

Application
systems for different
kinds of harvesters

ENSURE THE SUCCESSFUL APPLICATION OF AIV PRODUCTS

The right additive and a well-working application method guarantee a high-quality end result in ensiling. To ensure that you get all the benefits of AIV products, the application system must be efficient and accurate. From Happowa's range, you can find application solutions that have been tried and tested in the challenging northern conditions, available for all types of harvesters.



Happowa



EASTMAN

You can produce high-quality silage with AIV®* products

What the AIV preservation method can do for your farm

- The nutrients in the feed are preserved better, which minimizes losses and deterioration of quality
- Good hygienic quality of silage, less harmful microbes
- Aerobic stability of silage, meaning that the feed will not heat up during feed-out
- Increased feed intake and smooth flow of cow traffic during automatic milking
- Higher milk protein and fat content
- Successful ensiling has a positive effect on milk and meat production.



*) AIV® is a registered trademark of Valio Ltd.

Failed application is expensive

If there is not enough additive in the silage and if it has not been applied evenly enough, the end result may be malfermentation, loss of nutritional value and heating problems in the silage.

In the barn, the results of failed application can be seen in reduced feed intake and yield as well as the deterioration of milk quality. The protein and fat content of milk may deteriorate, and unpleasant flavor and spores of butyric acid bacteria may occur in the milk.

Prerequisites for high-quality silage

- Using the right methods at all stages of ensiling is essential for success.
- The silage additive is applied to the grass flow in the harvester.
- The right application method is a requirement for achieving the benefits of AIV.
- The application of AIV is easiest in a place where the grass flow is even and continuous.
- The harvesting method affects the characteristics required from the application system.



Take advantage of the benefits of AIV with correct application

- Silage additives affect the amount of microbes and the proportions of their strains in the feed.
- In order to achieve the full benefits of the additive, it needs to be applied to the silage as evenly as possible without losses. It must be possible to combat the harmful microbes in every part of the silage – not just here and there.
- The formic acid in AIV can be measured from the finished silage. This has been used in the development of the correct AIV application methods.
- AIV products contain organic acids, such as formic acid and propionic acid that can also be found naturally in the digestive tracts of animals.



Safety first

When using AIV solution, all components used in the application must be completely acid-proof. Check the safety instructions in the safety data sheet of the product and follow them.

Use personal protective equipment (PPE) and always have enough clean water available. Make sure that the different chemical preservatives cannot react to each other.

Choose the right additive from Eastman's product range

	Silage	Haylage, straw	Crimped grain	Whole grain	Total mix ration (TMR)
AIV products	✓		✓		✓
Eastman Propcorn products		✓	✓	✓	✓
Eastman Stabilizer products			✓		✓



Forage harvesters

- 1 IBC tank
- 2 Spreader acid applicator
- 3 Shredder nozzles
- 4 Spreader controller



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Install the equipment correctly

In a forage harvester, the best place for an acid applicator is usually in the back, in the same holder as the IBC tank. Happowa's rear-mounted holder has a place reserved for an acid applicator.

The controller is placed in the cab of the harvester. Note the length of the cable between the pump and the controller when choosing the placement of the pump unit.

The AIV solution goes from the IBC tank to the acid applicator's pump unit through a suction pipe installed into the tank and a suction hose attached to the pump. Installing a filter into the suction hose prevents debris and impurities from entering the pump.

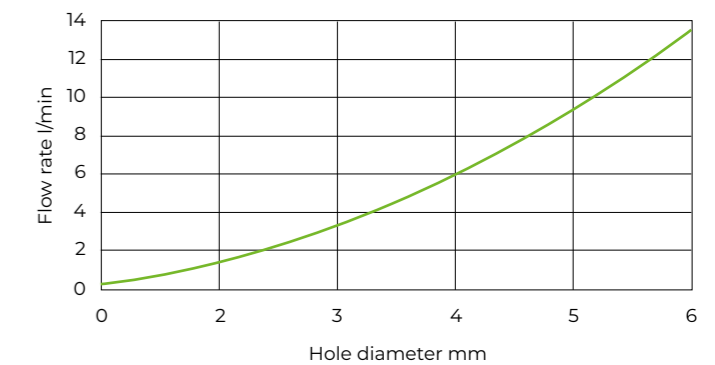
From the acid applicators, the additive goes through hoses to the shredder nozzles that are primarily installed to the chamber of the forage harvester to ensure that the additive spray is applied evenly to the grass flow. The nozzles can also be installed on top of the forage harvester's pipe, but the risk of additive loss is higher in that case.

The free flow of liquid from the tank to the nozzles must be prevented with an anti-drip valve that is installed in the hose as close to the nozzles as possible.

See the user manual of the acid applicator for more detailed instructions on installation, calibration and testing.

Liquid flow from the hole

0.65 bar under pressure

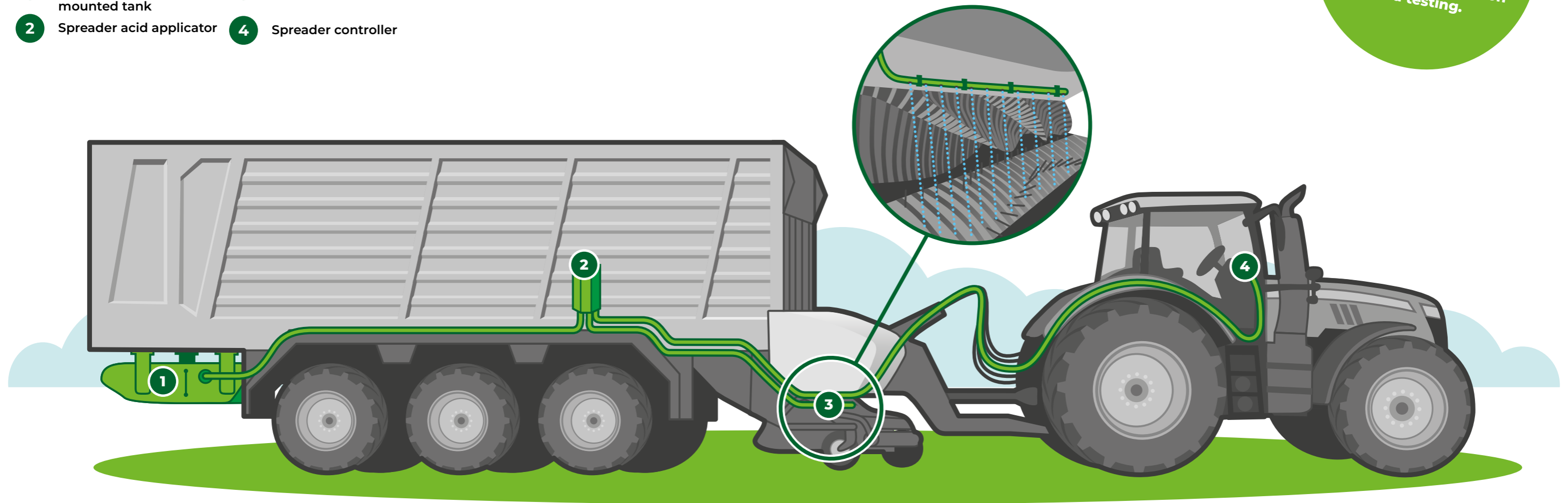


Solutions for forage harvesters

- The required pumping capacity required by a forage harvester is usually approx. 10–30 l/min.
- The capacity of forage harvesters' own applicators is usually not high enough for applying the AIV solution, which is why a separate application system is needed.
- Suitable acid applicator models include Happowa's Spreader 6000 and Spreader 30.
- Spreader 6000's maximum capacity is 12 l/min, while that of Spreader 30 is 30 l/min.
- The Spreader acid applicators have an electronic controller that makes it possible to adjust and monitor the flow rate easily and accurately.
- The controller sends an alarm when the flow of liquid from the tank stops, which means that the tank will not run empty by mistake.
- The most suitable option for transporting the AIV solution is a 1,000-liter IBC tank attached to the back of the forage harvester.
- If necessary, the forage harvester can send a signal to the acid applicator that can be used to start and stop the applicator. This requires a control relay that is sold separately.
- Shredder nozzles are selected as nozzles. Happowa's shredder nozzle set includes two spray nozzles with a 6 mm hole. If necessary, the hole can be enlarged by drilling. The diameter of the hole affects the flow from the nozzle; see graph.

Silage loader wagons

- 1 700-liter bottom-mounted tank
- 2 Spreader acid applicator
- 3 Spray bar
- 4 Spreader controller



See the user manual of the acid applicator for more detailed instructions on installation, calibration and testing.

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Solutions for silage loader wagons

- In a silage loader wagon, the additive is added to the cut grass in the pick-up, before the rake.
- The Spreader 6000, with a maximum capacity of 12 l/min, is an acid applicator suitable for most silage loader wagon models.
- The Spreader acid applicators have an electronic controller that makes it possible to adjust and monitor the flow rate easily and accurately.
- The controller sends an alarm when the flow of liquid from the tank stops, which means that the tank will not run empty by mistake.
- Tanks suitable for transporting AIV in silage loader wagons can be installed at the bottom, on the sides and in the front.
- A 600–700-liter bottom-mounted tank can be installed under the bed of the silage loader wagon, where it does not interfere with visibility or limit the functions of the wagon.
- If the bottom-mounted tank is unsuitable for the wagon, a 250-liter tank mounted on the side can be selected. The tank is installed on the side of the wagon, and if necessary, two tanks can be installed, one on each side of the wagon.
- Alternatively, a 500-liter front-mounted tank can also be installed on the front loader of the tractor.
- The AIV solution is applied to the grass flow with a spray bar. The spray bar is a pipe made out of acid-proof steel with 1.5-mm holes every 5 cm.

Install the equipment correctly

Place the pump unit of the acid applicator in a suitable location, where it does not limit the other functions of the harvester. In a silage loader wagon, the acid applicator can be installed on the side of the wagon, for example.

The controller is placed in the cab of the harvester. Note the length of the cable between the pump and the controller when choosing the placement of the pump unit.

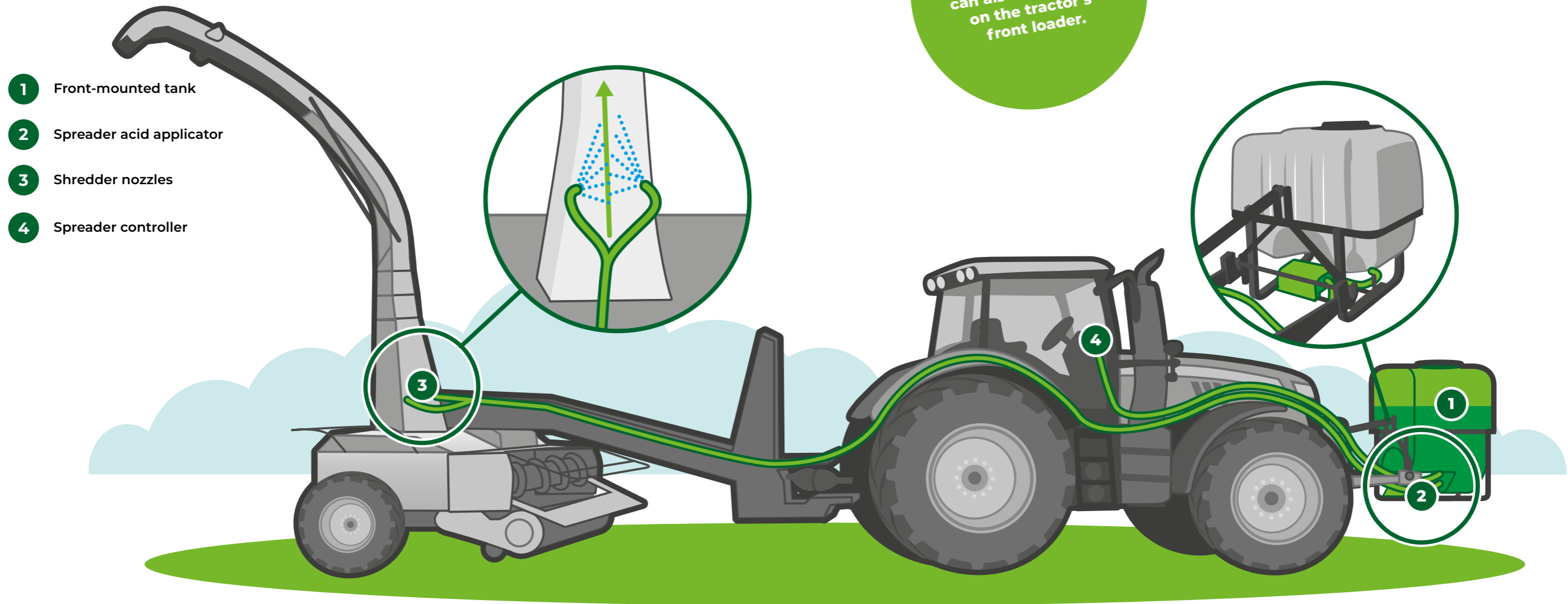
The silage additive goes from the tank to the acid applicator's pump unit through a suction pipe installed into the tank and a suction hose attached to the pump. Installing a filter into the suction hose prevents debris and impurities from entering the pump.

From the acid applicator, the additive goes through hoses to the spray bar, which is usually installed on top of the pick-up to ensure that the additive spray is applied evenly to the mass of feed.

Because the spray bar is usually lower than the liquid level in the tank, an anti-drip valve must be used to prevent the free flow of liquid. The anti-drip valve is installed in the hose, as close to the nozzles as possible.

See the user manual of the acid applicator for more detailed instructions on installation, calibration and testing.

Trailed forage harvesters



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Solutions for trailed forage harvesters

- In a trailed forage harvester, AIV is usually applied in the blowpipe.
- The required pumping capacity of the additive for trailed forage harvesters is usually 2–12 l/min, meaning that suitable acid applicator options include the Spreader 4000 and Spreader 6000.
- The Spreader 4000's maximum capacity is 6 l/min, while that of the Spreader 6000 is 12 l/min.
- The Spreader acid applicators have an electronic controller that makes it possible to adjust and monitor the flow rate easily and accurately.
- The controller sends an alarm when the flow of liquid from the tank stops, which means that the tank will not run empty by mistake.
- A 500-liter front-mounted tank for transporting AIV solution can be installed on the front loader of the tractor.
- A barrel holder for one or two 200-liter barrels can also be attached to the front of the tractor.
- Shredder nozzles are selected as nozzles.
- Happowa's shredder nozzle set includes two spray nozzles made out of acid-proof steel.

Install the equipment correctly

The pump unit of the acid applicator should be installed in a location where it does not limit the other functions of the harvester. If Happowa's barrel holder or 500-liter front-mounted tank is used, they have a place reserved for the acid applicator.

The controller is placed in the cab of the harvester. Note the length of the cable between the pump and the controller when choosing the placement of the pump unit.

The silage additive goes from the tank to the acid applicator's pump unit through a suction pipe installed into the tank and a suction hose attached to the pump.

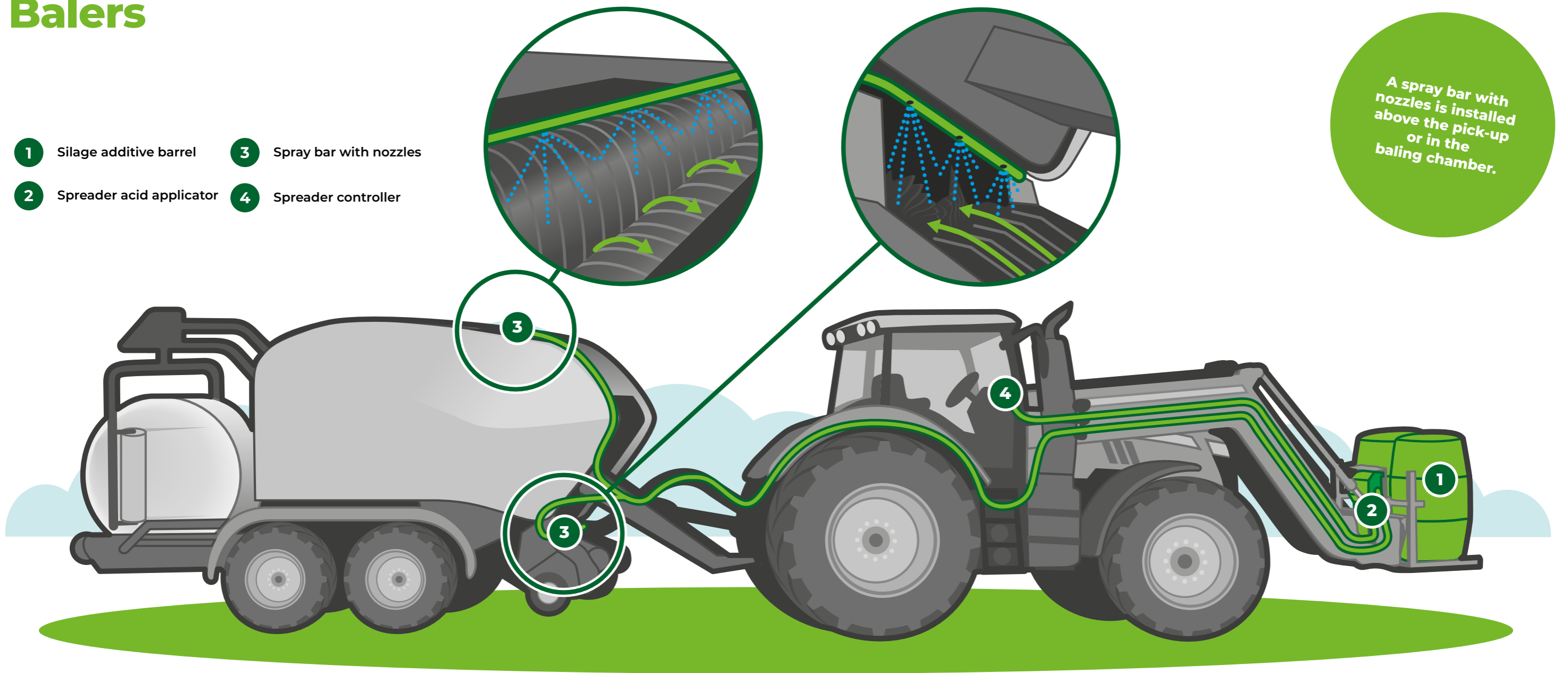
Installing a filter into the suction hose prevents debris and impurities from entering the pump.

From the acid applicator, AIV goes through hoses to the shredder nozzles, which are usually installed into the blowpipe.

If the nozzles are lower than the liquid level in the tank, an anti-drip valve is installed in the hose, as close to the nozzles as possible.

See the user manual of the acid applicator for more detailed instructions on installation, calibration and testing.

Balers



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Solutions for balers

- In the baler, the silage additive is added to the grass flow either in the pick-up before the rake, or directly in the chamber.
- The best choice for an acid applicator is the Spreader 4000, with a maximum capacity of 6 l/min.
- The Spreader acid applicators have an electronic controller that makes it possible to adjust and monitor the flow rate easily and accurately.
- The controller sends an alarm when the flow of liquid from the tank stops, which means that the tank will not run empty by mistake.
- The Easy 4000 also has a suitable capacity for the baler's flow rates.
- A 500-liter front-mounted tank can be installed on the front loader of the tractor.
- A barrel holder for one or two 200-liter barrels can also be attached to the front of the tractor.
- With the flow rates of a baler, a spray bar with nozzles is used to apply the additive to the grass flow evenly and accurately.
- Note that the size of the nozzle affects the droplet size. If the droplets are too small, the additive may be carried away by the wind.

Install the equipment correctly

The pump unit of the acid applicator should be installed in a location where it does not limit the other functions of the harvester. If Happowa's barrel holder or 500-liter front-mounted tank is used, they have a place reserved for the acid applicator.

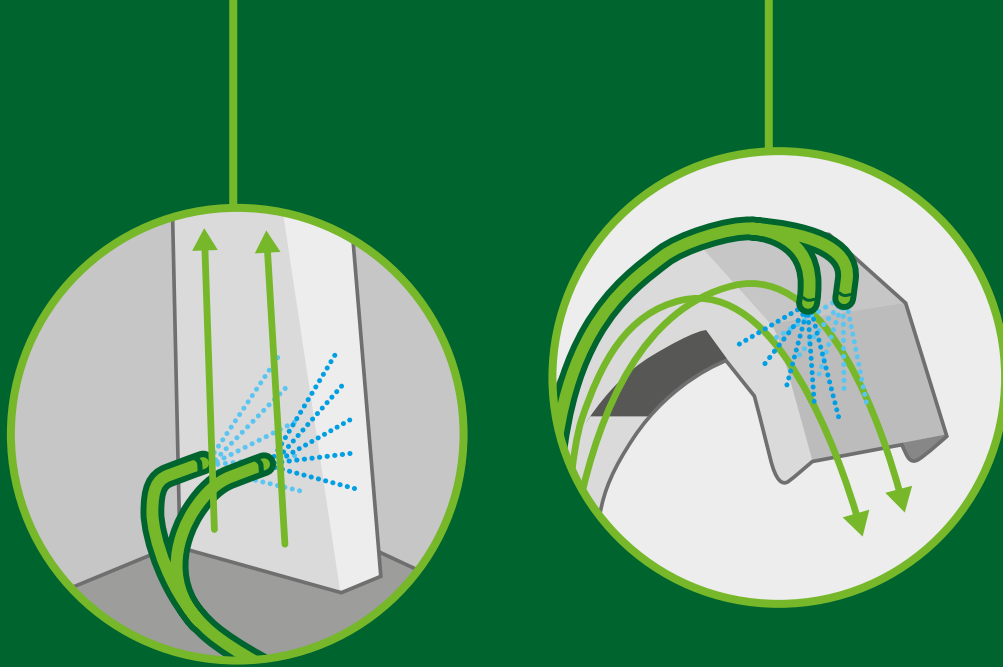
The controller is placed in the cab of the harvester. Note the length of the cable between the pump and the controller when choosing the placement of the pump unit.

The silage additive goes from the tank to the acid applicator's pump unit through a suction pipe installed into the tank and a suction hose attached to the pump. Installing a filter into the suction hose prevents debris and impurities from entering the pump.

From the acid applicator, the additive goes through hoses to the spray bar with nozzles. The spray bar with nozzles is installed in a sheltered location where the feed stream is even and continuous, such as above the pick-up or in the baling chamber.

Because the nozzles are usually lower than the liquid level in the tank, an anti-drip valve must be used to prevent the free flow of liquid. The anti-drip valve is installed in the hose, as close to the spray bar as possible.

See the user manual of the acid applicator for more detailed instructions on installation, calibration and testing.



Thank you for choosing Happowa and AIV products!

If you have any questions or if you need more
information, please do not hesitate to contact us.



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