a) MEDC 11(5762) P3/ISO 5167-1:2003

Title: Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full -- Part 1: General principles and requirements

SCOPE: This part of ISO 5167 defines terms and symbols and establishes the general principles for methods of measurement and computation of the flowrate of fluid flowing in a conduit by means of pressure differential devices (orifice plates, nozzles and Venturi tubes) when they are inserted into a circular cross-section conduit running full. This part of ISO 5167 also specifies the general requirements for methods of measurement, installation and determination of the uncertainty of the measurement of flowrate. It also defines the general specified limits of pipe size and Reynolds number for which these pressure differential devices are to be used.

ISO 5167 (all parts) is applicable only to flow that remains subsonic throughout the measuring section and where the fluid can be considered as single-phase. It is not applicable to the measurement of pulsating flow.

b) MEDC 11(5763) P3/ ISO 5167-2:2003

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

SCOPE: This part of ISO 5167 specifies the geometry and method of use (installation and operating conditions) of orifice plates when they are inserted in a conduit running full to determine the flowrate of the fluid flowing in the conduit.

This part of ISO 5167 also provides background information for calculating the flowrate and is applicable in conjunction with the requirements given in ISO 5167-1.

This part of ISO 5167 is applicable to primary devices having an orifice plate used with flange pressure tappings, or with corner pressure tappings, or with *D* and *D*/2 pressure tappings. Other pressure tappings such as “vena contracta” and pipe tappings have been used with orifice plates but are not covered by this part of ISO 5167. This part of ISO 5167 is applicable only to a flow which remains subsonic throughout the measuring section and where the fluid can be considered as single phase. It is not applicable to the measurement of pulsating flow. It does not cover the use of orifice plates in pipe sizes less than 50 mm or more than 1 000 mm, or for pipe Reynolds numbers below 5 000

c) MEDC 11(5764) P3/ISO 5167-3:2003

Title: Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full -- Part 3: Nozzles and Venturi nozzles.

SCOPE: This part of ISO 5167 specifies the geometry and method of use (installation and operating conditions) of nozzles and Venturi nozzles when they are inserted in a conduit running full to determine the flowrate of the fluid flowing in the conduit.

This part of ISO 5167 also provides background information for calculating the flowrate and is applicable in conjunction with the requirements given in ISO 5167-1.

This part of ISO 5167 is applicable to nozzles and Venturi nozzles in which the flow remains subsonic throughout the measuring section and where the fluid can be considered as single-phase. In addition, each of the devices can only be used within specified limits of pipe size and Reynolds number. It is not applicable to the measurement of pulsating flow. It does not cover the use of nozzles and Venturi nozzles in pipe sizes less than 50 mm or more than 630 mm, or where the pipe Reynolds numbers are below 10 000.

This part of ISO 5167 deals with

- a) two types of standard nozzles:
    - 1) the ISA[5)] 1932 nozzle;
    - 2) the long radius nozzle[6)];
- b) the Venturi nozzle.

The two types of standard nozzle are fundamentally different and are described separately in this part of ISO 5167. The Venturi nozzle has the same upstream face as the ISA 1932 nozzle, but has a divergent section and, therefore, a different location for the downstream pressure tappings, and is described separately. This design has a lower pressure loss than a similar nozzle. For both of these nozzles and for the Venturi nozzle direct calibration experiments have been made, sufficient in number, spread and quality to enable coherent systems of application to be based on their results and coefficients to be given with certain predictable limits of uncertainty.

d) MEDC 11(5765) P3/ISO 5167-4:2003

Title: Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full -- Part 4: Venturi tubes

SCOPE: This part of ISO 5167 specifies the geometry and method of use (installation and operating conditions) of Venturi tubes when they are inserted in a conduit running full to determine the flowrate of the fluid flowing in the conduit.

This part of ISO 5167 also provides background information for calculating the flowrate and is applicable in conjunction with the requirements given in ISO 5167-1.

This part of ISO 5167 is applicable only to Venturi tubes in which the flow remains subsonic throughout the measuring section and where the fluid can be considered as single-phase. In addition, each of these devices can only be used within specified limits of pipe size, roughness, diameter ratio and Reynolds number. This part of ISO 5167 is not applicable to the measurement of pulsating flow. It does not cover the use of Venturi tubes in pipes sized less than 50 mm or more than 1 200 mm, or where the pipe Reynolds numbers are below 2×10^5.

This part of ISO 5167 deals with the three types of classical Venturi tubes:

a) cast;

b) machined;

c) rough welded sheet-iron.

A Venturi tube is a device which consists of a convergent inlet connected to a cylindrical throat which is in turn connected to a conical expanding section called the “divergent”. The differences between the values of the uncertainty of the discharge coefficient for the three types of classical Venturi tube show, on the one hand, the number of results available for each type of classical Venturi tube and, on the other hand, the more or less precise definition of the geometric profile. The values are based on data collected many years ago. Venturi nozzles (and other nozzles) are dealt with in ISO 5167-3.

NOTE 1 Research into the use of Venturi tubes in high-pressure gas [≥ 1 MPa (≥ 10 bar)] is being carried out at present (see References [1], [2], [3] in the Bibliography). In many cases for Venturi tubes with machined convergent sections discharge coefficients which lie outside the range predicted by this part of ISO 5167 by 2 % or more have been found. For optimum accuracy Venturi tubes for use in gas should be calibrated over the required flowrate range. In high-pressure gas the use of single tappings (or at most two tappings in each plane) is not uncommon.

NOTE 2 In the USA the classical Venturi tube is sometimes called the Herschel Venturi tube.

e) MEDC 11(5766) P3/ ISO 5167-5:2016

Title: Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 5: Cone meters

SCOPE: This part of ISO 5167 specifies the geometry and method of use (installation and operating conditions) of cone meters when they are inserted in a conduit running full to determine the flow rate of the fluid flowing in the conduit.

As the uncertainty of an uncalibrated cone meter might be too high for a particular application, it might be deemed essential to calibrate the flow meter in accordance with Clause 7.

This part of ISO 5167 also provides background information for calculating the flow rate and is applicable in conjunction with the requirements given in ISO 5167-1.

This part of ISO 5167 is applicable only to cone meters in which the flow remains subsonic throughout the measuring section and where the fluid can be considered as single-phase. Uncalibrated cone meters can only be used within specified limits of pipe size, roughness, β, and Reynolds number. This part of ISO 5167 is not applicable to the measurement of pulsating flow. It does not cover the use of uncalibrated cone meters in pipes sized less than 50 mm or more than 500 mm, or where the pipe Reynolds numbers are below 8×10^4 or greater than $1{,}2 \times 10^7$.

A cone meter is a primary device which consists of a cone-shaped restriction held concentrically in the centre of the pipe with the nose of the cone upstream. The design of cone meter defined in this part of ISO 5167 has one or more upstream pressure tappings in the wall, and a downstream pressure tapping positioned in the back face of the cone with the connection to a differential pressure transmitter being a hole through the cone to the support bar, and then up through the support bar.

Alternative designs of cone meters are available; however, at the time of writing, there is insufficient data to fully characterize these devices, and therefore, these meters shall be calibrated in accordance with Clause 7.

f) MEDC 4(57687) P3/ ISO 14313:2007

Title: Petroleum and natural gas industries —Pipeline transportation systems —Pipeline valves.

SCOPE: This International Standard specifies requirements and provides recommendations for the design, manufacturing, testing and documentation of ball, check, gate and plug valves for application in pipeline systems meeting the requirements of ISO 13623 for the petroleum and natural gas industries.

This International Standard is not applicable to subsea pipeline valves, as they are covered by a separate International Standard (ISO 14723).

This International Standard is not applicable to valves for pressure ratings exceeding PN 420 (Class 2 500).

g) MEDC 4(57684) P3/ ISO 4437-1:2014

Title: Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) —Part 1- General.

SCOPE: This part of ISO 4437 specifies the general properties of polyethylene (PE) compounds for the manufacture of pipes and fittings intended to be used for the supply of gaseous fuels.

It also specifies the test parameters for the test methods referred to in this International Standard.

In conjunction with ISO 4437-2, ISO 4437-3, ISO 4437-4, and ISO 4437-5, it is applicable to PE pipes, fittings and valves, their joints, and joints with components of PE and other materials intended to be used under the following conditions:

a) the maximum operating pressure (MOP), is based on the design stress determined from the compound minimum required strength (MRS) divided by the *C* factor, and taking into account rapid crack propagation (RCP) requirements;

b) a temperature of 20 °C as reference temperature for the design basis.

NOTE 1 For other operating temperatures, guidance is given in ISO 4437-5:2014.

h) MEDC 4(57685) P3/ ISO 4437- 4:2015

Title: Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) —Part 4 – Valves.

SCOPE: This part of ISO 4437 specifies the characteristics of valves made from polyethylene (PE) for piping systems in the field of the supply of gaseous fuels.

It also specifies the test parameters for the test methods referred to in this part of ISO 4437.

In conjunction with ISO 4437-1, ISO 4437-2, ISO 4437-3:2014, and ISO 4437-5, it is applicable to PE valves, their joints, and to joints with components of PE and other materials intended to be used under the following conditions:

a) the maximum operating pressure, MOP, is based on the design stress determined from the compound MRS divided by the C factor and taking into account RCP requirements;

b) temperature of 20 °C as reference temperature;

NOTE 1 For other operating temperatures, derating coefficients are given in ISO 4437-5:2014.

c) operating temperature between −20 °C and +40 °C.

This International Standard covers a range of maximum operating pressures and gives requirements concerning colours and additives.

NOTE 2 It is the responsibility of the purchaser or specifier to make the appropriate selections from these aspects, taking into account their particular requirements and any relevant national regulations and installation practices or codes.

It is applicable to bi-directional valves with spigot ends or electrofusion sockets intended to be jointed with PE pipes conforming to ISO 4437-2 without any fittings or with PE fittings conforming to ISO 4437-3:2014.

This part of ISO 4437 covers valves for pipes with a nominal outside diameter $d_n \leq 400$ mm.

NOTE 3 Valves made from materials other than polyethylene designed for the supply of gaseous fuels conforming to the relevant standards are permitted to be used in PE piping systems according to ISO 4437 provided that they have relevant PE connections for butt fusion or electrofusion ends (see ISO 4437-3). The component, i.e. the complete valve, shall fulfil the requirements of this part of ISO 4437

i) MEDC 4(57686) P3/ ISO 4437-5:2015

Title: Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) —Part 5-Fitness for purpose of the system

SCOPE: This part of ISO 4437 specifies the requirements of fitness for purpose of the polyethylene (PE) piping system to be used for the supply of gaseous fuels.

It specifies the definitions of electrofusion, socket fusion, butt fusion, and mechanical joints.

It specifies the method of preparation of test piece joints and the tests to be carried out on these joints for assessing the fitness for purpose of the system under normal and extreme conditions.

It specifies the test parameters for the test methods referred to in this part of ISO 4437.

In conjunction with ISO 4437-1, ISO 4437-2, ISO 4437-3, and ISO 4437-4, it is applicable to PE pipes, fittings, valves, their joints, and joints with components of PE and other materials intended to be used under the following conditions:

- a) the maximum operating pressure (MOP) is based on the design stress, determined from the compound minimum required strength (MRS) divided by the *C* factor, and taking into account rapid crack propagation (RCP) requirements;
- b) a temperature of 20 °C as reference temperature for the design basis.

NOTE 1 For other operating temperatures, derating coefficients are given in Annex A.

NOTE 2 It is the responsibility of the purchaser or specifier to make the appropriate selections from these aspects, taking into account their particular requirements and any relevant national regulations and installation practices or codes.

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