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**Agricultural irrigation equipment —  
Manually operated small plastics valves**

*Matériel agricole d'irrigation — Petites vannes en matière plastique  
commandées manuellement*

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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 9911 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 18, *Irrigation and drainage equipment and systems*.

This second edition cancels and replaces the first edition (ISO 9911:1993), which has been technically revised.

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# Agricultural irrigation equipment — Manually operated small plastics valves

## 1 Scope

This International Standard specifies the general requirements and test methods for manually operated small plastics valves intended for operation in agricultural irrigation systems. It is applicable to manually operated plastics valves of nominal sizes DN 8 (1/4") to DN 100 (4").

The valves are intended for installation in irrigation piping networks, using water at temperatures up to 60 °C. Nominal pressures of the valves are as designated by the manufacturer.

## 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 7-1, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

ISO 48:1994, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 188:1998, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 815, *Rubber, vulcanized or thermoplastic — Determination of compression set at ambient, elevated or low temperatures*

ISO 1167 (all parts), *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure*

ISO 2859-1:1999, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 5752, *Metal valves for use in flanged pipe systems — Face-to-face and centre-to-face dimensions*

ISO 7349, *Thermoplastics valves — Connection references*

ISO 7508, *Unplasticized polyvinyl chloride (PVC-U) valves for pipes under pressure — Basic dimensions — Metric series*

ISO 8233, *Thermoplastics valves — Torque — Test method*

ISO 8242, *Polypropylene (PP) valves for pipes under pressure — Basic dimensions — Metric series*

ISO 8659, *Thermoplastics valves — Fatigue strength — Test method*

ISO 9393-1, *Thermoplastics valves for industrial applications — Pressure test methods and requirements — Part 1: General*

ISO 9625, *Mechanical joint fittings for use with polyethylene pressure pipes for irrigation purposes*

ISO 9644, *Agricultural irrigation equipment — Pressure losses in irrigation valves — Test method*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1

##### **body**

main component of the valve which provides the fluid flow passageways and the body ends

#### 3.2

##### **seat**

part of the valve which provides the obturator seating surface

NOTE It can be either integral or a separate component.

#### 3.3

##### **dividing wall**

integral part of the valve body which separates the inlet and outlet ports of a valve, and on which the valve seat is formed

#### 3.4

##### **nominal pressure**

##### **PN**

alphanumeric designation for reference purposes related to the mechanical strength of a valve

NOTE It usually corresponds to the service pressure in bar, with water at 20 °C, for which the valve is designed (1 bar = 0,1 MPa = 10<sup>5</sup> Pa; 1 MPa = 1 N/mm<sup>2</sup>).  
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#### 3.5

##### **nominal size**

numerical designation used to refer to the size of a valve which is identical to the diameter of the pipe or pipes to which the valve is intended to be connected directly

NOTE A single number designation is adequate if the inlet and outlet ports are the same size.

#### 3.6

##### **angle valve**

valve with a generally cylindrical body in which the body ends are in planes perpendicular to each other and having a stem the axis of which is co-linear with the axis of one body end

#### 3.7

##### **ball valve**

valve in which a ball can be turned to move its port, or ports, relative to the ports in the valve body, to control the flow of water

#### 3.8

##### **diaphragm valve**

valve in which a flexible diaphragm constitutes the closing and regulating mechanism to control the flow of fluid through the valve

#### 3.9

##### **globe valve**

valve with a generally cylindrical body in which the axes of the body ends are co-linear and in which the axis of the stem is perpendicular to the axes of the body ends

**3.10****oblique valve****Y-globe valve**

valve in which the axes of the body ends are co-linear and in which the axis of the stem is oblique to the axes of the body ends

**3.11****closing disc**

part of an obturator of any shape on which the disc face is formed and to which the disc facing ring, if used, is secured

**3.12****obturator**

moving member in a valve that operates to close the valve and, where applicable, contains a washer or similar sealing device

**3.13****disc face**

smooth face of the obturator in a valve which makes contact with the valve seat when the valve is closed

**3.14****disc facing ring**

ring, of material different from the closing disc, secured to the disc and used to ensure water-tightness when a valve is closed

**3.15****stem****shaft**

component of an obturator by which the actuating thread is formed and by which control of the closing component is effected

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**3.16****closing torque**

torque exerted over the closing operation to achieve full tightness of the valve at nominal pressure

**3.17****opening torque**

torque exerted initially to open the valve from fully closed or over the full opening operation at nominal pressure

**3.18****shell test**

test intended to check the design strength of a valve body, under internal hydrostatic pressure

**4 Marking**

Each manually operated plastics valve that meets the requirements of this International Standard shall bear a readily visible, clear and durable marking, which shall give the particulars listed under a), b) and e) below. Particulars listed under c) and d) may be given on an attached label or on the packaging.

- a) Name of manufacturer or registered trademark.
- b) Nominal size of inlet and outlet ports: for direct slip-on type connections to plastics pipe, the outside nominal diameter of the connecting pipe shall be given in millimetres; for threaded connections, the nominal thread size shall be given in accordance with ISO 7-1.
- c) Nominal pressure, in hundreds of kilopascals.
- d) Type of valve material: PE, PVC, PP, NP, etc.
- e) Direction of flow, if required, which should be shown on the valve body.

## 5 Sampling and acceptance requirements

### 5.1 Type-tests

Ensure that the test laboratory representative takes the sample of test specimens at random from a total of at least 100 valves. Ensure that the number of test specimens used for each test is in accordance with Table 1.

**Table 1 — Required number of test specimens and acceptance number**

| Clause | Test  | Number of test specimens | Acceptance number |
|--------|---|--------------------------|-------------------|
| 6      | Technical characteristics   | 2                        | 0                 |
| 7.2.1  | Closing torque  | 3                        | 1                 |
| 7.2.2  | Resistance to increased torque  | 3                        | 0                 |
| 7.3    | Pressure loss   | 2                        | 0                 |
| 7.4    | Resistance of valve and valve material to internal hydrostatic pressure | 4                        | 0                 |
| 7.5    | Seat and stem sealing test  | 5                        | 1                 |
| 7.6    | Valve performance at increased hydraulic pressure                       | 2                        | 0                 |
| 7.7    | Endurance testing   | 2                        | 0                 |
| A.1    | Moulded plastics material of valve body — Pressure test                 | 2                        | 0                 |
| A.2    | Shell test  | 3                        | 0                 |

If the number of defective specimens in the sample is equal to or less than the acceptance number given in Table 1, the lot shall be considered acceptable. If the number of defective specimens found in the test is greater than the acceptance number, the lot shall be rejected.

All parts of the valve shall be of good workmanship, whole and smooth, and shall contain no holes.

### 5.2 Acceptance tests

When acceptance of manufacturing lots or of shipments of valves is required, conduct the sampling in accordance with ISO 2859-1:1999, based on AQL 2,5 and special inspection level S-4.

Test all specimens in the sample, selected at random in accordance with ISO 2859-1:1999, Table II-A, for 1 h, as specified in 7.5.

The shipment or the lot complies with this International Standard if the number of defective specimens found in the test does not exceed the acceptance number according to ISO 2859-1.

For the other tests, the number of test specimens shall be selected at random from the sample in accordance with Table 1.

The shipment or the lot complies with this International Standard if the number of defective specimens found in the other tests does not exceed the acceptance number specified in Table 1.

## 6 Technical characteristics

### 6.1 General

All valve components that come into contact with water shall be suitable for use with water, fertilizers and chemicals commonly used in irrigation, including treated sewage water.

The body material shall be opaque.



All parts of the valve shall be of good workmanship, whole and smooth, and shall contain no holes, air bubbles, flash, projections or any other defects that could impair performance or cause injury.

All parts of valves that are of the same size, type and model produced by the same manufacturer shall be interchangeable.

The manufacturer shall supply written certification that the materials used in the manufacture of the valve are in accordance with this International Standard.

On request, the manufacturer shall supply any available information on the resistance of the valve to corrosive attack by fertilizers and chemicals used in agriculture.

## 6.2 Dimensions

According to the type of end connections of the valve, the basic dimensions of the valve shall be in accordance with the International Standards listed in Table 2.

**Table 2 — Basic dimensions**

| Material                                 | International Standard |
|--|------------------------|
| Polypropylene (PP)                       | ISO 8242               |
| Polyethylene (PE)                        | ISO 9625               |
| Unplasticized polyvinyl chloride (PVC-U) | ISO 7508               |
| Reinforced Polyamide (NP)                | ISO 5752               |

## 6.3 Connections to pipeline

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The connections of the valve to the pipeline shall be in accordance with ISO 7349 and Table 2.

NOTE Flanged connections are not included.

In valves with threaded ends intended for direct connection to the pipeline, the threads shall be in accordance with ISO 7-1. However, other threads are allowed, provided that a suitable adaptor is supplied with each threaded connection such that it complies with ISO 7-1. In valves intended for connection to polyethylene pipe by mechanical jointing fittings, the fittings shall be in accordance with ISO 9625.

## 6.4 Handwheel or handle

The handwheel or handle shall be free from sharp projections, burrs or other defects that could cause injury.

The handwheel or handle shall be securely connected to the valve stem and shall be replaceable.

## 6.5 Specific construction requirements for globe, oblique and angle valves

### 6.5.1 Threaded valve stems or spindles

The threads of the valve stems or spindles shall be as designed by the manufacturer, provided they are self-locking.

The valve stem shall be of sufficient length to permit full closure of the valve when the handwheel or handle is mounted on the stem and the disc facing ring is removed.