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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.

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

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

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

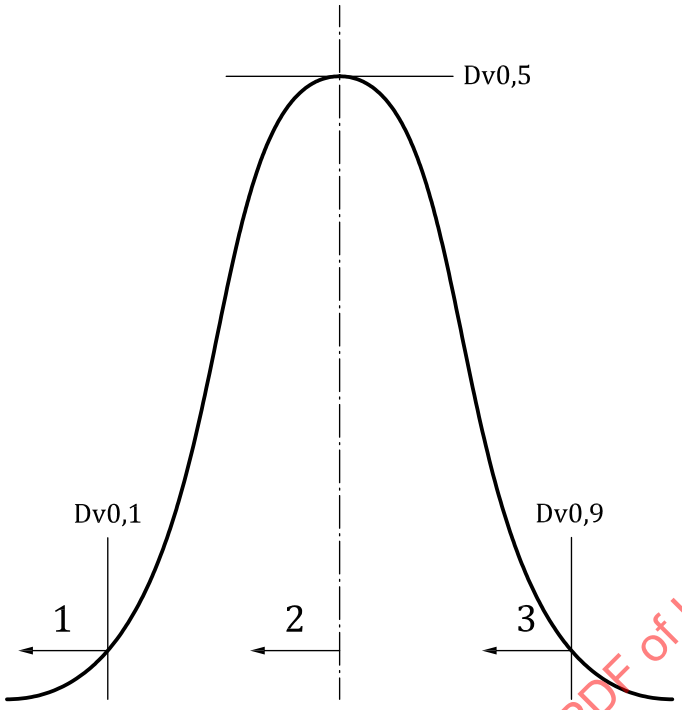
3.2.1.8
volume median diameter
vmd
$D_{v0,5}$
droplet size (3.2.1.6) where half the volume of the spray is in larger droplet sizes and half in smaller droplet sizes

3.2.1.9
number median diameter
nmd
$D_{n0,5}$
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).



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)

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)

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

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)

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

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

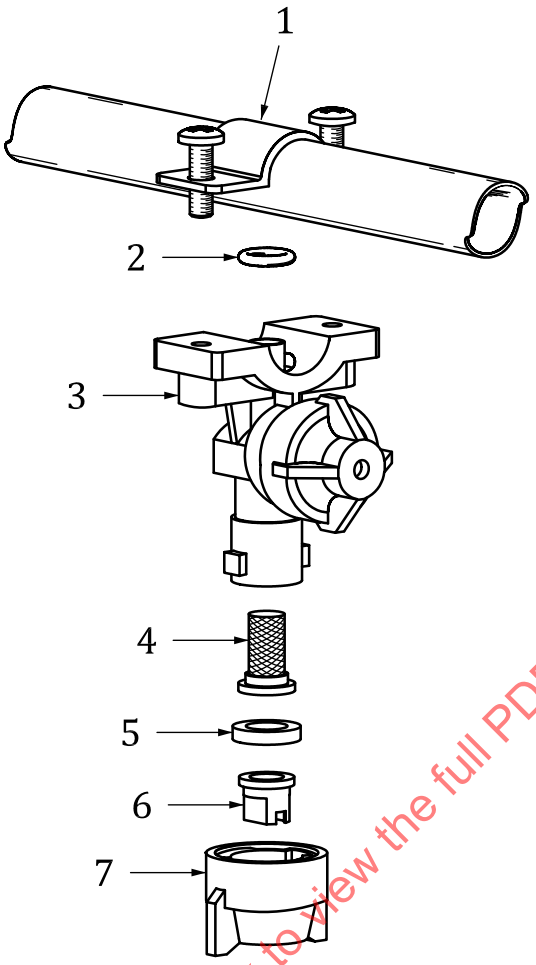
3.2.3.28
piezoelectric vibratory nozzle
Bergland-Liu nozzle
vibratory nozzle (3.2.3.19) in which a piezoelectric transducer transmits high frequency oscillations to a liquid jet to create droplets

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.



Key

1 *nozzle boss* (3.2.3.32)
2 seal
3 nozzle body/nozzle holder (with anti-drip diaphragm check valve)
4 *nozzle filter* (3.2.10.2)
5 seal
6 *nozzle tip* (3.2.3.33)
7 *nozzle cap nut* (3.2.3.31)

Figure 2 — Nozzle assembly on boom

3.2.3.31
nozzle cap nut
component which retains the assembled parts in or on a *nozzle body* (3.2.3.30)

Note 1 to entry: The *nozzle disc* (3.2.3.35) or *tip* (3.2.3.33) may be integral with the cap.

Note 2 to entry: See key 7 in Figure 2.

3.2.3.32
nozzle boss
part of the *spray boom* (3.2.7.4) or *spray lance* (3.2.7.1) to which a nozzle body or cap nut is fitted

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

3.2.3.33
nozzle tip
component containing the final orifice of a nozzle, usually a *fan nozzle* (3.2.3.3)

Note 1 to entry: See key 6 in Figure 2.

3.2.3.34
blank nozzle disc
device to prevent the emission of *spray liquid* (3.2.1.4) from a nozzle, usually a solid insert

3.2.3.35
nozzle disc
component containing the final orifice of a *cone nozzle* (3.2.3.11)

3.2.3.36
multi-nozzle head
assembly containing two or more nozzles, any one (or more) of which can be *spraying* (3.2.1.1)

3.2.3.37
nozzle turret
rotating assembly containing two or more nozzles, any one of which can be brought into the *spraying* (3.2.1.1) position

3.2.3.38
nozzle deflector
component of a nozzle which deflects the *spray liquid* (3.2.1.4) after its emission from the final nozzle orifice

3.2.3.39
swirl plate
swirl core
component of a *cone nozzle* (3.2.3.11) which imparts rotary motion to the *spray liquid* (3.2.1.4)

3.2.3.40
swirl back-plate
component of a particular type of *cone nozzle* (3.2.3.11) which forms the rear part of the *swirl chamber* (3.2.3.41) and the tangential *spray liquid* (3.2.1.4) entry channels

3.2.3.41
swirl chamber
cavity or chamber in a *cone nozzle* (3.2.3.11) in which the *spray liquid* (3.2.1.4) rotates or is swirled

3.2.3.42
nozzle spacing
distance between adjacent nozzles on a *spray boom* (3.2.7.4) or sprayer lance (tip to tip)

3.2.3.43
nozzle orientation
angle of nozzle bodies and tips to a plane, usually vertical

3.2.3.44
spray angle
top angle
angle formed close to a nozzle by the edges of the spray sheet/shape formed at the nozzle tip

3.2.3.45
nominal spray angle
spray angle (3.2.3.44) obtained at a reference *spraying* (3.2.1.1) pressure for a given type of *fan nozzle* (3.2.3.3)

3.2.3.46
nozzle offset angle
spray angle offset
angle differential of adjacent nozzles on a *spray boom* (3.2.7.4) or *nozzle bar* (3.2.7.5) to avoid collision of spray patterns

3.2.3.47
nozzle flow control method
method for setting a constant spray *liquid output* (3.1.13) rate delivered by a *nozzle* (3.2.3.1)

3.2.3.48
nozzle flow control setting
spray *liquid output* (3.1.13) rate set to be delivered by a nozzle

3.2.3.49
master flow control
device for switching on and off the complete spray *liquid flow* (3.1.12) to the entire *spray boom* (3.2.7.4) and/or *nozzle bar(s)* (3.2.7.5)

3.2.4 Sprayers

3.2.4.1
hydraulic pressure sprayer
appliance using one or more *hydraulic energy nozzles* (3.2.3.2) for spraying

3.2.4.2
air-assisted hydraulic pressure sprayer
hydraulic energy sprayer using air assistance to carry the droplets to the *spray target* (3.1.11)

3.2.4.3
centrifugal sprayer
appliance using one or more *centrifugal energy nozzles* (3.2.3.6) for spraying

3.2.4.4
air-assisted centrifugal sprayer
centrifugal sprayer (3.2.4.3) using air assistance to carry the droplets

3.2.4.5
pneumatic sprayer
appliance with one or more pneumatic *atomisers* (3.2.3.1)

3.2.4.6
twin fluid sprayer
appliance with one or more *twin fluid nozzles* (3.2.3.17)

3.2.4.7
fogger
aerosol generator
appliance for producing a fog or *aerosol* (3.2.1.14)

3.2.4.8
thermal sprayer
appliance for *thermal spraying* (3.2.2.7)

3.2.4.9
compression sprayer
appliance with *hydraulic energy nozzles* (3.2.3.2) in which the liquid pressure is produced by means of a compressed gas

3.2.4.10
knapsack sprayer
self-contained sprayer (3.2.4.32) carried on the operator's back or shoulder by means of straps or a strap

3.2.4.11
knapsack compression sprayer
knapsack sprayer (3.2.4.10) which uses a compressed gas to pressurize the *spray liquid* (3.2.1.4) in the tank for application through *hydraulic energy nozzle(s)* (3.2.3.2)

3.2.4.12
lever-operated knapsack sprayer
knapsack sprayer (3.2.4.10) which uses a lever-operated pump, normally a diaphragm or *piston pump* (3.2.5.6), to pressurise the *spray liquid* (3.2.1.4) in the tank for application through *hydraulic energy nozzle(s)* (3.2.3.2)

3.2.4.13
knapsack combustion engine-driven air-blast sprayer
knapsack mistblower
knapsack sprayer (3.2.4.10) which uses a backpack power unit, such as engine or motor, to generate air assistance to atomise and/or transport the spray

3.2.4.14
portable sprayer
manually carried sprayer

3.2.4.15
pedestrian sprayer
pedestrian operated sprayer

3.2.4.16
trolley sprayer
cart sprayer
wheelbarrow sprayer
sprayer mounted on a trolley, cart or wheelbarrow type frame

3.2.4.17
field crop sprayer
sprayer for applying *plant protection products* (3.1.1) on field crops such as arable crops, the application primarily being directed downwards onto/into the *spray target* (3.1.11)

3.2.4.18
horizontal boom sprayer
sprayer for applying *plant protection products* (3.1.1) along a boom or in bands, with the spray generally directed downwards onto/into the *spray target* (3.1.11)

3.2.4.19
vertical boom sprayer
sprayer for applying *plant protection products* (3.1.1) with the spray primarily directed sideways and/or upwards onto/into the target crop, generally for bush and tree crops such as vines, top fruit, hops, citrus (with oscillating booms often used in citrus)

3.2.4.20
sprayer for bush and tree crops
sprayer for applying *plant protection products* (3.1.1) on bush and tree crops such as grapes, fruits or hops (including annual plants/crops), the application being mostly directed sideways and/or upwards to the *spray target* (3.1.11)

3.2.4.21
cannon sprayer
sprayer with air-assistance, generally of high speed/volume, for one-sided spraying

3.2.4.22
multiple outlet sprayer
sprayer with air-assistance through multiple outlets directed at the target crop

3.2.4.23
air-blast sprayer
mistblower
air assisted or pneumatic sprayer, generally used for bush and tree crops or amenity applications

3.2.4.24
direct injection sprayer
sprayer with a *direct injection system* (3.2.8.15) for formulated *plant protection products* (3.1.1)

3.2.4.25
shielded sprayer
shrouded sprayer
hooded sprayer
sprayer using a mechanical shield or shroud covering the spray, generally to reduce *spray drift* (3.7.2.10)

3.2.4.26
reflection shield sprayer
sprayer incorporating shields to intercept the spray should it pass through the crop and a device to recover the intercepted spray

3.2.4.27
high clearance sprayer
sprayer with a frame designed to allow *spraying* (3.2.1.1) of tall crops, such as maize

3.2.4.28
mounted sprayer
sprayer mounted on a multi-functional vehicle, where the *sprayer liquid delivery system* (3.2.1.20) is generally run from the vehicle

3.2.4.29
demount(able) sprayer
skid mount(ed) sprayer
sprayer for mounting on a specific multi-functional vehicle so that it is integrated with the vehicle

3.2.4.30
trailed sprayer
sprayer trailed by a hitch from a multi-functional vehicle, where the *sprayer liquid delivery system* (3.2.1.20) is generally run behind the vehicle

3.2.4.31
self-propelled sprayer
sprayer in which the vehicle is dedicated to spraying, where the *sprayer liquid delivery system* (3.2.1.20) is generally integral to the vehicle

3.2.4.32
self-contained sprayer
sprayer mounted on, or trailing by, a multi-functional vehicle, where the *sprayer liquid delivery system* (3.2.1.20) is entirely contained within the sprayer (generally used with all terrain or utility vehicles)

3.2.4.33
fixed sprayer
sprayer primarily for application of *plant protection products* (3.1.1) in covered structures, and where the *pump/tank unit* (3.2.5.10) and/or *application unit* (3.2.7.15) do not move

3.2.4.34
semi-mobile sprayer
sprayer primarily for application of *plant protection products* (3.1.1) on crops grown in covered structures, and where the *pump/tank unit* (3.2.5.10) and *application unit* (3.2.7.15) are separately movable

3.2.4.35
aerial spray system
aerial sprayer
spray system (3.2.1.3) mounted on an aircraft

3.2.4.36
train sprayer
sprayer mounted on a train

3.2.4.37
band sprayer
sprayer for the application of *plant protection products* (3.1.1) in bands, generally over the crop or inter-row

3.2.4.38
inter-row sprayer
band sprayer (3.2.4.37) for *spraying* (3.2.1.1) between crops grown in rows

3.2.4.39
spot sprayer
sprayer for the application of *plant protection products* (3.1.1) to specific spots

3.2.4.40
drop leg sprayer
sprayer using drop legs for directed *spraying* (3.2.1.1) within a crop canopy, with the spray generally directed downwards or sideways into/onto the target crop or the inter-row

3.2.4.41
multiple row sprayer
sprayer for bush and tree crops (3.2.4.20) applying to multiple crop rows in one spray pass, generally from both sides of the crop row with the number of nozzles and air assistance adapted to the crop canopy, generally from *drop legs* (3.2.4.14) running between each crop row

3.2.4.42
tunnel sprayer
sprayer for bush and tree crops (3.2.4.20) that uses a tunnel or series of shields to confine the spray and airflows to the crop, with the tunnels or shields of sufficient length to cover the spray, generally including a device to recover intercepted spray passing through the crop

3.2.4.43
axial sprayer
sprayer for bush and tree crops (3.2.4.20) radiating air generally in a sideways and upward direction transverse to the direction of travel to transport the spray into the crop

3.2.4.44
cross-flow sprayer
sprayer for bush and tree crops (3.2.4.20) directing air generally in a sideways direction transverse to the direction of travel to transport the spray into the crop

3.2.5 Pumps

3.2.5.1
volumetric pump
pump in which the flow of the liquid is achieved by means of the positive displacement of the liquid

3.2.5.2
gear pump
volumetric pump (3.2.5.1) which achieves the flow of the liquid by gears

3.2.5.3
diaphragm pump
volumetric pump (3.2.5.1) in which the flow of the liquid is achieved by the deformation of a diaphragm

3.2.5.4
vane pump
volumetric pump (3.2.5.1) in which the flow of the liquid is achieved by the change in volume between vanes carried by a rotor and in contact with an eccentric stator

3.2.5.5
peristaltic pump
volumetric pump (3.2.5.1) in which the flow of the liquid is achieved by the continuous progression of a deformation in a flexible tube

3.2.5.6
piston pump
volumetric pump (3.2.5.1) in which the flow of the liquid is achieved by the movement of a piston in a cylinder

3.2.5.7
roller pump
volumetric pump (3.2.5.1) in which the flow of the liquid is achieved by the change in volume between rollers carried by a rotor and in contact with an eccentric stator

3.2.5.8
centrifugal pump
non-volumetric pump in which the flow of the liquid is achieved by means of one or more impellers

3.2.5.9
pump output
volume of liquid discharged by a pump at a given pressure per unit of time

3.2.5.10
pump unit
tank unit
appliance comprising at least the pump and the *spray liquid* (3.2.1.4) tank

3.2.6 Fans, compressors

3.2.6.1
axial flow fan
appliance producing an *air flow* (3.1.14) parallel to the fan shaft

3.2.6.2
centrifugal fan
radial fan
appliance producing an *air flow* (3.1.14) at right angles to the fan shaft

3.2.6.3
cross-flow fan
appliance producing a linear *air flow* (3.1.14) at right angles to the fan shaft

3.2.6.4
air deflector
device which alters the direction of an *air flow* (3.1.14)

3.2.6.5
air flow control
part of an appliance to control the *air flow* (3.1.14) volume, speed or direction

3.2.6.6
air compressor
appliance for increasing the pressure of air above that of the atmosphere

3.2.7 Nozzle supports, booms

3.2.7.1
spray lance
hand-held *nozzle bar* (3.2.7.5) which has one or more spray nozzles fitted at one end allowing the spray to be actively controlled and directed manually

3.2.7.2
spray gun
spray lance (3.2.7.1) with handle and quick acting shut off valve

3.2.7.3
spray lance extension
attachable tube enabling the overall length of a *spray lance* (3.2.7.1) to be increased

3.2.7.4
spray boom
device on which nozzles are mounted and which may form or support one or more pipelines which are supplying the *spray liquid* (3.2.1.4) to the nozzles

3.2.7.5
nozzle bar
rigid or flexible tube supplying the nozzles with *spray liquid* (3.2.1.4)

3.2.7.6
spray boom section
nozzle bar section
length of *spray boom* (3.2.7.4) or *nozzle bar* (3.2.7.5) which can be supplied with *spray liquid* (3.2.1.4) and controlled independently

3.2.7.7
spray boom winch
winch used to adjust the height of a *spray boom* (3.2.7.4)

3.2.7.8
spray boom suspension system
system by which a *spray boom* (3.2.7.4) is attached to a sprayer

3.2.7.9
spray boom damping system
part of a *spray boom suspension system* (3.2.7.8) intended to minimize unwanted movements

3.2.7.10
spray boom height
vertical height from the *spray boom* (3.2.7.4) to the *spray target* (3.1.11) or the ground

3.2.7.11
spray boom height control
system to control the height of a *spray boom* (3.2.7.4)

3.2.7.12
nozzle height
vertical height of the nozzle tip from the *spray target* (3.1.11) or the ground

3.2.7.13
ground clearance
vertical height between the ground surface and the lowest point on the machine (excluding parts which lie in the tyre path or are designed to travel between crop rows)

3.2.7.14
drop leg
auxiliary vertical *spray boom* (3.2.7.4) or *nozzle bar* (3.2.7.5), generally suspended from a horizontal spray boom to lower the nozzle position for improved targeting

3.2.7.15
application unit
device consisting of one or more nozzles/atomisers with or without air-assistance and used with a pump-tank unit to which it is connected with a pipeline

3.2.7.16
dribble bar
nozzle bar (3.2.7.5) in which the *spray liquid* (3.2.1.4) is discharged at low pressure through holes to form solid streams

3.2.8 Control valves, valves and sprayer instrumentation

3.2.8.1
spray volume per area adjustment system
device or *spraying* (3.2.1.1) system which varies the *spray volume* (3.2.2.14) output so that a set constant spray volume rate per area is maintained independent of factors such as forward speed

3.2.8.2
sprayer controller
device that actively controls the functioning of the sprayer

3.2.8.3
shut-off valve
device enabling *spray liquid* (3.2.1.4) supply to be shut off (if instantly called quick acting)

3.2.8.4
control manifold
multi-outlet control valve
device enabling the flow of the *spray liquid* (3.2.1.4) to be directed to one or more outlets

3.2.8.5
pressure regulator
device which automatically controls the *spraying* (3.2.1.1) pressure at a pre-determined value

3.2.8.6
pressure relief valve
valve which opens automatically when the *spraying* (3.2.1.1) pressure reaches a pre-determined value

3.2.8.7
pressure safety valve
pressure relief valve (3.2.8.6) which prevents the *spraying* (3.2.1.1) pressure exceeding a certain value

3.2.8.8
spray boom section pressure equalizer
nozzle bar pressure equalizer
device which maintains the *spraying* (3.2.1.1) pressure at a pre-determined value irrespective of the number of *spray boom* (3.2.7.4) or *nozzle bar sections* (3.2.7.6) in operation

3.2.8.9
air chamber
air vessel
air bottle pressure chamber
air chamber, with or without air pressurization, usually fitted on the output side of a pump to reduce pressure pulsations

3.2.8.10
pressure gauge
gauge to indicate visually the pressure of a fluid over atmospheric pressure

3.2.8.11
pressure indicator
device to indicate visually the pressure of a fluid over atmospheric pressure

3.2.8.12
non-return valve
device which automatically permits the flow of a fluid in one direction only

3.2.8.13
by-pass
device which allows all or part of the *spray liquid* (3.2.1.4) delivered by the pump to be returned to the *spray tank* (3.2.9.1) or elsewhere

3.2.8.14
spray tank contents indicator
device which indicates the volume of *spray liquid* (3.2.1.4) in the tank

3.2.8.15
direct injection system
spraying (3.2.1.1) system which meters the *formulated product* (3.1.3) into the *diluent* (3.1.6) in the *spray boom* (3.2.7.4), *nozzle bar* (3.2.7.5), or to nozzles at a predetermined set rate, generally in proportion to forward speed or according to a map/plan

3.2.8.16
anti-drip device
device, normally part of or fitted within the nozzle body, which prevents any further spray *liquid flow* (3.1.12) or dripping from the nozzle after the spray liquid flow to the *spray boom* (3.2.7.4) or *nozzle bar* (3.2.7.5) has been shut off

3.2.8.17
maximum working pressure
maximum *spray system* (3.2.1.3) pressure recommended for all parts of the sprayer, including additional or detachable accessories

3.2.8.18
control pressure
pressure used for *spray system* (3.2.1.3) control and reported to the operator

3.2.8.19
rated pressure
pressure or pressure range recommended by the manufacturer of the equipment or component e.g. nozzle, hose, pump

3.2.8.20
nozzle tip pressure
pressure measured immediately before the nozzle tip (after any flow control or anti-drip device)

3.2.8.21
pump outlet pressure
pressure measured as near as possible to the outlet of the system pump

3.2.9 Tanks, filling devices and storage facilities

3.2.9.1
spray tank
reservoir or chamber of the sprayer which contains the *spray liquid* (3.2.1.4)

3.2.9.2
tank sump
depression in the base of the *spray tank* (3.2.9.1), generally into which the pump inlet pipe and tank emptying device are fitted

3.2.9.3
filling hole
opening in the *spray tank* (3.2.9.1) through which the sprayer can be filled with *spray liquid* (3.2.1.4)

3.2.9.4
induction hopper
device, generally a bowl, into which *formulated products* (3.1.3) and *diluent* (3.1.6) can be poured for mixing and transfer to the *spray tank* (3.2.9.1)

3.2.9.5
induction probe
suction pipe for transferring *formulated products* (3.1.3) from containers into *spray tanks* (3.2.9.1)

3.2.9.6
closed transfer system
device or assembly of components, including the container to *application equipment* (3.1.16) interface, intended to wholly and partially transfer *plant protection products* (3.1.1) and other compatible liquids from their original containers into application or mixing equipment by direct coupling or other engineering means of enclosure that reduces the exposure of the operator and environment

3.2.9.7
tank nominal volume
volume indicated by the maximum filling level marked on the *spray tank* (3.2.9.1) when placed on a level horizontal surface

3.2.9.8
clean water tank
tank mounted on the sprayer containing clean water for washing the sprayer or operator

3.2.9.9
cleaning device
appliance or device attached or integrated to the sprayer for cleaning the external surface of the sprayer or the insides of empty *plant protection product* (3.1.1) containers

3.2.9.10
rinsing device
appliance or device attached or integrated to the sprayer for cleaning the inside of the sprayer, particularly the *spray tank* (3.2.9.1)

3.2.9.11
rinsing tank
tank of water for rinsing the sprayer

3.2.9.12
personal protective equipment storage
PPE storage
enclosure provided on the sprayer to store personal protective equipment (PPE), such as clothing, gloves, face shields, etc., used or worn by the operator to minimise risks to the operator's health and safety

3.2.10 Filters

3.2.10.1
filter
strainer
device which removes materials larger than a pre-determined size from the *spray liquid* (3.2.1.4)

3.2.10.2
nozzle filter
component, fitted between the nozzle holder and the nozzle tip, which removes solids larger than a pre-determined size from the *spray liquid* (3.2.1.4) to prevent nozzle blockage

3.2.10.3
suction strainer
device situated on the suction side of the system to prevent foreign bodies from entering the *spray system* (3.2.1.3)

3.2.10.4
tank filling strainer
device in the *filling hole* (3.2.9.3) of the *spray tank* (3.2.9.1) which prevents foreign bodies from entering the spray tank

3.2.10.5
flow meter strainer
device situated between the pump and the flow meter which prevents foreign bodies from entering the flow meter

3.2.10.6
spray boom filter
device to prevent foreign bodies from entering the spray boom plumbing

3.3 Equipment for applying dust

3.3.1 Basic definitions

3.3.1.1
dust
finely divided particles of a solid substance containing or carrying the *active ingredient(s)* (3.1.5) and ready for use

3.3.1.2
dusting
applying *formulated product* (3.1.3) in the form of *dust* (3.3.1.1)

3.3.1.3
electrostatic dusting
process where electrostatic forces are used to aid the deposition of a *dust* (3.3.1.1)

3.3.1.4
wet dusting
process comprising the simultaneous application of a *dust* (3.3.1.1) and a spray

3.3.1.5
mechanical dusting
process of distribution of a *dust* (3.3.1.1) by mechanical means only

3.3.1.6
pneumatic dusting
process of distribution of a *dust* (3.3.1.1) by means of *air flow* (3.1.14)

3.3.1.7
duster
appliance for applying *formulated products* (3.1.3) in the form of *dust* (3.3.1.1)

3.3.1.8
mechanical duster
appliance for *mechanical dusting* (3.3.1.5)

3.3.1.9
pneumatic duster
appliance for *pneumatic dusting* (3.3.1.6)

3.3.2 Components

3.3.2.1
dust nozzle
device for directing and distributing/spreading an *air flow* (3.1.14) containing *dust* (3.3.1.1)

3.3.2.2
dust hopper
container to hold *dust* (3.3.1.1)

3.4 Equipment for applying granules

3.4.1 Basic definitions

3.4.1.1
granule
particle, within a defined size range, of an solid substance(s) containing or carrying the *active ingredient(s)* (3.1.5) and ready for use

3.4.1.2
granule applicator
appliance for applying *granules* (3.4.1.1)

3.4.1.3
granule distributor
granule spreader
granule applicator (3.4.1.2) for *overall treatment* (3.1.8)

3.4.1.4
granule band applicator
granule applicator (3.4.1.2) that applies in bands or rows

3.4.1.5
granule spot applicator
granule applicator (3.4.1.2) that applies in spots

3.4.1.6
granule flow rate
mass of granules flowing through a metering device per unit of time

3.4.2 Components

3.4.2.1
granule nozzle
device that directs *granules* (3.4.1.1) towards their target and distributes them

3.4.2.2
granule metering mechanism
part of a *granule applicator* (3.4.1.2) that controls the flow of granules at the desired rate

3.4.2.3
granule hopper
container to hold *granules* (3.4.1.1)

3.5 Other definitions

3.5.1 Agitation systems

3.5.1.1
agitation
operation to produce and maintain a uniform concentration of *active ingredient* (3.1.5) or *formulated product* (3.1.3) in the *spray liquid* (3.2.1.4) in the *spray tank* (3.2.9.1) via mixing with liquid motion or, in the case of *dusts* (3.3.1.1) or *granules* (3.4.1.1), to facilitate their flow from the hopper

3.5.1.2
hydraulic agitation
agitation (3.5.1.1) by means of a pump to recirculate the *spray liquid* (3.2.1.4)

3.5.1.3
mechanical agitation
agitation (3.5.1.1) of the *spray liquid* (3.2.1.4), *dust* (3.3.1.1) or *granules* (3.4.1.1) inside a *spray tank* (3.2.9.1) or hopper by means of mechanically operated agitators

3.5.1.4
pneumatic agitation
agitation (3.5.1.1) of the *spray liquid* (3.2.1.4), *dust* (3.3.1.1) or *granules* (3.4.1.1) inside a *spray tank* (3.2.9.1) or hopper using *air flow* (3.1.14)

3.5.1.5
mechanical agitator
mechanical device intended to produce and maintain uniform concentration of *active ingredient* (3.1.5) or *formulated product* (3.1.3) in the *spray liquid* (3.2.1.4) in the *spray tank* (3.2.9.1) or in the case of *dust* (3.3.1.1) or *granules* (3.4.1.1) to facilitate their flow from the hopper

3.5.1.6
pneumatic agitator
device intended to produce and maintain uniform concentration of the *active ingredient* (3.1.5) or *formulated product* (3.1.3) in the *spray liquid* (3.2.1.4) in the *spray tank* (3.2.9.1) by using *air flow* (3.1.14) or in the case of *dust* (3.3.1.1) or *granules* (3.4.1.1) to facilitate their flow from the hopper

3.5.1.7
manual agitation
agitation (3.5.1.1) of the *spray liquid* (3.2.1.4), *dust* (3.3.1.1) or *granules* (3.4.1.1) inside a *spray tank* (3.2.9.1) or hopper by manual means

3.5.1.8
re-agitation
agitation (3.5.1.1) of a suspension that has settled out after an initial agitation

3.5.2 Injection system

3.5.2.1
injection
act of forcing a substance, such as a fluid, under pressure into another substance, for example a fluid or porous medium (such as soil)

3.5.2.2
injection treatment
operation of *injection* (3.5.2.1) of *active ingredients* (3.1.5) into soil, plants or water by means of an appropriate appliance or device

3.5.2.3
soil injection
injection (3.5.2.1) of a *plant protection product* (3.1.1) beneath the soil surface

3.5.2.4
tree injection
injection (3.5.2.1) of a *plant protection product* (3.1.1) under the bark of a tree

3.5.2.5
soil injector
appliance for injecting *plant protection products* (3.1.1) into the soil

3.5.2.6
tree injector
appliance for injecting *plant protection products* (3.1.1) under the bark of a tree

3.5.3
wiper
weed-wiper
device using an applicator such as a wick, rope or carpet for applying liquid *plant protection products* (3.1.1) to a target surface by direct contact

3.5.4
crop opener
device, generally mechanical, such as a bar suspended below a *spray boom* (3.2.7.4), for opening the crop to assist spray to penetrate the crop canopy

3.5.5
floating nozzle sprayer
crop surfer sprayer
slapduk
horizontal boom sprayer (3.2.4.18) with nozzles mounted on a flexible frame beneath the boom designed to maintain a constant *nozzle height* (3.2.7.12) above the target crop, maintained by the crop canopy or ground surface, to reduce the risk of *spray drift* (3.7.2.10) and improve *spray penetration* (3.7.2.4) into the canopy

3.5.6
seed treatment
application of a *plant protection product* (3.1.1) to seed prior to sowing

3.6 Machine operation

3.6.1 Field techniques

3.6.1.1
swath
successive passes of a sprayer, *duster* (3.3.1.8) or *granule distributor/spreader* (3.4.1.3) of a certain working width

3.6.1.2
swath width
effective working width of *horizontal boom sprayers* (3.2.4.18) or *granule distributors/spreaders* (3.4.1.3) operating in field crops and vertical boom or *air-blast sprayers/mistblowers* (3.2.4.23) operating in tree and bush crops

3.6.1.3
tramline
tracks in the field for the sprayer or *granule distributor/spreader* (3.4.1.3), generally established when sowing or drilling, and used repeatedly

3.6.1.4
swath marker
swath bout marker
device to indicate the extremity of the *swath* (3.6.1.1)

EXAMPLE Foam spots at the end of a spray boom.

3.6.1.5
calibration
operation of adjusting and checking an appliance to give the desired *spray volume* (3.2.2.14) *application rate* (3.6.2.4)

3.6.2 Rates of application

3.6.2.1
spray volume per unit area
volume of *spray liquid* (3.2.1.4) distributed by a sprayer over an area

3.6.2.2
mass per unit area
mass of *dust* (3.3.1.1) or *granules* (3.4.1.1) applied over an area

3.6.2.3
dose rate
mass of *active ingredient* (3.1.5) or of *formulated product* (3.1.3) applied per unit of length, area or volume to be treated

3.6.2.4
application rate
volume or mass of *spray liquid* (3.2.1.4), *dust* (3.3.1.1), *granules* (3.4.1.1) applied per unit of length, area or volume to be treated

3.6.2.5
broadcast application
application over an entire area or volume

3.6.2.6
localised application
application to a specific area or zone, such as crops, rows, beds

3.6.2.7
band application
banded application
application in (continuous restricted) bands, for example, over the crop or inter-row

3.6.2.8
basal application
application to the base of a plant

3.6.2.9
spot application
spot treatment
application to a selected area only

3.6.2.10
foliar application
application to the stems, fruits or leaves/needles of a plant

3.6.2.11
soil application
application to the soil

3.6.2.12
directed application
directed *localised application* (3.6.2.6), often using air assistance

3.6.2.13
space application
application by dispersion into a volume of air (usually indoors)

3.6.2.14
variable rate application
application of intentionally different amounts of *plant protection product* (3.1.1) to different areas of the area being tested

3.6.2.15
high volume application
HV
application generally of 600 l/ha or more for field crops/amenity and over 1 000 l/ha for bush and tree crops

3.6.2.16
medium volume application
MV
application generally of 200 up to 600 l/ha for field crops/amenity and of 500 up to 1 000 l/ha for bush and tree crops

3.6.2.17
low volume application
LV
application generally of 50 up to 200 l/ha for field crops and of 200 up to 500 l/ha for bush and tree crops

3.6.2.18
very low volume application
VLV
application generally of 5 up to 50 l/ha for field crops and of 50 up to 200 l/ha for bush and tree crops

3.6.2.19
ultra low volume application
ULV
application generally under 5 l/ha for field crops and under 50 l/ha for bush and tree crops

3.7 Evaluation of performance

3.7.1 All systems

3.7.1.1
efficacy
level of control of target pest or pest damage after application

3.7.1.2
distribution
evenness of volume of *spray liquid* (3.2.1.4), or mass of *dust* (3.3.1.1) or *granules* (3.4.1.1), deposited over the target or *treated area* (3.1.10)

3.7.1.3
transverse distribution
evenness of volume of *spray liquid* (3.2.1.4), or mass of *dust* (3.3.1.1) or *granules* (3.4.1.1), deposited in a horizontal plane transverse to the direction of travel

3.7.1.4
longitudinal distribution
evenness of volume of *spray liquid* (3.2.1.4), or mass of *dust* (3.3.1.1) or *granules* (3.4.1.1), deposited in a horizontal plane in the direction of travel

3.7.1.5
vertical distribution
evenness of volume of *spray liquid* (3.2.1.4), or mass of *dust* (3.3.1.1) or *granules* (3.4.1.1), deposited in a vertical plane over the *treated area* (3.1.10)

3.7.2 Sprays

3.7.2.1
spray classification
classification of sprays produced by nozzles by *droplet size spectrum* (3.2.1.7)

3.7.2.2
spread factor
ratio of the diameter of the contact area produced by a droplet after it has been deposited on a given surface to the actual diameter of the droplet

3.7.2.3
spray coverage percentage
ratio of the target area surface covered by droplets to the total target area surface

3.7.2.4
spray penetration
spray entering and being deposited within the inner part of a foliar canopy

3.7.2.5
droplet density
number of droplets deposited per unit surface area

Note 1 to entry: The unit surface area is usually 1 cm^2.

3.7.2.6
horizontal patternator
laboratory device to assess the variation in volume or mass distribution from a nozzle, *spray boom* (3.2.7.4), or *granule applicator* (3.4.1.2) in a horizontal plane (to simulate the ground) transverse to the direction of travel

3.7.2.7
vertical patternator
laboratory device to assess the volume distribution from a *nozzle* (3.2.3.1) or *spray boom* (3.2.7.4) in a vertical plane (to simulate a plant canopy) transverse to the direction of travel

3.7.2.8
spray overlap
percentage by which the spray from adjacent nozzles overlap, as measured in a horizontal or vertical plane at the target area surface level

3.7.2.9
spray deposition
quantity or volume or mass of *spray liquid* (3.2.1.4), *formulated product* (3.1.3) or *active ingredient* (3.1.5) deposited on a surface, generally the *spray target* (3.1.11)

3.7.2.10
spray drift
quantity of *plant protection product* (3.1.1) that is carried out of the *treated area* (3.1.10) by the action of air currents during the application process

3.7.2.11
vapour drift
quantity of *plant protection product* (3.1.1) that volatilises and is carried out of the *treated area* (3.1.10) by the action of air currents after the application process

3.7.2.12
spray drift potential
percentage of the *spray volume* (3.2.2.14) that can be displaced to a specified distance downwind of the sprayer by the action of air currents during the application process

3.7.2.13
spray drift reduction
difference in *spray drift* (3.7.2.10), or *spray drift potential* (3.7.2.12), of a *spray system* (3.2.1.3) compared to a reference spray system

3.7.2.14
spray drift reduction technology
DRT
sprayer or other technology that reduces *spray drift* (3.7.2.10) or *spray drift potential* (3.7.2.12) compared to a reference *spray system* (3.2.1.3)

3.7.2.15
spray drift reduction nozzle
DRN
nozzle that reduces *spray drift* (3.7.2.10) or *spray drift potential* (3.7.2.12) compared to a reference nozzle

3.7.2.16
spray drift deposition
proportion of *spray drift* (3.7.2.10) depositing at particular distances from the *treated area* (3.1.10) by the effect of gravity and/or air currents

3.7.2.17
volume of residual in the tank
dilutable volume
part of the total residue that remains in the *spray tank* (3.2.9.1) or that can flow back to the spray tank during normal sprayer operation

3.7.2.18
drainable volume
amount of *spray liquid* (3.2.1.4) collectable from the spray tank outlet(s) and/or other outlets after internal cleaning of the sprayer

3.7.2.19
drainable rinsing liquid concentration
concentration of *formulated product* (3.1.3) or *active ingredient* (3.1.5) in the *drainable volume* (3.7.2.18)

3.7.2.20
dead volume
non-dilutable volume
part of the total residual that cannot flow back to the tank during normal operation of the sprayer

3.7.2.21
volume of total residual
volume of the *spray mixture* (3.2.1.4) remaining in the sprayer which cannot be delivered with the intended *application rate* (3.6.2.4) and/or pressure, equal to the sum of the *volume of residual in the tank* (3.7.2.17) and the *dead volume* (3.7.2.20)

3.7.2.22
cleaning device for plant protection product container
device for cleaning the inside of emptied *plant protection product* (3.1.1) containers

3.7.2.23
pressure drop
drop in pressure from line losses as *spray liquid* (3.2.1.4) or *air flows* (3.1.14) through the sprayer delivery system

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