Kverneland

KULTISTRIP

STRIP-TILL

WHEN FARMING MEANS BUSINESS

Realising the full potential of farming is about growing and developing your business, not only your crop or livestock, but also your profit. Improve productivity and profitability by focusing on the positives and minimising disadvantageous aspects, through strong, dedicated management.

Success springs from determination and clear targets, from laying down the appropriate strategy and allocating correct investments for the future. Quality results require the right ideas and equipment. When there is work to be done, you need the optimal setup and smart solutions that support you towards an easier, more profitable way of working. You need solutions that make tough and demanding conditions less complicated.

TILLAGE

Preparing and cultivating your soil in order to achieve the highest possible yield is about choosing the correct tillage system.

YOUR KVERNELAND
INTELLIGENT FARMING SOLUTIONS

Choose the best farming solution for you and your land. Combine the highest possible yields with sustainability. This will start with the correct tillage. The choices you make depend on various factors and should match your specific circumstances, like soil structure, crop rotation, residue management, economic and ecological viabilities.

The choice is yours!

You must consider environmental and legal issues. From conventional methods to conservation tillage: the balance of operations at the right time has to be found to achieve high yields with the best soil condition (air, moisture, biological activity, etc.) with a minimum amount of energy, time and investment. For this, Kverneland offers a full range of intelligent farming solutions.

CONVENTIONAL TILLAGE

Conventional Tillage
- **Intensive** method of cultivation
- Complete soil inversion e.g. by a plough
- Less than 15-30% crop residues left on soil surface
- Seedbed preparation done by an active tool or special seedbed harrow
- High phytosanitary effect by reduced pressure of weed and fungi diseases - fewer herbicides and fungicides needed
- Better dry-off and faster increase of soil temperature for better nutrients absorption

CONSERVATION TILLAGE

Mulch Tillage
- **Reduced** intensity in terms of depth and frequency
- More than 30% of residues are left on soil surface
- Extended repose period of the soil
- Cultivator and/or discs incorporate the crop residues within the top 10cm of soil for stable bearing soil
- Full-width tillage - seedbed preparation and seeding in one pass
- Protection against soil erosion; reduce soil loss by run-off and improve water storage capacity.
- Improvement of soil moisture retention

Strip Tillage
- **Zonal strip loosening** before or during seeding of up to 1/3 of the row width (Loibl, 2006). Up to 70% of the soil surface remains untouched
- Strip-till combines the soil drying and warming benefits of conventional tillage with the soil-protecting advantages of no-till by disturbing only the area of the soil where the seeds are placed
- Exact fertilising deposit
- Soil protection against erosion and drought

Vertical Tillage / No-Till
- **Extensive** method
- Working soil vertically avoids additional horizontal layers or density changes
- Increasing water infiltration, root development and nutrient take-up
- Plants' roots dictate the overall health of the plant, as they deliver nutrients and water throughout the season, contributing to a higher yield
- A strong set of roots make plants more resistant to wind and drought.
- Lower energy input required

CROP ESTABLISHMENT SYSTEMS					KVERNELAND'S INTELLIGENT FARMING SOLUTION					
Method					Deep Tillage (not a must)	Basic Tillage	Seedbed Preparation	Seeding	Spreading	Spraying
CONVENTIONAL	intensive	Soil coverage after Seeding	up to 15%	**Conventional** with soil inversion		 				
			15 - 30%	**Reduced Tillage** without soil inversion						
CONSERVATION	extensive		> 30%	**Mulch Seeding** without soil inversion						
				Strip Tillage stripewise loosening						
				Vertical Tillage shallow tillage						

CLASSIFICATION OF TILLAGE METHODS KVERNELAND (Source: adpated from KTBL)


SUSTAINABLE
EASY
PRECISE
EFFICIENT

STRIP-TILL
FOCUS ON THE ESSENTIALS

Sustainable
Strip-Till combines the benefits of conventional tillage alongside the practice of a no-tillage system. Only the area of soil is cultivated where plants are intended to grow. Sustainable farming means protecting your soil against erosion and water evaporation without sacrificing yield.

Precise
Fertiliser is accurately placed only where it will be absorbed by the plant roots which reduces costs and benefits the environment. The Kultistrip accurately places the fertiliser for the plants to utilise with maximum efficiency and cost-effectiveness.

Easy
Soil structure and working conditions can vary from field to field. To save valuable time the Kultistrip is designed for easy adjustment to suit the soil conditions without tools. For minimum downtime the majority of the components have been developed for maintenance-free operation.

Efficient
You invest in the best equipment of state of the art engineering. In return, you want the best results and low cost of operation. The design of the Kultistrip frame is extremely short. Less lifting force needed means saving on fuel costs.

Strip-Tillage means that up to 70% of the soil surface remains untouched.

KVERNELAND SOIL KIT
MAINTAINING SOIL STRUCTURE

Without checking the soil profile to identify potential areas of resistance it is not possible to determine the correct depth of any compaction or barriers. This is important when planning operations to resolve any problems. You may already be aware of soil compaction but not have the tools to confirm the extent of the problem. For example, unnecessary effort to correct soil compaction by tilling to a deeper depth can be a waste of time and money.

The Kverneland soil kit within a stable case provides the necessary tools to access the soil profile ahead of any cultivation. It includes a Penetrometer which measures the compaction of soil, a knife, folding ruler, brush, shovel and a pair of working gloves. The Kverneland soil brochure included will also provide useful technical information in choosing the correct cultivation practice.

Please ask your local dealer for the Kverneland SOIL KIT to provide you with the correct equipment to improve your soil health, increase yields, save time and reduce fuel costs.


Kverneland

STRIP-TILL
DEFINED APPLICATION IN STRIPS

The efficient and innovative tillage procedure for row cultures such as maize, sugar beet or rape seed. It works by only preparing the soil selective with the application of a fertiliser deposit in which the crop is supposed to grow. Depending on the intended row width, up to 70% of the soil surface is not worked. This does not only protect the soil against erosion and drying but also reduce the tillage costs.

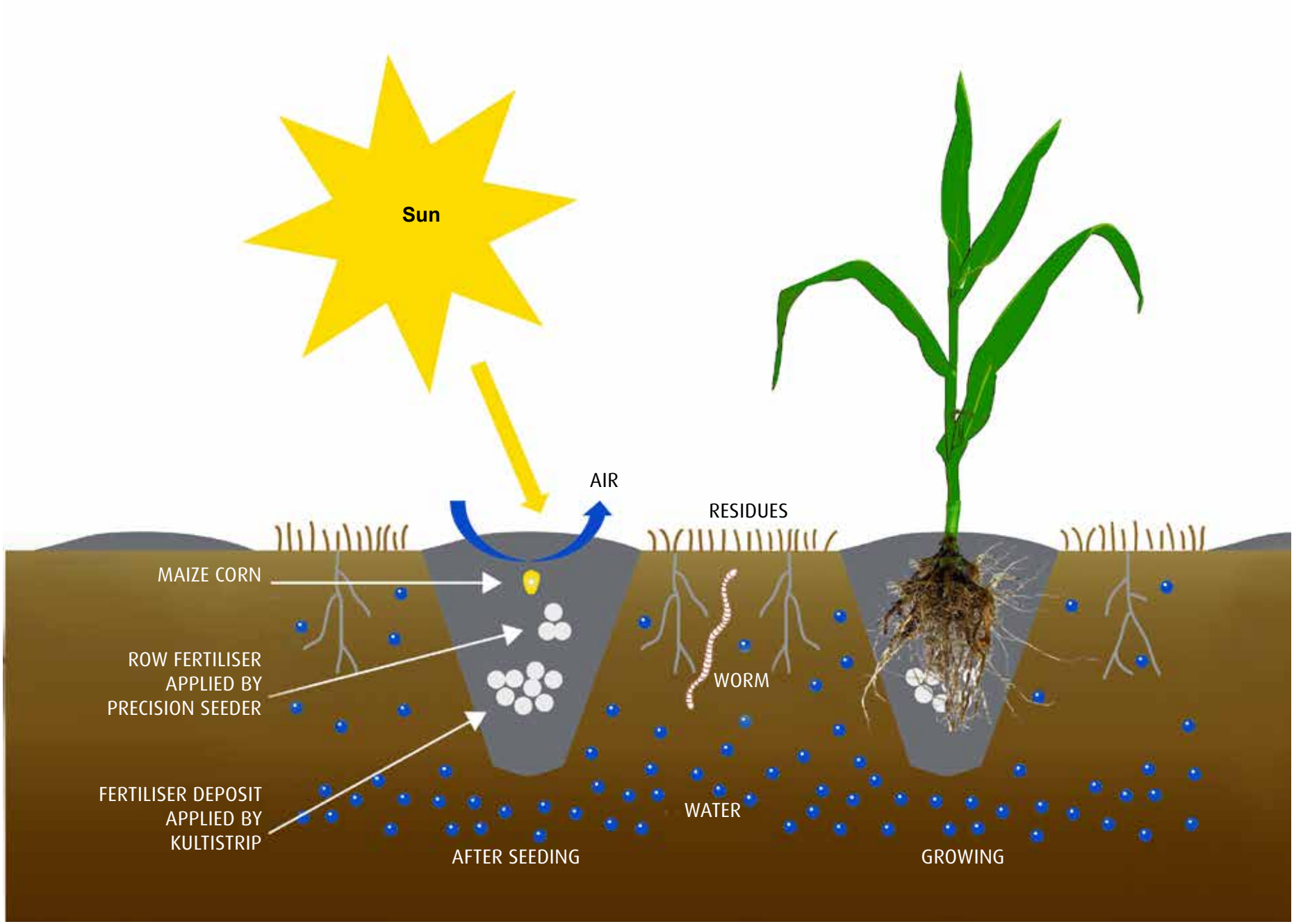
Strip-Till is an innovative cultivation concept for row cultures; only the area of soil is cultivated where plants are intended to grow. The rest of the soil remains untouched. This innovative method has been used in North America for more than 20 years; and it is now being adopted across Europe.

Exact deposit of fertiliser.

By dividing the field into cultivated and uncultivated areas, Strip-Till combines the advantages of direct seeding and seeding after ploughing. The untouched soil and the layer of residues between the rows prevent erosion and support the storage of water. Within the row that has been cultivated by the Kultistrip, a fine crumbled weatherproof seedbed is prepared, offering optimum conditions for the young plant. The strip till concept combines a high level of cultivation secureness with environmental aspects. In addition to the cultivation of the strips, the Kultistrip can, at the same time, implement a fertiliser layer in the soil, thus providing the plant with optimum nutrient availability.

GPS control of the tractor is advised for the Strip-Till. The implementation of the RTK-signal (+/-2cm) guarantees a high precision and is, therefore, recommended. The working width of the Stip-Till implement should correspond to the working width of the precision seed drill or have, or be, at most, double its width.

Possible crops: maize, sugar beet, sunflower, rape seed, sorghum, soya, vegetables, (hybrid) corn.

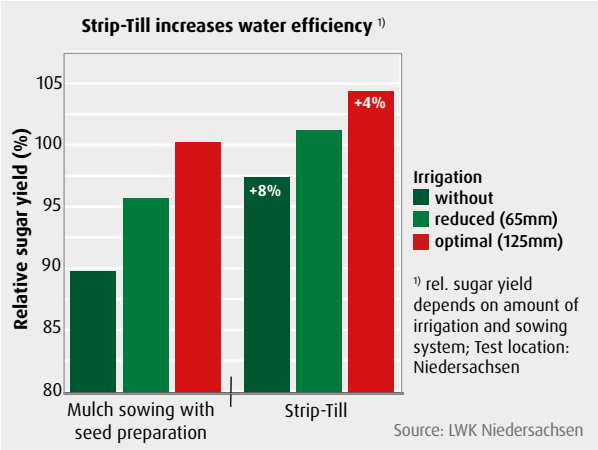

Sun
AIR
RESIDUES
MAIZE CORN
ROW FERTILISER
APPLIED BY
PRECISION SEEDER
WORM
FERTILISER DEPOSIT
APPLIED BY
KULTISTRIP
WATER
AFTER SEEDING
GROWING

- Better water absorption and storage
- Protection against erosion
- One pass fertilising & soil preparation
- Earlier soil warming
- Improved load bearing
- Better air circulation
- Stronger root development

BENEFITS ARE OBVIOUS
REDUCED CULTIVATION BUT HIGH YIELDS

For today's modern farms the demands for cultivation have changed. Tight time slots, restricted crop rotations, stricter environmental demands and economic aspects call for an adaption in technology that accomplish all requirements of modern cultivation. Kverneland proposes different configurations depending on the conditions of use, but also on the power ability.

Residue-free, deeply loosened seedbed ensures high emergence and deep root formation.



The operation with the **Kultistrip** improves the water absorption and storage. The soil is better protected against erosion with reduced soil loss and evaporation.

The prepared zonal strips are residue-free and the deeply loosened seedbed ensures high emergence and improved root formation.

In the same pass of cultivation, fertiliser may be placed exactly where the plant needs it during the growth stages. This saves time and energy with maximum of only 50% of the soil being moved at 45cm row spacing.

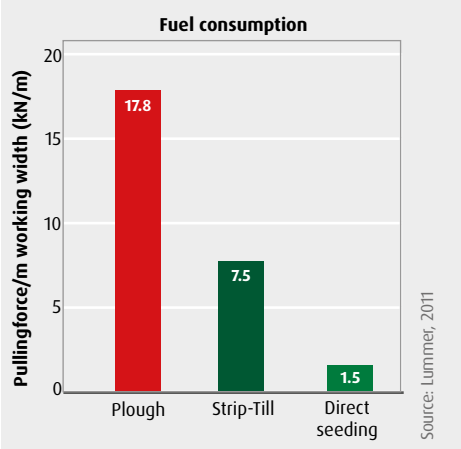
The field remains workable even in difficult weather conditions; this means drilling can be done earlier and driving on the field for crop care and harvesting becomes easier. Plant residues and straw between the strips on the surface help prevent the emergence of weeds sensitive to light.

The disturbed zonal strips of soil allow improved air circulation for a faster increase in temperature and drying during wet conditions.

THE KVERNELAND CONCEPT OF STRIP-TILL
REDUCED SOIL MOVEMENT AND LOSS OF MOISTURE

The incorporation of fertiliser whilst creating the strips presents one of the basic characteristics of Strip-Till. A special feature is that the adjustment of the cultivation tine and the fertiliser tube can be done independently. This means whilst maintaining a constant depth for the fertiliser application, the working depth of the implements can be changed - and vice versa. This allows the fertiliser to be placed precisely at the depth required.

High quality soil cultivation.



1 The row
The Kultistrip row (250kg) is the heart of the machine. The compact short design allows a reduced lifting capacity. During operation the row is guided by two large-dimensioned wheels which follow the soil contour via a parallelogram system. The large cutting disc (∅520mm) cuts through crop residues and opens the soil. Two fertiliser lances are available. A smaller one for granule mineral fertiliser and a large one (60mm) for the injection of slurry. Trash wheels remove the plant residues from the strips. Their angle of aggressiveness is also adjustable. Three different shapes of shares offer the right operation of all types of soil. The three options for both shares and press wheels are designed to suit varying types of soil and conditions.

2 The frame
The Kultistrip main frame is extremely compact. Both rigid or hydraulic foldable frames are available. On models with a rigid frame, the frame dimensions are 180x180x10mm, and on folding models the frame profile is 180x180x12mm designed to withstand the highest traction forces. The folding frame consists of three parts; two side sections and with one central section.

3 Toolless adjustments
The Kverneland Kultistrip is extremely operator friendly: all settings can be adjusted without the use of tools. The Kultistrip row is fully maintenance-free.


3
1
2


450MM
Minimum row distance for both
mineral fertiliser and slurry injection.

MINERAL OR ORGANIC FERTILISER
PERFECT PLACEMENT

The Kultistrip is prepared for both mineral fertiliser or slurry injection. Fertiliser application in Strip-Till - save time and money.

The incorporation of fertiliser whilst creating the strips is one of the main advantages of Strip-Till. Placing fertiliser accurately in the cultivated soil zone with the Kverneland Kultistrip provides two main advantages. First you are saving an additional operation, second the fertiliser is placed in the correct position to support root growth.

A special feature is that the adjustment of the cultivation tine and the fertiliser tube can be done independently. This means whilst maintaining a constant depth for the fertiliser application, the working depth of the implements can be changed - and vice versa. This allows the fertiliser to be accurately placed to the specific depth required.

Proven Reliability.

Slurry injection
Whilst the strips are being cultivated, the slurry is already incorporated.
No further passes are needed, unproductive loss of nutrients are avoided. This method of application complies with the EU regulation of incorporating slurry within 4 hours.

By mounting special slurry tines and slurry tubes, the Kultistrip is easily set-up for the incorporation of slurry. The adjustment of the slurry tube independently of the tine has been patented and ensures that the slurry is placed at the correct depth. A well-positioned slurry application can replace the mineral fertiliser placed under the seed. It is important to respect the distance between the seed and the slurry placement; this should be a similar distance as normal fertiliser placed under seed.

- **650kg release force on hydraulic auto-reset tine version**
- **Choice of 3 different tines and press wheels**
- **Independant fertiliser application from working depth**

6 STEPS TO OBTAIN A SEEDBED IN STRIPS
CUT-CLEAN-LOOSEN-DEFINE-APPLY-CONSOLIDATE

The front-cutting discs open the soil and cut long residues which can be easily removed by the following trash wheels.

The trash wheels move high amounts of residues out of the strip for a clean seedbed. Cleaning effect of the strips can be adjusted by spring-pressure.

Special tines with shares break-up the soil down to a depth from 10cm to 30cm. Three different type of tines and a hydraulic overload protects the loosening leg. For a longer lifetime a carbide version is available.

The side blades ∅460mm retain loose soil in the strip and define width and form of the strip via the angle and depth adjustment of the disc.

Two options of fertiliser lances are available. A smaller one used for granule mineral fertiliser and a larger one (60mm) for the injection of slurry. Depth-setting (0-20cm) independent of working depth. The fertiliser is placed during strip cultivation.

The press wheels consolidate the tilled strip. Pressure can be adjusted via crank. Three different press wheels give full versatility to changing soil conditions.

Straight tines are used for light soil. Low mixing effect. Minimum soil-disturbance on the surface. Perfect for moisture conservation.
Angled tines are used for light to medium soil. Good mixing and crumbling effect. Perfect for changing soil conditions.
Curved tines are used for heavy soils. Intensive mix and crumbling effect. More aggressive angle. Perfect for soils with high percentage of clay.

The Cage roller for medium consolidation and crumbling of the soil surface. Use for light and medium soil and perfect to use for slurry injection.

The Farmflex wheel used for effective crumbling and consolidation of the top soil layer. Used for wet or dry conditions and slurry injection.

The V-press wheel has impact of the soil down to 30cm. Ensures effective crumbling of the top layer and can be used for heavy soils. Limited usage with slurry injection.

USER COMFORT IS KEY
THE RIGHT SETTING WITHOUT ANY TOOLS

The Kverneland Kultistrip is extremely operator-friendly: all settings can be adjusted without the use of tools. The Kultistrip row is fully maintenance-free while all pivot points on the parallelogram frame sport composite bearings. No greasing is requested.

A special feature is the separate adjustment of the break-up share and fertiliser injector. This means that you can change the working depth whilst keeping the fertiliser placement the same, or alternatively, change the level of the fertiliser injection while leaving the working depth unchanged. The tube has been engineered to allow independent adjustment of each component.

Each Strip-till unit has depth wheels to provide a stable platform with which other elements can be set. While a parallelogram linkage affords contour following and weight transfer from 70-210kg (by moving a spring to one of three positions) from the main frame, the Kultistrip comprises several key components.

Simple adjustment
from the beginning to the end.

All three loosening legs are made from Hardox 500 steel, and the points and wings can be replaced separately. Their working range can be adjusted from 10-30cm in 25mm increments by refitting a pin. The pair of discs which run either side of the tine are adjusted in three ways — in the direction of travel, pitch and depth. This job does require a 19mm spanner, which is supplied with the Kultistrip. A crank handle together with a reasonable scale makes setting of the press wheels nice and easy.

FOR SMALL AND LARGE SIZED FARMS
VERSATILE FOR ALL CONDITIONS

The Kultistrip frame hydraulically folds within seconds ready to go to the next field. In transport position, the folding parts are locked by hydraulics and the parallelograms are locked mechanically in order to ensure utmost security on the road.

Kverneland offers the Kultistrip rigid and foldable frames from 3.00 to 6.00m working width. Different row configurations and distances are possible.

The right size for all farms.

The **rigid models** of the Kverneland Kultistrip 3000, 4500 and 6000 are available in working widths from 3 to 6 metres and offer an easy start into the Strip-Till technology. Starting with the 3.0m machine for small to medium-sized farms, this simple model complies with all demands. Due to the design of the large main frame, the machine is extremely short with a close centre of gravity, reducing the lifting capacity required. All three models have the frame dimensions of 180x180x10mm; this is designed to withstand the highest traction forces. Cat II or III headstocks are fitted on the rigid models in order to fit to tractor requirements. The 4.5 and 6.0m versions are fitted with larger headstocks.

The **folding models** of the Kverneland Kultistrip 4500F and 6000F allow a quick change from transport to working position which is necessary during operation on several fields or farms. With working widths of 4.5 and 6.0m large field capacity is achieved. A transport width of 3.0m and a transport height of 4.0m comply with road traffic regulations. The frame profile of the folding models is 180x180x12mm. The folding frame is divided into two side sections and a central section. The heavy-duty main frame and Cat III or IV hitch allow to work with high power tractors. The machines are ready to operate under extreme conditions. The fertiliser distribution head (mineral or organic) is mounted at the rear of the machine. Therefore, the folding of the Kultistrip is compact whilst maintaining a good visibility of the machine from the tractor cab. The fertiliser hoses are guided in a short and straight way to ensure that the fertiliser is distributed evenly. Bending and damage of the hoses during folding and unfolding process is prevented.

All frames can be equipped with an even or uneven number of rows. The minimum row distance is 45cm and maximum 80cm.

PRECISION SEEDBED, FERTILISING AND SEEDING
KVERNELAND TECHNOLOGY FROM ONE HAND

Kverneland offers not only soil preparation implements, but also seeding machines. The Strip-Till crop establishment systems compliment the row crop systems and therefore the Kverneland precision drill technology.

Strip-Till combines the advantages of direct seeding and seeding after ploughing. The undisturbed soil and the layer of residue between the rows prevent erosion and support the storage of water. Within the row that has been cultivated by the Kultistrip, a fine crumbled seedbed is prepared, offering optimum conditions for the young plant.

That`s fits together!

In addition to the cultivation of the strips the Kultistrip can implement a fertiliser layer in the soil at the same time, thus providing the plant with optimum nutrients. The plants can develop faster and the soil is covered earlier with vegetation due to an earlier row closure. Finally, the weed development is suppressed.

By using GEOCONTROL® there are no overlaps. Costs for fertiliser, seeds and chemicals are saved as well. GPS control of the tractor is advised for the Strip-Till. The implementation of the RTK signal (+/- 2cm) guarantees high precision. The working width of the Stip-Till implement should correspond to the working width of the precision seed drill or have its double width at maximum.

With the Kverneland **Optima** which is used mainly for maize, sun flowers or beans, the fertiliser application is very precise and optimal.

The mechanical precision drill solution Kverneland **Monopill** and **Unicorn** are mostly used for sugar beet but also for chicoree and rape seeding.

Kultistrip suits

Cambridgeshire-based LS Plant Breeding (LSPB) has chosen a Kultistrip to carry out strip tillage for its oilseed rape trial plots. The move follows a migration from traditional plough and power-harrow based seedbed preparation, giving the business uncultivated land where wheelings can be placed. Leaving swathes of soil untouched also reduces competition for the trial plots.

But perhaps more importantly, strip tillage has enabled starter fertiliser to be incorporated at precise depths, ahead of drilling.

"We're really pleased with the accuracy of the Kultistrip," explains LSPB's Gareth Davies who is involved with harvesting and drilling the trial plots. "We have a five-row unit that lets us follow with a plot drill to sow twin rows of oilseed rape near the edge of each strip of cultivated soil."

"The three central strips form the trial plot, with each using a 22cm band of cultivated soil, separated by a 28cm gap," explains Gareth. "And the two outer units are set much wider, leaving a 55cm gap to allow for tractor wheelings, before the outer rows form the basis of a plot border to create defined separation between plots."

Now in its third season, the five-row unit was chosen following successful use of an identical model, at LSPB's parent company in Germany. Combined with a DF1 front tank, it allows fertiliser to be placed into the strip, making nutrients readily available to encourage crop establishment and fend off pest and weed competition.

"Where we used to spread fertiliser ahead of power harrowing and then mix it into the whole seedbed, we can now be much more precise and that means we're no longer feeding any weeds," says Gareth. "It delivers accuracy and precision for row widths and spacings, thanks to RTK, and has made drilling a more efficient process." He says that in addition to reduced cultivations, the Kultistrip has encouraged LSPB to consider other options in future.

"We'd like to try strip tillage for establishing bean trials, and with the addition of a small seeder, we can also see an opportunity for one-pass establishment of headlands with the Kultistrip. This could provide a physical boundary with a single variety, to protect the highly important in-field trial plots."

LSPB is wholly-owned by NPZ-Lembke, which is a privately-owned plant breeding company operating from two sites in Germany. NPZ-Lembke is a leading breeder of oilseed rape, beans and peas, with a long track record of breeding successful varieties for UK growers.

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TECHNICAL DATA

Model	Kultistrip 3000	Kultistrip 4500	Kultistrip 6000	Kultistrip 4500F	Kultistrip 6000F
Frame	mounted rigid	mounted rigid	mounted rigid	mounted fold	mounted fold
Working width (m)	3.00	4.50	6.00	4.50	6.00
Transport width (m)	3.00	4.50	6.00	3.00	3.00
No. of rows minimum row width	6	10	12	10	12
No. of rows maximum row width	4	6	8	6	8
Row width (cm)	45-80	45-80	45-80	45-80	45-80
Mainframe (mm)	180 × 180 x 10	180 × 180 x 10	180 × 180 x 10	180 × 180 x 12	180 × 180 x 12
Linkage (CAT.)	II / III	II / III	II / III	III	III
Hydraulic overload protection	●	●	●	●	●
Mineral fertiliser injection	○	○	○	○	○
Slurry injection	○	○	○	○	○
Lighting equipment	○	○	○	○	○
Weight F/S*at minimum row width (kg)	1,243/1,273	1,888/1,934	2,231/2,285	2,263/2,309	2,866/2,927
Weight F/S*at maximum row width (kg)	1,738/1,823	2,878/2,954	3,764/3,863	3,274/3,350	3,877/3,968
Power requirement min.- max. (HP)	160-240	240-400	280-520	240-400	320-480

* Weights are given as an indication. F=mineral fertiliser / S=Slurry

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