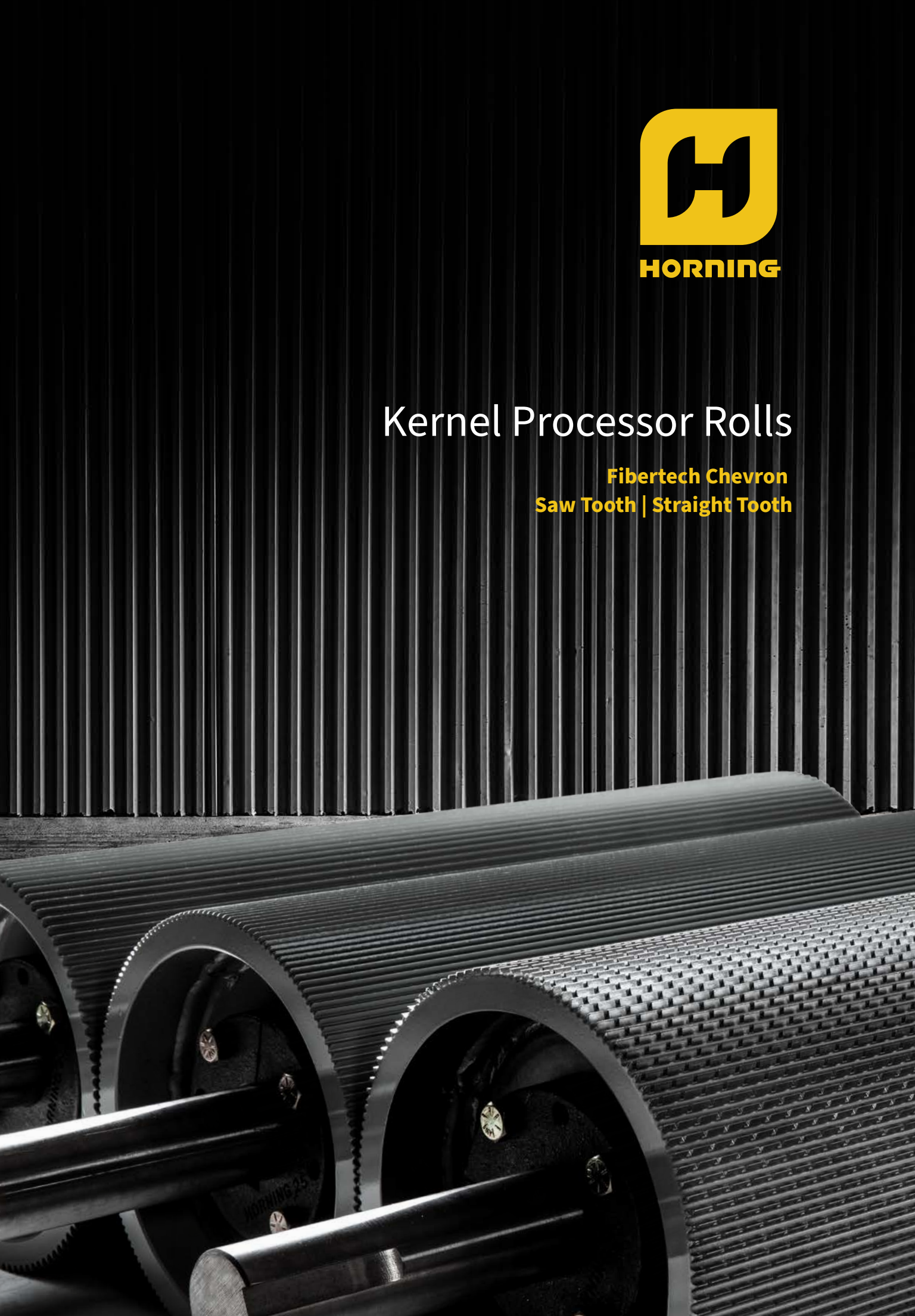
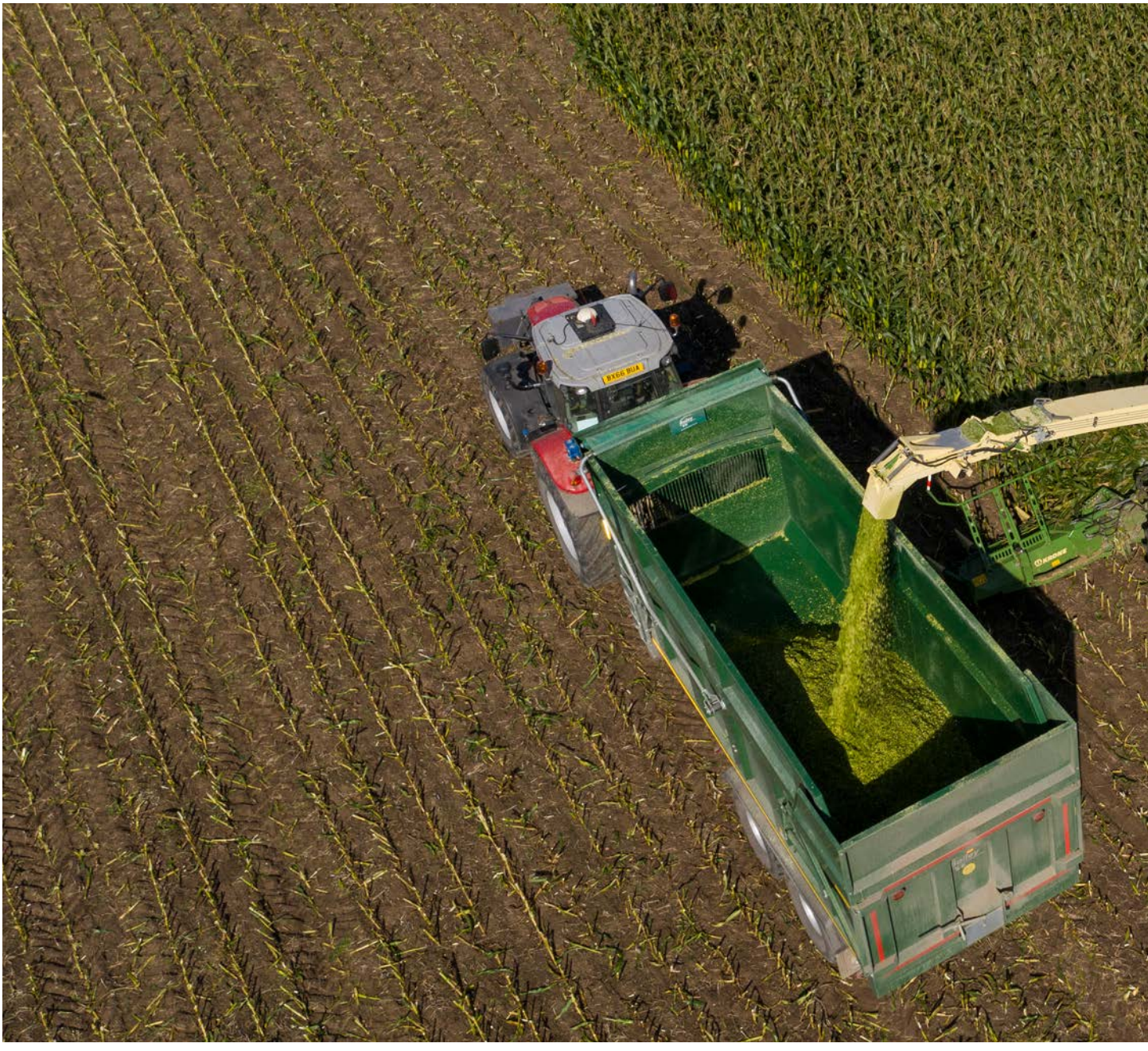
HORNING

Kernel Processor Rolls

Fibertech Chevron
Saw Tooth | Straight Tooth





Created for Leaders

Engineered to be overachievers. Proven to be market leaders. Horning rolls flat perform. Advanced, nutrition-optimized, kernel processing in forage harvest of any scale. Impressive mill solutions. You'll be smiling all the way to the bank.

1998
First product produced

2000
Company Formed. First KP built

2002
Hi-capacity tooth developed

2007
New first-of-its-kind Dual-cut Rollers developed

Shreddermill produced
2008

2013
Original Fibertech roll developed

4 **Fibertech Chevron Rolls**

16 **High-Capacity Sawtooth Rolls**

20 **Straight Tooth Rolls**

2014
3-row released

2016
New manufacturing facility

Fibertech Chevron rollers developed

2018
2-row released

Stationary Roller Mill
2019

2020+ Ongoing Development and Innovation

Key Factors in Kernel Processing

What does it take to run with the best in obtaining kernel processing scores that will optimize nutrition, health and milk production in dairy cows? It takes a Kernel Processor unit: a good one. There are four key factors that need to be understood, implemented and monitored to consistently crank out KP scores that will put you at the top of your dairy nutrition game.

1 Roll Condition

Farmers and custom operators take great pains to select the right rolls. And they should – it's critical. An often overlooked factor to quality processing is the condition of the processing rolls. If rolls continue to be used when they pass their prime, KP scores begin to falter, then drop off sharply. Running a roll too long can actually be worse than choosing the wrong roll.

2 Tooth Spacing

Tooth spacing is the next critical factor in quality kernel processing. There are many different options in the marketplace.

- Running tooth spacing combination of 3.5 or 4 grooves per inch on one roll and 4.5 grooves per inch on the other is optimum for corn silage in the self propelled industry.
- In direct-cut, whole-crop such as wheat, sorghum, etc., testing has shown 6 grooves per inch using a Fibertech Chevron roll with a straight tooth profile instead of a sawtooth profile, produced unmatched results in grain processing.
- For the feed mill industry 10 groove rolls do a good crack on wheat, barley, etc. To just crack corn 6 groove rolls are the most common but 8 grooves can be used if you'd like to process it a bit finer.

3 Tooth Style

The third critical factor in outstanding kernel processing is the style of the tooth.

First a brief history of the development of tooth style designs. Kernel processing first debuted in the 80s with straight tooth rollers. When processing took hold in the industry in the mid 90s, innovation soon followed with the sawtooth design for more ripping action. The Hi-Capacity sawtooth design was pioneered by Horning in 2002. In 2007 Horning introduced Dual Cut (now being discontinued in favor of better designs) to the marketplace with great success. The design that Shredlage began using in 2011 is a similar variation of the dual cut design. A huge breakthrough came to the industry when Horning unveiled the innovative Fibertech Chevron design in 2015, a patented offering that continues to lead the market. (What will be the next innovation? Stay tuned!)

Tooth style contributes to quality kernel processing in 3 ways:

1. Groove patterns affect the way the forage crop mat feeds through between the rolls. This affects wear life, crop mat penetration and throughput capability.
2. Tooth shape, formed by the intersecting lines running horizontally and vertically across the roll, is key to the type of processing action. Fibertech Chevron tooth shape has square corners and can be used with either the Hi-Capacity sawtooth profile or the straight tooth profile, depending on the application. The shape and profile combination of the teeth have a huge bearing on how much ripping action happens, how the crop mat is penetrated and the wear pattern of the roll.
3. Tooth quantity configurations can be chosen for different fineness in processing for various applications.

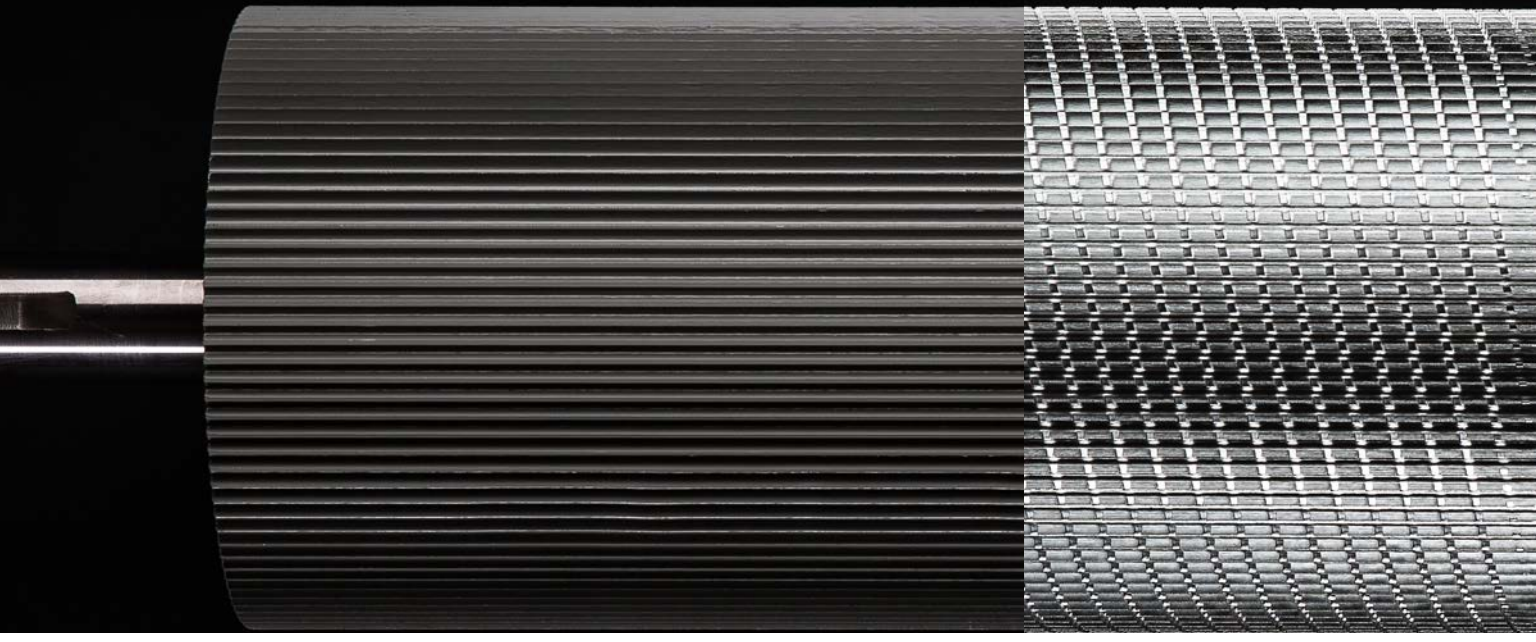
The more aggressive roll patterns are designed for higher throughput on higher horsepower machines and better processing.

4 Speed Difference

The fourth critical factor (a driving factor) to quality kernel procession is the speed difference at which the rolls are spinning. 20% differential was common in the early days but has been stepped up to 30% in most models. Today, new machines are delivered with at least a 30% speed differential, and most times in the self propelled industry a 40% to 50% differential, which delivers the optimum processing action.

Some older machines will not be able to go more than 30% but quite a few can be updated. It simply takes more horsepower to do a better processing job. The higher the speed differential, the more visible the results. See page 23 in this brochure on how to figure speed differential.

Horning Roll Line-up

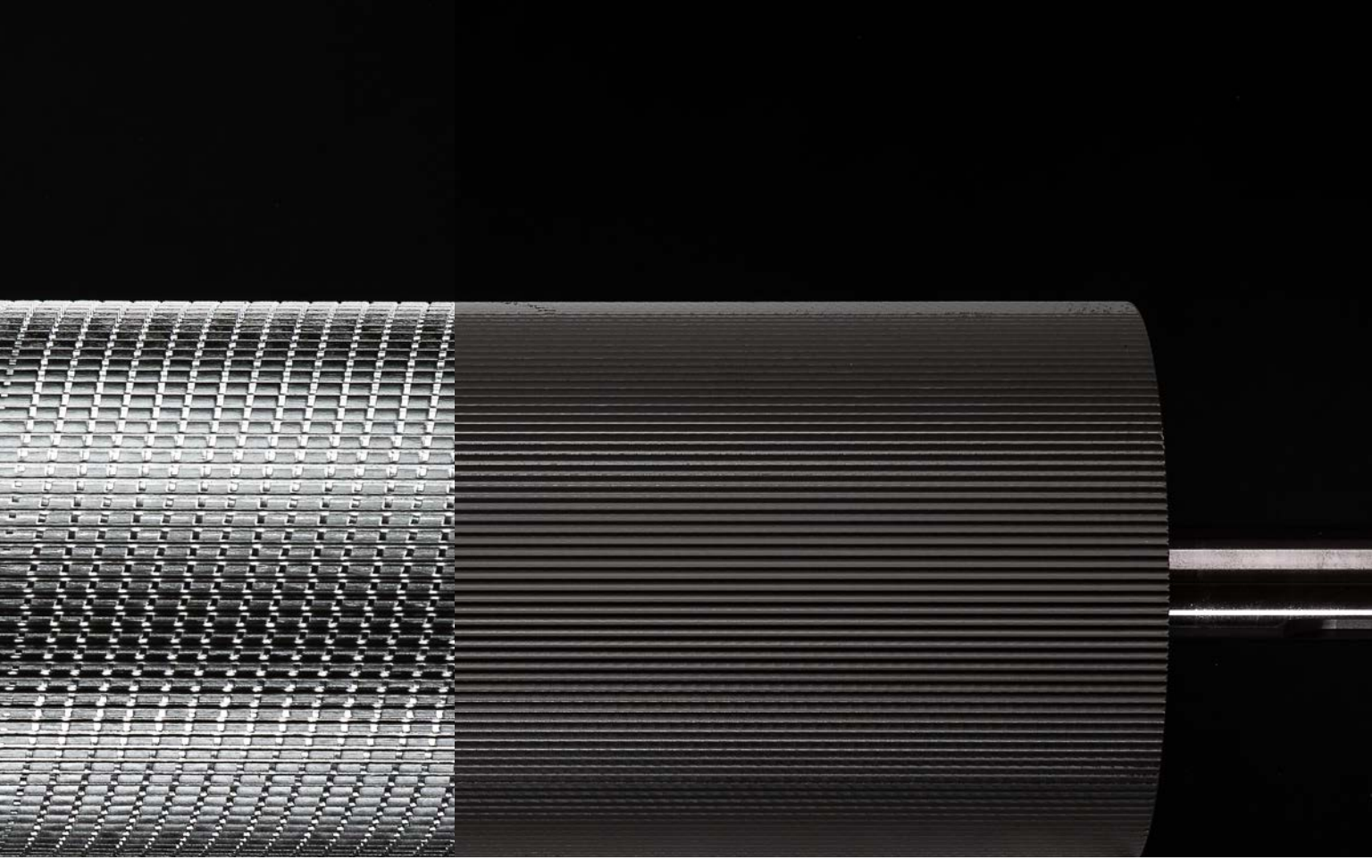


Sawtooth

- The sawtooth design was an enhancement to the original straight-tooth design. It adds a tearing action instead of smashing
- Superior crop mat penetration compared to competing sawtooth options
- Power efficient
- Can be used on older, lower-power machines
- Process kernels in one dimension
- Less stalk processing than grooved designs
- Less strain on your machine
- Runs in speed differentials ranging from 20-40%

FIBERTECH CHEVRON

- Horning's patented design leading the industry in kernel processsing effectiveness
- Superior crop mat penetration at any chop length
- Most intense kernel processing design on the market
- Utilizes hi-capacity sawtooth profile for standard forage processing applications
- Process kernels in multiple dimension, tearing while shearing sideways with the groove pattern
- Less strain on your machine. End strain comes from a single direction groove pattern designs in competing brands
- Runs in speed differentials ranging from 30-50%
- Crop mat feed-through is efficient, allowing maximum performance at a minimum of wear



Straight Tooth

- Straight tooth rolls were the original KP roll design in the industry using crimping action to process kernels by crushing
- This tooth configuration is primarily used in the milling industry
- This tooth in a fine tooth-count is used in conjunction with the Fibertech Chevron pattern for small-grain, whole-crop processing applications
- Tooth configurations for nearly any application and size of milling need

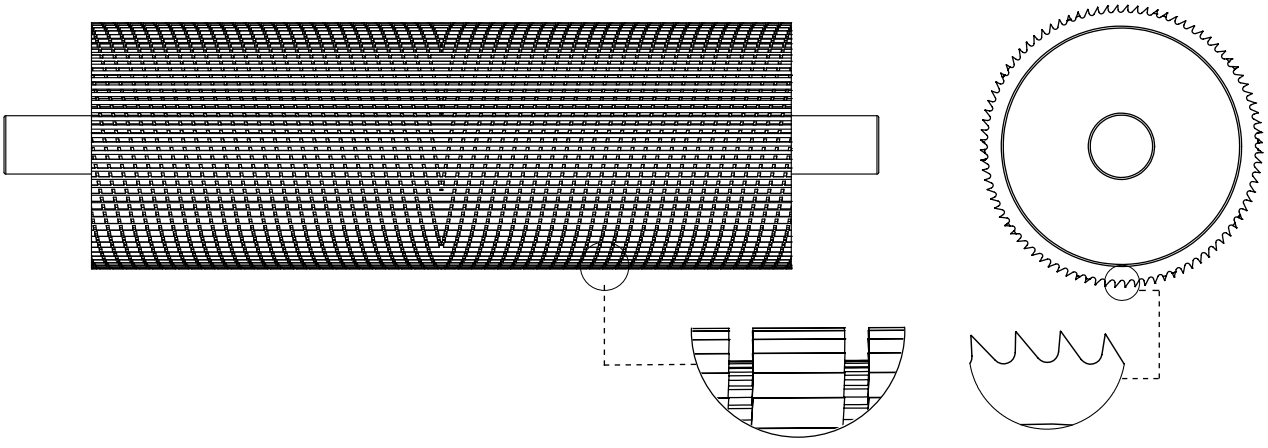
All Horning Rolls:

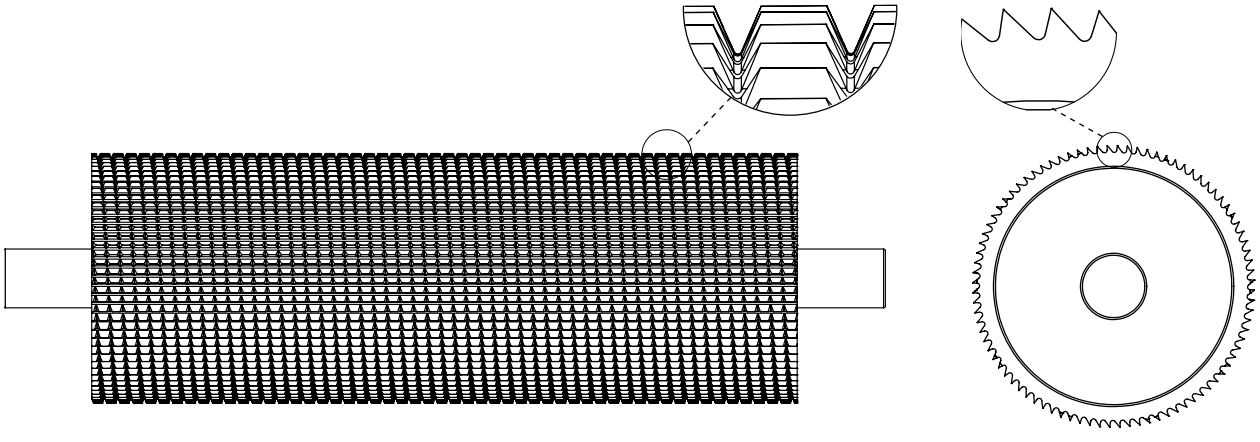
- Made from the best quality materials
- Multiple tooth-count options available for fine-tuning your kernel processing strategy
- Available in heat treated only or chrome plated for choosing economics vs. wear life
- Precision balanced
- Every roll is quality control inspected

Tooth Detail

FIBERTECH CHEVRON

Horning Fibertech Tooth Details





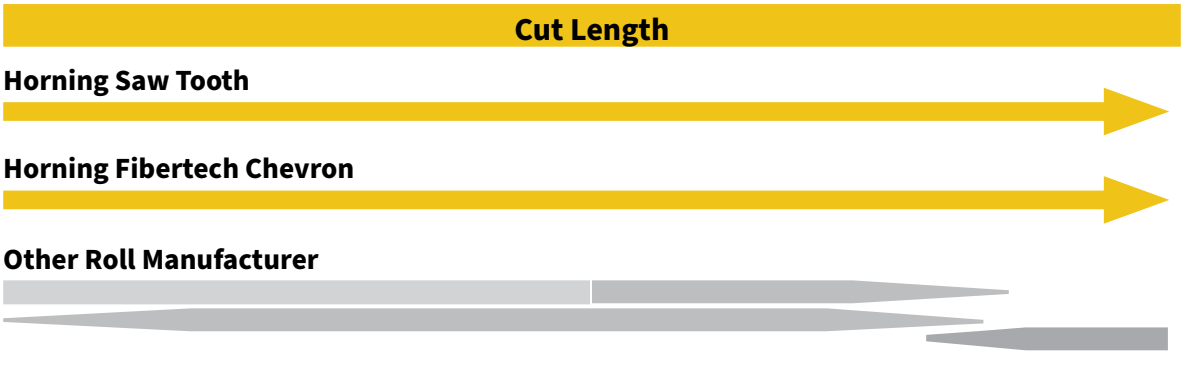
Other Roll Manufacturer's Tooth Details

The process Horning uses in the milling production of our rolls creates a sharp, square tooth edge. Other rolls have a sloped tooth wall and slightly rounded effect to the edges of the tooth. The square effect, coupled with the Horning's Hi-capacity sawtooth profile design creates a peerless aggression in unwrapping the cellulose fibers of the stalk, and penetrating the crop mat for outstanding KP quality and consistency.

Why are Horning rolls legendary for longevity and wear resistance?

1. They are carefully engineered to optimize the crop mat flow pattern between the rolls contributing to outstanding evenness of wear.
2. Our milling technique in the manufacturing of the rolls creates the uniquely square tooth.
3. Our coating method is detailed and focused on creating highest-quality surface hardness.

Crop Mat Penetration at Varying Crop Lengths



Sieve Tests

These comparison tests were done in the UK in machines with the rolls of comparable condition, all with minimal wear. Each test was duplicated three times to get an average of the result. The results were done in the same field with the same crop on the same day. The pictures reflect the most aggressive roll option offered by each manufacturer.

Leading Competitor

18mm chop length

1mm KP gap

We encourage you to do your own tests to see for yourself. For convenient and accurate KP scoring, check out the SilageSnap App that uses a smartphone camera; available for iOS or Android.

Horning Fibertech Chevron

20mm chop length

1mm KP gap

Leading Competitor, 100/125 Teeth, 18mm chop length, 1mm KP gap. 30% Differential						
	Sample 1		Sample 2		Sample 3	
	Weight (grams)	%	Weight (grams)	%	Weight (grams)	%
Top Sieve	100	13	109	15	112	14
Middle Sieve	502	65	488	65	517	66
Bottom Sieve	122	16	105	14	108	14
Tray	54	7	48	6	45	6
Total	778	100	750	100	782	100

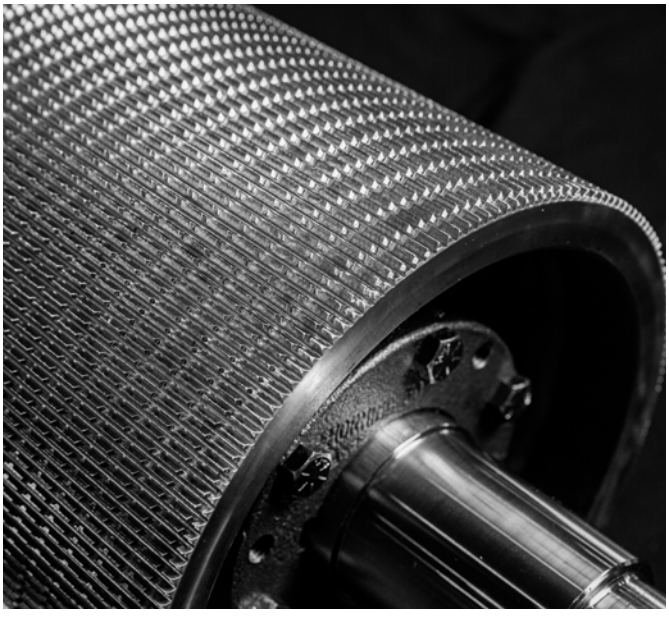
Leading Competitor, 18mm chop length, 1mm KP gap. 50% Differential						
	Sample 1		Sample 2		Sample 3	
	Weight (grams)	%	Weight (grams)	%	Weight (grams)	%
Top Sieve	93	11	121	13	109	11
Middle Sieve	545	62	562	62	624	63
Bottom Sieve	131	15	116	13	135	14
Tray	105	12	114	12	115	12
Total	874	100	913	100	983	100

Horning Fibertech Chevron, 15mm chop length, 1mm KP gap. 50% Differential						
	Sample 1		Sample 2		Sample 3	
	Weight (grams)	%	Weight (grams)	%	Weight (grams)	%
Top Sieve	57	6	76	9	62	7
Middle Sieve	525	57	477	58	473	56
Bottom Sieve	187	20	141	17	171	20
Tray	157	17	124	15	146	17
Total	926	100	818	100	852	100

Horning Fibertech Chevron, 20mm chop length, 1mm KP gap. 50% Differential						
	Sample 1		Sample 2		Sample 3	
	Weight (grams)	%	Weight (grams)	%	Weight (grams)	%
Top Sieve	96	11	96	10	91	10
Middle Sieve	438	48	458	46	465	50
Bottom Sieve	203	22	225	23	197	21
Tray	176	19	194	20	184	20
Total	913	100	991	100	937	100

Whole Crop Processing

Whole crop processing is a popular form of forage production in some regions, particularly in the United Kingdom and in some small regions of the United States. In the UK, whole crop forage is often processed in anaerobic digesters. There are a variety of crops that work well for whole crop kernel processing, and each has distinct need to optimally process both kernel and stalk during the harvest.



Straight Tooth + FIBERTECH CHEVRON

Straight Tooth Meets Fibertech Chevron

Working to solve the need for ultra-fine processing with these small grains, Horning married "old" technology with the new for an innovative, high-performance solution. The straight-tooth roll with a high tooth count for super fine processing was combined with the patented Fibertech Chevron groove pattern. Initially a customized solution, this roll has become a popular and very effective stocked item that offers a whole crop processing solution that is second to none!

Continual innovation means exploring new frontiers. Horning would be delighted to customize a solution for your forage or grain processing challenge.


JAGUAR
PAUL GUNTHER CONTRACTING LTD
SPRUCE
BAILEY
CLAAS
DIRECT DISC

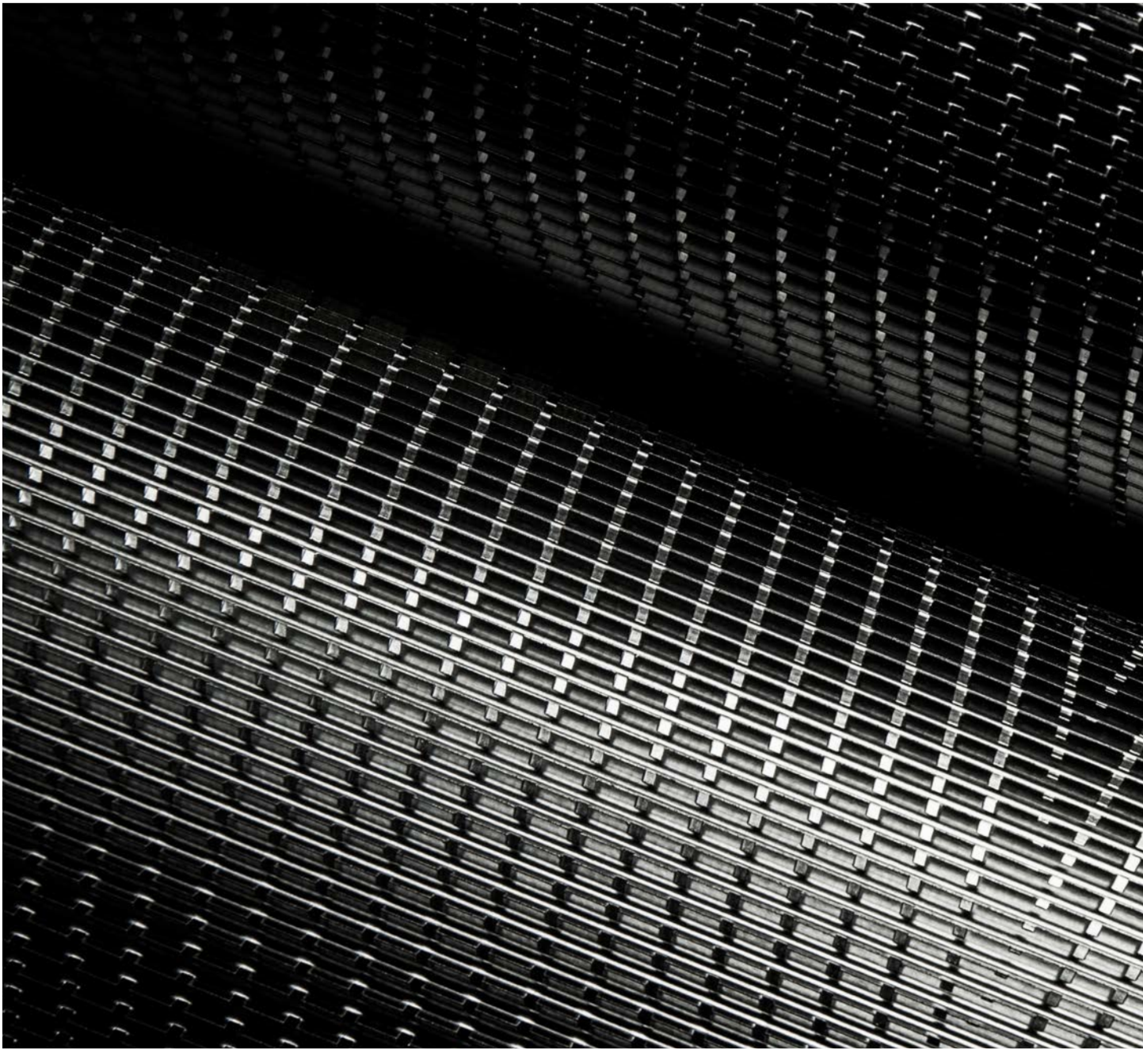
Fibertech Chevron Rolls

FIBERTECH CHEVRON

A Revolution in Kernel Processing

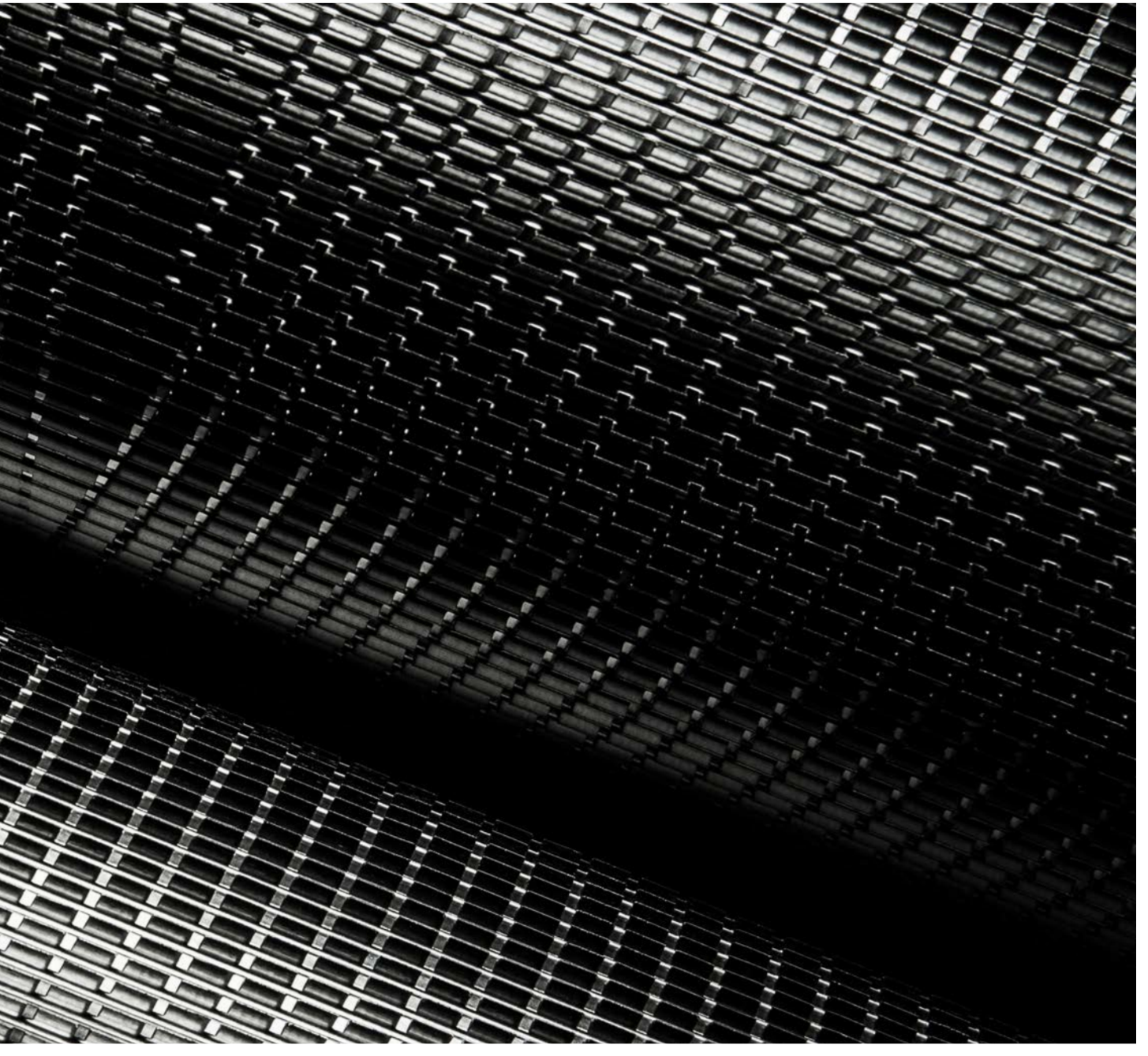
This patented roll design is a game changer, combining the best of dual cut and sawtooth technologies and amping them up for a win-win-win!

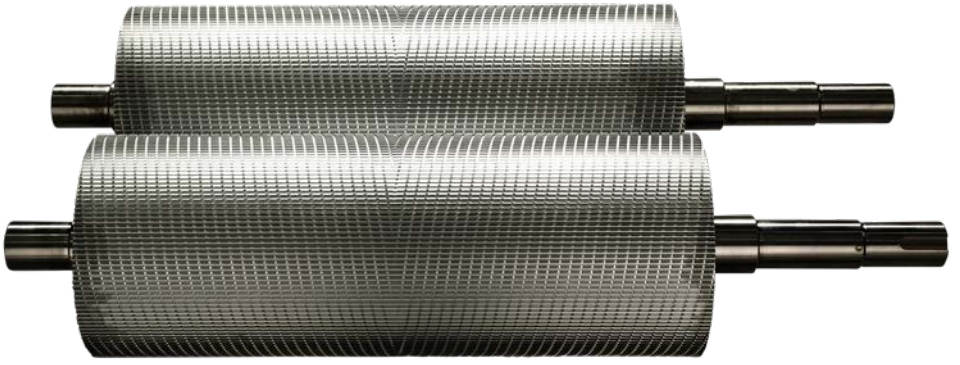
The Fibertech Chevron roll was designed as an ultra-performance solution at the intersection of farm profitability, optimized nutritional value, and in-the-field harvest rigors. A nutritionist's dream, a farmer's problem solver, and a custom operator's sidekick.



Aggressive Spirals & Square Corners

Where roughage hits the roll is no place to curve corners. The closer, more pronounced grooves with the chevron pattern create sharp corners on the teeth—those kernels don't stand a chance! The result is optimum cob grip and aggressive kernel processing action. The spirals spin out from the center, distributing stress balance across the roll, reducing end wear and enhancing forage feedthrough.





Connecting Your Horsepower to Tonnage

As forage harvesting technology advances, greater horsepower steps onto the field. Harnessing those horses is key. The Fibertech Chevron roll is extremely power efficient on a per ton basis, optimizing the horsepower to tonnage conversion. The intense work of shredding the cellulose is no longer a bottleneck. With Fibertech rolls in the equation, horsepower equals tonnage out the chute.

Combined Tooth Configuration Accents Speed Differential

Running processing rolls at different speeds has enhanced kernel processing scores for many years. Not satisfied, we took extreme processing beyond the unique roll pattern design by innovating where the rolls meet. We learned how to optimize kernel processing by running different tooth configurations that complement the speed variable.

Quality Materials for the Long Haul

In the marathon we expect our rolls to run, the short haul is just the warm up. The relentless weeks and grueling rigors of chopping season reveal the stuff we are made of. That's why these rolls are constructed of premium stuff—selectively sourced alloys that are closely monitored through manufacturing and meticulously inspected before shipping.

Easy on Your Machine

Every Fibertech Chevron roll leaves our facility expertly balanced to an extremely close tolerance. Shaft and roll body alike are engineered to run perfectly smooth. The spiral action handles the forage in way designed to distribute stress evenly across the roll to reduce end wear, bearing stress, and overall machine stress.

Productivity Out the Chute!

The Fibertech Chevron is a hungry brute. Watch it hog through amazing throughput, delivering consistent kernel processing at extreme levels with much higher volume than traditional sawtooth rolls.

Horning Tough for Up to 3x Wear Life

Though it goes without saying, the Fibertech Chevron roll is built like you'd expect a Horning to be. Every aspect of the engineering is simple, straightforward, and built to last. All Fibertech rolls are finished with our highest wear-resistant finish of heat-treated chrome plating, which extends the wear life up to 3x on self-propelled choppers.


BAILEY


JOHN DEERE
9600i
FY19 FUH

High-Capacity Sawtooth Rolls

Teeth With a Bite

Compared to a Straight Tooth roll, this guy is vicious. The hook shape engineered into the tooth transforms the smashing action of a plain ole roller mill into a slicing, ripping action that puts OEM rolls to shame. These powerful teeth combined with a wider gap makes this roll a market leader in capacity.

Differing Roll Speeds to Pack a Greater Punch

Consistency is great, except when it isn't. These rolls are actually designed to spin at different speeds for best performance. This differential maximizes the effect of the hooked tooth design. As the forage hits the gap, the hooked teeth on each roll—one faster, one slower—disintegrate the cob, chopping the kernel into a consistent meal of tiny granules.

Power Efficiency for Less Stress on Your Machine

The Sawtooth design allows a wider gap between rolls because it processes so thoroughly. Not only that, but the cutting action increases power efficiency as well. Long story short, Sawtooth rolls are easy on your machine while devouring the forage with less effort that the old Straight Tooth.

Precision Crafted for Frictionless Running

Precision milled from teeth to shaft, this roll doesn't put up with slop. Painstakingly designed, milled, and assembled to ensure snug bearing fits and long life of chewing up forage. Strict quality control, electronic balancing, and product consistency make this unit ready to hit the ground running.

Rough and Tough

Like all Horning rolls, the Sawtooth roll is engineered to take a beating and keep on rolling. Constructed from premium materials, it's ready to take on whatever you throw at it. With a Sawtooth purring in the machine, you can turn your attention to other things. Sawtooth rolls are in it for the long haul.

Choose the Best Tooth Configuration

Whether you'd like to run your tooth configurations fine or coarse, we have precisely what you need. You know best what works for you, so with multiple tooth configurations, you can customize your roll to your conditions for the best value to your application.

High-Level Wear Resistance

When manufacturing is complete to our rigorous specifications, all Horning rolls are heat treated to harden the steel for long life in tough conditions. You can add chrome plating for up to three times the roll life.

More Customization Options

We love innovation. And we love options. We are committed to offering a high level of customization so you can dial in your roll to your application for optimum efficiency. Horning has it.


NEW HOLLAND

Straight Tooth Rolls

The Old Standby

This roll style is the original crimping-style roller still used in roller mills today. While Horning has dramatically improved kernel processing technology in forage applications with improved tooth and lateral action designs, the Straight Tooth roll is still Old Faithful for some applications.

Superior Design, Superior Performance

Precision milled Horning rolls stand tall among the competitive roll options on the market. We embedded in this design all that we have learned from 20 years experience engineering solutions for the harshest conditions.

Tough Enough

Instead of embracing the “cheapen it up” philosophy of our age, we go the other direction. We believe in building it the best way possible. Designed and built like a tank, the Straight Tooth roll doesn’t give up when the going gets tough.

Quality Materials That Last Longer

Material sourcing is key for premium product quality. We carefully choose and test premium metal alloys to find the best materials for each application. Quality materials = no regrets.

Wear Happens—But We’re Ready

Heat, friction, vibration, and stress—it’s all part of the job that we design Horning rolls to meet (and conquer). Every Horning roll is heat-treated to harden the steel for enhanced wear resistance. Chrome plating is available on some products for up to three times the lifetime.

Choose Your Best Tooth Configuration

Horning has always believed that you deserve options so you can get the best results. Choose from a number of tooth count configurations to best serve your application.

Specialty Grains in Forage Harvest

Specialty mills, roller mills, and forage harvesters for whole crop sorghum and milo are prime candidates for these rolls. Enjoy longevity, quality, and outstanding customer service with your Horning replacement Straight Tooth roll.

Customize for More Success

Do you have a custom application or size? We offer complete customization and design to get you back in the field rolling toward success.

Helping you be the leader.

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