



Specialist information for soy producers and processors

Flex cutting units - Technology and market overview



There is hardly any other thresh crop where the lowest pods are as close to the ground as in the case of the soybean. The biggest challenge during harvesting is to guide the cutter bar as low as possible without picking up stones and soil. On level, stone-free fields this can be achieved with conventional technology using narrow cutter bars. Yet even with medium sized cutter bars or slight unevenness, considerable yield losses or stones and earth in the combine harvester must be accepted. With a flexible cutter bar, however, harvest losses can be greatly reduced even at very large working widths. Additionally the stone ingress is reduced.

In North America, the flex technology is now standard. Due to the large proportion of soy the bigger part of combine harvesters are equipped with the flex technology. In the European soybean regions, the technology is also becoming increasingly widespread and also in Germany some soybean pioneers have already converted. As more and more soybeans in Germany are processed directly into food products, purity is the top priority. Due to the higher producer price of soy for food products, technology for minimizing harvest losses also pays for itself more quickly.

Functionality

The principle is simple and the same for all manufacturers: Over its entire width the cutting unit rests on the ground on skids. At surface irregularities, the skids partially push the flexible cutter bar upwards or let it sink a little to move along the surface irregularities. Depending on the manufacturer, unevenness of up to more than 30 cm can be compensated. The degree of flexibility is called flex path; it depends on the pressurization pressure of the cutter bar.



The flex path indicates how much the cutter bar can be moved. Depending on the manufacturer it is between 10 and over 30 cm. Photo: "CLAAS" factory photo

Good flex cutters can be guided to approx. 2.5 cm to the ground - over the entire width and also on uneven surfaces, provided that the irregularities are not too abrupt. However, even for flex cutter bars losses are not zero although they can be drastically reduced.

A flexible cutting unit can also be advantageous for crops such as peas and possibly even for lodged grain. For harvesting conventional threshing crops, the cutter bar is set rigid, depending on the manufacturer this is being done manually or hydraulically, and then functions like a conventional device without any compromises. The American manufacturers have adopted a technique in which the flex path can be hydraulically adjusted to the soil conditions via the pressurization pressure, even during operation.

The weight is even more important for flexible technology than for normal cutting units. The lighter the cutting unit, the better it can be placed on the skids. Weight and design ultimately determine whether the unit can only be guided close to the ground under optimum, dry conditions or also under more unfavorable conditions, i.e. at higher soil moisture.

The various makes available differ in the details. From the flexible Vario cutter bar and electronically optimized ground adaptation, to the foldable combine header for transport or the adjustable cutter bar tilt, everything is available. Details like Auto-Contour can be retrofitted without further ado.

The American manufacturers offer the technology optionally as draper. Draper units produce a particularly even crop flow, which facilitates a gentle threshing of the sensitive soybeans - at higher throughputs. However, this is offset by a high purchase price, more wearing parts and a higher power requirement.



Segmented skids over the entire width in combination with a flexible cutter bar are the basis of the flexible engineering.

Manufacturers

Manufacturer	Product	Country	Working widths	Contact person Sales Germany
Cressoni	SF2	IT	3.75 m, 4.42 m, 5.35 m	Direct sales (contact via www.cressoni.it)
	CRX Sojaflex (foldable)	IT	5.40 m, 6.00 m, 6.60 m, 7.20 m	Direct sales (contact via www.cressoni.it)
Biso/ Schrattenecker	Trendline Light Flex	AT	5.50 m, 6.50 m, 7.50 m	Biso distribution - (contact: gerhard.reich@biso.at)
	Soja-Flex (attachment)	AT	3.50 m, 4.50 m, 5.50 m, 6.50 m, 7.50 m	Biso distribution - (contact: gerhard.reich@biso.at)
John Deere	600F and 600FD HydraFlex	USA	6.10 m, 6.70 m, 7.60m, 9.15 m, 10.70 m	John Deere Sales
CLAAS	Maxflex	D	5.60 m, 6.20 m, 7.70 m, 9.30 m, 10.50 m, 12.00 m	CLAAS sales department
Case	3020 TerraFlex	USA	6.70 m, 8.20 m, 9.70 m, 11.20 m	Case distribution
New Holland	Super Flex	USA	6.70 m, 8.20 m, 9.70 m, 11.20 m	New Holland distribution
MacDon	FD 75	USA	9.10 m, 10.60 m, 12.20 m, 13.70 m	Direct sales

Seven manufacturers are currently represented on the German market with flexible cutter bars, several of which have only been in business since 2014. While some manufacturers have been in business for 30 years, others only shifted to soybean harvest some years ago. The decision by John Deere, New Holland and Case to offer their American equipment in Western Europe shows the dynamic that is expected in the local soybean cultivation. It remains to be seen which brands will prevail. Below you will find an overview of the brands currently available in Germany.

Biso



Factory photo

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Based in Austria, the company has been on the market for decades with a range of special front attachments. It was one of the first to build flex cutting units for Europe in 2000. With working widths of 5.5 to 7.5 meters and a flex path of 15 cm, the Biso Trendline Light Flex is oriented to Central European conditions. Special feature: The flexible cutter bar can be combined with various accessories. Additionally, Biso offers a 56 cm Vario table and rapeseed knife as an option to the flex cutter. The cutter bar angle can be adjusted hydraulically to a steeper angle.

In addition, Biso offers the Soja-Flex, a flexible attachment that can be attached to all conventional cutter bars in less than 1 hour. The unit is an inexpensive option for companies that already have a rigid cutter bar and do not want to invest in a new unit.

In the past there have been problems with the stability of the drive block. According to the manufacturer, however, these have been rectified.

The Biso device in use (from minute five):

https://www.youtube.com/watch?v=_ZlyhZPeMd8

Case



By concentrating on the development of good rotary combines, Case has made an early name for itself in the soybean harvest in America. Flexible cutting units are offered with the combines, optionally available as draper units. As for John Deere, the pressurization pressure can optionally be adjusted hydraulically during operation. The machines have been available in Europe since 2014 and have immediately been used on large organic soy fields in Eastern Europe - to the complete satisfaction of the farmers.

Claas



The German manufacturer has already been building the Maxflex cutter bars with 10.5 and 12 meters working width for the American market for many years (represented there as 'Caterpillar'). For Europe, the "Flex" series has initially been developed with smaller working widths. The disadvantages were the small flex path of 10 cm, and the fact that the cutter bar was only flexible upwards. Since 2015, the Maxflex has also been produced in smaller working widths starting from 5.10 meters with 18 cm flex travel and also downwards flexibility. In practice users have been satisfied by the results. The device is available with hydraulic fixation, which can now be operated from the cab.

Cressoni



Italy is the leader in European soybean cultivation - and Cressoni has been manufacturing flex-cutting systems since the 1980s. Today, in addition to a standard machine, a special feature is a flex cutter that can be folded for transport, in working widths of up to 7.2 meters. The manufacturer advertises with an adapted intake auger, which is equipped with fingers over its entire width, enabling a better crop flow.

John Deere



The USA is the world's largest producer of soybeans. Accordingly, John Deere has been working intensively on harvesting technology from an early stage. Today, as almost solely flex cutters are sold in North America, John Deere has brought the machines to perfection with the HydraFlex technology and various details. The ground adjustment of the cutter bar is electronically supported. The driver can continuously adjust the contact pressure hydraulically. The cutter bar angle is also variable. Three knife types are available for different crops, from robust to fine. For rapeseed harvesting, 'Zuern' offers a rapeseed header that is specifically compatible with the John Deere flexible cutter bars.

However, it took a long time before John Deere launched their flex cutting units in Western Europe. Only 2014 the first units of the 600F series were sold in Bavaria and Eastern Germany.

In the Ukraine, the series is already widely used. There are also plans to introduce flexible draper units (Flexdraper), which are already widely used in America.

Two informative videos about the HydraFlex (English):
<https://www.youtube.com/watch?v=sGHsCZz3LDY>
<https://www.youtube.com/watch?v=1bPkIfS3YhE>

New Holland

New Holland has also recently entered the German market with flex cutters. The manufacturer uses the same technology as Case; both manufacturers purchase their equipment from the same supplier in the USA.

MacDon



MacDon flex cutters are popular in North America because of their lightweight but reliable design. Optionally they are also available as draper units. Two special features make the MacDon unit stand out:

- Not only the cutter bar is flexible, but the entire table. When the cutter bar is lowered this prevents a steep edge where the crop accumulates
- The reel can partly follow the contour of the knife bar. This ensures that even in a depression all plants are well guided by the reel.

Unfortunately MacDon only builds working widths from 9.10 meters upwards.

Practical experience

• **Jean-Marie Friehe, Taifun contract farmer, Alsace:**
"I grow 30 hectare of soy for Taifun-Tofu. Despite a small working width of 5.1 meters, I decided to use a Maxflex for the due renewal of my Claas cutter bar this year. As I want to use the machine for many years, it will pay for itself in any case – especially since the extra cost is manageable."

• **Norbert Ponath, contractor, Vienna Basin, Austria:**
"We thresh about 250 hectares of soy each year. In our region, flex technology is now the absolute standard for soy harvest. My next cutter bar will probably be from a US manufacturer. Unfortunately, MacDon is only available in widths from 9 m upwards, which is a bit too big for our needs."

• **Thomas Schubert, Taifun contract farmer, Halle/Saale:** "With larger working widths, there is no way around the flex technology. At 300 kg loss per hectare and a price of almost 1,000 €/t for organic consumer goods you don't have to reckon for long. Recently we have been using a John Deere Hydraflex and we are completely satisfied."

Economic efficiency

The fact that flex cutters can also be used for other crops without compromising on quality makes the cost calculation much easier. Most Flex products are only discarded during the rape harvest.

The profitability of the technology depends largely on the following parameters:

• Purchase price: Flex and Vario cutting units are usually in the same price range. Only rigid, non-variable cutter bars are cheaper. If a combine harvester is retrofitted with a flex cutter bar, the acquisition costs are usually



Deep pods: the greatest challenge in soya harvesting. Here the losses were over 500 kg/ha - with 7 meters of rigid cutter bar on gravel ground.

The effect of the flex technique is obvious: These plants were cut off cleanly below the lowest pods.

considerably higher than when purchased together with a new thresher. In this case, there must be a secure prospect of harvesting larger areas of soya.

- Soy producer price: For years, the price of organic soy has been up to three times higher than that of conventional goods. Accordingly, a flex cutter already pays for itself with half the area. If seeds or consumer goods are threshed, this effect is even greater.

- Potential yield gain: When using a narrow cutter bar on predominantly flat, stone-free surfaces, the step to the flex cutter bar will be more difficult than with a wide machine that is being used a lot in difficult, stony terrain. Here the losses are often 500 kg per hectare and more. With a good flex cutter, they can easily be reduced to 200 kg. However, with working widths from 5 meters upwards, flex cutter bars always provide a yield advantage over conventional technology, even under optimum harvesting conditions.

In order to convince a contractor to purchase a flex cutter, a multi-year perspective is required in addition to the willingness to pay a surcharge for the soy harvest. In addition to the expected increase in yield, the fact that fewer stones get into the thresher must also be taken into account.

Conclusion

The technology of the flexible cutting units has been tried and tested for years and is fully developed. There is no doubt that the investment pays off quickly for medium and large soybean areas. This is particularly true in organic farming, where the soy price is up to three times higher than for conventional soy. It is to be hoped that contractors in soybean regions will increasingly use flexible cutters, especially since the machines can be used for other crops without any restrictions. This will be easier to achieve if soybean producers are prepared to pay an additional price for the use of optimum soybean harvesting technology by their contractors. It is not yet foreseeable which producers will prevail in Europe in the long run. At present there is a wide range of equipment available. The American technology has been tested over many years in the large soybean regions. In particular, the hydraulic adjustment possibility during operation is making a name for itself. The domestic manufacturers are distinguished by various details. It is to be hoped that the manufacturers are correct in their assessment that the German market will develop well.

For comprehensive information on all aspects of soy cultivation visit:

www.sojafoerderring.de

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