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 **KRONE**
THE POWER OF GREEN



Lightweight machine for newcomers

Driving impression The Krone Swadro TC 640 is described as a twin-rotor rake for farmers who are actually looking for a single-rotor unit. We took the new small-scale model from the German manufacturer on a test drive in the Austrian Alps.

The photos in this article may seem to suggest that the Swadro TC 640 is a pure mountain machine, but in fact that's only half the story. Indeed, the 6.40m work width and the low 1,400kg operating weight are excellent recommendations for working on slopes, yet the same qualities – along with the great manoeuvrability courtesy of the short frame – are equally appreciated by users who farm flat land.

The TC 640 with a working width of up to 6.40m replaces the 6.80m TC 680, which up to now has been the smallest model in the Krone range of twin-rotor centre-delivery rakes. Introduced to the public at the farming festival in Munich in September

IN BRIEF

- The Swadro TC 640 is the new entry model to Krone's range of twin-rotor rakes.
- Raking at widths of up to 6.40m and weighing in at 1,400kg, the new machine can deliver plenty of punch, even with a lower-powered tractor in front.
- Its rotors and running gear are well-proven Krone assemblies, but its tine arms are 13cm shorter.
- The 2.70m-wide rotors hug the ground and combine with the lift tines to reduce crop contamination.

2016, the new model has now been officially added to the company's price list for the 2017 season.

Short tine arms

Anyone familiar with the Krone product range will find a lot of well-known features on the Swadro TC 640. The grass is raked by the well-proven Krone rotors which boast cardanic suspension, the typical lift tines, the Duramax cam track, a maintenance-free, semi-fluid greased gearbox and maintenance-free tine arms.

The rotor diameter has been reduced to 2.70m from 2.96m, which has been smallest diameter up to now. The smaller diameter is due to a difference in tine arm length. Yet

in all other respects, the machine resembles its high-capacity siblings. We took the rake on a short test drive in the Tyrolean mountains near Kitzbühel. The test was actually too short for any conclusions to be drawn on the longevity of this machine, but we assume that the cam track and the gearbox easily absorb the forces transmitted by the tine arms – even in large volumes of grass and hay – meaning they are durable and lasting. After all, they have been in service on the existing models for a long time.

Three or four double tines

Another outstanding detail about the new model is the fact that the rotor arms are fitted with only three double tines as standard specification. This may seem odd to farmers in Central Europe who are used to seeing four double tines here. Yet a look at the model history of the Swadro TC 640 gives the explanation: the design was inspired by Irish farmers who achieved good results with trial machines that had only three double tines.

Even so, by way of compromise, the arms are equipped to take a fourth pair of tines, so buyers who prefer four double tines can easily retrofit an extra pair. The Krone lift tines have kinked ends that allow them to work vertically, meaning that the tines can be set higher and work at higher ground speeds reducing the chance of contamination. The cardanic suspension allows the rotors to pivot through a $\pm 5^\circ$ range in axial direction and $\pm 7^\circ$ across the direction of travel, which should be enough for good ground hugging in most circumstances. After all, we had no complaints about



The fully-sealed bevel gearboxes and the tine arm bearings are lifetime lubricated. The bearings are made from robust cast aluminium and are connected gap-free with the arms.

this in the Tyrolean mountains. The rotors on the standard machines run on four-wheel bogies with steered leading wheels and rigid rear wheels. But there is also the option of six-wheel bogies or castering wheels.

Simple and without electronics

The height is controlled manually by means of a crank. We appreciated the excellent scale which is very easy to read and

allows operators to adjust the height very accurately down to the millimetre. The electrically powered height control system on the higher-capacity models is not available for the Swadro TC 640. Krone says this is deliberate and intentional, because the Swadro TC 640 is designed as a simple entry-level machine.

The work width, too, is adjusted manually by means of a crank on the standard model. Yet there is also the option of hydraulic width control listed on the acces-



1 The height is adjusted by means of the crank...
2 ... and with the help of a clear scale.
3 On headland, the Swadro TC 640 lifts out clear without disturbing the swaths.

MEIN NUTZWERT

Technical data Krone Swadro TC 640

Dimensions and weights

Work width	5.70-6.40 m
Swath width	1.0-1.70 m
Transport width	2.55 m
Transport height (rigid tine arms)	3.55-3.90 m
Transport length	4.82 m
Weight	1.400 kg
Power requirement	22/35 kW/hp
Hydraulic spools	1 da
Tyre size on running gear	10.0/75-15.3

Rotors

Rotor diameter	2.70 m
No. of tine arms per rotor	10
No. of tines per arm	3 (optional 4)
Height control/mechanical	mechanical
Tyres on bogies	16/6.50-8
Swath width	1.00-1.70m

Prices ¹⁾

Entry-level machine	£18.375
Articulated steering	£940
Central swath deflector	£335
Test machine ²⁾	£19.650

¹⁾ List prices excl. VAT;

²⁾ without extra pairs of double tines which have to be ordered from the dealer
Source: Manufacturer

Minimum use 240 ha/year

$$\text{me} = \frac{\text{fc}}{\text{rc} - \text{vc}} = \frac{(\text{£}1.965)}{\text{£}10 - \text{£}1.80} = 240 \text{ ha/year}$$

Explanations

MU	Minimum use
fc	fixed costs: £1.965 /year (= 10 % off the £19,650 purchase price)
vc	running costs: £1.80 /ha (wear, service & maintenance)
rc	rental costs: £10 /ha

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1 The work width is adjusted steplessly by means of a crank between 5.70m and 6.40m.

2 As an option, two tine arms come with joints on each rotor to fold in.

3 The optional articulated steering makes the Swadro 60cm longer but more agile.

4 The track is widened by moving the innermost spacer ring to its outermost position on the axle.



3



4

PLUS & MINUS

- + Concept:** The base model is an excellent entry model to the twin-rotor class.
- + Raking quality:** The excellent quality of rake is due to the cardanic suspension, the steep cam tracks, the lift tines and the small-diameter rotors.
- + Light pulling:** A 35hp tractor is fine for achieving high work rates in flat land, yet a 60hp machine is recommended in hilly land.

5 The Swadro TC 640 comes in at less than 3m transport height after the tine arms are folded in.

- Level of specification: Although features such as electronic height control or independent rotor lift-out are certainly not a must, we find they should be on the accessories list.



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sories list at a price of €665. Both rotors swing 35cm to the side, which allows users to extend the work width from 5.70m to 6.40m. Consequently, the swath width is between 1.00m and 1.70m. Although the transport height of the Krone Swadro TC 640 is less than 4m, it is also available with the option of two foldable arms – an important feature for anyone whose gates have not grown to reflect the size of modern machines. The foldable arms reduce the transport height to 3m – small enough to pass through very low gates

Steering as an option

Consistent with the entry-level concept, articulated steering is only an option and there is no steered axle on the basic specification model. Without this, the machine is only 4.22m long, whereas it measures 4.82m with the steered axle. Krone says that, because of its short beam and the narrow 2.50m track width, the machine manages perfectly well without the steering option, without compromising on agility.

The same applies to steering through bends, where Swadro TC 640 is claimed to roll without scuffing. We could not verify this, because our test machine did have a steered axle. Unlike the articulated steering systems on side-delivery rakes, the artic steering on Krone's centre-delivery rakes uses fewer moving parts, and there is only one single pivot point which is right on the axle support that needs regular greasing. Otherwise the axle is maintenance-free and only minimally susceptible to damage.

Great stability on slopes

Its 2.50m track width gives the Swadro TC 640 great stability on slopes, and yet

wheel weights are available as a reassuring option. In addition, you can extend the track width simply by refitting the distancers from their outermost to the innermost position on the axles. This increases the track by about 10cm, which may not seem much but can make a great difference on slopes.

Stability on sloping terrain is also the reason why this machine lacks the independent rotor lift-out feature. In Germany, the Swadro TC 640 is homologated for 40km/h on public roads. But as our test took place in Austria, our test machine had to comply with the 25 km/h limit under Austrian traffic laws. The quality of work was typically Krone – i.e. excellent: The Swadro TC 640 cleared the fields effectively.

Summary

After testing the Swadro TC 640, we conclude that the machine has the potential to become a bestseller. Admittedly, it sells at a much higher price than the high-capacity single-rotor rakes, but this money buys a larger work width, smaller-diameter rotors and therefore better ground contouring and more uniform swaths. In addition, the machine is happy with a smaller tractor. All these are valid arguments for making the change to a slightly bigger machine.

Although the twin-rotor rake requires operators to change their driving and steering from what they are used to with a single-rotor machine, this is a skill that is soon learnt. So to sum up, the Swadro TC 640 is certainly a worthwhile option for small-scale and mid-sized farmers. *amh*



The Swadro TC 640 produced the kind of fluffy and uniform swaths that are typical of centre-delivery rakes.



The standard Swadro TC 640 gives a transport height between 3.50m and 3.90m, depending on the set work width. The Fendt 209 Vario had more than enough engine power to operate the rake.

photos: Holzhammer