
**Irrigation equipment — Safety devices
for chemigation —**

Part 2:
**Chemigation valve assemblies from
DN 75 (3") to DN 350 (14")**

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*Matériel d'irrigation — Dispositifs de sécurité pour l'application de
produits chimiques par irrigation —*

*Partie 2: Installations de vannes pour application de produits
chimiques par irrigation de DN 75 (3") à DN 350 (14")*

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 18, *Irrigation and drainage equipment and systems*.

ISO 13693 consists of the following parts, under the general title *Irrigation equipment — Safety devices for chemigation*:

- *Part 1: Small plastics valves for chemigation*
- *Part 2: Chemigation valve assemblies from DN 75 (3") to DN 350 (14")*

Introduction

Chemigation is the practice of injecting chemicals into irrigation water for the purpose of distributing the chemicals onto crops. During the course of this activity, under certain hydraulic conditions, the chemicals being injected can migrate upstream into a well or other pressurized water supply and pollute that water source. A chemigation valve assembly has been developed to meet this need. The chemigation valve assembly is designed to meet the specific need and performance requirements as required to prohibit the migration of injected chemicals into irrigation wells, thereby polluting ground water supplies.

This part of ISO 13693 applies to a mainline check valve assembly in sizes from DN 75 (3") to DN 350 (14"), with related components, that is designed to permit full flow in the operational mode and stop backflow (back siphonage or back pressure) when the pipeline shuts down. The potential for backflow from back siphonage occurs as water tumbles back down the column pipe when the pump shuts down. The potential for backflow occurs when a positive pressure exists on the downstream end of the valve. The valve obturator is forced to the closed position by a pre-tensioned spring. A resilient cover on the obturator helps to seal the valve against very low pressures.

This chemigation valve assembly is included in a technical report (to be written) that specifies a complete chemigation safety system. This system features a chemical tank (fertilizers and chemicals), a chemical pump (positive displacement or Venturi), check valves, and interlocking safety shutdown controls. The system is designed to keep irrigation water from flooding the chemical tank and to shut the chemical system down when the irrigation pump shuts down or the irrigation system pressure has been reduced to a level where the injected chemical is not being uniformly distributed to the field. The functional requirements of the chemigation valve could possibly be provided by valves of a different design. The valve is not designed for use in potable water systems.

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Irrigation equipment — Safety devices for chemigation —

Part 2:

Chemigation valve assemblies from DN 75 (3") to DN 350 (14")

1 Scope

This part of ISO 13693 specifies the construction and performance requirement and test methods for metal-bodied chemigation valves with water at temperatures not exceeding 50 °C, which might contain fertilizers and chemicals of the types and concentration used in agriculture.

The valve is designed to prohibit backflow caused by either back pressure or back siphonage. It is not designed for use in potable water systems. It is not to be confused with other forms of backflow prevention devices including pressure vacuum breakers, double check valves, reduced pressure zone valves, or goose neck loops. This part of ISO 13693 specifies the minimum design, construction, and performance testing requirements for the chemigation valve assembly. The assembly consists of the following components:

- a valve body into which a spring-loaded check valve is mounted with a resilient disk cover on the sealing surface;
- a combination air release/vacuum relief valve located upstream of the check valve;
- a low pressure drain valve located upstream of the check valve;
- an inspection port located so as to permit visual and manual inspection of the valve working components.

2 Normative references

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

ISO 9635-1:2014, *Agricultural irrigation equipment — Irrigation valves — Part 1: General requirements*

EN 1267:1999, *Industrial valves — Test of flow resistance using water as a test fluid*

3 Terms and definitions

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

3.1

chemigation valve

valve featuring a chemical injection port and designed to prevent injected chemicals from moving upstream

3.2

check valve

valve which permits flow of water in one direction only

3.3

air vent

vacuum relief valve

valve which opens automatically to allow air from the atmosphere to enter a pipeline during drainage of the pipeline and/or venting of air to the atmosphere during pipeline filling

3.4

low pressure drain valve

spring-loaded valve which opens up at low pressure to provide drainage

3.5

chemical injection port

threaded port in a body of the chemigation valve to accommodate the injection of chemicals

3.6

inspection port

port in the body of a chemigation valve to allow for the manual and visual inspection of its internal components

3.7

resilient cover

elastomeric cover on the disk of a check valve

3.8

chemigation valve body

main part of a chemigation valve through which water flows, which houses the internals of the valve and which allows for connection to the piping system

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4 Design considerations

4.1 General requirements

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The valve is designed to prevent backflow of irrigation water that might contain fertilizers and other chemicals of the types and concentrations commonly used in pressurized agricultural irrigation systems. The valve is mounted in pipelines using a flange or other suitable connections. The valve must prevent backflow that results from both back siphonage and back pressure conditions present in the pipeline. See [Figure 1](#).

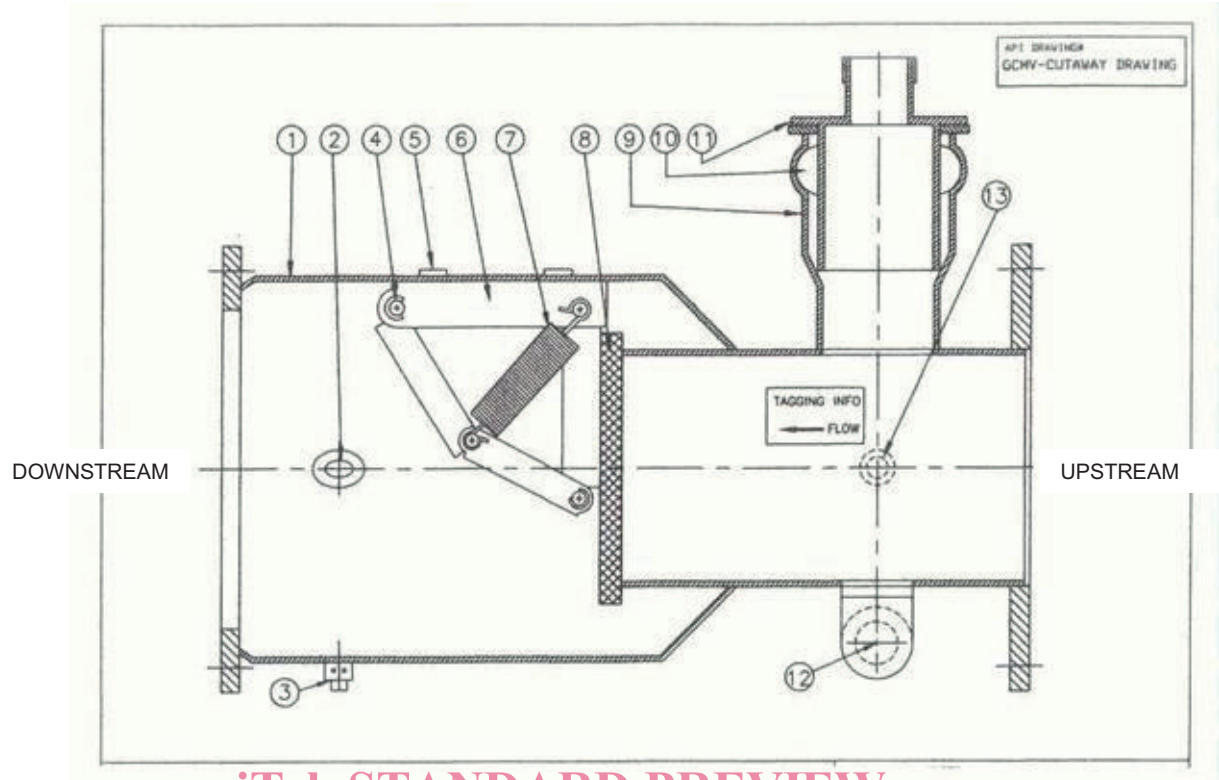


Figure 1 — Cutaway drawing of a chemigation valve body assembly

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- 1 valve body (metallic)
 - 2 threaded connection
 - 3 manual drain port
 - 4 linkage mounting pin
 - 5 linkage mounting bolt
 - 6 linkage mounting frame
 - 7 spring
 - 8 check valve resilient sealing surface
 - 9 female coupling
 - 10 gasket
 - 11 male coupling to mount the air vent/vacuum relief valve
 - 12 threaded connection to mount the low pressure drain valve
 - 13 threaded port to mount the pressure gauge (optional)

4.2 Specific requirements

Chemigation valve assemblies shall be designed in accordance with the following requirements.

- a) Valve ends shall be designed for ease of installation and removal in piping systems and provide for a watertight sealing of the connecting joints.
- b) The check valve assembly shall provide for full flow in the open position and a watertight seal in the reverse flow direction.
- c) The air vent/vacuum relief valve shall function as an air vent on pump start-up and as a vacuum relief valve when the pump is shut down.