



SLOVENSKI STANDARD

SIST ISO 2186:2010

01-april-2010

Pretok tekočin v zaprtih kanalih - Povezave za prenos signala tlaka med primarnimi in sekundarnimi elementi

Fluid flow in closed conduits - Connections for pressure signal transmissions between primary and secondary elements

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Débit des fluides dans les conduites fermées -- Liaisons pour la transmission du signal de pression entre les éléments primaires et secondaires

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INTERNATIONAL
STANDARD

ISO
2186

Second edition
2007-03-01

**Fluid flow in closed conduits —
Connections for pressure signal
transmissions between primary and
secondary elements**

*Débit des fluides dans les conduites fermées — Liaisons pour la
transmission du signal de pression entre les éléments primaires et
secondaires*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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

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

ISO 2186 was prepared by Technical Committee ISO/TC 30, *Measurement of fluid flow in closed conduits*, Subcommittee SC 2, *Pressure differential devices*.

This second edition cancels and replaces the first edition (ISO 2186:1973), which has been technically revised.

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Introduction

The primary devices are flow meters described in ISO 5167 (all parts).

A secondary device in this context receives a differential pressure signal from a primary device and can display the differential pressure value and convert it into a signal of a different nature, i.e. an analogue or digital signal, to transmit the value of the differential pressure to another location.

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Fluid flow in closed conduits — Connections for pressure signal transmissions between primary and secondary elements

1 Scope

This International Standard sets out provisions for the design, lay-out and installation of a pressure signal transmission system, whereby a pressure signal from a primary fluid flow device can be transmitted by known techniques to a secondary device safely and in such a way that the value of the signal is not distorted or modified.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4006, *Measurement of fluid flow in closed conduits — Vocabulary and symbols*

ISO 5167-1:2003, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 1: General principles and requirements*

ISO 5167-2, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 2: Orifice plates*

ISO 5167-3, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 3: Nozzles and Venturi nozzles*

ISO 5167-4, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 4: Venturi tubes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4006 and ISO 5167-1 and the following apply.

3.1

secondary device

device which receives a differential pressure signal from a primary device, may display the differential pressure value and may convert it into a signal of a different nature, i.e. an analogue or digital signal, to transmit the value of the differential pressure to another location

4 General principles

4.1 Safe containment

The differential pressure signal shall be transmitted in a safe manner within a pipe or tubing to the secondary device. This requires that the fluid between the primary and secondary device be safely contained. Safe containment of the fluid requires conformity to the applicable standards and codes and requires the selection of the proper materials of construction, the fabrication methods and practices and any required gaskets and

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sealing materials. For on-line maintenance or verification, design shall cover safe means for proof of isolation, depressurization, flushing and removal/replacement of secondary instrumentation.

4.2 Piping specification

The pipe or tubing installed between the primary and secondary device should comply with applicable national standards and codes of practice.

NOTE 1 National regulations can also apply.

A process-piping specification should include the specification for the isolation valve (or block valve) closest to the primary device. The specification for the piping or tubing between this isolation valve and the secondary device, including any additional valves in this piping, may differ from the piping specification for the isolation valve. This is because the small size, and often the more limited temperatures involved on the instrument secondary piping, justifies these differences.

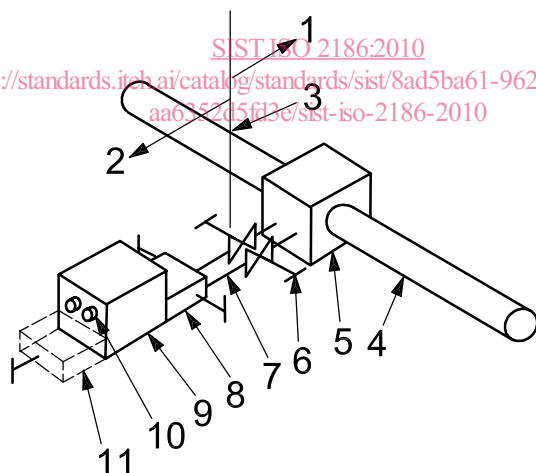
The break (change) in piping specification between the process and the instrument (or secondary) side is normally at the process isolation valve on its secondary connection end (see Figure 1). If the process-piping specification requires flanged connections, then the process end of the isolation valve is flanged and the mating flange on the secondary side is an instrument connection or may have another approved fitting.

NOTE 2 An approved hydrostatic test can be required for piping systems to prove the integrity of the pressure-containing parts of the piping system.

NOTE 3 Some installations require provision for "rodding out" of the process connections. This is the use of a rod or other physical device to remove materials blocking the free flow of fluid in the impulse lines. Safety precautions apply.

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Key

- 1 primary side
- 2 secondary side
- 3 specification break, where the piping specifications change between secondary and primary
- 4 conduit running full
- 5 primary head creating device
- 6 isolation valves
- 7 impulse line connecting pipe
- 8 manifold
- 9 secondary device
- 10 bleed valves, typical
- 11 alternative location of equalization valve

Figure 1 — Primary and secondary at same elevation, preferred installation

4.3 Isolation (block) valves

Isolation (block) valves are required to separate the entire measurement system from the main pipeline, when necessary, but they should not affect the pressure signal.

It is recommended that isolating valves should be located immediately following the pressure tapings of the primary element. If condensation chambers are installed, isolation valves may also be fitted immediately following the condensation chambers. However, if condensation chambers are used, it is important to check that they are emptied regularly and that they do not become a source of leaks due to corrosion.

When specifying an isolation valve, practical considerations include the following.

- a) The valve shall be rated for the pipe design pressure and temperature.
- b) There shall be a careful choice of both valve and packing, particularly in the case of dangerous or corrosive fluids and with gases such as oxygen.
- c) Valves shall be chosen that do not affect the transmission of a pressure signal, particularly when that signal is subject to any degree of fluctuation.

Ball valves or gate valves should be used where possible, as globe-style block valves can create a pocket of gas or liquid if they are installed with the valve stem in the vertical plane.

NOTE This pocket can result in a distortion of the pressure difference, which can result in an error in the indicated measurement. Installation with the valve stem at an angle of 90° from the vertical normally solves this problem.

4.4 Valve manifolds

Valves are often installed to permit operation, calibration and troubleshooting of the secondary device without removing it. Some typical valve manifold configurations are shown in Figure 2.

These valves are used

- a) to isolate the secondary device from the impulse lines;
- b) to open a path between the high and low pressure sides of the secondary device. The secondary device zero (no flow signal) can be adjusted at operating pressure with one block valve closed and the bypass valve(s) open;
- c) to drain or vent the secondary device and/or the impulse piping to the drain or to atmosphere.

Manufactured valve manifolds can reduce cost and save space. Valve manifolds integrate the required valves and connections into one assembly. Valve manifolds shall be installed in the orientation specified by the manufacturer to avoid possible errors caused by trapped pockets of gas or liquid in the body.