

Band spraying

Realize large savings relatively easily



agrifac



Agrifac makes sustainable agriculture approachable

Now more than ever, agriculture faces political, environmental and economic challenges. According to the UN, over 600 million people worldwide are underfed and the world population continues to grow rapidly. The challenge we face is to feed all these people, even when the amount of available farmland is limited. Agrifac believes that the long term solution is to increase yield on existing farmland using more sustainable methods and specially developed technology. In short: use solutions that provide your crops with the best care and protection, but do it in the most sustainable way possible.

For many years, Agrifac has been involved in this challenge and we will not stop. It is our mission to provide innovative and sustainable solutions to enable farmers to produce as much safe and nutritious food as possible, while simultaneously lowering their ecological footprint.

One of the tools we developed is band spraying. In this whitepaper we will inform the latest developments of this technology.

Roeland Coopman
CCO
Agrifac Machinery B.V.





Join us

Working together on higher yields and less chemicals with **band spraying**

Producing food is about to get even more challenging, but with a smart approach, there is no reason why we shouldn't be able to produce sufficient, nutritious and safe food for everyone. Agrifac wants nothing but the best for both farmers and plants. This means that we want to increase yield while reducing the use of chemicals at the same time.

Band spraying allows us to apply resources more efficiently on crops grown in rows. By applying resources only on or between crop rows, large savings can easily be achieved. In addition, we prevent unnecessary stress on the crops and optimize yields.

For successful row spraying, it is essential to hold the nozzles precisely and stably above the plant rows. The Agrifac self-propelled sprayer, with its stability, is the machine of choice for this.



4e
for growers

- efficiency
- economy
- ergonomy
- ecology



What is Band spraying

Band spraying is the spraying of a crop grown in rows. By spraying only a row / strip, large savings can be achieved relatively easily. Row spraying occurs when the crop is not yet in "full canopy" or in other words the soil is not yet fully covered by the crop biomass.

In these crop stages it is possible to apply band spraying, band spraying can be divided into 2 applications:

1. Band spraying on top of the crop.

Fungicide, herbicide or insecticide applications. Such as aphids in potatoes.

2. Band spraying between the crop.

Herbicide applications.

Row crops

Row crops are crops grown in lines / trisp, the most common row spacings are:

- 75cm
- 50cm
- 45cm

Potatoes and maize are grown at 75cm.

Many vegetables are grown on 50cm rows, as are many legume crops such as soya, beans, lentils etc.

Why band spraying with a sprayer and not in combination with a hoeing machine?...

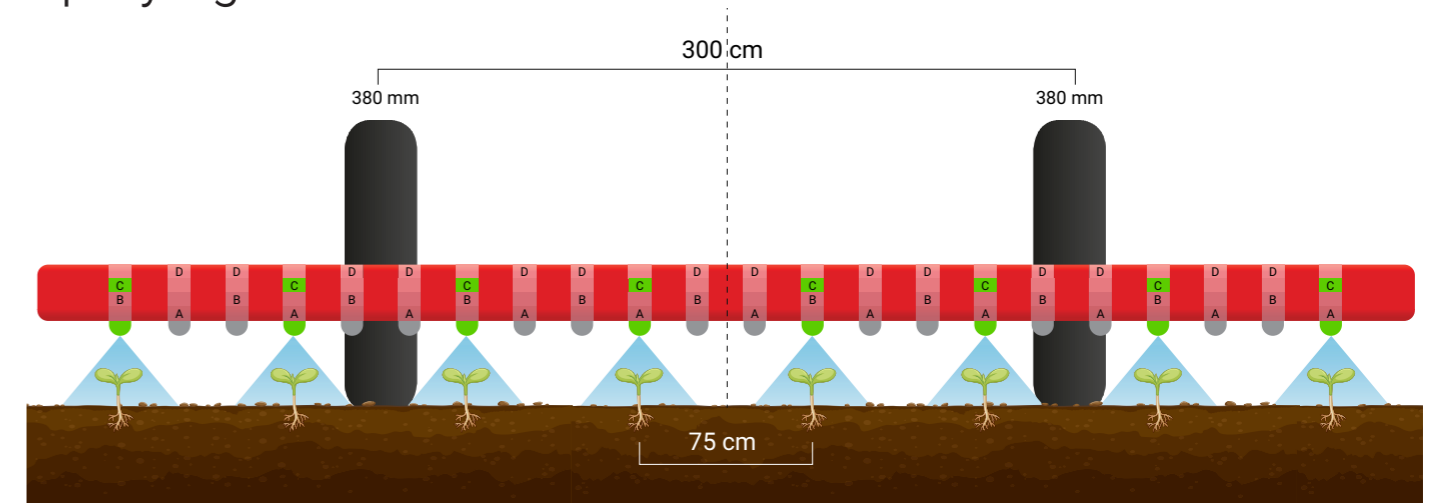
Capacity

The working width of a hoe is usually limited to the working width of the seeder. Usually ranging from 3 to 6 metres. The working speed is between 2 and 10 km/h. In contrast, the capacity of a sprayer is much higher, allowing as much spraying as possible in the most optimal conditions.

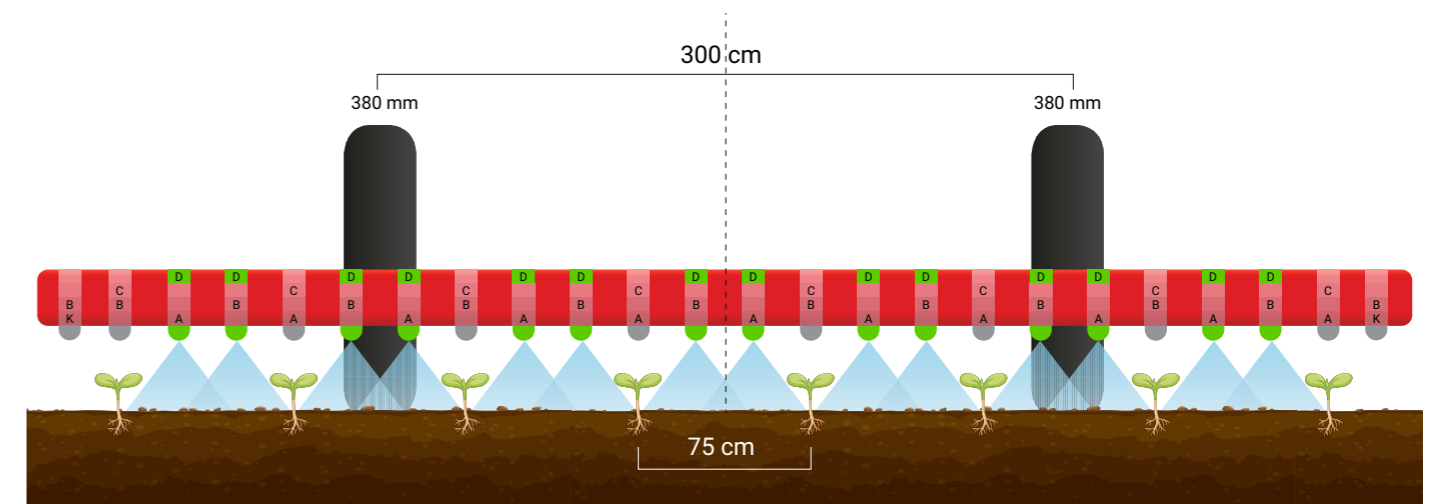
Timing

Hoeing is done in sunny weather where the soil should not be too moist. Under these conditions, the best hoeing results are achieved and the roots the hoeed weeds dry out fastest. In contrast, the optimum spraying conditions are in moderate weather conditions, and moist soil is important for soil herbicides to work properly.

Spraying on the row

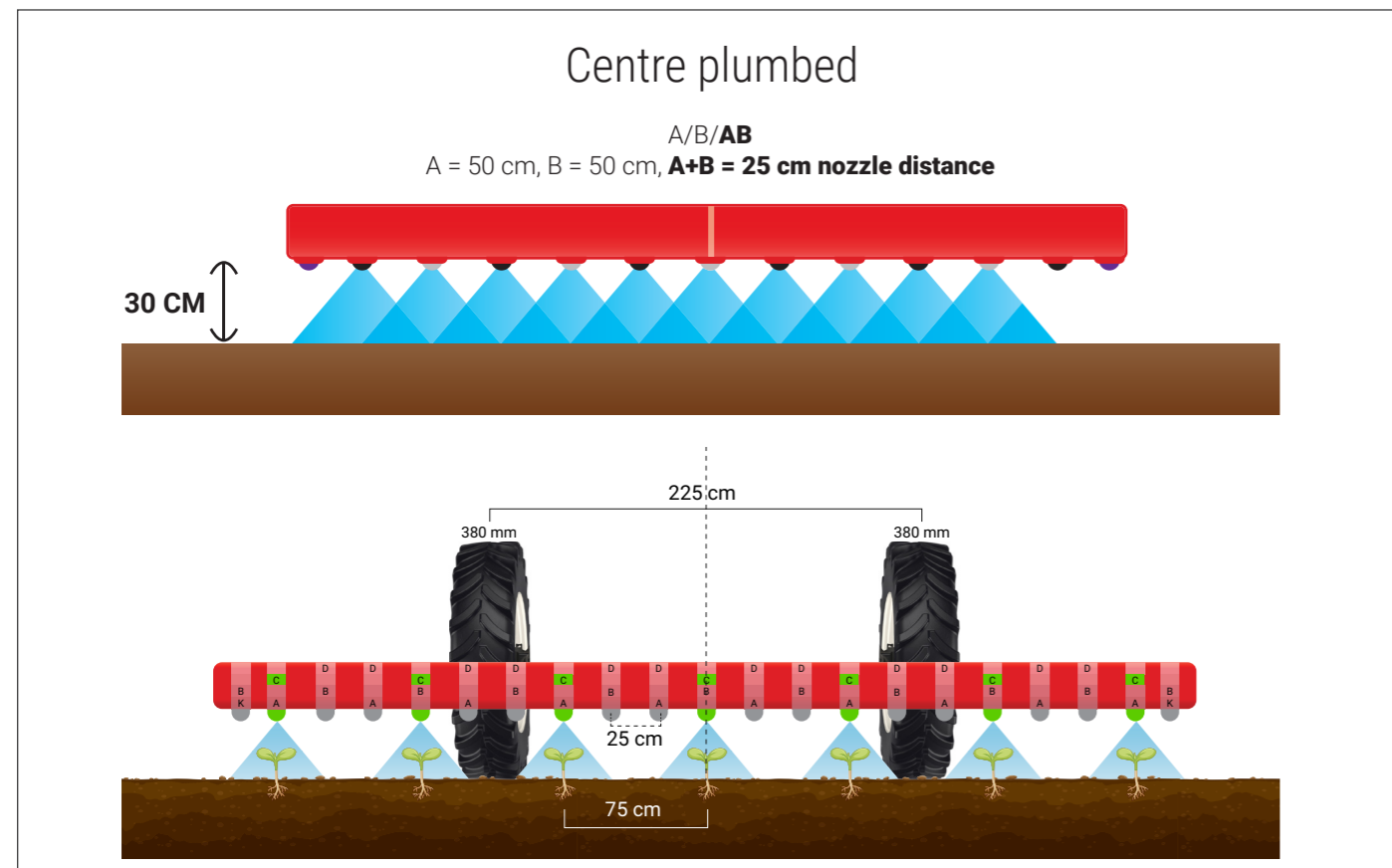
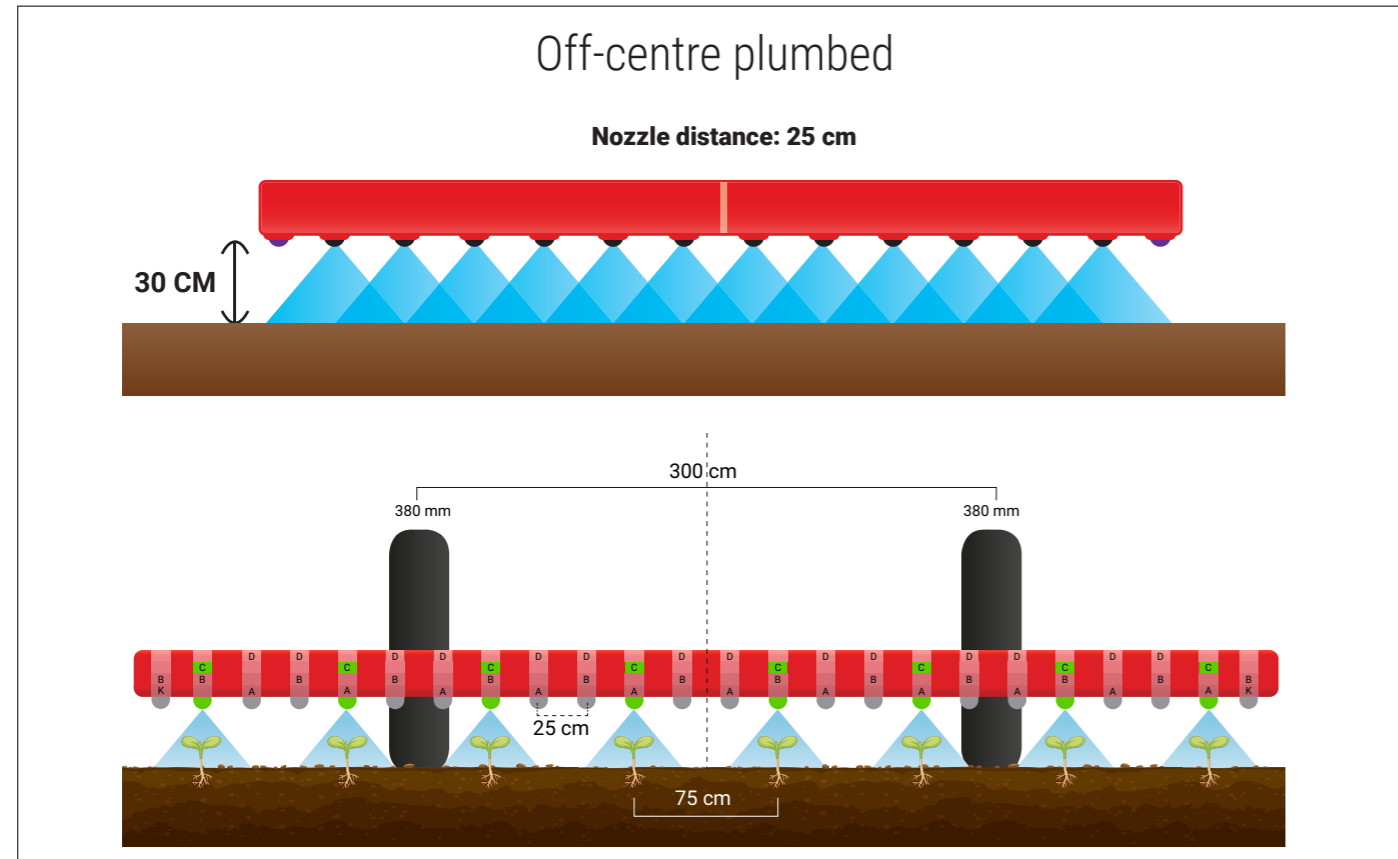


Spraying between the row



Hardware configuration

The desired track width and thus the number of rows between the wheels defines whether there is an even or uneven number of rows within the machine's track. Based on this, one chooses either a **centre plumbed boom** or an **off-centre plumbed boom**.



Choice of hardware configuration

As standard, Agrifac supplies off-centre plumbed booms.

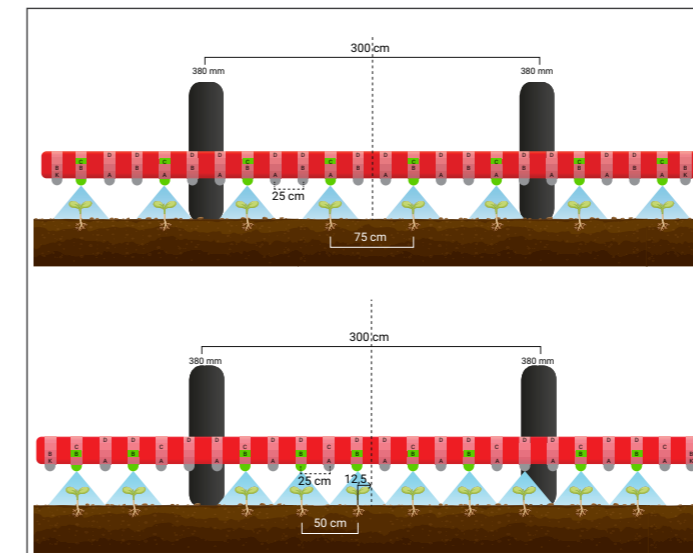
The choice of a centre plumbed boom or off-centre plumbed boom depends on a number of factors:

1. Desired track width (and therefore amount of rows under the machine)
2. Band spraying at 50 cm, 75 cm or both
3. Ability to shift path 12,5 cm left or right from the centre of the track

Below the possible scenarios and modes of operation:

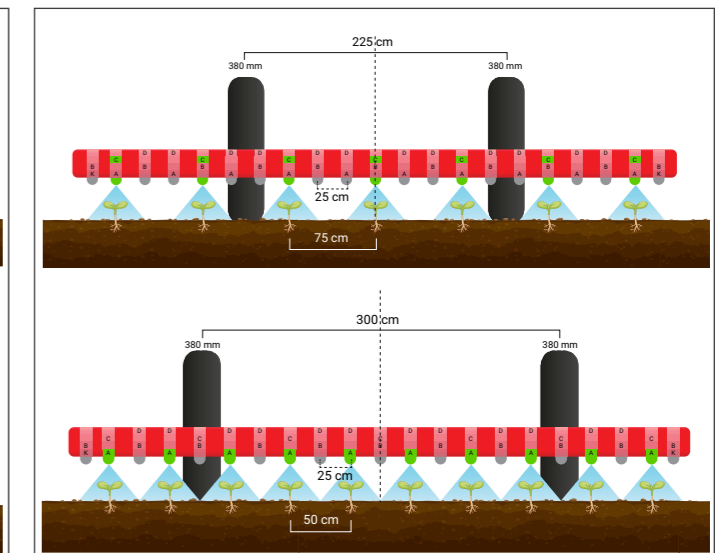
Off-centre plumbed 50 cm and 75 cm band spraying:

1. An offset of 12,5 cm in the drive path is necessary to get the nozzles above the plant row. There must be room for this in the paths, this means that two rows remain fallow when band spraying in 50 cm row spacing.
2. A track width of 300 cm is necessary.



Centre plumbed 50 cm and 75 cm band spraying:

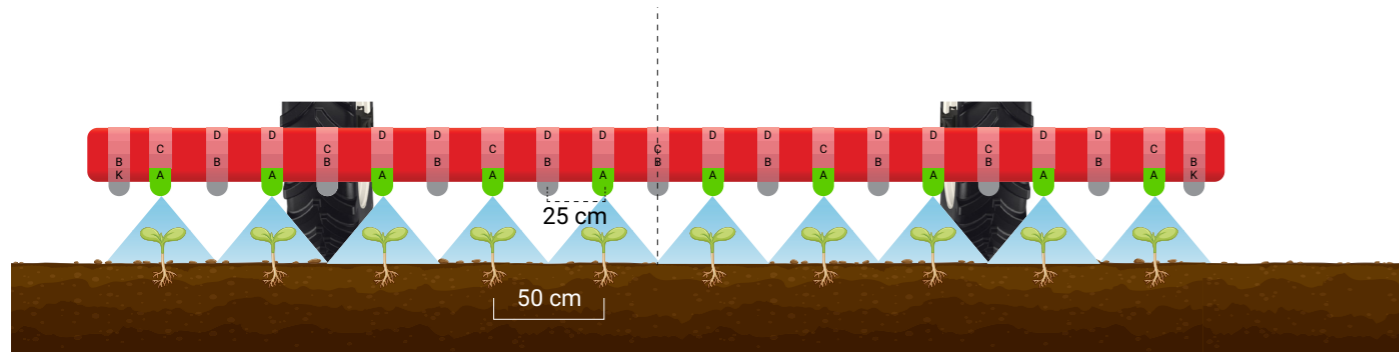
A track width of 225 cm and 300 cm is necessary.



Software-configuration

The EcoTronicPlus system works with pre-programmed nozzle configurations. Under each configuration there are certain nozzles, which become active when the configuration is selected. With a maximum of 4 configurations, meaning A, B, C and D configuration.

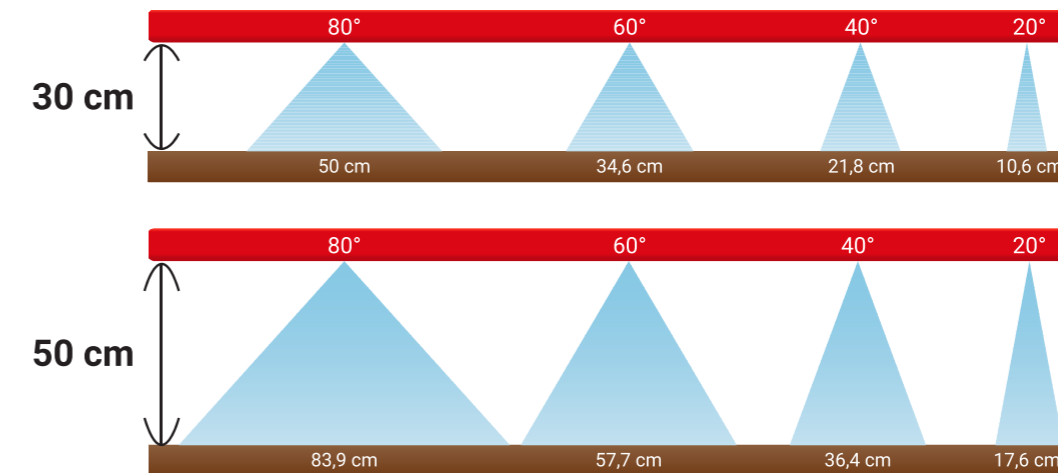
Below, an example of a boom with a activated A-line, causing all nozzles configured under line A to open. Switching from A, B, C and D line is easily done via the EcoTronicPlus screen.



Nozzle selection

The nozzle to be used depends on the desired effective spray width. As the crop grows, it may be necessary to change to a larger spray tip angle during the season.

Overview of effective spray widths:



For most band spraying applications, 40° is a nozzle suitable for band spraying. Practice shows that optimal adjustment of the automatic GPS-guidance system and appropriate row speeds are extremely important.

Type nozzle tip

So-called EVEN spray nozzle tips are specifically designed for band spraying and it is recommended to use them. An EVEN spray nozzle tip is designed to distribute the liquid evenly over the entire working width of the nozzle, whereas normal flat fan nozzle tips need the spray pattern of the neighbouring tips to achieve even distribution, also known as "double-overlap".

Most commonly used nozzles for band spraying are:

- Teejet TP E
- Wilger ER & DX
- Lechler E



Application rate & Savings

The dosage in l/ha to be set should be adjusted for row spraying, it depends on the effective working width per nozzle tip and row spacing.

The effective working width per nozzle depends on the boom height and the top angle of the nozzle tip. The row spacing is the distance at which the plant rows grown, 50cm or 75cm.

The formula below results in the dosage of band spraying to be set.

$$\text{Dosage Band spraying} = \frac{\text{working width per nozzle}}{\text{row spacing}} * \text{broadacre dosage}$$

Example:

- Row spacing 75 cm
- Effective working width per nozzle 21,8 cm
- Broadacre dosage 100 l/ha

$$29 \text{ l/ha} = (21,8 \text{ cm}) / (75 \text{ cm}) * 100 \text{ l/ha}$$

$$29 \text{ l/ha} = \frac{21,8 \text{ cm}}{75 \text{ cm}} * 100 \text{ l/ha}$$

$$21,8 / 75 * 100 = 29 \text{ l/ha}$$



Dosering benodigd



Band spraying - savings

Row distance: 75 cm

Effective working width per nozzle: 21,8 cm

Savings:

