090 : 1989)

EN 29539

Materials for equipment used in gas welding, cutting and allied processes (ISO 9539 : 1988)

EN ISO 2503

Gas welding equipment – Pressure regulators for gas cylinders used in welding, cutting and allied processes up to 300 bar (ISO 2503 : 1998)

EN ISO 14113

Gas welding equipment - Rubber and plastic hoses assembled for compressed or liquefied gases up to a maximum design pressure of 450 bar (ISO 14113 : 1997)

3 Definitions

For the purposes of this standard, the following definitions apply (partly adopted from EN 730).

3.1 acetylene cylinder manifold systems: Systems with up to 16 acetylene single cylinders or up to two acetylene bundles coupled on the high pressure side, to the high pressure tube, for collective gas withdrawal.

3.2 acetylene cylinder bundles (packs): Up to 16 cylinders connected for collective filling and emptying or connected within a pallet for collective emptying.

3.3 manifold high pressure pipework: Pipework system, including tube and/or hose assemblies, connecting acetylene cylinders or bundles, which are subjected to acetylene at full cylinder charging pressure, extending from the cylinder or bundle outlet connection to the inlet of the pressure regulator.

3.4 flame arrestor: A device which quenches a flame front. Depending on design, devices are effective in one or both directions [EN 730].

3.5 Cut-off valve

3.5.1 temperature sensitive cut-off valve: A device which stops the gas supply when a predetermined temperature is reached [EN 730].

3.5.2 pressure sensitive cut-off valve: A device which closes in the event of a back-pressure wave from the downstream side of the cut-off valve [EN 730].

3.6 quick-acting shut-off device: A safety device which prevents the continued withdrawal of acetylene and/or gaseous products of decomposition from the manifold system if an acetylene decomposition or a flashback occurs.

3.6.1 manual quick acting shut-off device: A device allowing to cut rapidly the gas flow rate by acting manually (e. g. a quarter turn valve).

3.6.2 automatic quick acting shut-off device: A self-acting device which closes quickly e. g. when triggered by an acetylene explosion in the high pressure manifold pipework.

3.7 pressure limiting device: A device which limits the pressure downstream of the manifold regulator in the event of regulator failure or malfunction.

Examples of such devices are: (a) relief valve, (b) pressure actuated shut-off valves.

3.8 high pressure stop valve: A device to prevent, when closed, the flow of gas.

3.9 non-return valve: A device which prevents passage of gas in the direction opposite to normal flow [EN 730].

3.10 change-over unit: A device allowing cylinders or bundles to be changed in a safe manner in a reversible system without interrupting the gas supply.

3.11 three way valve: A device which allows gas flow from one side of the high pressure manifold to enter the regulator while isolating flow from the second side. Its position can be reversed so that gas flows from the second side while the first side is isolated. It prevents simultaneous flow from both sides.

3.12 nominal flow rate: The flow rate in m³/h measured at the outlet corresponding to the limit of the scope of this standard. The test conditions of the regulator as defined in EN ISO 2503 or EN 961 for the measurement of Q₁ (standard discharge).

3.13 pressure-actuated shut-off valve: A device which automatically stops the gas supply to the regulator when the downstream pressure rises above the maximum operating pressure (see EN ISO 2503 and EN 961).

4 Design and materials

4.1 Design / schematic construction

4.1.1 Equipment

Acetylene cylinder manifold systems shall be equipped with the following system components:

- a) High pressure non-return valve located immediately downstream of the cylinder or bundle outlet;
- b) Manifold high pressure pipework with a part which can be flexible;

- c) Manual or automatic quick-acting shut-off device;
- d) Cylinder regulator or manifold regulator;
- e) Pressure indication on the upstream and downstream side of the pressure regulator, e. g. pressure gauges;
- f) Pressure limiting device. If a relief valve is chosen, the vented gas shall be piped to a safe location.
- g) Low-pressure pipework downstream of the manifold regulator extending to and including the safety devices, located immediately downstream of the pressure regulator;
- h) Low pressure non-return valve;
- i) Low pressure flame arrestor;
- j) Temperature or pressure sensitive cut-off device;

NOTE 1: Acetylene cylinder manifold systems should be equipped with facilities for venting and purging, if necessary, and/or facilities to prevent ignition by adiabatic compression.

NOTE 2: Acetylene cylinder manifold systems should be equipped with a change-over valve arrangement.

4.1.2 Standard manifold systems

See annexes A and B.

4.2 Materials of construction

The materials shall be resistant to acetylene, acetone and dimethyl formamide (DMF) as well as to the mechanical, chemical and thermal loads which occur under operating conditions (see EN 29539 and EN ISO 14113).

4.3 High pressure flexible hoses

Lengths of flexible hoses shall be kept to a practicable minimum.

5 Tests

5.1 Strength test

All parts of the high-pressure section shall withstand a hydraulic test pressure of 300 bar.

Testing is not required for components already separately tested for type tests according to the appropriate standard. System components which do not have to withstand the test pressure shall be removed before the strength test, e. g. pressure gauges, relief valves, regulators.

5.2 Gas tightness test

The manifold system shall be tested for leaks before start-up.

Two tightness tests shall be performed on the high pressure section:

- a test at low pressure (approx. 1 bar);
- a test at high pressure of at least 18 bar.

The low pressure section [between the regulator and valve 17 (see annex A)] shall be tested at the maximum outlet pressure of the regulator.

6 Marking

The following information shall be clearly and permanently marked on a plate permanently fixed to the manifold system:

- a) Number of this standard;
- b) Name or trademark of the manufacturer or distributor;
- c) Type of gas "Acetylene";
- d) Maximum regulated pressure [bar];
- e) Nominal flow rate;
- f) Month / year of manufacture.

NOTE: The marking plate should be fixed on the changeover arrangement or on the pressure regulator.

7 Instructions for use

The manufacturer, supplier or distributor shall supply instructions for use with each manifold system, covering:

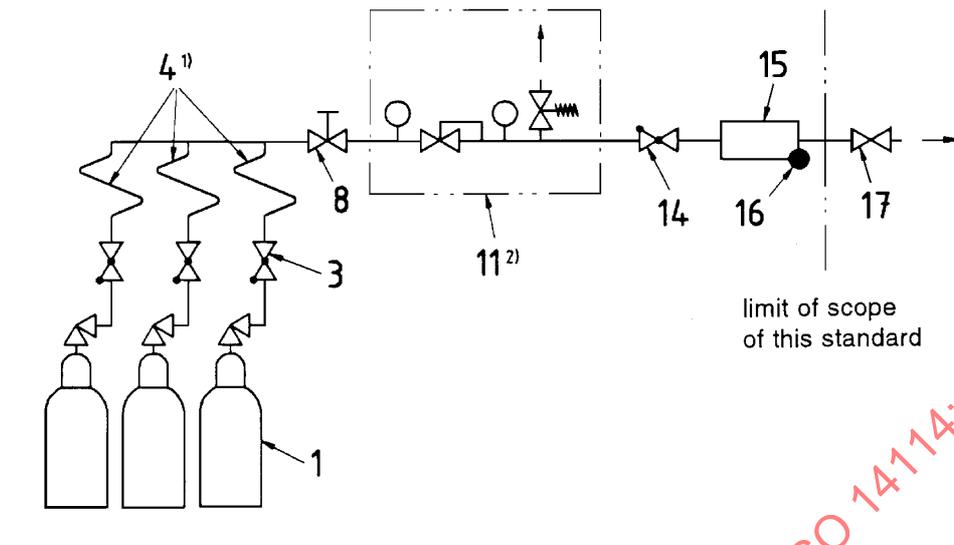
- a) field of application of the manifold system;
- b) description of manifold system and the meaning of the marking;
- c) the safe and correct installation of the manifold system;
- d) the commissioning tests that are necessary to prove safe and correct installation prior to service;
- e) the use and maintenance of the manifold system (intended for the operator); this includes trouble shooting, hazards and safety precautions.

Annex A (normative)**Configurations of acetylene manifold systems**

List of components contained in figures A.1 to A.8:

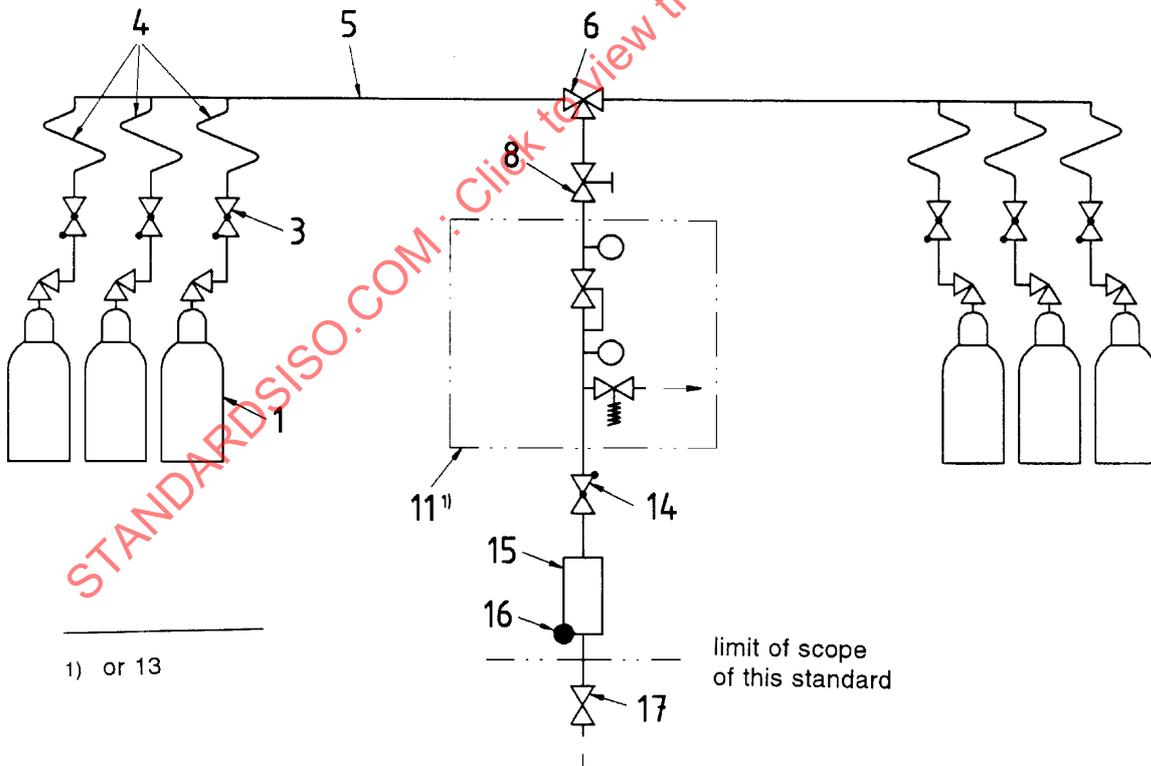
- 1 cylinder
- 2 bundle (see 3.2)
- 3 high pressure non-return valve
- 4 high pressure hose assembly
- 5 high pressure tube (see 3.3)
- 6 three way valve (see 3.11)
- 7 high pressure stop valve (see 3.8)
- 8 manual quick acting shut-off valve (see 3.6.1)
- 9 automatic quick acting shut-off device (see 3.6.2)
- 10 cylinder regulator according to EN ISO 2503 without downstream pressure measuring device
- 11 cylinder regulator according to EN ISO 2503 and pressure limiting device¹⁾
- 12 manifold regulator according to EN 961 without downstream pressure measuring device and pressure limiting device
- 13 manifold regulator according to EN 961¹⁾
- 14 low pressure non-return valve according to EN 730
- 15 flame arrestor according to EN 730 (see 3.4)
- 16 temperature or pressure sensitive cut-off device according to EN 730 (see 3.5)
- 17 main isolation valve - optional and on the piping of the downstream system

¹⁾ Alternative arrangements to those illustrated are shown in annex B.



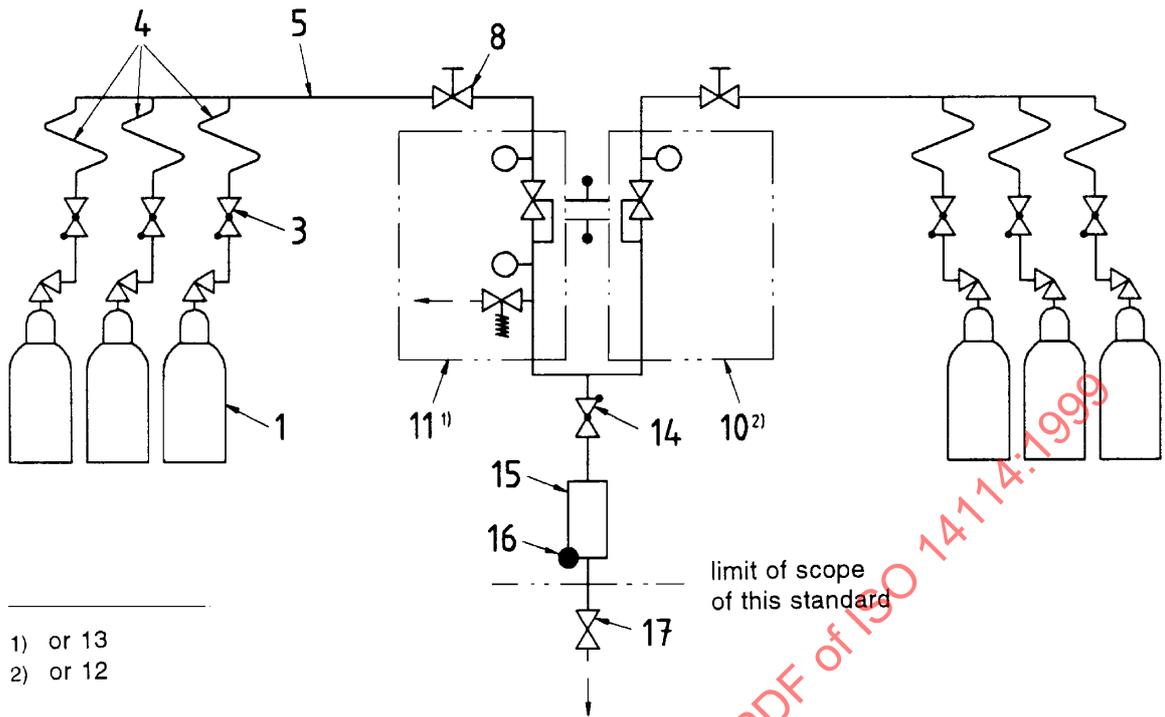
- 1) and/or 5
- 2) or 13

Figure A.1: System for up to 3 cylinders



- 1) or 13

Figure A.2: System with three way valve and one regulator for up to 2 x 3 cylinders



NOTE: Where the alternative systems shown in Annex B are used, two identical systems need to be employed to form the double regulator change-over-unit.

Figure A.3: System with double regulator change-over unit for up to 2 x 3 cylinders

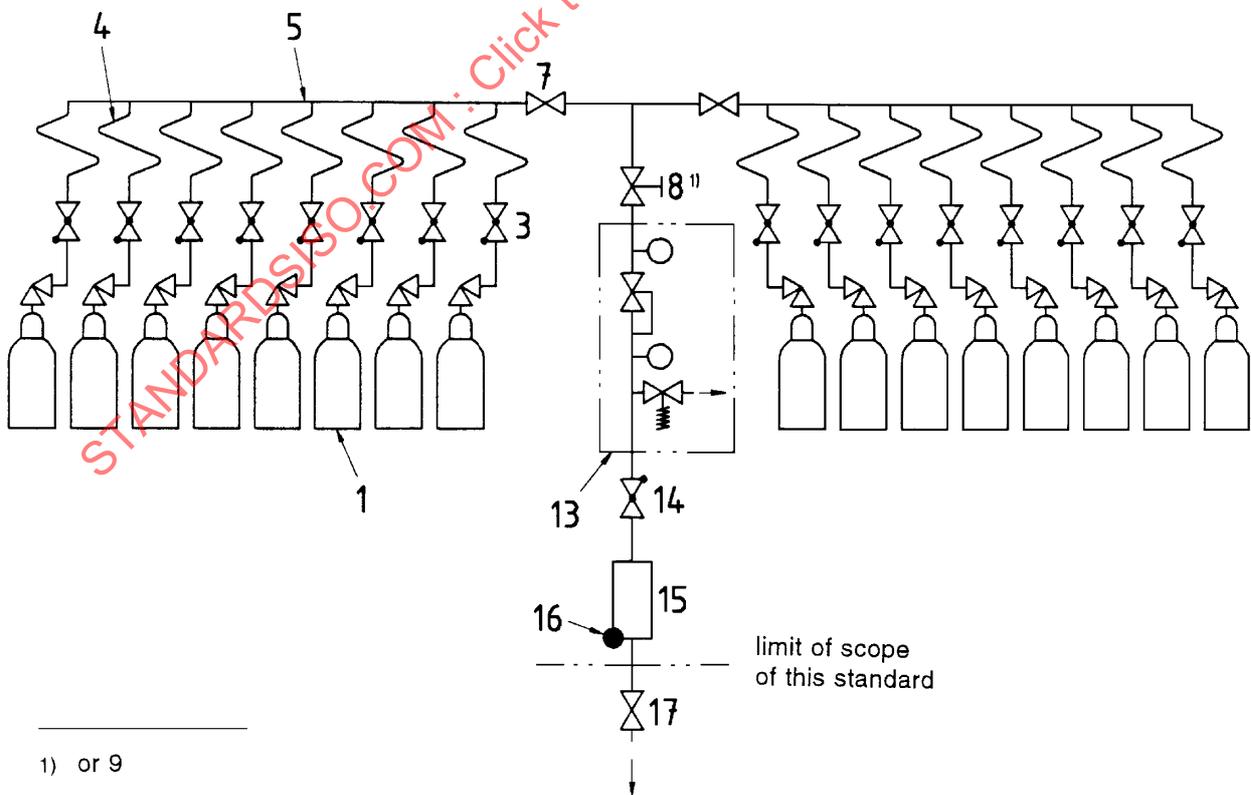
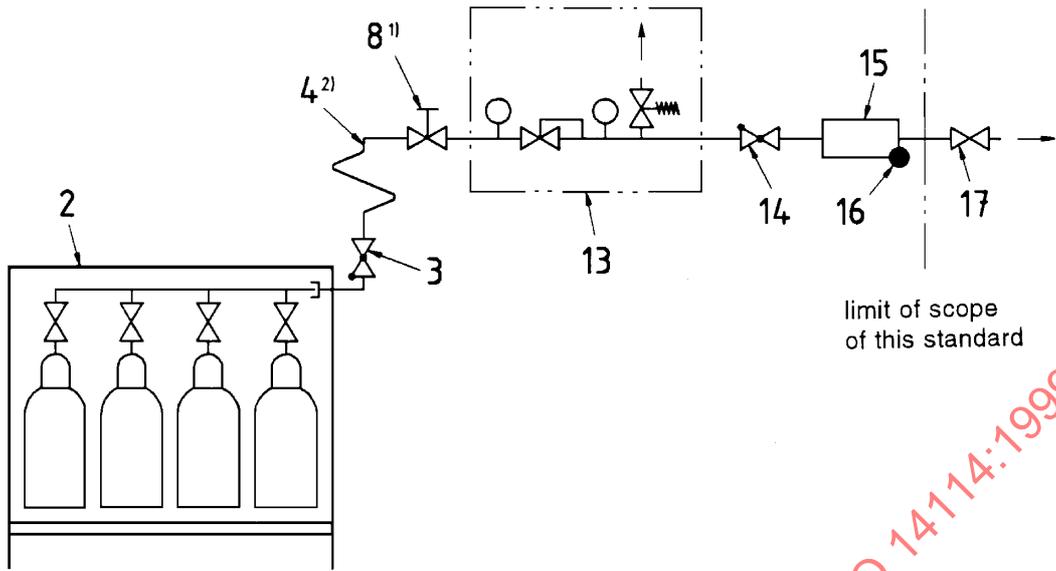
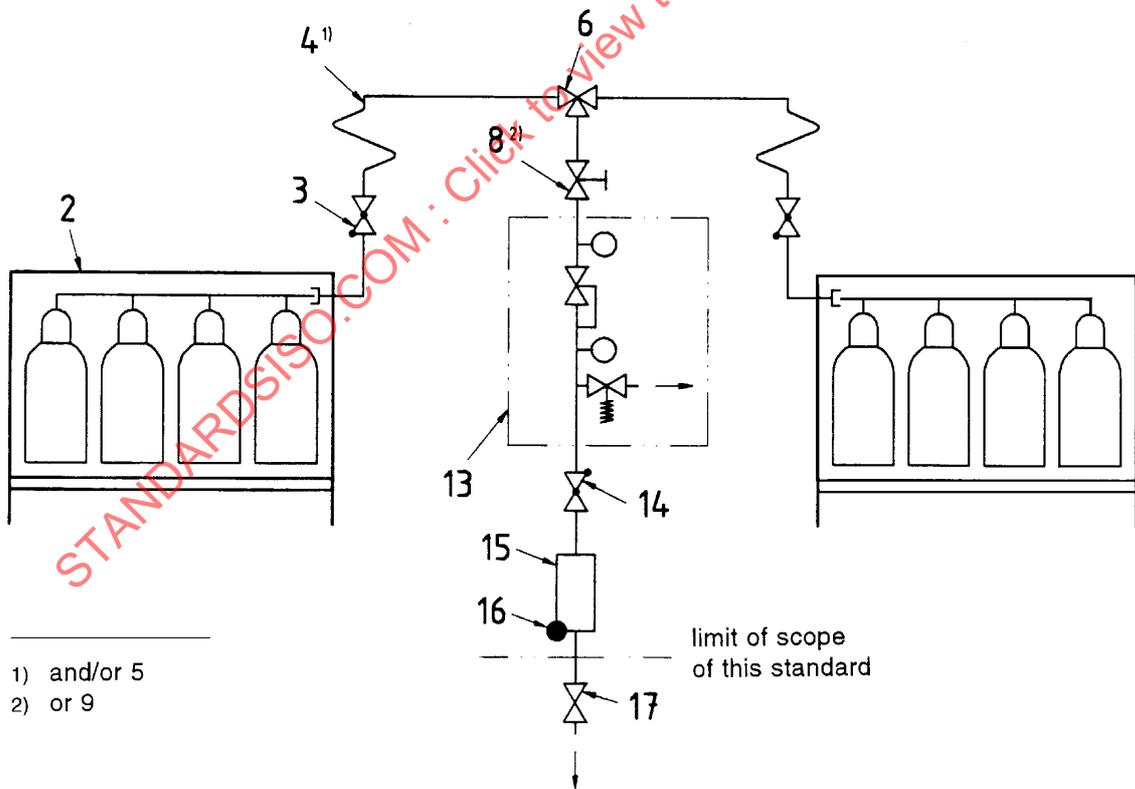


Figure A.4: Two-sided system for up to 2 x 8 cylinders



- 1) or 9
- 2) and/or 5

Figure A.5: System for one bundle



- 1) and/or 5
- 2) or 9

Figure A.6: System for two bundles with three way valve and one regulator