



For Earth, For Life
Kubota

CU

**KUBOTA STUBBLE CULTIVATOR
CU2000-CU3000 SERIES**

Cultivators for effective stubble incorporation



WHATEVER THE SOIL, THERE WILL

CU2000 SERIES



CU3000 SERIES



AL ALWAYS BE A CU CULTIVATOR!

CU3000C SERIES



CU3000CD SERIES



THE RIGHT BASE – FRAME



CU2000 Series: two rows of tines



CU3000 Series – three rows of tines with main frame 100 x 100mm

Enhanced Power

The very versatile CU Series can be used for many requirements. It can work as deep as a subsoiler (40cm singularly) or with heavy accessories.

Because the CU Series has so much power, Kubota redesigned the frame, which is the master piece of this machine.

Kubota has developed a new range of frames which can absorb 240hp with a 3m machine and up to 350hp for the folding 5m implements. Kubota has set a new standard regarding the power accepted for mounted cultivators.

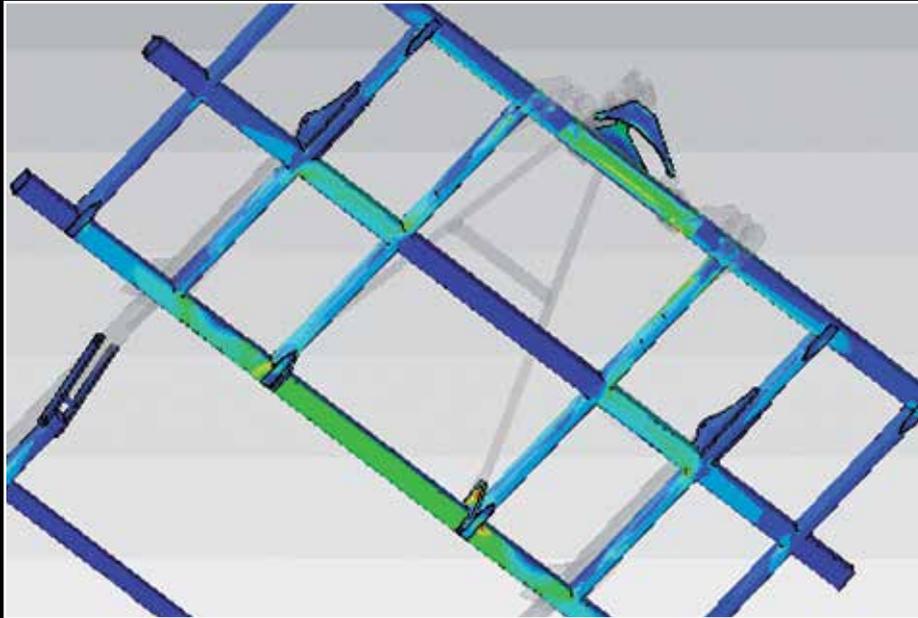
Material treatment

The type of material used determines the lifetime of a machine. Like with a plough, the weakness of a mounted cultivator becomes noticeable not only in the field, but also during transport and on headlands. Since the conception stage, various tests have shown the exact stress points on the machine. The material used can be calibrated effectively so that the ratio between reliability and weight can be optimised. This is why we use tubes that are heat treated. Because of the heat treatment, the material is able to bear significant loads whilst remaining reliable and light. The weight carried by the tractor is therefore reduced and fuel is saved.

Security

An automatic hydraulic lock valve offers maximum safety for the complete range of folding models during transport and in the park position. Parking legs are also part of the standard equipment.

STRUCTURE

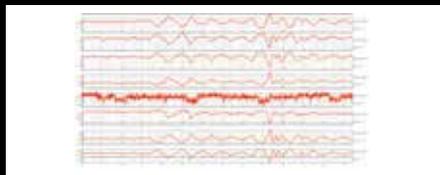


THE THREE CRITICAL PHASES OF THE FRAME DEVELOPMENT

A mounted cultivator has to cope with a lot of force during work but also during transport. The high forces that the structure has to endure can be managed and distributed around the structure. Various tests have determined this.

FEM calculation

The FEM calculation is done in parallel to the shaking test to report and confirm what can be done physically on the robot shaking the machine. It analyses the data and the factors are checked which confirms the power ability of each structure. This enables Kubota to rate a 3m cultivator at 240hp.



Shaking test

The cultivator is attached to a robot which shakes the machine over a given period and is able to replicate stress during transport and work for the lifetime of the product. The stress test is conducted over a period of weeks and provides information about the reliability of any structure. It is the best way of securing the launch of new products and to be sure about the reliability of our machines.

Strain gauge test

Gauges are placed in strategic points of the structure. The registered forces are recorded on a computer which then reports what the stress levels are at these points. The basic data will also be used to prepare the next test phases. This knowledge is proven to be very efficient on our cultivator range. We are investing a lot to allow our customers to make the best profit with our equipment.



HIGH TECH HOLLOW T

High Flexibility

One of the main advantages of the hollow tine technology is the ability to flex sideways by up to 14 (CU3000) to 20cm (CU2000) helping to bypass obstacles below the field surface. Fields are rarely 100% square

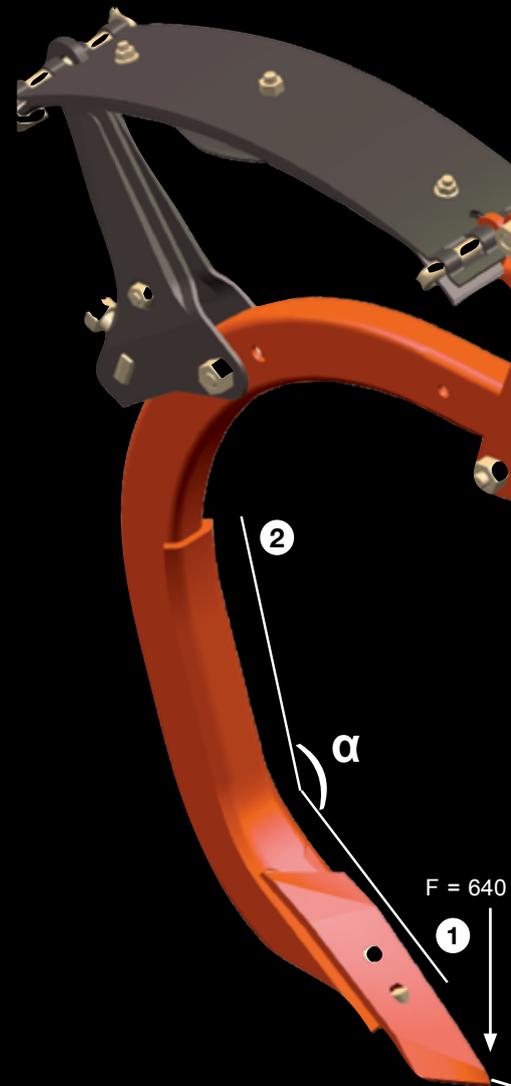
and the sideways forces for standard forged and full material tines produce a lot of stress to the tine holder system and consequently to the frame structure. To avoid this stress on all components Kubota think strong rather than big: The natural quality of fine grain steel and the use of our proven heat treatment process can provide immense strength to a simple piece of tube. Being flexible this tube can then "flex around" obstacles and erase stress peaks by dispersing it throughout the implement.

Maintenance-free Zone

The CU tine is a maintenance-free zone. All components are heat treated and produced from a very high quality hardened steel. These parts are then able to sustain high pressure and friction without the need for any greasing. Greasing is both costly and time consuming and in some cases greasing parts can cause even more damage (at its worst grease attracts fine dust and encourages wear).

A Special Angle

The tine shape with two working angles guarantees efficient penetration. The first zone lifts the soil for good loosening. The second zone with little power requirement ensures efficient and homogeneous mixing.



Kubota offers a wide selection of shares including the Knock-on patented system. The CU Series use a unique "C" tine design and can be equipped to suit all needs in all crops every season, every year!



"C" Tine with standard reversible plough point.



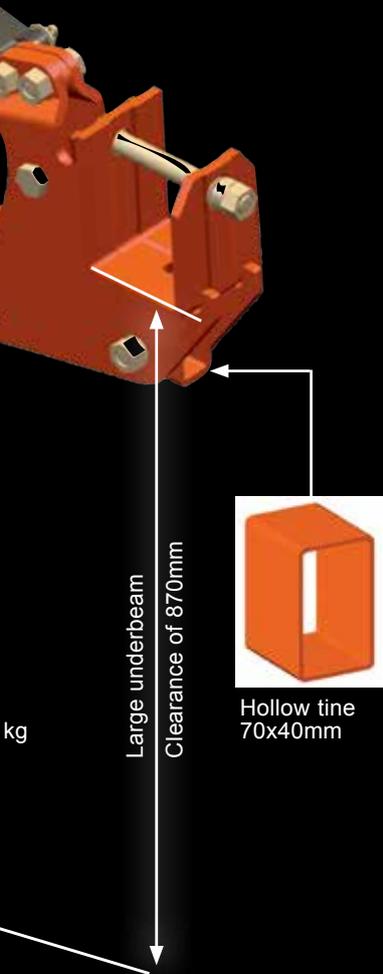
Standard reversible point in combination with 300mm wing share for shallow working.



Quantum share 345mm

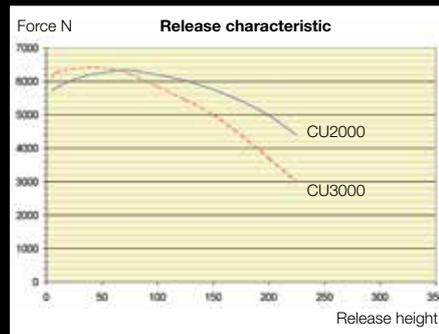
- always in combination with Knock-on or Tiger carbide point 80mm. It has been designed for use especially against hard soil. The action of the 80mm point combined with the 345mm wing share ensures perfect penetration, and complete flat cutting for a homogeneous weed regrowth.

TINE TECHNOLOGY



Leaf spring

The Kubota Auto-reset leaf spring system guarantees high reliability as well as low maintenance costs. Being a real 3D safety system, the Kubota leaf spring system allows movements up to 25cm and thus supports perfect cultivation results even at a deep working depth. With a 640kg weight, the tines are kept at a stable position under all soil conditions, which ensures constant depth control. The piano effect, where the tines move back and forth, is minimised and fuel consumption is reduced to a minimum.



The systems' kinematics describe a descent of force beyond a release height of 10cm to avoid a transmission of stress onto the frame structure.

Vibromat shear bolt system

As an alternative to the auto-reset leaf spring, a unique shear-bolt system is also available which is based on the same components. The leaf spring is replaced by a plate holding a standard 12mm shear bolt through the leg. With the tine being so flexible the leg can bend backwards 10cm and reach up to 2 tons pressure at the point before the bolt shears. This effect is named Vibromat®, and anticipates untimely breaking of bolts and therefore helps to reduce down time.

Patented Tine Holder

This tine holder system consists of squeezing a U-shaped plate onto the frame beam by means of a single bolt. This U-plate is 100mm wide and enables the tine to be located deep onto the main frame. One of the many advantages of bolted tine carriers is the reduction in frame weakening when welding is required. With the tines being light (38kg) and fitted with a single bolt, it is very easy to take them off to adapt the cultivator to the working conditions and the tractor available.



2 new types of carbide points

- 80mm and 150mm. The special design ensures progressive and high penetration and requires low pulling force. The special shape of the carbide plate resist against aggressive stony conditions.

KNOCK-ON



Coulter width (mm)	320	345	250	150	80
Working depth (cm)	3-10	3-15	3-15	8-25	10-35

FAST AND EASY CHANGEMENT



Soil friendly

The Knock-on range is full of possibilities offering 6 cutting widths with 80, 150, 250, 320mm shares and 345mm wing shares (Quantum share) to match with various tine spacing and depth requested.

The combination of the 80mm point and the Quantum share 345mm is mostly used for shallow cultivation. The Quantum share can be removed quickly by removing 2 bolts when deeper operations are necessary. It is not easy to perform cultivation in ideal soil conditions every year. When work has to be done the machine should provide the best possible effect and cause the least damage to soil structure. Therefore, the Knock-on system offers a wide range of deflectors and tine protections which can be more or less active in boiling and breaking down aggregates.

In wet soil a wide deflector should not be used. A narrow protection plate will produce smaller aggregate maintaining soil structure. This in addition will save fuel. However in optimum conditions a good boiling effect will be possible with the wide deflector. In order to make it easy and fast, the deflectors are locked by a single bolt.



With Knock-on minutes become seconds!

To change the points on a 3.00m unit with 10 tines it takes 1 minute 30 seconds - whilst 20 minutes are needed with bolted reversible shares.



KNOCK-ON

90% DOWN TIME SAVING!



Cost Effective and Eco-Friendly

Knock-on is a patented system* and the easiest way of changing parts on a cultivator, either to adapt the machine to the job to be done or to change wearing parts. This user friendly system is able to work from 3 down to 35cm in a very economic way in regards to the low pulling requirement and the cost of the parts which is the same level as the standard points. Kubota always uses the highest quality steels. This enables the Knock-on to use a simple locking system. The Knock-on system fits easily to the tine, requiring only a hammer to knock the parts in and out in seconds.

Economic ...

The bulb shape on the shares protects the holder system by decreasing the soil pressure on it. The holder can take several shares before it has to be changed, reducing the downtime dramatically. If the soil is wet or dry the shares will not behave the same way:

1. In dry soil, the point wears down to the end, the bulb continues to protect the holder.
2. In humid soil, the point wears thin but will not lose its shape. when a hole appears its time to consider changing the point.

... and Ecological

As a comparison, a standard reversible point (1300g) worn out after having done the same number of hectares (been reversed half way) as the Knock-on parts above. With the Knock-on system, up to 75% of the original part can be used, in comparison to standard points where only 60% can be used. This saves more than 200g of steel each time a point is changed.

Thousands of Kubota tines will contribute to saving a lot of steel and energy!



1000g



1. 250g



2. 280g



500g

WE MAKE THE DIFFERENCE



NCE!



The weather conditions may differ quite considerably from year to year and also various crop rotations make it difficult to have just one implement to meet all requirements. This is why Kubota offers a wide range of cultivators and accessories in order to provide the right implement for all the different requirements and various conditions.

This large variety together with the demand for an economic solution require a flexible and versatile implement. The CU Series has become a very well appreciated implement because of its working quality, its reliability and its great versatility.

2 or 3 rows of tines?

The choice between 2 or 3 rows of tines depends on the soil conditions, on the pulling power available and on the specific application. To cope best with all these requirements, Kubota offers these two configurations in their portfolio.

	2 rows	3 rows
Lifting performance	✓✓✓	✓
Traction performance	✓	✓✓
Heavy accessories	✓✓✓	✓
Incorporation in solo operation	✓	✓✓
Incorporation with accessories	✓✓	✓✓✓
Soil flow	✓	✓✓✓

✓ = good ✓✓ = very good ✓✓✓ = excellent

FOR STUBBLE CULTIVATION OR SOIL LOOSENING

CU2000 SERIES

The CU2000 Series is equipped with the technical features of the CU3000 Series with 3 rows. It is based on the same design of the frame and the parallelograms supporting the accessories.

The CU2000 Series, therefore, matches its 3-row equivalent. It can be combined with the heaviest rollers and accessories for a good re-compaction and a reduced overall length. This compact design reduces the power requirement of the CU2000 Series and optimises the connection between tractor and implement.

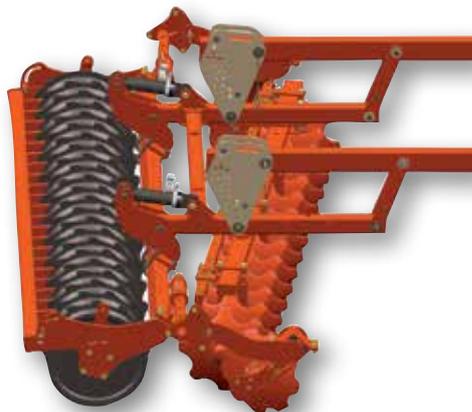
The tines are fixed by a single bolt at the frame and can be easily taken off or replaced in order to adjust to the power available or to prepare the machine for loosening the sprayer tracks in solo operation.

CU2000 SERIES at a glance:

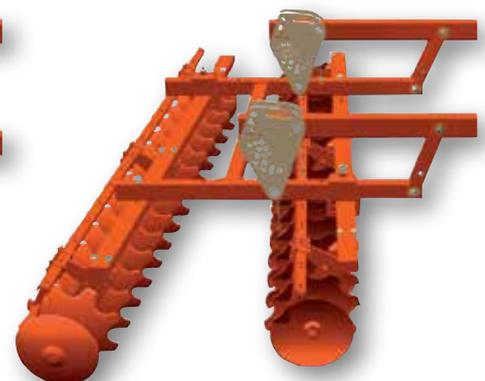
- Frame: 2-bar
- Tine: long
- Levelling: Combi-disc or double disc
- Rollers: full range

CU2000 SERIES: REAR ACCESSORIES

With the narrow tine spacing of 280mm, the best combination is the use of a disc gang. As the tine is designed to work some depth, the disc gang is handling the top layer by incorporating the straw and crumbling. It can be either a single one which is then used in combination with a roller, or a double disc gang for intensive mixing and crumbling.



Combidisc + roller of choice



Double disc gang

TECHNICAL DATA



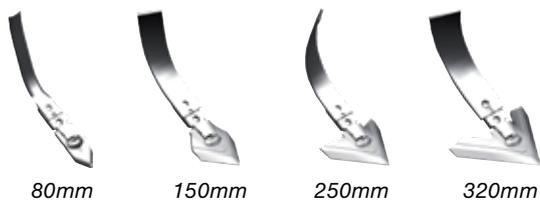
The tine is the best possible combination to go with single and double disc sections. Due to its rather small size, the lifting and intensive breaking of the soil into smaller clods supports a good mixing of the plant residues with the

soil by the following disc section. For shallow stubble cultivation, there is the option of the wing share of 320mm or 345mm operating over the entire working width of the machine.

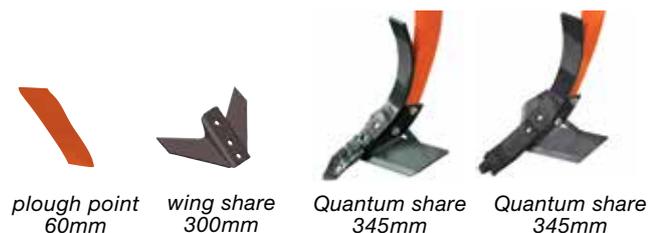
GAUGE WHEELS

When equipped with a double disc gang or in solo operation at a deeper working depth, the gauge wheels give the CU2000 Series more stability and help control the working depth. (Gauge wheels 600x9 for rigid models, 700x15 for folding models).

Easy and fast share chngement



Bolted shares



CU2000 rigid and foldable: Technical data

Models	Rigid			Fold
	CU2250	CU2300	CU2350	CU2400F
Number of tines / Working width (m) CU2000 Series	9 / 2.50	11 / 3.00	13 / 3.50	13 / 4.00
Transport width (m)	2.50	3.00	3.50	2.85
Row spacing (mm)	900			
Frame box section (mm)	100 x 100 x 8mm			Central 200 x 200 - ext. 100 x 100
Linkage	Cat II & III			Cat III & IV
Underbeam clearance (mm)	870			
Average tine spacing (mm) CU2000 Series	265	265	265	280
Min. / Max. HP	65/210	80/240	95/270	110/300
Weight (kg) CU2000 Series AR* / Combidisc + Actiring	1554	1805	1977	3015
Lifting capacity (t) with Combidisc + Actiring**	4.4	4.8	5.4	7.4

* AR=Auto Reset, SB=Shear bolt ** consider -15% if cage roller and +15% if Actipack or double disc

THE MOST VERSATILE M

CU3000 SERIES



The CU3000 Series has been especially designed to work with the most powerful tractors. With 240HP maximum for 3.00m and up to 350HP for the 5.00m folding model, the Kubota cultivator CU3000 Series has become the benchmark regarding admissible power. It can, therefore, be combined with any type of roller and accessories which makes it extremely versatile. This quality to absorb the strongest forces also ensures a very long durability.

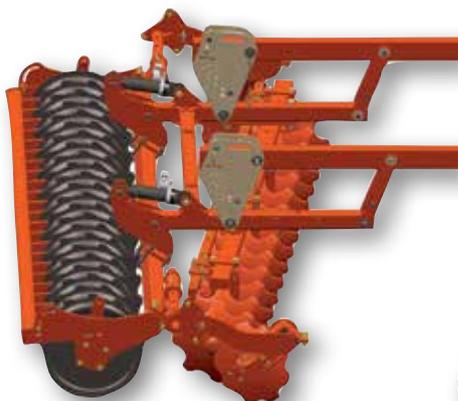
The Cultivator range can be equipped with two types of tines and a wide selection of shares. According to the operation requested and the type of soil, the large choice of following implements allows all sorts of cultivation to be carried out: from stubble cultivation at 5cm to deep loosening at 30cm working depth.

The great versatility of the CU3000 models makes it the ideal implement to meet all your requirements.

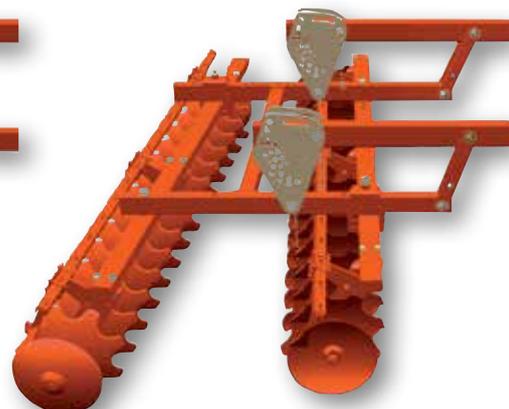
CU3000 Series – Rear Accessories

The CU3000 Series can be equipped with the full range of following implements. The 3-row configuration allows all combinations via the parallelogram of the machine. The various levelling devices are available on a H-frame which also receives the rollers. This H frame is fixed by 4 bolts and allows the combination of all sorts of equipment with the same implement in order to adjust the machine to the season or the operation requested which makes the machine completely

14 versatile.



Combidisc



Double disc section

ODEL

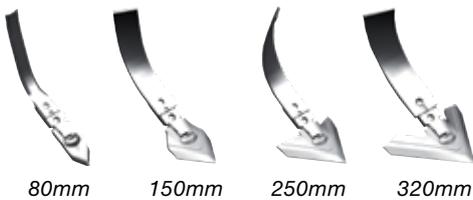


MIXING AND INTENSIVE CUTTING

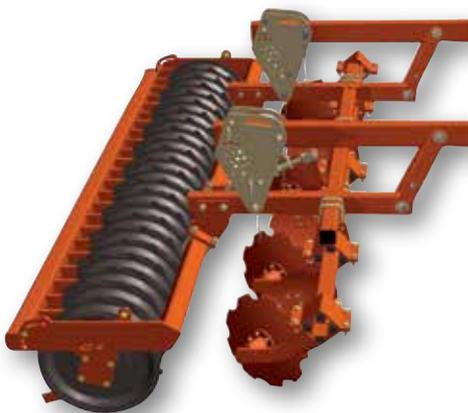
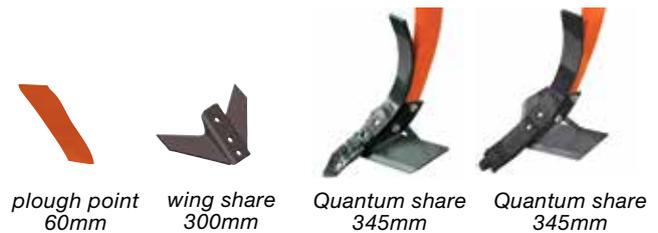
The quality of the incorporation of vegetable residues and the capacity to loosen the soil characterise the main features of a cultivator.

As a matter of fact 1.5 to 2cm working depth are needed to incorporate 1 tonne of straw per hectare and to optimise the mixing of the soil with the plant residues. The 3-row design supports the intensive mixing and ensures a good distribution of the straw over the whole working width. This allocation of the tines together with the high underbeam clearance of 870mm allows the free flow of material without the risk of blockage even in case of long and fibred residues such as maize, etc ... The easy material flow with the 3-row frame also reduces the power requirements and the fuel consumption whilst ensuring a good cutting quality at the same time.

Easy and fast share chngement



Bolted shares



Levelling discs

FOR SMALLER TRACTORS

CU3000C SERIES



CU3000C Series – Rear Accessories

To make the CU3000C Series very compact and to reduce the weight as much as possible, the parallelogram carries two curved arms that reduce the overhang of the machine. A section of levelling tines is directly connected to the roller frame. Lighter than discs, the tines ensure an excellent levelling result in all conditions. The working depth and aggressiveness of the levelling tines is infinitely adjustable.

Therefore the CU3000C Series is 50cm shorter than the CU3000 Series; this shifts the centre of gravity closer to the tractor. The aim of developing lighter version for smaller tractors is achieved.



Levelling tines

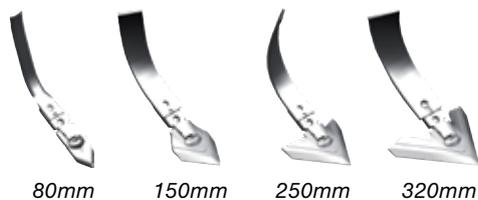
TECHNICAL DATA

CU3000 and CU3000C rigid and foldable models: Technical data

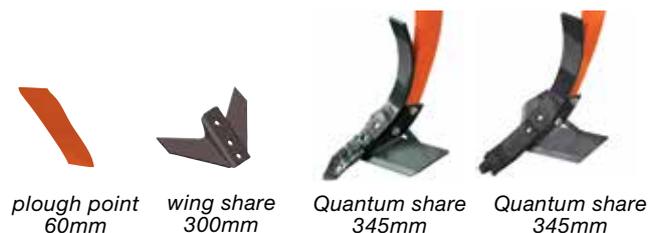
Models	Rigid			Fold		
	CU3300 / CU3300C	CU3350 / CU3350C	CU3400	CU3400CF	CU3450F / CU3450CF	CU3500F / CU3500CF
Number of tines	10	12	14	13	15	17
Working width (m)	3.00	3.50	4.00	4.00	4.50	5.00
Transport width (m)	3.00	3.50	4.00	2.85		
Row spacing (mm)	810					
Frame box section (mm)	100 x 100 mm			Central 200x200 - ext. 100x100		
Linkage	Cat II & III			Cat III & IV		
Underbeam clearance (mm)	870					
Average tine spacing (mm)	280			290		
Min. / Max. HP CU3000 Series	120/240	135/270	165/300	185/300	190/325	200/350
Weight (kg) CU3000 Series AR* / Combidisc + Actiring	1986	2200	2563	2980	3220	3600
Lifting capacity (t) CU3000 Series AR* + levelling disc + Actiring**	5,2	5,8	6,7	7,9	8.5	9.5
Min. / Max. HP CU3000C Series	85/160	100/200	–	130/230	150/255	170/280
Weight (kg) CU3000C Series AR* / Actiring	1634	1814	–	2647	2730	2910
Lifting capacity (t) CU3000C Series AR* + Actiring**	3,9	4,3	–	5,9	6,7	7.2

* AR=Auto Reset, SB=Shear bolt ** consider -15% if cage roller and +15% if Actipack or Double disc

Easy and fast share chngement



Bolted shares



A Clever Concept

For tractors with low or medium power, the CU3000C Series product range has been extended to the new CU3000C Series. The result is impressive both regarding the level of lifting capacity and regarding the quality. A tractor of 90 HP can operate a 3.0m model and 4.0m folding model can be operated by a tractor from 130 HP.

The CU3000C Series is a very compact, simple and efficient implement which can work down to a depth of 30cm. It is especially suited to mixed arable farming.



DISCS FOR LONG RESIDUES

CU3000CD SERIES



ZONE 4 Consolidation

Very active rollers provide a nice recompaction and close contact soil / residues.

ZONE 3 Levelling

The rear equipment reduces the required lifting capacity, and can then be equipped with the levelling tines and the short roller arms. It is compact enough to be used with a lighter tractor. Other equipment like Combidisc or double discs can also be used.

ZONE 2 Cultivating

The front cutting discs are followed by 2 rows of tines with wide tine spacing (approx. 400mm) for managing the residues. The wider share, Quantum 345mm, is used. The tines can have Knock-On deflectors for nice stubble incorporation.

ZONE 1 Cutting

Equipped with one row of front cutting discs, the CU3000CD is the ideal machine for working with long residue conditions like sunflower, maize, etc...

Kubota offers CU3000CD rigid models (3m and 3.5m) or fold models (4m). All CU3000CD models have short CU tines which has 640kg of point pressure to work in the most compacted soils. The depth can be controlled by the front wheels when there is no roller at the back (like with double disc gang) or in addition of the rear roller for an accurate depth control.

CU3000CD Series – Rear Accessories

To make the CU3000CD series very compact and to reduce the weight as much as possible, the parallelogram carries two curved arms that reduce the overhang of the machine. A section of levelling tines is directly connected to the roller frame. Lighter than discs, the tines ensure an excellent levelling result in all conditions. The working depth and aggressiveness of the levelling tines is infinitely adjustable.



Levelling tines

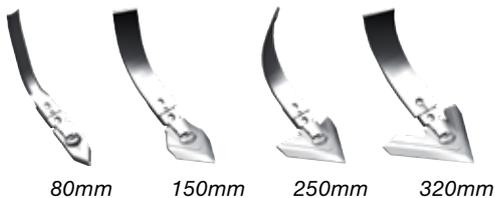
TECHNICAL DATA

CU3000CD rigid and foldable models: Technical data

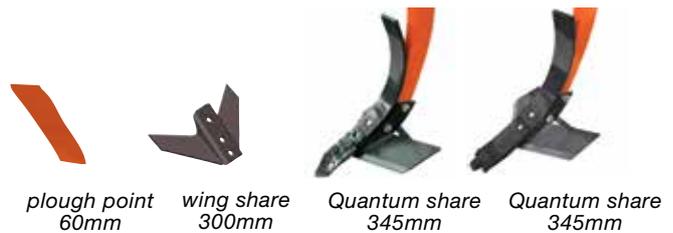
Models	Rigid		Fold
	CU3300CD	CU3350CD	CU3400CDF
Number of tines	7	9	13
Number of discs	10	12	15
Working width (m)	3.00	3.50	4.00
Transport width (m)	3.00	3.50	2.85
Row spacing (mm)	810		
Frame box section (mm)	100 x 100 mm		Central 200x200 - ext. 100x100
Linkage	Cat II & III		Cat III & IV
Underbeam clearance (mm)	870		
Average tine spacing (mm)	420	385	350
Min. / Max. HP CU3000CD Series	100/240	135/270	190/325
Weight (kg) CU3000CD Series SB* / levelling tines + Actiring	1873	2148	3017

SB=Shear bolt *

Easy and fast share chngement



Bolted shares



Front Cutting Discs

The front cutting disc can be hydraulically adjusted from the cab at any time. This means that the pressure on the discs is also defined by the cylinder position. The working depth is often around 5 cm to be able to cut the material and the roots if necessary.

Each disc is independently protected by 4 rubber shock absorbers. The bearings are maintenance free.



PERFECTION TO THE END



Levelling discs (only CU3000):

- Rubber spring loaded, to follow the ground and protect against stress
- Border discs as standard
- Disc linked to the roller via a parallelogram, so that when changing working depth with the roller the disc will stay at same optimum position for levelling
- Easy adjustment via turnbuckle to set up disc position (centralized one)



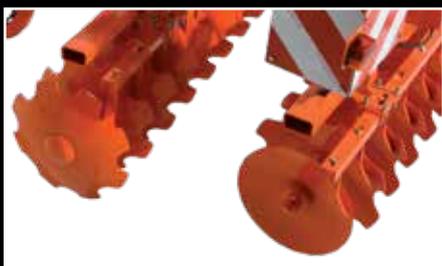
Levelling tines (only CU3000C and CU3000CD):

- Good levelling capacity
- Good following of the ground contour
- No risk of soil blockage
- Easy to adjust
- Very low lifting capacity



Combidisc (only for CU2000 & CU3000):

- Combination of a single disc gang with all roller types
- Intensive mixing and incorporation, well adapted to high amount of residues
- Very good levelling capacity



Double disc gang Ø 510 mm (only for CU2000 & CU3000):

- Position controlled with pins
- Easy angle adjustment with bolts
- Good mixing and incorporation
- Leaves a rough surface with aggregates ready for wintering. Ready at the end of autumn season for preparing spring fields and crops



Cage roller Ø 550mm

- 10 bars for a good loading capacity and operation in wet conditions
- Effective crumbling action



Double cage roller 400mm (tube/flat)

- Good crumbling
- Precise depth control
- Good levelling effect
- Good carrying capacity

A SECOND SOIL PREPARATION TOOL!



Actiflex Ø 580mm

The Actiflex especially designed to match with all types of conditions. Its intensive mixing effect combined a good recompaction makes this roller the ideal tool for the best volunteer regrowth. Its large diameter of 580mm ensures a good driving effect even in light soils. This roller is definitely a good compromise between the weight (160 kg/m) and mixing performances.



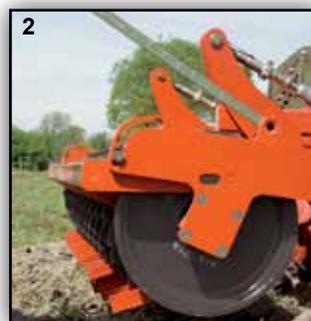
Actipack: A second preparation tool!

The Actipack roller displays its superb working qualities especially on medium to heavy soils. The integrated cutting discs break the larger clods whilst the adjustable knives cut the remaining clods resulting in optimal clod breakdown. The pressure on knives can be set as high as that of the disc to provide equal firming on the entire working width. An "Off" position allows the knives to be lifted completely to leave a rougher surface and help protect the top layer of soil from capping and erosion.



Actiring: Strong and light!

The Actiring roller is a lighter variant of the Actipack, using the same frame structure and knife system. The discs have been replaced by a "V" profile ring, this saves 50kg/m, which is of critical importance for reducing lifting requirements for mounted equipment. This new design will also provide a lower cost alternative to the Actipack especially in lighter soil conditions where the additional features of the Actipack are not required. The wider shallow angel of the V profile is less aggressive than that of the Actipack disc design resulting in a better load carrying in medium to light soil conditions. The springs and knives have been especially designed to prevent stones getting into the rotor and causing blockages.



4 different pressures can be applied on the skids depending of the soil nature and the required finish.

STUBBLING AND SEEDING

PNEUMATIC SEEDER SH200 OR SH500 INTEGRATED ON CULTIVATOR



The position of the distribution outlet is before the roller. Position and angle are adjustable.



Fans adapted to Seeds, Working Speed and Width

- The SH series can be equipped with two types of fan:
- An electric fan recommended for small seeds and allowing seed rates of 4 kg/min (for a machine 50kg/ha - 4m working width at 12km/h) - (only proposed on mounted machines)
- A hydraulic fan for flow rates up to 14 kg/min (standard for fold machines)

IN ONE PASS



Seeders for Cover Crops: One Response to the Nitrate Directive

The EU nitrate directive aims to protect water resources so-called vulnerable with a rate higher than 50 mg nitrate/l. One of the measures taken into account to avoid leaching, resulting in the generalization of the soil cover in the fall by vegetation cover, which will absorb nitrogen from the soil and air, to convert it into organic nitrogen. The cover crops will then release nitrogen to the next crop (1/3), protect soil against erosion and improve its structure.

SH200 an SH500 with 200l resp. 500l hopper capacity have been designed to meet a rapid implementation of cover

crop during stubble operations while minimizing their costs. In addition, they can also be used for establishing rape or mix of different diameters seeds (leguminous plant, crucifers, ...).

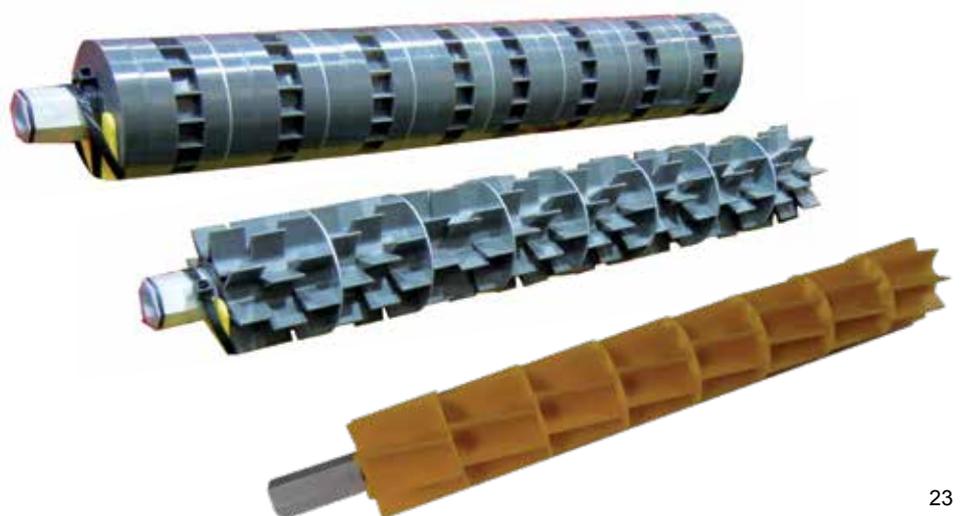
Precision and High Work Output

Two models are available depending of the seed rate/ha and the output of the machine: The SH200 will be used for rather small seed sizes with a low seed rate/ha, whereas the SH500 would be preferred with higher seed rate (25 to 50 kg/ha - mix of seeds, grass, etc ...) in order to maintain a significant autonomy even with wide machines. Both models have 8 outputs which will spread the flow of seeds uniformly over the working width.



Seed Metering Rotors for all Conditions

The SH200 and SH500 are delivered with two types of rotor: one for small seeds (rape, mustard, cabbage, clover, etc ...), and a medium rotor for seeds (vetch, grass, sunflower, ...). The agitator placed above the rotor ensures a steady stream of seeds. A brush, located at the base of the rotor, will regulate the flow and improve the setting accuracy. For large seeds (peas, horse beans, etc ...), it is strongly advised to choose the Flex rotor option, which is able of deforming with large seed diameter.



The company reserves the right to change the above specifications without notice. This brochure is for descriptive purpose only. Some of the items pictured in this brochure are optional and not standard equipment. Please consult your local Kubota dealer for warranty, safety or product information. For your safety, Kubota strongly recommend the use of a seat belt in all applications.

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The Kubota logo is rendered in a teal color. It features a stylized 'K' followed by the letters 'u', 'b', 'o', 't', 'a' in a rounded, sans-serif font. A registered trademark symbol (®) is located at the bottom right of the letter 'a'.