
**Agricultural irrigation equipment —
Water-driven chemical injector pumps**

*Matériel agricole d'irrigation — Pompes doseuses à moteur hydraulique
pour l'injection de produits chimiques*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO 13457:2000](https://standards.iteh.ai/catalog/standards/sist/0875f3c5-f8d2-44f9-920a-5d3e7fc8709d/iso-13457-2000)

<https://standards.iteh.ai/catalog/standards/sist/0875f3c5-f8d2-44f9-920a-5d3e7fc8709d/iso-13457-2000>



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 13457:2000

<https://standards.iteh.ai/catalog/standards/sist/0875f3c5-f8d2-44f9-920a-5d3e7fc8709d/iso-13457-2000>

© ISO 2000

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 734 10 79
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

Contents

Page

Foreword.....	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Classification.....	5
4.1 Classification according to installation type	5
4.2 Classification according to mixing ratio	5
5 Marking	5
6 Technical characteristics	6
6.1 General.....	6
6.2 Materials	6
6.3 Connection of a water-driven injector pump to an irrigation system.....	6
7 Mechanical and function tests	7
7.1 General.....	7
7.2 Sampling and acceptance requirements.....	7
7.3 Test of resistance to pressure.....	8
7.4 Test of watertightness of check valves.....	8
7.5 Test of range of working pressure.....	9
7.6 Test of resistance to draining.....	9
7.7 Test of injection rate.....	10
7.8 Drive water ratio test	10
7.9 Test of injection rate for proportional water-driven injector pump	10
7.10 Test of head loss for in-line water-driven injector pump.....	11
8 Durability	11
9 Information to be supplied by the manufacturer	12

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 3.

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 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 13457 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 18, *Irrigation and drainage equipment and systems*.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO 13457:2000](https://standards.iteh.ai/catalog/standards/sist/0875f3c5-f8d2-44f9-920a-5d3e7fc8709d/iso-13457-2000)

<https://standards.iteh.ai/catalog/standards/sist/0875f3c5-f8d2-44f9-920a-5d3e7fc8709d/iso-13457-2000>

Agricultural irrigation equipment — Water-driven chemical injector pumps

1 Scope

This International Standard specifies construction and operational requirements and test methods for water-driven chemical injector pumps, referred to hereinafter as water-driven injector pumps. These water-driven injector pumps are used to inject chemicals into irrigation systems. The chemicals include liquid fertilisers and solutions of fertilisers and other soluble agricultural chemicals such as acids, pesticides and herbicides.

This International Standard is applicable to water-driven injector pumps which are intended to operate at water temperatures of up to 50 °C and with the types and concentrations of chemicals routinely applied in irrigation. It is not applicable to backflow prevention devices (which are not an integral part of a water-driven injector pump), nor to Venturi-principle water-driven devices for injecting chemicals into an irrigation system.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 7-1:1994, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*.

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 7005-1:1992, *Metallic flanges — Part 1: Steel flanges*.

ISO 7005-2:1988, *Metallic flanges — Part 2: Cast iron flanges*.

ISO 7714:—¹⁾, *Agricultural irrigation equipment — Volumetric valves — General requirements and test methods*.

3 Terms and definitions

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

1) To be published. (Revision of ISO 7714:1995)

3.1

water-driven injector pump

water-driven chemical injector pump

hydraulic pump intended to inject chemicals into an irrigation system, operated exclusively by the energy of irrigation water driving a hydraulic device such as a piston or turbine

3.2

nominal size

conventional numerical designation used to define the nominal size of the device for connecting the water-driven injector pump to the irrigation system, by means of threads, flanges or other connecting devices

NOTE This designation is used to define the size of an in-line water-driven injector pump

3.3

minimum working pressure

P_{\min}

lowest pressure declared by the manufacturer at the inlet of a water-driven injector pump at which the water-driven injector pump functions properly

3.4

maximum working pressure

P_{\max}

highest pressure declared by the manufacturer at the inlet of a water-driven injector pump at which the water-driven injector pump functions properly

3.5

range of working pressure

pressure range between the minimum working pressure p_{\min} and the maximum working pressure p_{\max}

3.6

drive water

irrigation water used to operate an on-line water-driven injector pump

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 13457:2000

[https://standards.iteh.ai/catalog/standards/sist/0875f3c5-f8d2-44f9-920a-](https://standards.iteh.ai/catalog/standards/sist/0875f3c5-f8d2-44f9-920a-5d3e7fc8709d/iso-13457-2000)

[5d3e7fc8709d/iso-13457-2000](https://standards.iteh.ai/catalog/standards/sist/0875f3c5-f8d2-44f9-920a-5d3e7fc8709d/iso-13457-2000)

NOTE The drive water may be ejected from the water-driven injector pump or may be returned to the irrigation system.

3.7

drive water ratio

ratio of one unit volume of injected chemicals to the volume of drive water required to inject the same unit volume of chemical solution

EXAMPLE 1:2 or 1:3

3.8

irrigation water flow rate

rate of flow of irrigation water through irrigation pipeline which is serviced by the water-driven injector pump

3.9

injection rate

pumping rate

rate of flow of chemical solution injected into an irrigation system during operation of a water-driven injector pump

3.10

chemical

liquid fertilisers and solutions of fertilisers and other soluble agricultural chemicals such as acids, pesticides and herbicides used in agriculture in liquid, solution or water soluble form, normally applied through or otherwise injected into irrigation systems

3.11**chemical solution**

water in which one or several types of chemicals have been dissolved or diluted

3.12**irrigation system water flow rate**

sum of the irrigation water flow rate and the injection rate

3.13**mixing ratio**

ratio of the injection rate to the irrigation system water flow rate

EXAMPLE An injection rate of 1 l/h into an irrigation water flow rate of 199 l/h gives an irrigation system water flow rate of 200 l/h, and a mixing ratio of 1:200.

3.14**pulse volume****stroke volume**

volume of chemical solution injected into an irrigation system in one water-driven injector pump cycle

EXAMPLE One stroke in a piston or membrane activated water-driven injector pump.

3.15**proportional water-driven injector pump**

proportional water-driven chemical injector pump

water-driven injector pump intended to maintain a relatively constant mixing ratio throughout the period of its operation at the irrigation water flow rates declared by the manufacturer.

3.16**in-line water-driven injector pump**

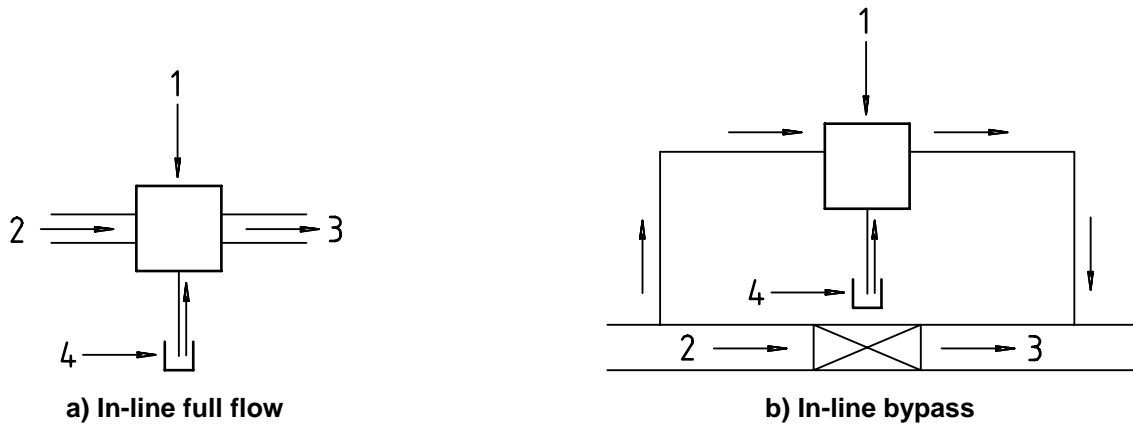
in-line water-driven chemical injector pump

water-driven injector pump installed in the main irrigation system piping or in bypass piping and featuring three ports including:

- one inlet for chemicals,
- one inlet for irrigation water,
- one outlet for irrigation water with chemicals injected

See Figure 1.

NOTE The injection of a chemical occurs inside the water-driven injector pump.



- Key**
- 1 Injector pump
 - 2 Irrigation flow
 - 3 Irrigation water with injected chemicals
 - 4 Chemicals

Figure 1 — In-line water-driven injector pump

3.17 on-line water-driven injector pump
 on-line water-driven chemical injector pump

water-driven injector pump installed off the main irrigation system piping and featuring four ports:

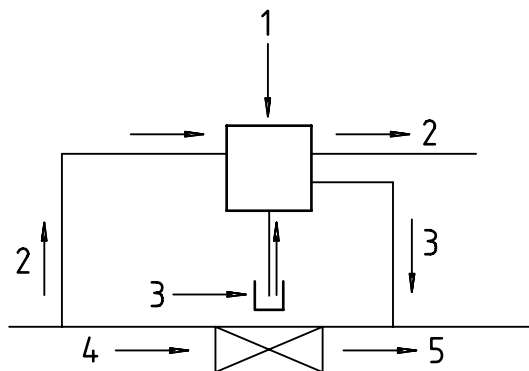
- one inlet for chemicals,
- one outlet for chemicals,
- one inlet for drive water,
- one outlet for drive water

STANDARD PREVIEW
 (standards.iteh.ai)

ISO 13457:2000
<https://standards.iteh.ai/catalog/standards/sist/0875f3c5-f8d2-44f9-920a-5d3e7fc8709d/iso-13457-2000>

See Figure 2.

NOTE The injection of a chemical into the irrigation water occurs outside the water-driven injector pump. The outlet for the chemical is intended to be connected to the main irrigation system piping. The drive water from the drive water outlet cannot be returned to the main irrigation system piping.



Key

- 1 Injector pump
- 2 Drive water
- 3 Chemicals
- 4 Irrigation flow
- 5 Irrigation water with injected chemicals

Figure 2 — On-line water-driven injector pump

3.18

chemical storage tank

container for storing chemicals and supplying them to a water-driven injector pump

ITeH STANDARD PREVIEW
(standards.iteh.ai)

4 Classification

4.1 Classification according to installation type

ISO 13457:2000
<https://standards.iteh.ai/catalog/standards/sist/0875f3c5-f8d2-44f9-920a-5d3e7fc8709d/iso-13457-2000>

4.1.1 In-line water-driven injector pump

4.1.1.1 Full flow installation

4.1.1.2 Bypass flow installation

4.1.2 On-line water-driven injector pump

4.2 Classification according to mixing ratio

4.2.1 Proportional water-driven injector pump

4.2.1.1 Fixed mixing ratio

4.2.1.2 Adjustable mixing ratio

4.2.2 Non-proportional water-driven injector pump

5 Marking

The water-driven injector pump shall bear a clear, legible and durable marking which shall give the following particulars:

- a) name of manufacturer or the manufacturer's trade mark;