
**Agricultural irrigation equipment —
Sprinklers —**

**Part 1:
Definition of terms and classification**

Matériel agricole d'irrigation — Asperseurs —

Partie 1: Définition des termes et classification

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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.

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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 15886-1 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 15886-1:2004), which has been technically revised.

ISO 15886 consists of the following parts, under the general title *Agricultural irrigation equipment — Sprinklers*:

- *Part 1: Definition of terms and classification*
- *Part 3: Characterizing of distribution and test methods*

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Agricultural irrigation equipment — Sprinklers —

Part 1: Definition of terms and classification

1 Scope

This part of ISO 15886 defines terms related to irrigation sprinklers and specifies the classification of sprinklers according to the following categories: physical factors; characteristics of the water spray; the mechanism for operation and water distribution; the mechanism for sealing; the intended use; additional functions incorporated into the sprinkler. The scope is intentionally broad to cover the widest possible range of sprinkler construction, performance, and intended-use alternatives.

2 Terms and definitions

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

2.1

accumulator

pressure accumulator

hydraulic device that stores fluid under pressure and cushions shock waves

2.2

anti-drain valve

valve designed to remain closed whenever the system pressure does not exceed a pre-set value and to open for higher pressures

2.3

chemigation

application of chemicals through irrigation systems

2.4

compression-disk nozzle

nozzle fitted with an elastic disk that flexes under pressure so as to alter the hydraulic properties of the nozzle

2.5

cross vane

flow conditioning vanes, the design of which tends to trap waterborne contaminants

2.6

constant-acceleration nozzle

nozzle, the shape of which changes gradually and smoothly so as to cause a constant rate of acceleration in the flow passages

2.7

constant-flow nozzle

nozzle, the internal geometry of which does not vary under fixed operating conditions thus maintaining constant hydraulic properties

2.8

constricting-flow nozzle

nozzle fitted with elastic sleeves that alter the hydraulic properties of the nozzle in response to changes in operating pressure

2.9

continuous-move irrigation machine

irrigation machine in which the position of sprinklers is fixed on a supply line which moves continuously in a particular direction

EXAMPLES Centre pivot irrigation machine, moving lateral irrigation machine, traveller irrigation machine.

2.10

controlled-acceleration nozzle

nozzle, the shape of which changes gradually and smoothly so as to cause a specific rate or rates of acceleration in the flow passages

2.11

customized nozzle

nozzle, the design of which meets specified hydraulic criteria for acceleration, turbulence and separation

2.12

element parallel to water flow

upstream flow conditioning component, the centreline of which is parallel to the nozzle centreline

2.13

element not parallel to water flow

upstream flow conditioning component, the centreline of which is at an angle to the nozzle centreline

2.14

spray elevation

height to which a spray rises above a horizontal plane passing through the elevation of the nozzle

2.15

finger spray

stream of water directed either as a cohesive or continuous jet or as a concentration of individual drops

2.16

flexing-orifice nozzle

nozzle fabricated from elastic materials that flex under pressure so as to alter the hydraulic properties of the nozzle

2.17

flow-rate change mechanism

mechanism provided that automatically changes hydraulic properties during operation

2.18

fluidic device

device (such as an amplifier or control) that depends for operation on the pressures and flows of a fluid in precisely shaped channels

NOTE Definition based on that for “fluidic” from the Free Merriam-Webster Dictionary, accessed on 2012-01-24. [Available from: <http://www.merriam-webster.com/dictionary/fluidic>.]

2.19

gradual-acceleration nozzle

nozzle, the shape of which changes gradually and smoothly so as to cause a gradual, usually linear, acceleration in the flow passages

2.20

groove along flow passages

rifling along flow passages

flow conditioning element designed to modify hydraulic properties of the flow passage thus increasing flow passage turbulence

2.21**impact arm**

balanced arm of a sprinkler rotating about a vertical axis (usually corresponding to the sprinkler axis) that momentarily intercepts and deflects a portion of the jet so as to provide the torque required to rotate the water distribution component of the sprinkler

2.22**impulse arm**

balanced arm of a sprinkler rotating about a horizontal axis that momentarily intercepts and deflects a portion of the jet so as to provide the torque required to rotate the water distribution component of the sprinkler

2.23**jet-spray**

stream of water issuing from an orifice under pressure

2.24**location of maximum trajectory height**

radial distance from the sprinkler axis at which the maximum trajectory height is reached

2.25**maximum trajectory height**

maximum height, above a sprinkler or a sprayer of the trajectory of the principal water stream discharged from the sprinkler nozzle or sprayer operating at test pressure

2.26**mechanically-controlled stream breakup sprinkler**

sprinkling device with a capability for controlling stream breakup in a series of mechanically pre-set repeatable cyclic patterns

2.27**moveable fixed-grid agricultural system**

irrigation system in which sprinkler set positions are nominally fixed by a supply pipeline, a hydrant, infield access or other infrastructure constraints

EXAMPLES

Hand-move system, wheel-move system.

2.28**moving sheet**

sheet spray which moves in a linear fashion or which rotates

2.29**no-variation sprinkler systems**

sprinkler systems that operate on mechanically controlled repeatable cycles

2.30**no-statistical-variation sprinkler systems**

sprinkler systems that operate without fixed mechanical control, but that produce statistically repeatable results

2.31**nominal size**

numerical designation used to refer to the size of a sprinkler which is identical to the nominal diameter of a pipe to which the sprinkler is intended to be connected directly

2.32**nozzle**

aperture or adjutage in a sprinkler through which water is discharged

2.33**off-axis-bore nozzle**

nozzle in which the orifice centreline does not correspond to the nozzle centreline

2.34

open vane nozzle

nozzle with flow conditioning vanes that are designed to shed waterborne contaminants

2.35

opposed reaction-force driven sprinkling device

balanced reaction-force driven sprinkling device

sprinkling device driven by hydraulic reaction forces from more than one jet acting in opposite directions such that the rotational torque is balanced to provide speed control and rotational stability

2.36

pop up/pop down mechanism

mechanism within the sprinkler that automatically raises the nozzle height to improve crop clearance when the system is pressurized and automatically lowers the nozzle to the original position when the system is de-pressurized

2.37

ring orifice

disk orifice

aperture in a ring or disk placed in the nozzle of a sprinkler normal to the direction of flow

NOTE The ring or disk is readily replaceable to allow for change in the hydraulic performance of the sprinkler.

2.38

rotating sprinkler

device which by its rotating motion around its vertical axis distributes water over a circular area or part of a circular area

2.39

sheet spray

water spread out into a flat plane-like spray

EXAMPLE Spray that results when water impinges on a deflector plate.

2.40

space-filling fog spray

emission from an orifice which fills the air with a "cloud" of ultra-fine droplets the size of which may be specified usually for the purpose of crop cooling

2.41

space-filling mist spray

emission from an orifice which fills the air with a "cloud" of very fine droplets the size range of which may be specified

2.42

space-filling rain spray

emission from an orifice which fills the air with a volume of relatively medium to coarse drops the size range of which may be specified

2.43

space-filling spray

emission from an orifice which fills the air with a "cloud" of relatively fine droplets the size range of which may be specified

2.44

space-filling spray combination sprinkler

sprinkling device combining a number of space filling spray types

2.45

adjustable-speed sprinkler

sprinkler that provides mechanically adjustable speed control features

2.46**splash re-direct mechanism**

tube or deflection device mounted on an arm driven sprinkler to re-direct the drive action portion of jet in a direction generally parallel to the main jet

2.47**sprinkler**

water distribution device of a variety of sizes and types for example impact sprinklers, fixed nozzle, sprayers and irrigation guns

2.48**spray**

release of water from a sprinkler

2.49**stationary fixed-grid system**

irrigation system in which sprinkler set positions are rigidly fixed by semi-permanent or permanently installed lateral pipelines

EXAMPLE Portable solid-set irrigation system, buried irrigation system.

2.50**straight-bore nozzle**

nozzle utilizing a cylindrical cross-section approaching the orifice, normally no vena contracta is associated with this design

2.51**taper-bore nozzle**

nozzle utilizing a conical section approaching the orifice

2.52**trajectory angle**

angle above the horizontal plane of the water stream or spray discharged from a sprinkler nozzle or a sprayer operating at test pressure

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2.53 trajectory angle change mechanism

mechanism that automatically changes the trajectory angle during operation

2.54**valve-in-head**

valve mechanism fabricated as an integral part of the sprinkler that adds features independent of the sprinkling operation, to control flow rate

2.55**variable-cycle sprinkler**

sprinkler that operates on fixed mechanically controlled repeatable sequences

NOTE Sequences consist of a number of cycles exhibiting one set of hydraulic properties followed by a number of cycles exhibiting a second set of hydraulic properties.

2.56**variable-geometry nozzle**

nozzle fabricated to a non-regular shape for a specific purpose such as pressure or flow regulation or jet breakup

2.57**variable internal geometry nozzle**

nozzle, the performance of which is significantly affected by the upstream flow passage components

2.58

variable-performance nozzle

nozzle, the internal geometry of which varies in some repetitive manner under fixed operating conditions to produce variable hydraulic properties

2.59

wobbling sprayer

nutating sprayer

wobbler

off-centre rotary-action sprinkler

3 Classification

3.1 General

Sprinklers shall be classified according to the following major categories and their particular characteristics, as specified in 3.2 to 3.7. The intention is to cover all possible sprinkler types, by classifying them according to

- a) physical factors, such as size, materials, operating pressure,
- b) characteristics of the water spray, e.g. type of spray, area of coverage,
- c) the mechanism for operation and water distribution, e.g. methods of spraying and sprinkler drive methods,
- d) the mechanism for sealing, e.g. bearings, washers, O-rings,
- e) the intended use, e.g. agricultural, turf, garden, nursery, greenhouse, frost and dust control, cooling, wastewater utilization,
- f) additional functions incorporated into the sprinkler, e.g. pressure or flow regulation, or pop-up.

3.2 Physical factors

3.2.1 Size of nozzle

3.2.2 Flow rate

3.2.3 Working pressure

- Minimum working pressure.
- Maximum working pressure.
- Range of working pressure.

3.2.4 Nominal size of inlet connection

3.2.4.1 Type of connections

3.2.4.1.1 Type of connections at inlet (ISO 13460)

- Pipe thread (ISO 7-1:1994):
 - male;