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Equipment for crop protection — Vocabulary

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National foreword

This British Standard is the UK implementation of ISO 5681:2020. It supersedes BS ISO 5681:1992, which is withdrawn.

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Equipment for crop protection — Vocabulary

Matériel de protection des cultures — Vocabulaire

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Foreword

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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).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 6, *Equipment for crop protection*.

This third edition cancels and replaces the second edition (ISO 5681:1992), which has been technically revised.

The main changes compared to the previous edition are as follows:

— review and addition of new terms and definitions, in line with new International Standards published and developed by ISO/TC 23/SC 6.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Equipment for crop protection — Vocabulary

1 Scope

This document defines terms commonly used in relation to equipment for applying plant protection products for crop protection.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1 General terms

3.1.1
plant protection product
PPP
any substance or micro-organism, including a virus, or a mixture or solution composed of two or more of them, prepared in the form in which it is supplied to the user intended: to protect plants or plant products against harmful organisms or prevent the action of such organisms, influence the life processes of plants other than as a nutrient, preserve plant products, destroy undesired plants or parts of plants, or check or prevent the undesired growth of plants

3.1.2
plant protection product container
collective name for *plant protection product* (3.1.1) packaging such as cans, bottles, bags, sacks or boxes

3.1.3
formulated product
plant protection product (3.1.1) as purchased by users

3.1.4
ready-to-use formulated product
RTU formulated product
formulated product (3.1.3) that does not require dilution

3.1.5
active ingredient
substance with primary biological activity for specified uses

3.1.6
carrier
diluent
substance used to dilute the *active ingredient* (3.1.5) to aid in metering and delivery

3.1.7
treatment
operation of applying *plant protection products* (3.1.1) to produce a biological effect

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3.1.8
overall treatment
treatment (3.1.7) carried out over the entire area of a crop or field

3.1.9
localised treatment
treatment (3.1.7) carried out over part of a crop or field, generally in bands or spots

3.1.10
treated area
sprayed area
area to which the *treatment* (3.1.7) is intended

3.1.11
spray target
specific pest, part of the plant, or surface to which the *treatment* (3.1.7) is intended

3.1.12
liquid flow
liquid flow rate
volume of liquid flowing through an appliance or device per unit of time

3.1.13
liquid output
volume of liquid discharged by an appliance or device per unit of time

3.1.14
air flow
air flow rate
volume of air flowing through an appliance or device per unit of time

3.1.15
air output
volume of air discharged by an appliance or device per unit of time

3.1.16
application equipment
device or assembly of components to mix and apply *plant protection products* (3.1.1) and other compatible chemicals, including fertilisers, to the target

3.2 Equipment for spraying

3.2.1 Basic definitions

3.2.1.1
spraying
division and emission into the air of a *spray liquid* (3.2.1.4) by atomisation into the form of droplets

3.2.1.2
spray
droplets produced by a *nozzle/atomiser* (3.2.3.1)

3.2.1.3
sprayer
spray system
machines/appliances for application of *plant protection products* (3.1.1) and liquid fertiliser

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3.2.1.4
spray liquid
spray mixture
liquid containing the *formulated product* (3.1.3) ready for *spraying* (3.2.1.1)

3.2.1.5
droplet
substantially spherical liquid particle, generally with a diameter less than 1500 µm

3.2.1.6
droplet size
diameter of the *droplet* (3.2.1.5) in micrometre (µm)

3.2.1.7
droplet size spectrum
cumulative distribution of *droplet sizes* (3.2.1.6) by volume or number

3.2.1.8
volume median diameter
vmd
$\mathbf{D_{v0,5}}$
droplet size (3.2.1.6) where half the volume of the spray is in larger droplet sizes and half in smaller droplet sizes

3.2.1.9
number median diameter
nmd
$\mathbf{D_{n0,5}}$
droplet size (3.2.1.6) where half the number of droplets in a spray are in larger droplet sizes and half in smaller droplet sizes

Note 1 to entry: The vmd/nmd ratio is used to characterise the uniformity of droplet sizes in a spray.

3.2.1.10
span
measure of range of *droplet sizes* (3.2.1.6) in a spray

Note 1 to entry: Span is expressed as $\frac{D_{v0,9}-D_{v0,1}}{D_{v0,5}}$ (see Figure 1).

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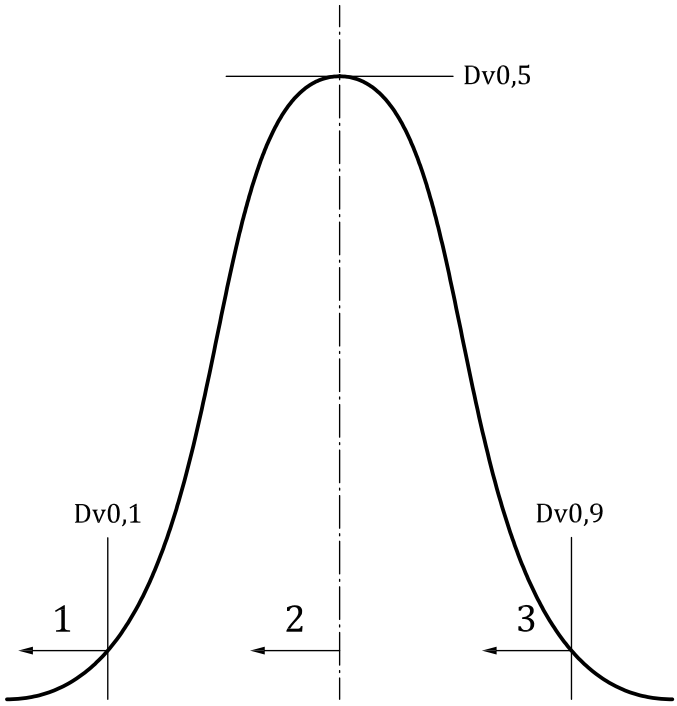

Key

1 10 % of spray volume below this size

2 50 % of spray volume below this size

3 90 % of spray volume below this size

Figure 1 — Droplet spectrum parameters for calculation of span

3.2.1.11
droplet volume fraction
$D_{v0,x}$
droplet size (3.2.1.6) where the fraction 0,x of the *spray volume* (3.2.2.14) is in smaller droplet sizes

Note 1 to entry: See also Figure 1.

3.2.1.12
sauter mean diameter
SMD
$D_{3:2}$
diameter of a droplet having the same volume/surface area ratio as the entire spray

3.2.1.13
mist
spray with *volume median diameter* (3.2.1.8) between 50 µm and 100 µm

3.2.1.14
fog
aerosol
spray with *volume median diameter* (3.2.1.8) under 50 µm where the droplets are effectively suspended in air with little or no settling by gravity

3.2.1.15
controlled droplet application
cda
spray with a narrow *droplet size spectrum* (3.2.1.7), designed for a specific target, defined by limits of vmd/nmd ratio or *span* (3.2.1.10)

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3.2.1.16
flat spray
spray with a flat shape

3.2.1.17
flat fan spray
spray with a thin flat ellipsoid shape

3.2.1.18
conical spray
spray with a conical shape

3.2.1.19
solid stream spray
spray with a cylindrical shape

3.2.1.20
sprayer liquid delivery system
system for delivery of *spray liquid* (3.2.1.4) from the *spray tank* (3.2.9.1) to the *nozzle/atomiser* (3.2.3.1)

3.2.1.21
sprayer set up
combination of nozzle and boom parameters and sprayer adjustment on a specific sprayer model

3.2.1.22
spray quality
classification of *droplet size spectrum* (3.2.1.7) against a reference

3.2.1.23
spray volume fraction
Vy
fraction of the *spray volume* (3.2.2.14) in droplets smaller than y micron

3.2.2 Types of spraying

3.2.2.1
hydraulic energy spraying
hydraulic pressure spraying
spraying (3.2.1.1) obtained by using only the hydraulic energy of the *spray liquid* (3.2.1.4)

3.2.2.2
centrifugal spraying
spraying (3.2.1.1) obtained by the use of centrifugal force imparted to the *spray liquid* (3.2.1.4), generally by mechanical rotational energy from a spinning disc, cup or gauze

3.2.2.3
pneumatic spraying
spraying (3.2.1.1) obtained by the action of a high velocity air stream on the *spray liquid* (3.2.1.4), generally after the nozzle outlet and using a distributor/plate

3.2.2.4
air-assisted spraying
spraying (3.2.1.1) in which the droplets are carried wholly or partly by a flow of artificially created air

3.2.2.5
electrostatic spraying
spraying (3.2.1.1) obtained by the use of electrostatic forces or where electrostatic forces are used to aid *spray deposition* (3.7.2.9)

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3.2.2.6
ultra-sonic spraying
spraying (3.2.1.1) obtained either partly or wholly by (ultra-)sonic energy

3.2.2.7
thermal spraying
spraying (3.2.1.1) obtained either partly or wholly by thermal energy

3.2.2.8
twin fluid spraying
spraying (3.2.1.1) obtained by the action of a pressurised air stream mixed with the *spray liquid* (3.2.1.4) before the nozzle outlet

3.2.2.9
precision spraying
directed and/or *localised application* (3.6.2.6) to improve spray targeting

EXAMPLE Using sensors, maps, etc.

3.2.2.10
sensor activated spraying
spraying (3.2.1.1) adaptation using sensors

3.2.2.11
crop adapted spraying
canopy adapted spraying
spraying (3.2.1.1) adaptation based on physical characteristics of the crop, e.g. canopy size and/or density

3.2.2.12
underleaf spraying
spraying (3.2.1.1) where the spray target (3.1.11) is the underside of the leaves

3.2.2.13
spray dose
quantity of *plant protection product* (3.1.1) applied

3.2.2.14
spray volume
quantity of *spray liquid* (3.2.1.4) applied

3.2.3 Droplet generators

3.2.3.1
nozzle
atomiser
device to form droplets from a *spray liquid* (3.2.1.4)

3.2.3.2
hydraulic energy nozzle
part or an assembly of parts with an orifice through which the *spray liquid* (3.2.1.4) is forced under hydraulic pressure to provide the energy to obtain a spray at the orifice

3.2.3.3
fan nozzle
hydraulic energy nozzle (3.2.3.2) with an orifice in the shape of a slit or elliptical orifice, producing a flat shape of spray

3.2.3.4
flat fan nozzle
fan nozzle (3.2.3.3) producing a thin flat ellipsoidal spray

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3.2.3.5
double flat fan nozzle
flat fan nozzle (3.2.3.4) having two separate orifices when mounted, intended to direct spray into and rearward of the direction of travel

3.2.3.6
centrifugal energy nozzle
rotary nozzle
rotary atomiser
device atomising the *spray liquid* (3.2.1.4) by centrifugal energy

3.2.3.7
deflector nozzle
anvil nozzle
impact nozzle
flood(ing) nozzle
hydraulic energy nozzle (3.2.3.2) with a deflector producing a flat shape of spray, with the shape of the spray dependent on the deflector

3.2.3.8
off-centre nozzle
nozzle (3.2.3.1) in which the fan pattern is not symmetrical around the centerline of travel for the nozzle

EXAMPLE End nozzle.

3.2.3.9
off-centre fan nozzle
fan nozzle (3.2.3.3) in which the angle of the spray shape and volume distribution are asymmetrical about the nozzle axis

3.2.3.10
directional nozzle
nozzle (3.2.3.1) which enables the direction of spray to be altered

3.2.3.11
cone nozzle
hydraulic energy nozzle (3.2.3.2) in which the spray *liquid flows* (3.1.12) rotationally, or is swirled, producing a conical sheet of spray

3.2.3.12
hollow cone nozzle
disc-core nozzle
cone nozzle (3.2.3.11) in which most of the *spray liquid* (3.2.1.4) is in the outside of the conical spray pattern

3.2.3.13
solid cone nozzle
full cone nozzle
cone nozzle (3.2.3.11) in which *spray liquid* (3.2.1.4) is directed throughout the conical spray pattern

3.2.3.14
solid stream nozzle
nozzle (3.2.3.1) which produces a cylindrical spray

3.2.3.15
impinging stream nozzle
hydraulic energy nozzle (3.2.3.2) designed so that spray is produced by the impact of two or more streams of *spray liquid* (3.2.1.4)

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3.2.3.16
pneumatic nozzle
air shear nozzle
atomiser (3.2.3.1) in which the spray is produced by the action of an air stream on the *spray liquid* (3.2.1.4)

3.2.3.17
twin fluid nozzle
air atomising nozzle
nozzle (3.2.3.1) in which mixing of spray liquids or the *spray liquid* (3.2.1.4) and air takes place under pressure within the nozzle with the spray discharged through a common nozzle tip

3.2.3.18
adjustable nozzle
hydraulic energy nozzle (3.2.3.2) designed so that the spray *liquid flow rate* (3.1.12) to the nozzle tip and spray droplet size can be altered without changing the components

3.2.3.19
vibratory nozzle
nozzle (3.2.3.1) in which an oscillating solid surface is the primary source of energy used to produce the spray

3.2.3.20
ultra-sonic nozzle
pneumatic (3.2.3.16) or *vibratory nozzle* (3.2.3.19) in which energy is imparted to the spray by (ultra-) sonic waves

3.2.3.21
fog nozzle
nozzle (3.2.3.1) for producing a fog

3.2.3.22
pre-orifice nozzle
nozzle (3.2.3.1) with an internal orifice that meters the *spray liquid* (3.2.1.4) prior to producing spray at the nozzle tip

3.2.3.23
variable orifice nozzle
nozzle (3.2.3.1) with an adjustable opening to vary spray *liquid flow rate* (3.1.12) and/or droplet size

3.2.3.24
air induction nozzle
venturi nozzle
pre-orifice nozzle (3.2.3.22) with a hole in the chamber between the two orifices to suck external (generally atmospheric) air into a reduced pressure chamber to mix with the *spray liquid* (3.2.1.4)

3.2.3.25
pulse width modulation nozzle
PWM nozzle
nozzle (3.2.3.1) using a controlled solenoid valve to determine the volume of *spray liquid* (3.2.1.4) sprayed from the nozzle, thereby allowing independent variation of spray *liquid flow rate* (3.1.12) and *spraying* (3.2.1.1) pressure

3.2.3.26
vibrating reed nozzle
vibratory nozzle (3.2.3.19) in which individual droplets are formed from a needle point attached to an oscillating reed

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3.2.3.27
vibrating needle nozzle
vibratory nozzle (3.2.3.19) in which *spray liquid* (3.2.1.4) under pressure is passed through a vibrating needle to form a liquid jet which disintegrates into droplets

3.2.3.28
piezoelectric vibratory nozzle
Bergland-Liu nozzle
vibratory nozzle (3.2.3.19) in which a piezoelectric transducer transmits high frequency oscillations to a liquid jet to create droplets

3.2.3.29
electromagnetic vibratory nozzle
vibratory nozzle (3.2.3.19) in which an electromagnetic transducer transmits high frequency oscillations to a liquid jet to create droplets

3.2.3.30
nozzle body
nozzle holder
main component into or on which other components of a nozzle are fitted, generally mounted on the *spray boom* (3.2.7.4), *nozzle bar* (3.2.7.5) or *spray lance* (3.2.7.1)

Note 1 to entry: See key 3 in Figure 2.

Note 2 to entry: In some designs, the *nozzle boss* (3.2.3.32) performs the function of the body and the *cap nut* (3.2.3.31) screws directly on to the boss.

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