

# OptiMaize

'Short' or 'long' –  
you have the choice!



 **KRONE**  
THE POWER OF GREEN



**Dear reader,**

A new technique of harvesting maize is currently being discussed – a harvesting technique which produces significantly longer chop lengths than we are used to here in Germany and elsewhere in Europe. The method originated in America, and as with anything that comes from America, it has generated a great deal of hype in Germany. You have no doubt received several enquiries from your customers and you may even feel pressurised into making new investments in this field. So a word of reassurance: Every forage harvester manufacturer in the marketplace has their own specific technology for producing the long-chop maize silage currently being promoted by the Americans. Just ask your manufacturer – they will doubtless be able to offer you a suitable solution. In this brochure we would like to show you the various methods available from KRONE for producing long-chop maize silage.

However, we believe it is somewhat short-sighted to blindly pursue this hype from America. In our view the process poses a number of risks to the silage, of which you should make your customers fully aware. Otherwise you run the risk of possibly damaging the silage and, as a contractor, subsequently being held responsible. The 11/2015 edition of the German magazine Lohnunternehmen (Contractors) featured an article that was written by a group made up of DLG approved manufacturers and DLG members to work on 'Recommendations for the use of silage additives' and who explored the topic very thoroughly. In the article, they come to the following conclusion:

*"A wholesale transfer of American conditions to German farms is inadvisable. The effects on silage management as well as those on forage still have to be investigated, if only on the grounds that recommendations for producing maize silage differ considerably between the USA and Germany."* (LU 11/2015) You can read a translation of the full article on page 14 of this brochure.

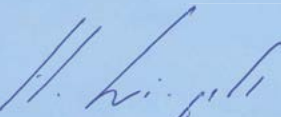
**Yet, we can sum up the situation for you and your customers as follows:**

All manufacturers of forage harvesters are technically capable of implementing long maize chops, albeit using different solutions.

Tell your customers about the risks of this harvesting technique and ideally seek confirmation that you will not be held responsible for any potential damage to the silage.

While we appreciate the difficult times that dairy farmers are currently facing, we wish you all the very best for the 2016 season.

Thank you and best wishes from Emsland



Heinrich Wingels  
Head of Marketing



Henrik Feldmann  
Head of Product Marketing





# OptiMaize



“You want to crack kernels down to 4.5 mm<sup>2</sup> fragments.”

**Hans Günter Gerighausen**  
Chamber of Agriculture of  
North-Rhine Westphalia, Germany

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# KRONE OptiMaize

“Short” or “long” – you have the choice!



## Which is the right chop length?

The length of cut in maize silage is always down to the destined application of the silage (see table). On principle, the chops can be shorter the more roughage, such as grass, is added to the ration to add structure to the regime.

## OptiMaizing

No matter which LOC you choose, it is essential that the kernels are not just damaged but in fact crushed to very small fragments, because only then can the nutritious starch be available to the cow and is not released undigested. Krone offers six different roller crackers and one disc cracker that offer the best choice for every silage application. The disc cracker is particularly recommended for OptiMaize XL.



# OptiMaize

Model	Length of cut	Application	Drum model
<b>OptiMaize S</b>	4 mm – 7 mm	Biogas	Biogas (40 blades) or MaxFlow (36 blades)
<b>OptiMaize M</b>	8 mm – 10 mm	Dairy feed rations with ~40 % maize Beef bulls	MaxFlow (36 blades) or MaxFlow (28 blades)
<b>OptiMaize L</b>	11 mm – 19 mm	Dairy feed rations of ~60 % maize	MaxFlow (28 blades) or MaxFlow (20 blades)
<b>OptiMaize XL</b>	20 mm – 30 mm	Dairy feed rations of >80 % maize	MaxFlow (20 blades)

## Proper compaction

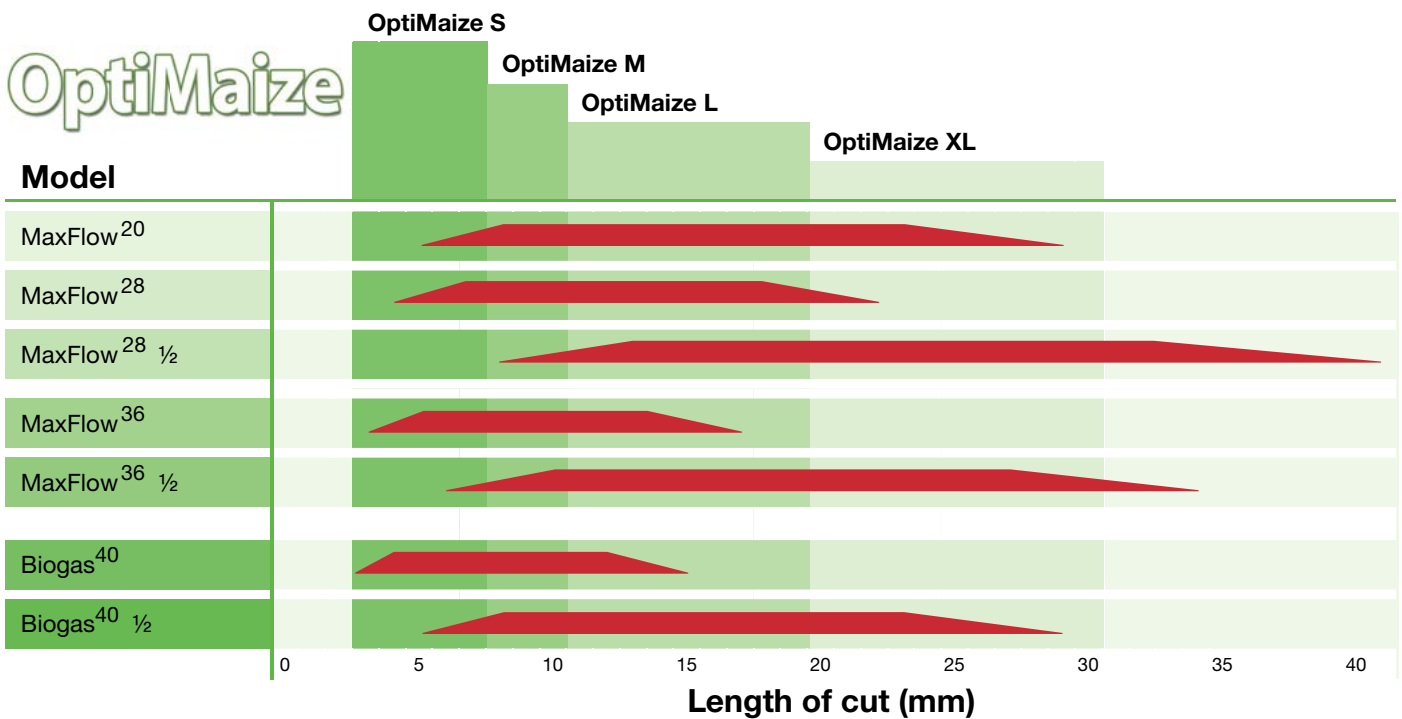
Chop lengths of more than 20 mm will require a significant higher level of compaction, because longer chops tend to be in disarray like the sticks in a pick-a-stick game. Yet to avoid warming up and moulding, it is essential to use heavier equipment for compacting and roll more often. Special compacting equipment is now available on the market that 'combs' the chops to bring them into alignment and enhance the level of compaction.



# KRONE chopping drums

The right concept for every job

The KRONE OptiMaize chopping drums offer a wide range of technical solutions that achieve an equally wide range of chop lengths. The drums can be operated with all or half the number of blades, producing any chopping length your customers may ask for. Changing OptiMaize S to OptiMaize XL is very quick and easy – thanks to a unique design that allows fastest blade attachment and removal. Not convenient enough? Then take a look at our new VariLOC pulley gearbox which converts the drum from S to XL within minutes.





# The silage specialists



## OptiMaize S

### The 40-blade drum:

This 'biogas drum' delivers an extremely high cutting frequency. With all blades in place it is the specialist drum for the kind of short LOCs that biogas plants want. And you can easily convert it to long-chop lengths by removing half the blades.

LOC range: 2.5-15 mm from 40 blades  
5-29 mm from 20 blades



## OptiMaize M, S

### The 36-blade drum:

Handling massive throughputs and providing a wide range of cutting lengths, this 36-blade drum will earn its keep in no time. Remove half the blades and the unit is perfect for long-chop applications.

LOC range: 3-17 mm from 36 blades  
6-34 mm from 18 blades



## OptiMaize L, M

### The 28-blade drum:

This is our universal drum. Used with just half the number of blades, it is perfect for producing long-chop silage.

LOC range: 4-21 mm from 28 blades  
8-42 mm from 14 blades



## OptiMaize XL

### The 20-blade drum:

This drum cuts the kind of long lengths that are called for in some countries.

LOC range: 5-29 mm from 20 blades



### Quick fit blades:

Each blade is attached with only three bolts. For extra stability, each blade is bolted to the underside of its holder.

### Cutting edge:

A precise LOC is down to the gap between each blade and the counterblade. Aligning the blades relative to the counterblade is straightforward thanks to the eccentric bolts.

### More carrying space:

The special design of the blade holders provides plenty of carrying space and makes for high throughputs and quieter running, especially in long chop lengths.

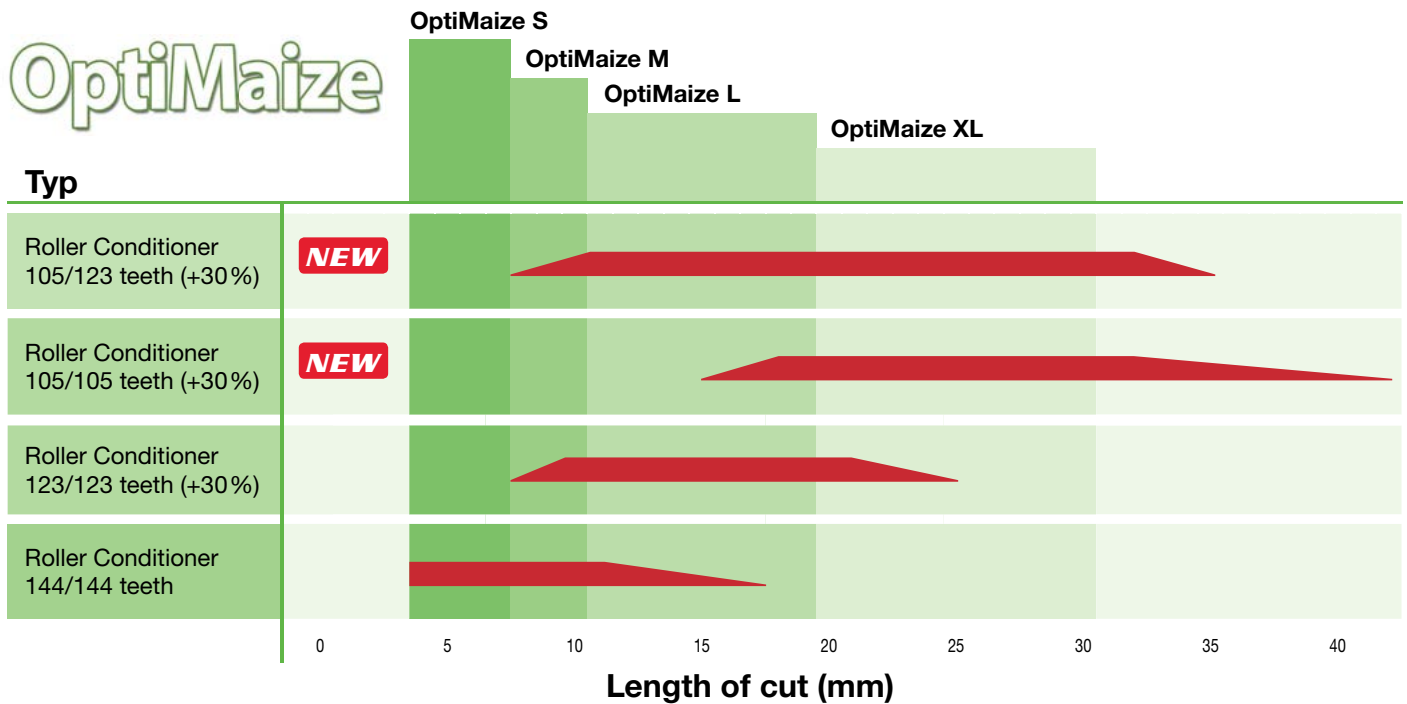




# KRONE roller conditioners

Tailor-made systems that boost your bottom line

- Large 250 mm diameter rollers
- Perfect conditioning from a large friction surface area
- 30% speed difference for maximum fracturing
- A different number of teeth for each LOC range





# Optimal digestibility

Livestock farmers want forage that is very easy to digest. This means every single kernel needs to be cracked and husks, leaves and stalks must be fractured, even when you're chopping long lengths. KRONE roller conditioners deliver just that. Larger diameter rolls and larger friction faces deliver top quality conditioning and perfect results.

## Standard toothed rollers:

Our standard conditioners are available with 105, 123 or 144 teeth. These teeth feature a special triangular design which ensures perfect crop treatment.

## Hard chrome plated toothed rollers:

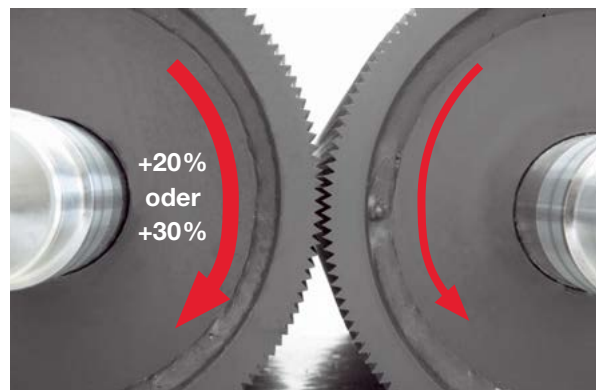
Developed for heavy-duty applications, the chrome plated roller conditioner has an extremely long service life. Providing a sawtooth friction face, these rollers deliver maximum conditioning. The rollers are available with 105, 123 or 144 teeth.

## The KRONE roller conditioner cracks every kernel:

Our 250 mm diameter rollers have a larger friction face than the smaller diameter toothed rollers. They can be operated with a larger roll gap for greater efficiency and fuel economy and they are more efficient at conditioning longer chops. The standard speed difference between the two rollers is 20% but this can be increased to 30% if a greater intensity is desired. We also recommend the 30% speed difference for long-chop applications, so as to achieve thorough conditioning and fracturing of long chops.

## Variable roll gap:

The operator can control the roll gap from the cab, adjusting it steplessly to the current conditions. The current setting is shown on the display screen.

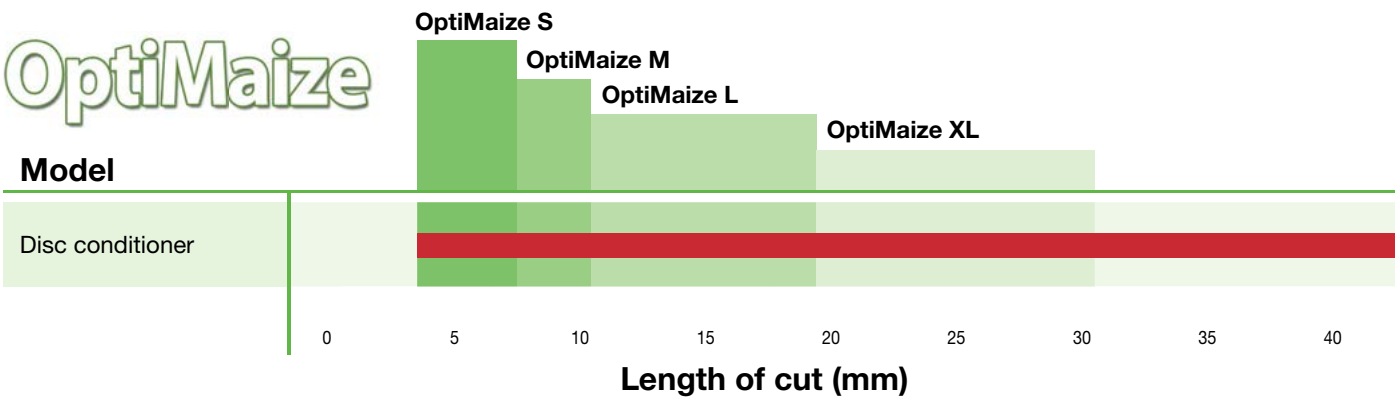




# KRONE disc conditioner

The system for maximum conditioning

- Powerful disc conditioner with a friction surface area 2.5 times larger than that of the roller conditioner
- Perfect conditioning and fracturing
- Large 265 mm disc diameter
- Disc gap adjusts conveniently from the cab





# The perfect match for OptiMaize - the KRONE disc conditioner

With V-shaped gaps between the individual discs to increase the friction surface area, the KRONE disc conditioner delivers maximum conditioning while requiring low power input, producing perfectly conditioned forage.

## The KRONE disc conditioner:

The disc conditioner assembly is made up of two shafts with interlocking discs that provide V-shaped gaps to crack the kernels. This design has 2.5 times the friction face of a roller conditioner and delivers outstanding conditioning and fracturing, even in high throughputs and long LOCs.

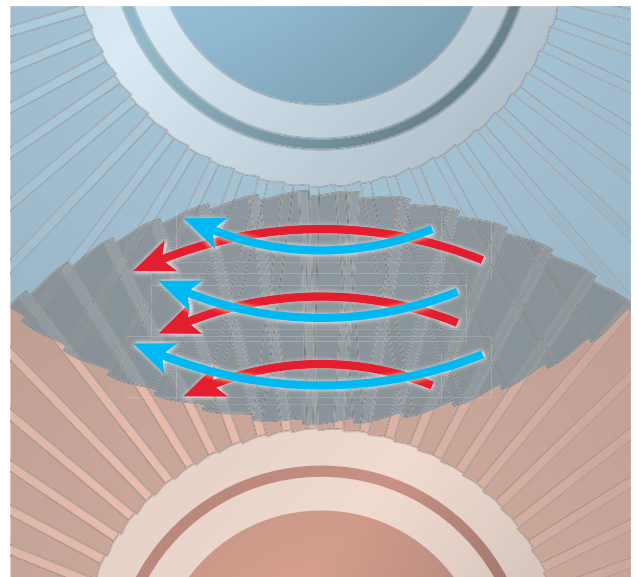
## KRONE disc conditioner cracks every kernel:

With the discs on the outer shaft measuring 265 mm in diameter and those on the inner shaft measuring 135 mm, and both rotating towards each other at identical speeds, the assembly generates two different circumferential speeds, which in turn causes frictional effects that grind the material between the discs.

The result? Every single kernel is cracked effectively and long stalks are fractured lengthways. The clear benefit of this is that the conditioning effect is intensive without destroying the structure. Just what farmers have asked for.

## Variable disc gap:

The operator can control the disc gap from the cab, adjusting it steplessly to the current conditions. The current setting is shown on the display screen.





# KRONE VariLOC

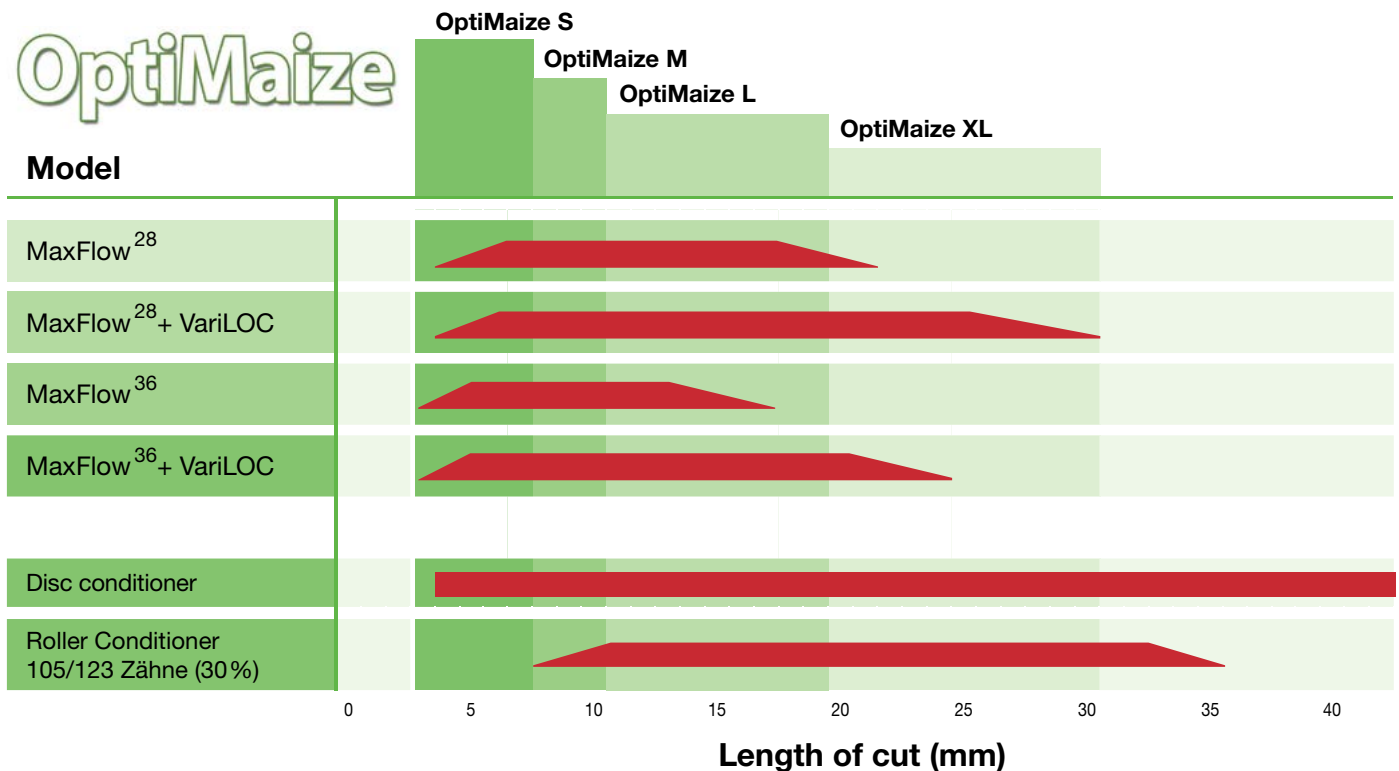
**NEW**

The pulley gearbox – a KRONE exclusive

- A unique world innovation
- Turns your forage harvester into an all-rounder
- Switches flexibly from short cuts to long cuts
- Changeover takes less than 5 minutes
- No downtime, no machine conversion, no up-front planning



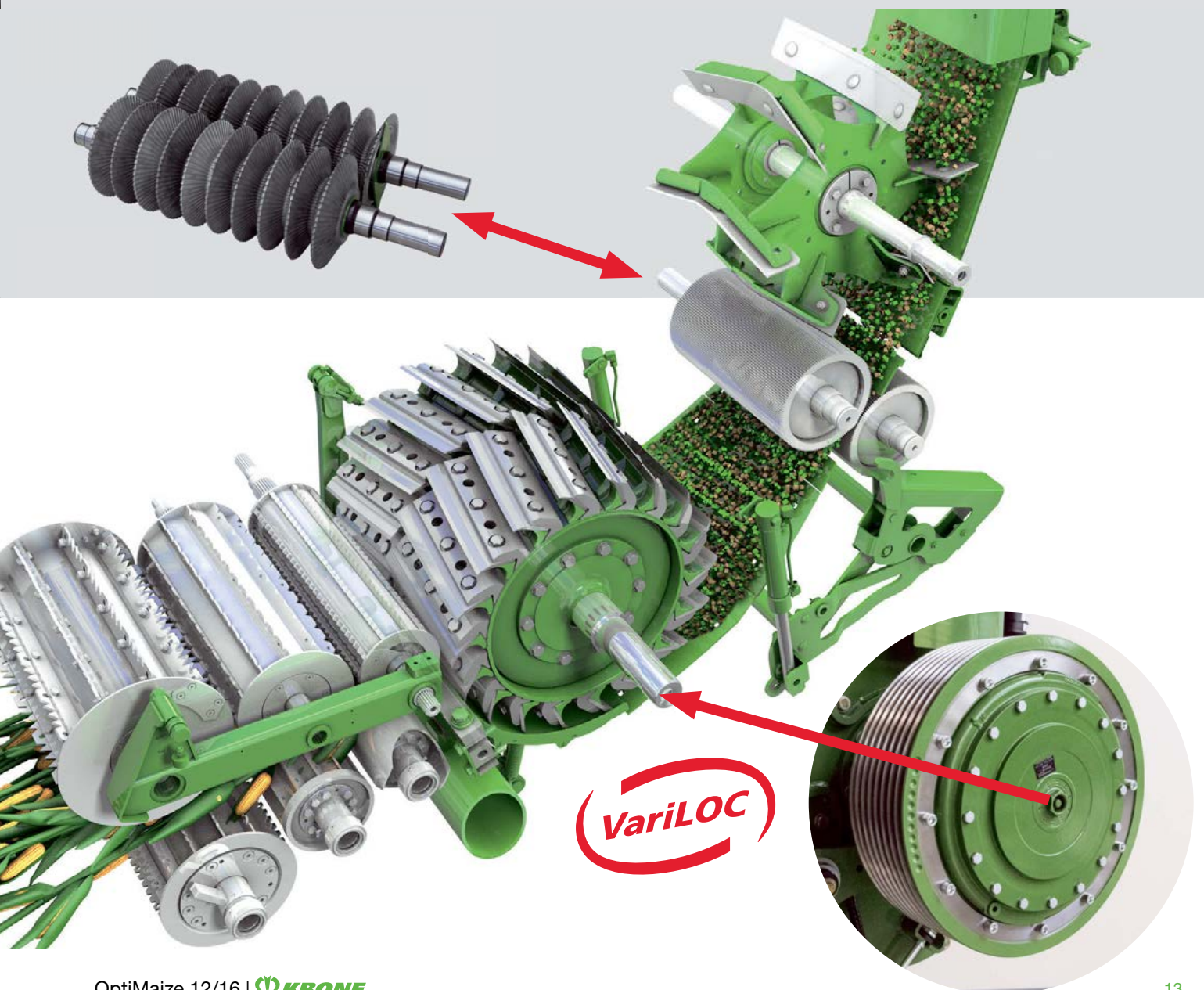
## OptiMaize





# Biogas silage (S) in the morning, long chops (XL) in the afternoon

Forming an integral part of the pulley, VariLOC is a gearbox that shifts the speed of the chopping drum. By changing the drum speed from 1250rpm to 800rpm with a simple spanner, you can increase the LOC range by up to 53%. This way you can instantly change over from short to long cuts and vice versa within a few minutes, allowing you to respond to customer requirements at short notice without any prior modifications to the machine or up-front planning. Combined with the new 105/123 tooth roller conditioner (with 30% speed difference) or the disc conditioner, this gearbox turns your BiG X into an all-rounder and gives you maximum flexibility.







Krone now offers a gearbox for the chopping drum on its BiG X 600 to 1100 series models – the VariLOC.

**Krone VariLOC chopping drum gearbox:**

# Free rein...

Freedom of choice – what’s not to like? But what does this have to do with the Krone BiG X forage harvester? Plenty. The north German specialist manufacturer of forage harvesters has developed a mechanical gearbox that gives operators the freedom and flexibility to change the speed of the forager’s chopping drum at any time within minutes. The gearbox is an option that complements the drum’s stepless LOC control...

**Gottfried Eikel**

**B**ack in the day, buyers of a new forage harvester didn’t have to think about how many blades they wanted on their chopping drum. That was because maize chopping lengths were set in steps by using different numbers of blades. Later on, the steps disappeared and the chopping length could be adjusted steplessly between 5mm and 15mm. And when operators wanted a longer chop in grass they removed every second blade from the drum. But these days biogas plants sometimes specify chop lengths of less than 5mm. And in the dairy sector there are two trends. Dairy farmers will ask for an 8mm chop if the ration contains enough crude fibre from grass silage, for example. Or they will ask for a 20-30mm chop to increase the percentage of crude fibre in the maize silage if it contains more than 75% maize. This type of long-chop silage is known as “shredlage”.

**If contractors want to meet both needs and provide long chops for livestock farmers and very short cuts for biogas plants, they have to convert their machine**

**Nominal LOC ranges provided by VariLOC on the Krone BiG X 500 to BiG X 1100 foragers**

MaxFlow chopping drum	Drum speed		LOC range	
	1,250 rpm	800 rpm	without VariLOC	with VariLOC
28 blades	4.0 mm to 21.0 mm	6.2 mm to 30.0 mm	17 mm	26 mm (+53%)
36 blades	3.0 mm to 17.0 mm	4.7 mm to 24.0 mm	14 mm	21 mm (+50%)

several times a season. This means they have to allow extra time and money for removing and replacing the blades or swapping the entire chopping drum. And even large contractors who run a big forager fleet and who can fit their machines with different drums, may find themselves in a situation where a specific chop length is required but the particular forager is in the wrong place and needs to be moved quite a distance.

**“This is the problem contractors have asked us to solve,”** Krone explained when asked why they developed a gearbox that changes the drum speed. Unveiled at Agritechnica, this new gearbox was developed with the aim of integrating it in the forager’s existing driveline. Another aim was to

change the drum speed hassle-free and within less than in under five minutes. The idea was born four years ago and was implemented for the 2014 season. At the end of this year’s maize season we got the chance to take a look at a VariLOC gearbox which was installed in a BiG X 700 equipped with a 12-row EasyCollect header and a disc cracker. The machine was owned by German contractor Otto Hamester.

**From the outside, the gearbox is so inconspicuous** that even a forager expert finds it difficult to tell whether the drum has the VariLOC gearbox or not. The box is a two-speed planetary gearbox which is integrated inside the pulley on the shaft that drives the drum. When the drum is revolving at its regu-





lar 1,250rpm, the housing of the gearbox (i.e. the pulley) is directly connected to the shaft. Shifting reduces the shaft speed to 800rpm. Krone wouldn't reveal – yet – exactly how the new development works. But they did say the technology was not as simple as you might think. Take the bearing lubrication, for example, which takes place with those high centrifugal forces going on inside the rotating planetary drive.

**Like the drum speed, the cutting frequency is also reduced by 36%.** This means the number of cuts drops from 22,500 to 14,400 cuts per minute on a BiG X 700 with a 36-blade drum. This approach translates into

straightforward: remove the pulley housing, take a regular 36mm open spanner and turn the shaft as required. Make sure the gear locks home. It was still a bit on the notchy side in our test.

**A key feature of long chop lengths is that all the kernels need to be cut in half at the very least.** Better still, they should be quartered or totally destroyed, something that regular corn crackers fail to achieve. So Krone recommends opting for the disc cracker (profi 4/2013). Depending on the spec, this comes at a €3,000 to €6,000 premium over a roller cracker.

In our brief test, we analysed the structure of the chopped material by setting the LOC to 4mm, 14mm and 24mm. We found that the fractions contained no kernels that were left undamaged. So the disc cracker did a good job. And the small, medium and long chop fractions are clearly visible in the photos.

**Other points worth mentioning:**

- VariLOC is available for the MaxFlow drums with 28 and 36 blades.
- At present, VariLOC is available for the high-capacity BiG X models only (BiG X 600 to BiG X 1100), but it will also be available for the smaller models (BiG X 480 to BiG X 630) at a later date.
- Once the operator has changed the speed in order to chop longer lengths, he still has to calculate the longer length himself before he can enter it to the terminal. Yet this is only a temporary solution. In future the software will do it all for him.

**Summary:** The new Krone VariLOC chopping drum gearbox increases the range of chop lengths that are available from MaxFlow chopping drums, providing a 50% larger LOC range on the 36-blade drum and a 53% larger range on the 28-blade drum. Changing the speed in the planetary gearbox can be done in the field and just takes a few minutes – with no special tools needed. At a price tag of €9,800 excl. VAT, it doesn't



The quality of chop obtained in our test on a BiG X 700 with a 36-blade MaxFlow chopping drum, a VariLOC gearbox and a disc cracker can be seen here. The nominal LOC was set to 4mm (left), 14mm (middle) and 24mm (right). The kernels were effectively crushed in all samples. Photos: Eikel, manufacturer (1)

two theoretical LOC ranges – the conventional 3-17mm plus the 4.7-26.6mm range. This said, the maximum length is actually 24mm. So the gearbox increases the overall range of available cutting lengths by 50%, from 3mm to 24mm (and by 53% with a 4-30mm range on models with the 28-blade drum).

Changing the range takes as little as three minutes, although as usual it's a bit tight for space around the front wheel, the intake system and the chassis. But the procedure is



The VariLOC speed is changed with a regular 36mm spanner.

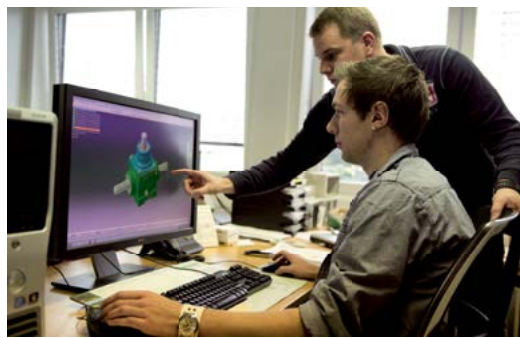
come cheap. But it compares favourably with the alternative of spending €18,000 on a 20-blade drum – never mind the cost of the time-consuming conversion and extra road travel.

Translation by trans-agrar



# The Bernard Krone agricultural machinery factory

Perfect in every detail



Innovative, proficient and close to our customers – these are the keywords that mark the philosophy of our family-owned company. As a forage specialist, KRONE manufactures disc mowers, tedders, rakes, forage wagons, round and square balers as well as the high-capacity and self-propelled BiG M mower conditioners and our BiG X forage harvesters. Quality made in Spelle – since 1906

Your KRONE dealer



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