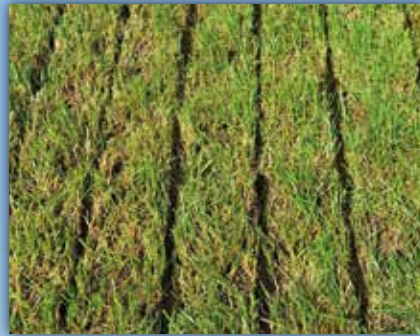




Vredo Slurry Injectors

ZB3 & ZBFE



35%
MORE
EFFICIENT

20% reduction of nitrogenous compounds in cow slurry



Vredo

Direct to the roots where it's needed!

Vredo

The best in the field

IN-HOUSE DEVELOPMENT

Vredo is a leading manufacturer of agricultural, public amenities and fine turf equipment. Vredo's regular production manufactures four product lines:

- **Overseeders (Agricultural, Amenities and Fine Turf)**
- **Slicing Filters (Static and mobile)**
- **Slurry Injectors**
- **Self-Propelled Vehicles (SlurryTracs)**

All these product lines are fully developed and produced in-house. To this end, Vredo is equipped with state of the art production equipment. Vredo sells and distributes her products directly and through a carefully selected distribution network both nationally and internationally.

History

The beginnings of the company go back to 1947. At that time Mr. B de Vree, a farmer's son, started an agricultural contractor's business. The activities were diverse and machines were often adapted to the specific demands of the heavy clay soils of the local Betuwe area. The adaption of existing machinery changed slowly in the course of time into the development of new machines. The agricultural contracting business changed, therefore the business developed more and more into an engineering company and later into a fully-fledged factory.

In 1976 de Vree introduced a completely self-developed machine: the Vredo Grassland Overseeder. At the end of the 80's the same double disc principal was used for the development of the unique Vredo Slurry Injectors.

In 1989 Vredo mounted a slurry tank on top of a Horsch three wheel self-propelled flotation vehicle. This was Vredo's first foray into working with self-propelled vehicles. In 2012 Vredo celebrated its 35th anniversary and the 25th birthday of the Slurry Injectors. Presently we are manufacturing the 3rd generation (ZB3) of the Slurry Injectors as well as the ZBFE for lighter trailed tanks.

Vredo Vision

Vredo has set itself the objective to contribute to the further development of the industry with her products. It is important to Vredo that all parties concerned, including partners and customers, are able to obtain good financial results by using Vredo products.



Complete Vredo team fall 2014

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DOUBLE DISCS PRINCIPLE
ALWAYS CUTS CLEANLY
COMPACTION FREE OPERATION
MAXIMUM ABSORPTION
LOW ENGINE-POWER NEEDS
PERFECT CONTOUR-FOLLOWING



VALUE & NECESSITY

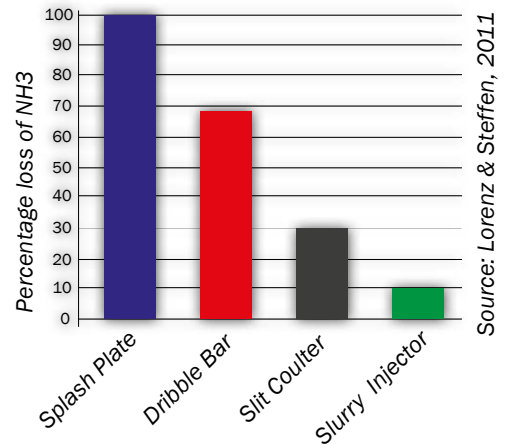
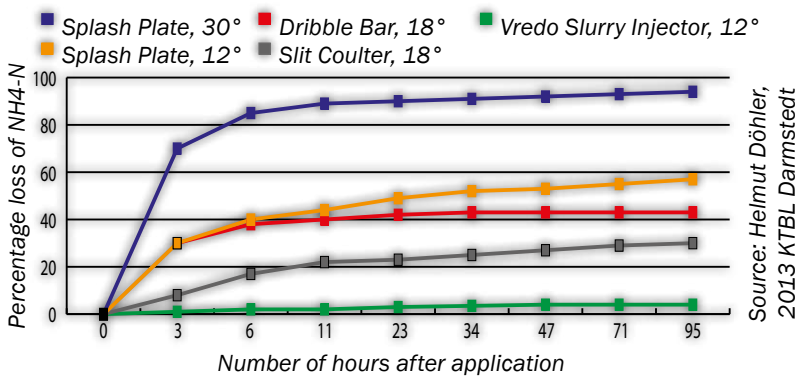
Thanks to the increasing intensification of agricultural practices, forage yields have become even more important. The quality and quantity of the feed also help determine the farm's returns. Also, the application system (animal fertilizer) used has a great influence on the final results. Slurry injection has been proven to be the most cost effective way of manure application.

Manure is nutritional

The key elements in manure and digestate are nitrogen (N), potassium (K), phosphorus (P) & magnesium (Mg). In particular nitrogen and phosphorus are vital for plant growth, vitality and therefore quality. Animal manure and digestate are therefore high quality sources of crop nutrients! You see, muck is brass!

Emission makes the difference

Emission* is an evaporation process, and therefore dependent on the weather. Radiation, humidity, wind, manure composition, temperature and the amount of manure have influence on the evaporation process itself, and also on nitrogen loss. The surface area of the slurry with the surrounding air also plays a great part in the evaporation process.



Application condition

Splash Plate

- crop contamination
- plant-burn over the entire surface area
- partial growth up with solid manure parts
- not grazable in the first weeks
- poor absorption - approximately 70% nitrogen loss!

Dribble Bar

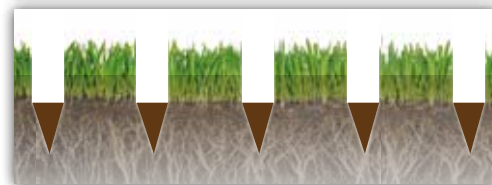
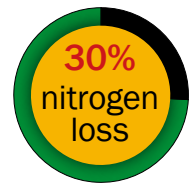
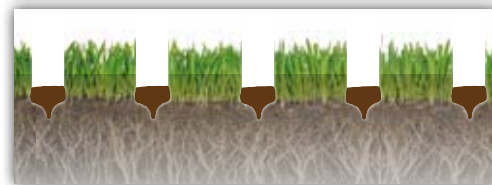
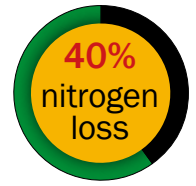
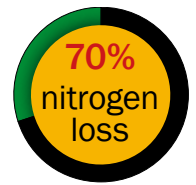
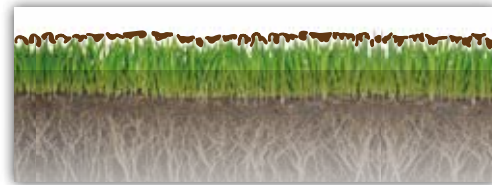
- crop contamination in strips
- plant-burn in strips
- partial plant-growth with manure particles
- loss of crop
- not grazable for the first few days
- poor absorption - approximately 40% nitrogen loss!

Slit Coulter

- manure lies on the crop and partially in the soil
- plant-burn in strips
- loss of crop (coulter & overlying manure)
- not grazable for the first few days
- poor absorption - approximately 30% nitrogen loss!

Vredo Slurry Injector

- manure in the slot at the roots
- no plant-burn
- no loss of crop (grass and roots pushed aside)
- directly grazable
- perfect absorption - only about 10% nitrogen loss!



* Loss of nitrogen is very much dependent upon the weather - this applies to all application techniques

THE RESULTS

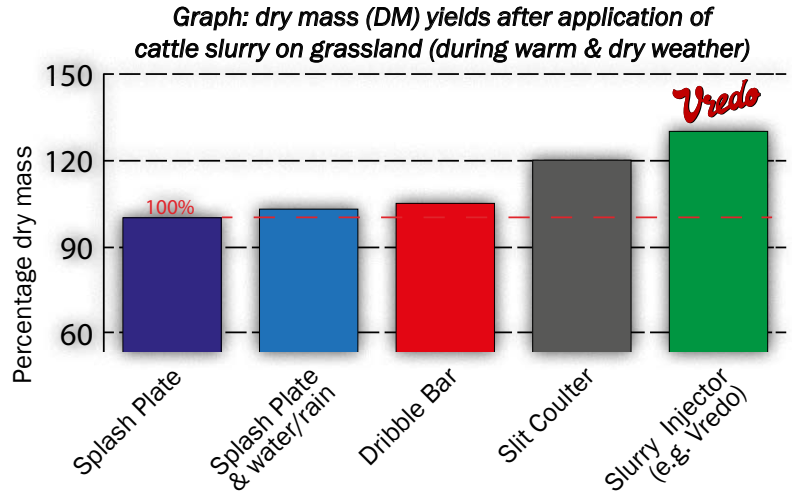
The key question is what slurry application does for you and/or your customer. On this page you can see the difference between the various application techniques in terms of yield (KgdM) and how much extra artificial fertilizer needs to be used, just to reach the yield levels achieved by a Vredo slurry injector. In short, fertilizing grassland with a Vredo slurry injector leads to:

- 35% more utilization of available nitrogenous compounds from cattle slurry
- 41% more utilization of available nitrogenous compounds from pig slurry

This increased use of valuable nitrogen compounds results in:

1. Better absorption of nutrients
2. Reduced need of artificial fertilizers
3. No smearing
4. A qualitatively better crop
5. A higher yield - 1 to 2 additional cuts (in dry weather)

This graph (right) shows the superior performance of the slurry injector in comparison with other application techniques.



Dry Mass Yields (grassland) using diverse application techniques during warm & dry weather (Source: Lorenz & Steffens, 1996)

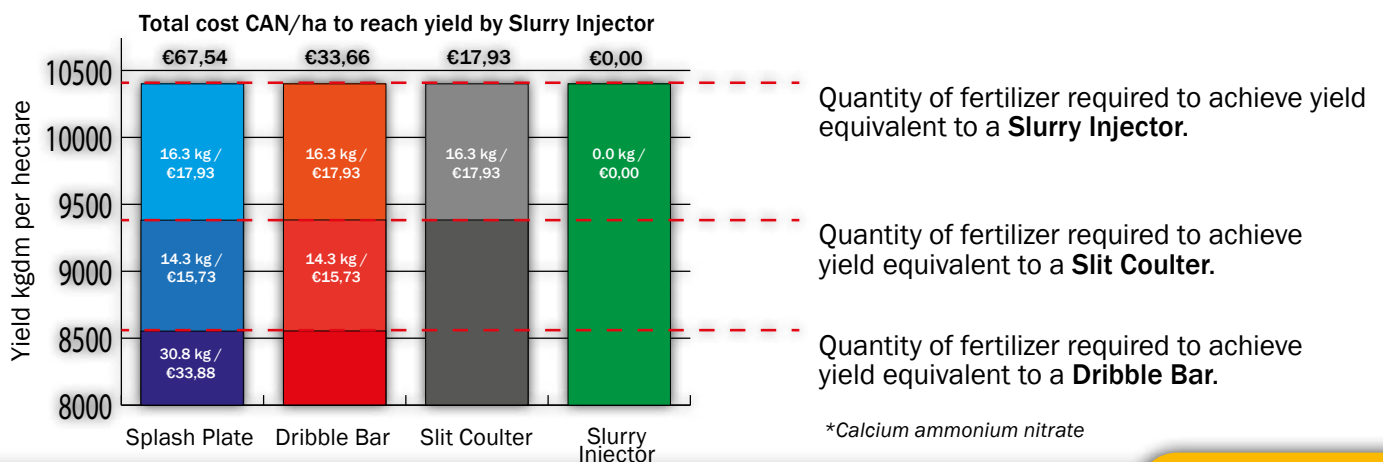
Table: Average grassland yield

	Yield (kgdm/ha ⁻¹)	Extra yield compared with Splash Plate		Profit from extra yield (kgdm/ha ⁻¹ @ €0,22 kg ⁻¹)
		(kgdm/ha ⁻¹)	in percentage	
Splash Plate	8000	n/a.	n/a	n/a
Dribble Bar	8640	640	8%	€ 141,-
Slit Coulter	9600	1600	20%	€ 352,-
Slurry Injector	10400	2400	30%	€ 528,-

Economical with artificial fertilizer

The various slurry application techniques affect the absorption/utilization of the nutrients in the slurry, by employing the best application technique, one can save on the artificial fertilizer costs needed to achieve optimum results. The following graph displays the amount of artificial fertilizer needed in order to obtain comparable returns as when compared to a Vredo slurry injector only.

Graph: necessary application of artificial fertilizer (kg CAN*/hectare/year) per application technique



CLEAN CUTTING IS THE KEY

Clean and sharp

Our Slurry Injector series are furnished with the unique VREDO Double Disc System, which is the key to clean and sharp cutting. Two durable discs, arranged in a V-shape, create a narrow cut in the sod, consistently under all soil conditions - clay, peat, clay or sand, either wet or dry. The VREDO Double-Disc element = quality!

The sod is sharply incised and horizontally opened by the V-shaped twin cutting discs, whereby the root system remains intact and minimum compaction occurs. Also, the soil maintains its open structure meaning that the slurry is optimally absorbed. Also, burning and drying of the crop is also prevented.

The individually suspended and sprung double-disc elements are provided with a drag foot in order to create a keen cut. Together with the unique central pivot, the machine's wings continue to follow the ground for continuous cutting contact. The sharp incision with minimal soil compaction helps the soil to bounce back quickly along the length of the slot. This gives weeds little chance of growing in the slot.

The slurry is injected into the slot by specially shaped outlet nozzles, which are almost in between the discs themselves. The V-shaped disc-pair not only slices keenly into the sod but also has a self-sharpening action, which has a low draught force requirement, and thus lower fuel consumption.

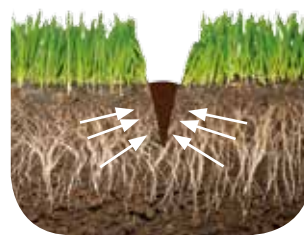
Thanks to the VREDO double-disc system the sod is sharply incised & opened without causing soil compaction. This results in the sod optimally absorbing the nutrients as well as returning to its original position.



1. Before



2. Sharply incised



3. Filled with slurry



4. Slurry absorbed

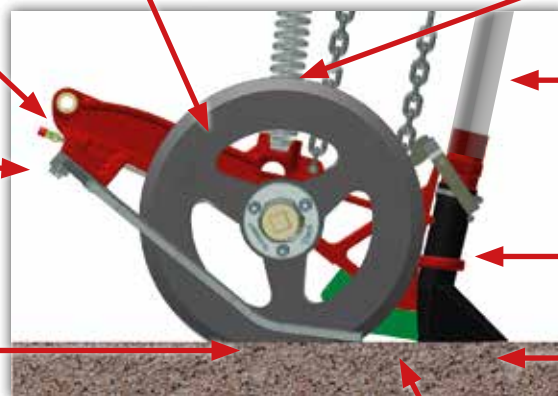
Independently suspended fertilizing element with a single pivot point - follows ground contours keenly.

Lubrication System to lubricate the disc bearings: prevents wear and excessive play.

Drag Foot ensures:
1. Clean incision
2. Discs remain clean
3. Limitation of depth of cut

Self-sharpening V-shaped disc pairs made of high quality durable material. Open discs prevent blockage with crop residues. Easily drawn whilst cutting (see page 7).

The ground contour-following of the fertilizing element is regulated by a low maintenance coil spring.



Slurry feed hose with an internal diameter of 50 mm.

Galvanized mechanically operated-slurry valve. Trouble-free operation which completely and immediately shuts off manure flow.

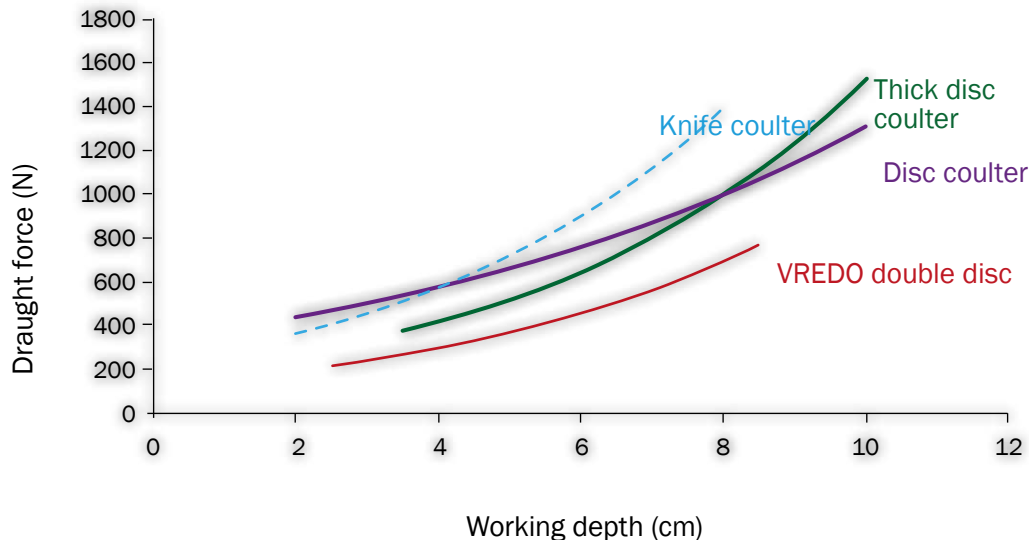
Rubber outflow nozzle puts the slurry neatly into the slot. Flexible and durable construction.

Plastic block keeps the slot momentarily open for the slurry.

COMPACTION FREE OPERATION

Draught force requirement

The required pulling force of a slurry injector VREDO is, according to independent research, the lowest when compared to other slurry application principles. Compared with competing systems such as a knife-coulter, a coulters disk and a thick disc coulters the VREDO slurry injector causes little damage to the soil (read compaction and smearing of the ground). Competitive systems compact the soil in that the disc / coulters is forced vertically into the soil. Thanks to VREDO's low-compaction operation the soil remains springy, the slot springs partially closed again and weeds have little opportunity to establish themselves. See chart below for more information.



Source: Journal of Agricultural Engineering Research 71 (1998) Huijsmans, Hendriks & Vermeulen

Graph: Draught force of the four shallow injection techniques at various working depths on the sandy loam soil

Economical

Since the VREDO slurry injector's required draught force is low, your tractor unit has to work less hard, resulting in lower fuel consumption. The fuel savings can be substantial.

Superior contour-following

Thanks to the operation of the independently suspended fertilizing elements, the heavy-duty coil spring, and the centre pivot, the VREDO slurry injector can also fertilize undulating and uneven grassland. Even over a mound the VREDO is able to continue following the ground, keeping contact between the cutting discs and the sod, and so continue to inject the slurry neatly in the slots.



SLURRY INJECTOR SERIES

Vredo has Slurry Injector series: the ZBFE and ZB3. Both series have the same unique double disc principle and are suitable for professional use. The fertilising elements on both series are exactly the same.

ZBFE Slurry Injector

The ZBFE is a solidly constructed slurry injector manufactured from a galvanized box beam frame. The double disc elements are mounted on the frame giving the same fertilization quality equal to the other Vredo slurry injector series. Thanks to this box beam construction the ZBFE has a low actual weight which makes this series ideal for mounting behind trailed slurry tanks.

The ZBFE slurry injector has a good basic configuration which can be upgraded as needed with various options.

Working widths available from 5.2 metres to 7.2 metres.*



ZB3 Slurry Injector

The ZB3 is a robustly constructed slurry injector which is suitable for mounting behind professional slurry tanks and all brands of self-propelled slurry vehicles.

The injector is designed so that it is suitable for daily use in the professional contracting sector.

Working widths from 7.3 metres to 12.0 metres available.*

** See dimensions on page 11 for further information.*



PRECISION IS THE FUTURE

The fertilizer (animal-based) legislation in many countries is aimed at striking a balance between the amount applied and the nutrients absorbed. This means that, in practice, much less manure can/must be applied and that this distribution needs to be more accurate. Therefore unnecessary double fertilization is to be avoided as far as possible as well as double incision of the sod.

Section Shut-Off

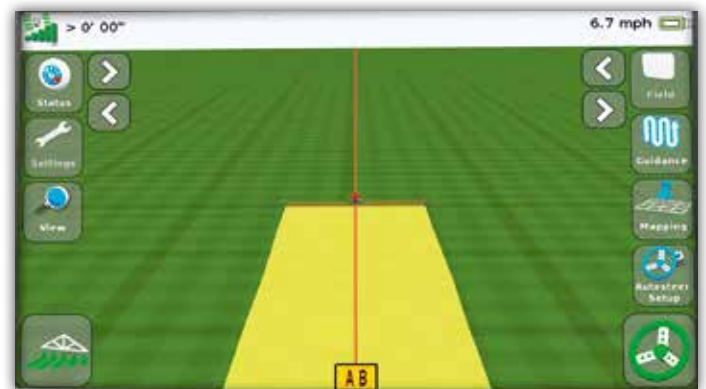
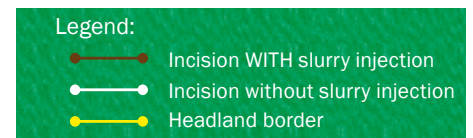
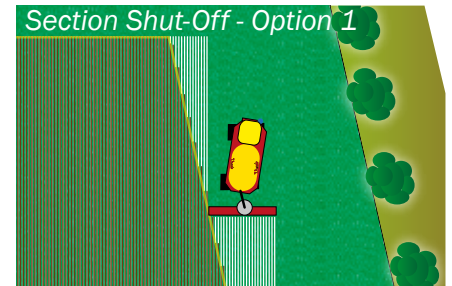
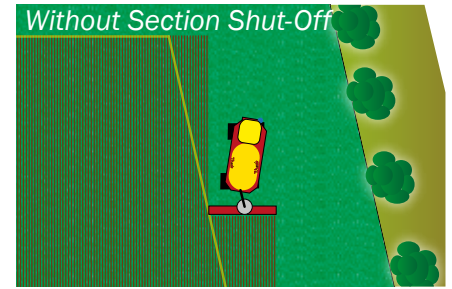
Vredo has developed a Sectional Shut-Off constructions with a width of 90 cm per section: with that **the entire injector is able to be shut-off in sections without being lifted (pneumatic).**

Efficiency equals profit

By varying the working widths, it is possible to continue to make whole passes with the Slurry Injector. This prevents double passes, double fertilizing and double cutting, which increases overall efficiency and is economical for man, machine and manure.

GPS-RTK

If the injector is connected to a vehicle equipped with GPS RTK the injector can automatically shut off and pull up the sections. By adjusting the output of the vehicle in accordance to the resulting working widths a combination exists that can distribute the slurry with precision over the land. Precision has the future!



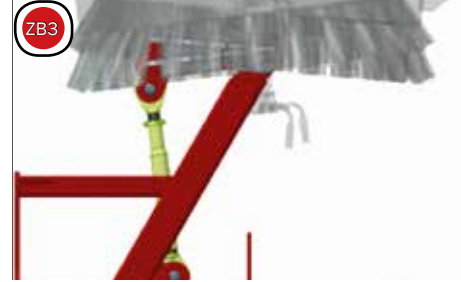
FEATURES & OPTIONS



Automatic lubrication system for low maintenance.



Hydraulic shut-off valves for a clean operation



The slurry distributor can be set horizontally for a perfect distribution.



Compact build, requires less space and the gravity point is close to the machine.



The centre pivot, to stay in contact with the soil even with undulations.



The unique Vredo double discs system, for a perfect result



Reflective automatic retractable disk protection shields.



Vogelsang distributor for a perfect distribution



Single attachment, for minimal wear and optimal working results



Ground clearance, for easy transportation in crops



Greasable bearings for a long lifespan



Mechanical pressure on the soil for optimal adaptation.



Support wheels



TÜV Germany: Modification for safe road transport



Hydraulic closure valves



Tow bar

ZB Standard equipment on ZB3 & ZBFE

ZB3 Standard equipment on ZB3

ZB3 ZB3 option

ZBFE ZBFE option

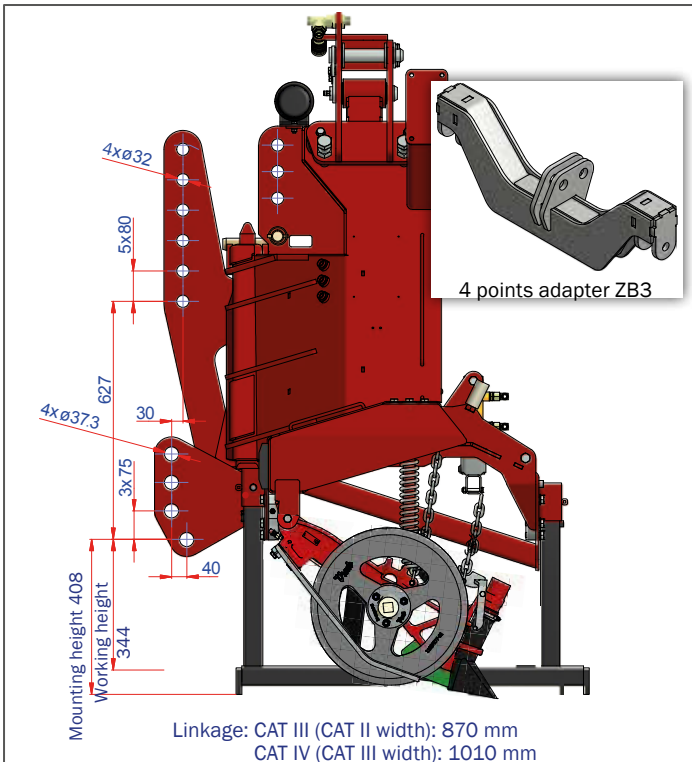
TECHNICAL SPECIFICATIONS

Series	ZB3						ZBFE					
Model	7342	8046	8448	8750	9152	12068	5223	5229	6127	6135	7031	7241
Working Width	7,3	8	8,4	8,7	9,1	12	5,2	5,2	6,1	6,1	7	7,2
No. of sections	3					5	3					
No. of elements	42	46	48	50	52	68	23	29	27	35	31	41
Element suspension	Independently mechanically suspended											
Row distance (cm)	17,5						22,5	17,5	22,5	17,5	22,5	17,5
Transport width	2,82 meter						2,82 meter					
Height (from the ground)	3,05	3,4	3,57	3,75	3,92	3,64	2,54		3,05		3,5	
Weight (kg)	2820	2940	3000	3060	3120	4200	1480	1665	1600	1855	1730	2045
Hitch	Quick hitch A-frame						Fixed					
Coupling	3 or 4 points CAT III (CAT II width) & CAT IV (CAT III width)						3 or 4 points CAT III (CAT II width) & CAT III (CAT III width)					
Required hydraulics	Folding 1xDW 1/2 "center open											
	Drip-stop 1xDW 1/2 "closed centre											
	Distributor 1x DA 3/4 "center open 50-60 l / min with automatic reversing capability											
Options (pay attention: not every option is fit for every model)	Wing closure valves German TÜV Compatibility Kit Disc Protectors ES 2000 switch 24V conversion eye hitch Towing bar A-frame 4-points hitch convertor Ball hitch cat.3 / 3 KKV 5 "+ flange Extra wheel Heavy-duty wheel 4L grease reservoir Closing distributor aeration Counterpiece coupling Section closure						German TÜV Compatibility Kit Disc Protectors ES 2000 switch Closing distributor aeration Counterpiece coupling Automatic lubrication system Central lubrication Support wheels					

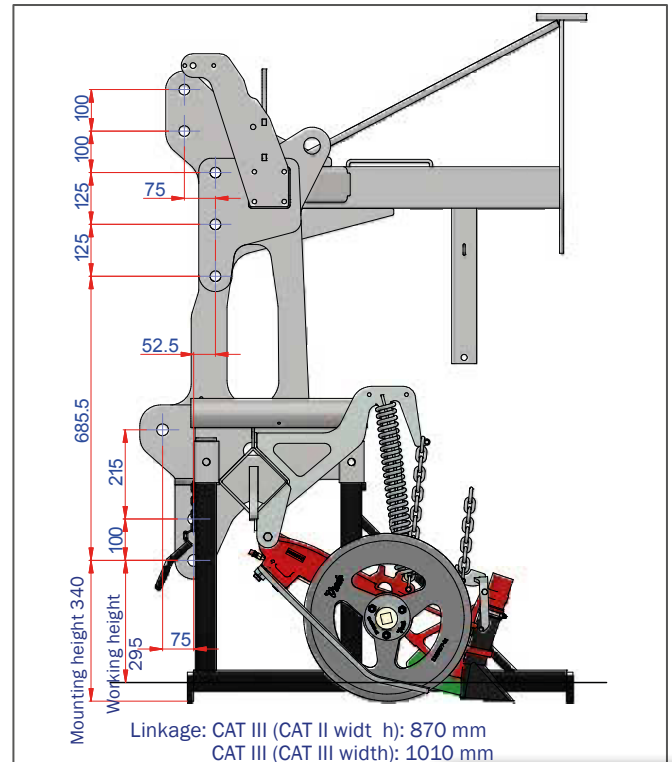
Vredo Dodewaard BV reserves the right to change specification and design of products described in this literature without notice..

HITCH DIMENSIONS

Quick hitch A-frame ZB3



Fixed 3/4 points hitch ZBFE



Service team



Our philosophy

Vredo's philosophy is "Built to Work", and yet every machine, however reliable, needs regular maintenance to keep working. To make the maintenance work as easy as possible, we've designed our machines to be service-friendly where possible. Vredo's support on parts and service is customer-focussed, reliable, competent and fast.

Original Spare Parts

Vredo has almost all wearing parts and other parts belonging to her products on stock. When you purchase an original Vredo part, you purchase quality and assurance of mind. Our parts are manufactured according to rigorous guidelines in order to meet our own high standards.

Service

Vredo has a full-time team of professional and well-trained service engineers in house, in order to make sure that your machine continues to function optimally even during the most hectic peak-periods. Thanks to our fleet of service vehicles, we are also able to attend to repairs and servicing on location, wherever our client's may be in the world. The Vredo Service team also functions as a back up for the dealer Service Teams, with frequent updates and organised training days.



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Ask your representative
for the options.*

The best in the field