

Nozzle selection

for conventional boom sprayers treating cereals and oilseed rape



Photo: Syngenta Crop Protection

Nozzle type	Air induction		Conventional			Low drift (pre-orifice)					
											
	Flat fan		Flat fan			Hollow cone		Flat fan		Deflector	
BCPC spray quality	'Finer'	'Coarser'	Fine	Medium	Coarse	Fine	Medium	Medium	Coarse	Medium	Coarse
Likely drift potential	Low	Low	High	Medium/Low	Low	High	High	Low	Low	Medium	Low
Soil-acting herbicides											
Pre- and early post-emergence	▲	▲*		▲	▲			▲	▲	▲	▲
Foliage-acting herbicides											
Grass weeds – 3 leaves or fewer			▲▲	▲*		▲	▲				
Grass weeds – more than 3 leaves	▲*		▲	▲▲				▲		▲	
Broad-leaved weeds – up to 2cm across			▲▲	▲▲*							
Broad-leaved weeds – 2–5cm across	▲*		▲	▲▲			▲			▲	
Broad-leaved weeds – more than 5cm	▲▲*			▲▲			▲	▲	▲	▲	
Large weeds: non-selective (eg glyphosate)	▲▲	▲*		▲▲	▲			▲▲	▲	▲	▲
Cereal plant growth regulators (PGR) and eyespot fungicides											
Up to GS32	▲*			▲▲				▲		▲	
After GS32	▲▲*			▲▲				▲		▲	
Cereal fungicides											
Up to GS23	▲*		▲	▲▲			▲	▲		▲	
Up to GS24–49	▲▲	▲*	▲	▲▲			▲	▲		▲	
After GS50 (ear spray)	▲▲*			▲▲			▲				
Cereal insecticides											
Autumn spray	▲*		▲	▲▲			▲				
Ear spray			▲▲	▲*		▲	▲				
Oilseed rape fungicides											
Vegetative stage	▲*		▲	▲▲			▲	▲		▲	
From green bud	▲▲*		▲	▲▲			▲	▲		▲	
Oilseed rape insecticides											
Vegetative stage			▲	▲▲*			▲				
From green bud			▲▲	▲*		▲	▲				

Quality – nozzle classification based on droplet size distribution – see *BCPC Field Sprayers Handbook*.

Drift – compared to a conventional 110° flat fan nozzle operating at 3.0bar pressure and giving a flow rate of 1.2L/min – ie 110 03 nozzle as used to define the medium/fine spray quality boundary in the BCPC classification scheme and the reference condition for LERAP assessments (www.pesticides.gov.uk).

When using products or tank mixes with more than one mode of action or multiple targets, use a nozzle with acceptable efficacy (ie at least one ▲) for all components of the application.

Some herbicides, eg glyphosate, can give higher levels of control when applied at low volumes. Water volumes and droplet sizes should be used as specified on the label.

Nozzle colour
Industry standards specify that nozzles are colour-coded by flow rate.

All nozzles on a sprayer should be of the same colour.

Colour	Flow rate at 3.0 bar pressure L(/min)	Common designation
Orange	0.4	"01"
Green	0.6	"015"
Yellow	0.8	"02"
Purple	1.0	"025"
Blue	1.2	"03"
Red	1.6	"04"
Brown	2.0	"05"
Grey	2.4	"06"
White	3.2	"08"
Light blue	4.0	"10"
Light green	6.0	"15"
Black	8.0	"20"

Other systems

Twin-fluid nozzles operating at the same flow rates as conventional nozzles can give reduced levels of drift. Flow rate and spray quality for twin-fluid nozzles can be adjusted to match target requirements by varying both liquid and air pressures.

Adding air assistance from ducts mounted on the spray boom can reduce drift and increase canopy penetration provided that the quantity and speed of air are matched to canopy conditions.

Consult manufacturer's literature for setting details.

Key

- ▲ = nozzles offering acceptable efficacy
- ▲▲ = preferred nozzles for efficacy
- ▲* = nozzles offering best drift control

Nozzle selections indicated are based on nominal application volumes down to 100L/ha at forward speeds 12–14km/h and using a typical range of pressures for each nozzle design. Some targets, formulations or crop/weather conditions may require water volumes of more than 100L/ha to be used.

The Plant Protection Products (PPP) code states that lower than label-recommended volumes can be used for field sprayers in some circumstances:

- If the label does not prohibit lower volumes than those specified.
- If the amount of product is also reduced, so that maximum permitted product concentration is not exceeded where:
 - the label requires PPE to be worn at the ready-to-use dilution
 - the warnings: 'corrosive', 'very toxic', 'toxic', or 'risk of serious damage to eyes' are on the label.

For all other labels, the recommended volume can be reduced provided:

- spray quality is no finer than fine
- maximum concentrations do not exceed 10 times the maximum label concentration
- a risk assessment is carried out for people, other creatures, plants and the environment and necessary controls are put in place
- the appropriate PPE is worn (see Annex E of the code).

For full details refer to page 80–81 paragraph 4.6.4 of the '*Code of practice for using plant protection products*' (January 2006) available on www.pesticides.gov.uk.

These guidelines on water volume are solely concerned with the protection of people and the environment, and not with efficacy.