

*Already 50 years*

**Productivity  
in harmony  
with nature**



# Crimping - for successful farming



## Why is crimping profitable?

- No drying costs
- Lower labour costs
- Appetising feed
- Less weather-reliant
- Longer threshing period
- Up to 30% larger grain harvest (dry matter)
- Improved feed/straw value
- You can adopt higher yield varieties
- You can thresh three weeks earlier, at a time of highest nutrient content
- Reduces toxin levels
- Milk even 11% more

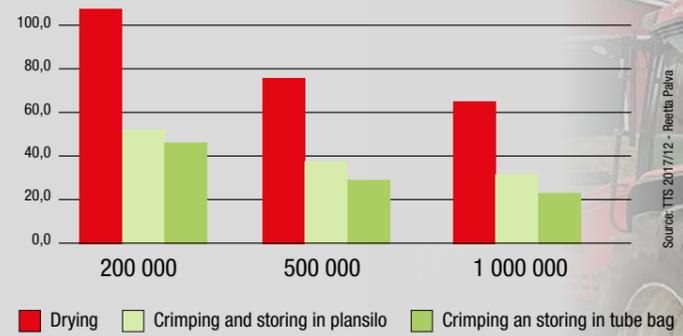
## By crimping into a plastic tube...

- No need for silos or dryers
- It takes just one operation to crimp and preserve the grain
- Quick and easy
- Your grain preservation system gives optimum productivity

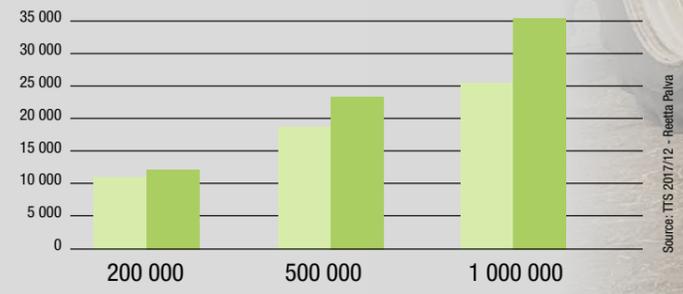


## Financial gain from crimping!

Preservation costs: EUR/ton (25% moisture content)



Saving compared to drying / EUR (Ask to your dealer to make your personal calculation)





## High quality cost-effective feed

Crimping is a cost-effective way to produce high-quality feed for all livestock. It improves profitability of the farm by reducing costs of investments (dryer, storage) and energy (oil, electricity). Production costs of crimped grain are much lower than those of dried grain.

Crimped grain is ready to feed without any further processing. It can be used directly from the storage for feeding as such or as a component of Total Mixed Rations (TMR) for cattle or in liquid feed for pigs. Ensiling of crimped grain is based on lactic acid fermentation by lactic acid bacteria. Favourable environment for lactic acid fermentation is created by lowering the pH of crimped grain to the level of 4 and by anaerobic conditions.

### Cultivation technique and harvesting

Grain for crimping can be cultivated similarly to grain for drying, but it is harvested 2-3 weeks earlier at the yellowish stage when the grain's energy content and protein content are at their highest. Early harvesting allows cultivation of late varieties with higher yield potential. Fertilization is also more flexible and manure can be used more freely. Grain at the yellowish stage is softer and bigger than at the mature stage. The moisture content of the grain is typically 30-40%.

### Crimping and ensiling

A specialized Murska crimping machine is used to process the grain. Add the crimping additive into the crimping machine to achieve good mixing of additive in the grain. Crimped grain with high moisture content is easy to consolidate to exclude air. If the grain is crimped in the field, it is unloaded directly from the combine into the crimper, crimped, and at the same time the additive is added. Finally, crimped grain is lifted with elevator to the trailer and transported to the storage site.



### Storage

Crimped grain can be stored in plastic tubes, bunker/horizontal silos, clamps or airtight tower silos.

### Bagging of crimped grain

Bagging of crimped grain in plastic tubes is low-cost and simple grain processing and storage method. Bagging is easy, since no consolidation or weighing is needed. No fixed storages are needed and size of the tube can be adjusted according to the yield. Crimping in bags is flexible as it can be stopped at any time and continued later.

Bagging is also less weather dependent than ensiling in clamp silos.

### High-value low-cost feed with crimping

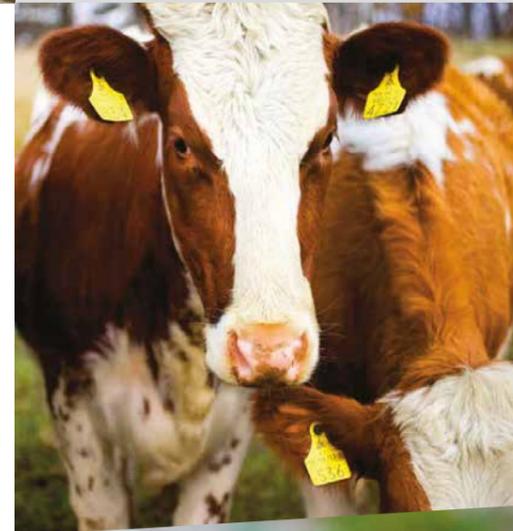
- Crimped grain has high nutritive value.
- Crimped grain fits perfectly in total mixed rations.
- Crimped grain can be used for all livestock.
- Cost per energy unit of crimped grain is lower than that of dried grain.
- Phosphorus utilization in pigs and poultry fed with crimped grain is better than in those fed with dried grain
- Crimped grain fits well in liquid feeding systems.
- Crimped grain is dust free.
- Crimping is a low-energy method of processing feed grain.
- Crimping allows the use of later cereal and maize varieties; harvesting even under unfavourable weather conditions.
- Reduces toxin levels

## Valuable and low-cost feed for all livestock

Despite of the earlier harvesting time, the nutrient content of crimped grain is similar to that of the grain harvested at full mature stage. Crimped corn is very high performance feed and can achieve even 11% increase for the milk production of dairy cows.

### Ruminants

Beef cattle grow as well or even faster with crimped grain as compared to dried grain. Several studies have confirmed that dairy cows produce as much milk with crimped grain as with dried grain.



Overall nutritive value of crimped grain for ruminants is similar to that of dried grain. The actual amounts of crimped grain fed or used in TMR are higher than those of dried grain due to lower dry matter content of crimped grain. Otherwise crimped grain can be fed as dry grain and it can completely replace dry grain in feeding

### Pigs

Crimped grain can be fed to pigs as such. It fits perfectly for liquid feeding. In practice, 8-10% variation in dry matter content of grain does not affect the daily growth or the feed conversion ratio. Vitamin E content is lower in crimped grain. In practice, crimped grain can fully replace dried grain in the feeding of pigs.



### Crimping in a nutshell

- Harvest 2 to 3 weeks earlier than normally at yellowish stage; optimal grain moisture 30-45%.
- Crimp on the field or at the storage with Murska crimper.
- Use additive 3-5 liters per ton.
- Store in bunker silos, plastic tubes, bags or tower silos.
- Remember careful compacting, covering and weighing.
- Feeding can start about 3 weeks after closing the silo.

### Poultry

Crimped grain as such is palatable feed for poultry, too. Crimped grain improves both daily weight gain and feed conversion ratio of broiler chickens. This is related to the 25% higher energy value of crimped grain as compared to that of dried grain. Energy value is increased due to the lower  $\beta$ -glucan content in crimped grain resulting in lower gut content viscosity. This effect is similar to that of  $\beta$ -glucanase enzyme. Digestibility of lysine and threonine are increased in broilers fed crimped grain as compared to those fed dried grain. Similarly to pigs, digestibility of phosphorus is increased, too.



# W-Crimping technology

**Murska W-Max** is a power mill, designed to meet the user's every need. W-Max will achieve up to 50 tonnes/hour (maize) performance at low energy need. The new grinding crimping technology gives perfect results.

The W-roller can be used on all feed grains, whether dry or harvest-moist: oats, barley, wheat, maize, peas, beans and mixed grains.

Murska W-Max is comfortably quiet and really fun to use. It is capable of carrying a large volume of preservative. It is easy to adjust the crimping level, but this is seldom necessary. The service points are easily accessible. The advanced control system allows the user to stop thinking about the preservative dosage and the crimped tons of grain. **Is there any easier way to preserve grain?**

## W-Data control system

The optional control system facilitates use. The mill has automatic fill control, and preservative dosing is based on the moisture content of the grain. When the work is complete, the system sends a report to a mobile phone, and the contractor can attach it to his invoice. The report details the time spent, the amount of preservative added and the total volume of the crimped cereal. The system will also produce interim data. The control system takes care of user and machine security. In the event of a disruption, the mill alerts the user and stops the supply of grain.

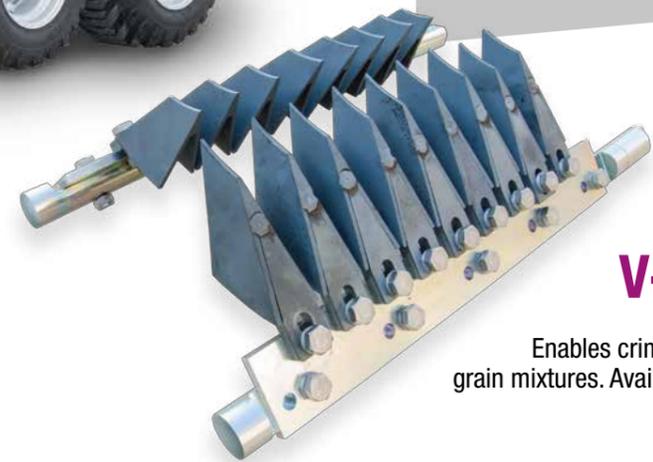


# W-Max



## Best of the bests W-Max 20C

**Murska W-Max 20C** is a high-performance professional product, designed to the last detail. Drawn by a tractor, the mill runs smoothly and comfortably along the bumpiest of roads, thanks to a spring bogie. It accommodates up to 2800 litres of additive. There is a wide range of transporter options.



## V-Scrapers

Enables crimping high moist pea and horse bean grain mixtures. Available as optional for all W-Max models.



## Surprising performance W-Max 15

A capacity is up to 30 tonnes/hr of harvest-moist grain. A tube packing machine or 3-5 m discharge elevator can be placed on the multipurpose chassis.

# W-Max



## Favorite model W-Max 10

A capacity is up to 20 tonnes/hr of harvest-moist grain. A tube packing machine or 3-5 m discharge elevator can be placed on the multipurpose chassis.



Please see the technical specifications on page 10

# The roller mill for successful farming!

Murska roller mills have become known for their power and their durable rollers. Murska machines are easy to use and maintain. Operating reliability has been confirmed globally in all conditions and circumstances.

Murska's experience in crimping goes back to 1969.



Murska 2000 with standard transport chassis



## Murska 350 S2

The mill has three-point linkage and it is generally powered by a tractor. Power requirement is 30-40 hp, and 15 kW with an electric motor. Wet grain crimping capacity is 5 t/h, while with dry grain it is 3-10 t/h, depending on the roller surface.

## Murska 700 HD

The smallest HD model is the Murska 700 HD, which is excellent on medium-sized and slightly larger farms. The mill incorporates gear-driven specially hardened rollers, which will crimp millions of kilos of feed grain. Wet grain capacity is 10 t/h, while with dry grain it is 8-20 t/h, depending on roller surface. Tractor power requirement is 70-80 hp.



## Murska 2000 S 2x2

The technical specifications of the Murska 2000 S 2x2 are the same as for its smaller version, the 1400 S 2x2, but with enhanced crimping capacity of up to 50 t/h. This is usually enough for even the busiest farmer or contractor. A wise choice, if time is of the essence.



## Murska 1400 S 2x2

The Murska 1400 S 2x2 is equipped with a unique roller cassette, driven by four gears, achieving a crimping capacity of up to 40 t/h. The tractor power requirement is 140 hp.

The mill has a standard transport chassis or Max bogie trailer. The latter is able bring up to 2800 litres of additive and runs smoothly drawn by a tractor. Standard equipment includes hydraulic elevator tilt, working lights and a tool box. The Murska 1400 S 2x2 is an ideal machine for crimping large quantities of feed grain in a short space of time.



Murska 1400 with Max bogie trailer

## Diverse range of equipment

- Trailer chassis for Murska 350-1000 roller mills
- Bagger tube packing machine
- Acid bottle stand for a 200 litre barrel with hoist
- Additional hopper
- Range of rollers: 2, 3 and 4 mm groove pattern and spot flute
- Three times more operating time with super rollers

## Murska 1000 HD

A larger model in the HD range, the 1000 HD looks the same as the 700 HD and has the same technical specifications, but it is equipped with longer rollers.

Crimping capacity is up to 30 t/h. The efficient operation of the Murska 1000 HD requires an 80-90 hp tractor.



Please see the technical specifications on page 10



	10C	15C	20C	350 S2	700 HD	1000HD	1400 S2x2	2000 S2x2
Capacity max	20 t/h*	30 t/h*	50 t/h*	10 t/h*	20 t/h*	30 t/h*	40 t/h*	50 t/h*
Power requirement	60-80 kW	80-120 kW	80-120 kW	15-30 kW	20-50 kW	30-65 kW	75 kW	95 kW
Hopper volume / auxiliary tank	380 / 3500 l	400 / 3500 l	2200 / 3300 l	190 / 1700 l	300 / 2330 l	365 / 3500 l	1600 / 3400 l	1700 / 3400 l
Max-bogie trailer	4100 mm	4100 mm	4480 mm	3600 mm	4100 mm	4100 mm	4180 mm	4180 mm
Elevator unloading height	5800 / 5330 mm	5800 / 5330 mm	7370 / 7000 mm	5800 / 1459 mm**	5800 / 2002 mm**	5800 / 2252 mm**	5600 / 4400 mm	5900 / 4700 mm
Max-bogie trailer	2245 / 2150 mm	2245 / 2150 mm	2535 / 2475 mm	2245 / 1242 mm	2245 / 1374 mm	2245 / 1374 mm	7367 / 6568 mm	7367 / 6568 mm
Widht bagger / elevaattori	2120 / 2020 kg	2500 / 2400 kg	4000 / 3900 kg	1705 / 605 kg	1990 / 990 kg	2260 / 1269 kg	3200 / 2800 kg	3620 / 3170 kg
Max-bogie trailer	2910 mm	2910 mm	3120 mm	2848 / 2187 mm	2520 / 3036 mm	2520 / 3036 mm	4500 (E) / 4800 kg (BC)	5000 (E) / 5300 kg (BC)
Loading height bagger / elevaattori							2900 mm	2900 mm
CRIMPING UNIT								
Discs / rollers	19 pc.	31 pc.	39 pc.	2 kpl 350 mm	2 kpl 700 mm	2 kpl 1000 mm	4 kpl 700 mm	4 kpl 1000 mm
Guard magnets	X	X	X	X	X	X	X	X
Protection against impurities	X	X	X	X	X	X	X	X
OPTIONS								
Elevator extension	1 m	1 m	1 m	1 m	1 m	1 m	1 m	1 m
Electromotor drive	-	-	-	15 kW	30 kW	45 kW	-	-
Additive Dispenser	-	-	X	-	-	-	X ***	X ***
Automatic lubrication system	X	X	X	X	X	X	X	X
W-Data	X	X	X	-	-	-	-	-
Preservative dispenser	X	X	X	X	X	X	X	X
Discharge conveyor options	B/E	B/E	B/E/BC/FA	B/E	B/E	B/E	B/E/BC/FA	B/E/BC/FA
Transport alternatives	M	M	Max	NK/K	NK/K	NK/K	S/Max	S/Max

Bagger = B Elevator = E Belt conveyer = BC Foldable auger = FA

M = Multipurpose Chassis Max = Max bogie trailer S = Standard transport chassis NK = 3-point linkage K = Transport Chassis

\*Capacity can be lower when crimping horse bean / pea grain mixtures \*\* 3-point linkage \*\*\* Max-bogie trailer

\*\*\* Max-bogie trailer

The manufacturer reserves the right to make changes.

## Murska Rear elevator - elevator transport chassis as optional extra for the bagger

For situations where an elevator is necessary in addition to the bagger, for instance when the grain is crimped in the field directly from the harvester to the cart.

Assembly is easy, using for example the front loader's lifting forks. Attachment is by quick-hitch latches.

The elevator is driven by a hydraulic motor and has a hydraulic cylinder tilt.

The rear elevator fits all bagger models.

## Murska models that can be equipped with a tube packing machine

Murska 350 S2 • Murska 700 HD • Murska 1000 HD  
Murska 1400 S 2x2 • Murska 2000 S 2x2  
Murska W-Max 10 • Murska W-Max 15 • Murska W-Max 20

# Murska equipments

## Equip your roller mill with a tube packing machine

### Preserving grain in a plastic tube is a cost-effective and easy solution

The Murska roller mill equipped with a bagger crimps, adds preservative and packs the harvest-moist grain into an airtight plastic tube - all in a single operation. The crimped grain is ready-to-feed fodder, suitable for all livestock. The tube can be filled to mostly a length of 60 m, meaning that a sack measuring  $\varnothing 2.0$  m will accommodate around 180 m<sup>3</sup> of high-quality compacted grain. There are available different bag sizes.

The opening in the sack is easy to manage, and suitable also for minor consumption.

Tube packaging comes into its own especially on farms which buy in some of its grain feed. Often, grain is delivered irregularly, and there can be a break of several days in the crimping operation. In the case of tubing, preservation can be interrupted without any additional work phases.





**Elevator**

Discharge elevator conveyor tilts manually or hydraulically. Unloading height is 3.6-5.2 m.

Crimped grain flow can be adjusted in the desired direction by a remote control. (optional accessory)



**Folding screw conveyor**

This folding screw conveyor designed for unloading is both powerful and comfortable to use. Unloading height is 4.1 m.

**Automatic lubrication system**

Automatic lubrication system is available for all Murska crimper. The system lubricates the connected items fully automatically. The user needs only to take care of filling of the lubricant container. The system pumps the optimum amount of lubricant to each lubrication point as required.



**Additive pump**

HP20 is reliable and easy to use. Capacity of the pump is 0-5 l/min.



**Pro-Device additive pump**

First class accuracy and usability. Dosers enclosure is made of stainless steel. Intelligent control electronic regulates flow to a certain constant level. A change in supply voltage, suction/pumping height or fluid level in the tank does not affect the total delivery.



**Belt conveyor**

The belt conveyor enables the unloading of crimped grain from both sides directly to the back because the conveyor turns 180°. This is why the mill is suitable in different kinds of crimping conditions. Unloading height is 4.1 m.



**Additive dispenser**

Vitamins, urea/maxammon additives etc. can be dosed with crimped grains by the dispenser. It is equipped with load sensors and a tachometer to get the most accurate result.

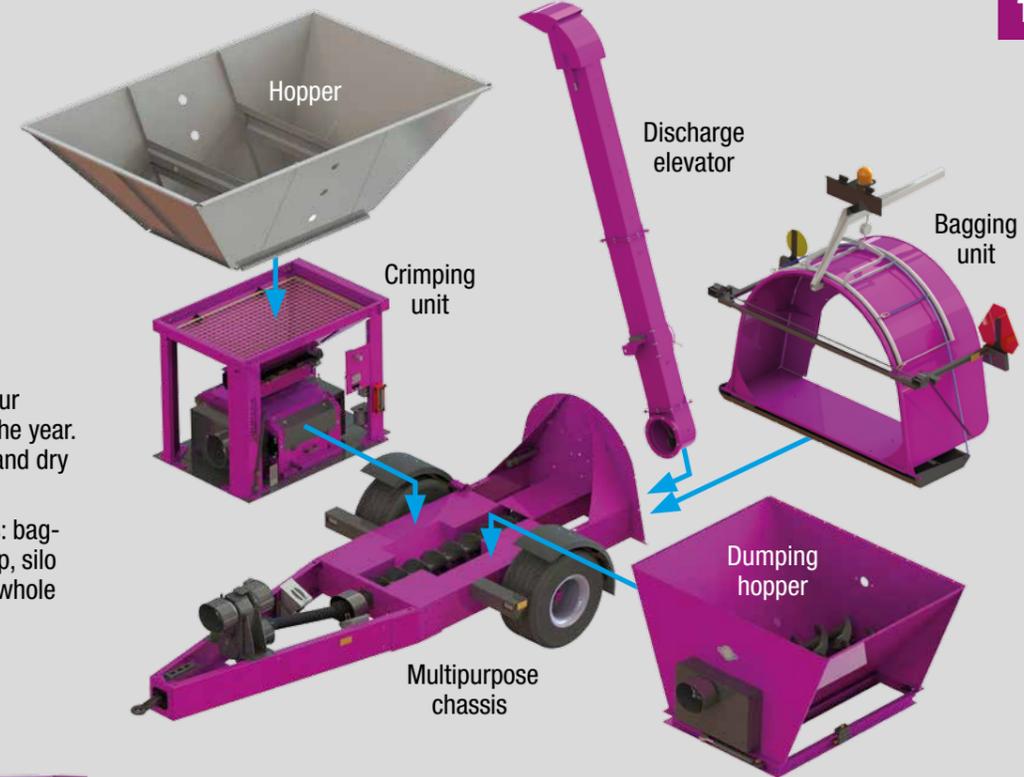
Hopper volume	900 l.
Input	12V
Hydraulic	45 l/min
Length	1560 mm
Height	1319 mm
Width	1391 mm
Weight	380 kg
Display	x
Tachometer	x



**Murska Multipurpose Chassis**

Gives you a possibility to use your Murska equipment throughout the year. Crimping unit for high moisture and dry grain/maize crimping.

Dumping hopper for other times: bagging whole cereals, pressed pulp, silo maize, brewery grain, chopped whole grain etc.



**Electric motor drive**

An electric motor driven crimper saves energy and helps to reduce air pollution. Automatic start-up and close down. Rotation safety guard stops the mill in case the drive-belt slips or breaks.

**Dumping Hopper**

Murska bagger with dumping hopper, see details above. (multipurpose chassis)



**Murska filling augers**

The filling device transfers the grain to the roller mill, the trailer, the lorry or the silo, removing the need for another work phase, i.e. using a loader. The grain remains cleaner and there is less wear and tear on the mill rollers.

	FA-300	FA-250
Capacity	->40 t/h	->25 t/h
Hydraulic	40-45 l/min	45 l/min
Hopper volume	1500 l	n.150 l
Unloading height	3150-3800 mm	
Length (towing pos.)	2993 (4407) mm	
Width (with wings)	2550 (2855) mm	
Tipping width	2800 mm	
Height	min. 2600 mm	
Tipping height	590 mm ->	650 mm
Weight	1300 kg	



FA-250



FA-300

## Crimp filling device

The Murska crimp feeder can be used in conjunction with a feed cart on rails, a fixed feed mixer or a liquid feed distributor, etc. Because the crimp feeder is equipped for electricity, it is easy to place in use. The hopper's front and back panels can be opened.

- The automatic Crimp Filler provides intermediate storage for crimped grain and dry grain, for instance, as well as acting as a filling device for feeders
- A robust 6 m<sup>3</sup> hopper
- Twin-lane grain transfer from hopper to conveyor screw
- A reliable elevator conveyor from hopper to feeder



## Murska roller mills for the processing of dry and acidified feed grain

The roller mill is used to crimp dry grain, to produce groat, which is more suitable for livestock feed.

The Murska 220 SM is a top-of-the-range, modern roller mill for crimping dry and propionic-acid grain. It is the result of long-term product development and is equally at home in the feeding automation chain or as part of a hand feeding system.

The rollers are at the heart of the mill, and consequently they have been the focus of special attention. They are spring-loaded, gear-driven (with both rollers driving) and hardened. Shield magnets protect the rollers from the metal.

The roller surface is optionally either spot fluted or 2 mm grooved. Spot fluted rollers are suitable for use with dry and acid grain.

Because it is possible to run the Murska 220 SM with grain between the rollers, it can also be installed directly underneath a silo.



### Murska 220 SM

Throughput	600-1500 kg/h
Power requirement	4 kW
Height	650-1300 mm
Width	600 mm
Length	830 mm
Weight	180 kg
Hopper volume	20 l
Shield magnets	2 x ø80 mm

### Pre-Crimper

Throughput	Max. 3000 kg/h
Power requirement	4 kW
Shield magnets	2 x ø80 mm
Length	750 mm
Width	650 mm
Height	385 mm

## Diverse range of equipment for transferring grain to/from the mill



## Pre-Crimper

Murska Pre-Crusher is designed to pre-crush horse beans, peas, corn, etc. large pulses before Murska 220SM crimper do the final secondary crimping. It can be used also as a separate unit for crimping beans, peas and corn.

Electric motor drive with integrated reduction gear transfer power to the hardened gear wheel driven fluted rollers. PreCrimper is comfortably quiet and almost dust free.

Pre-Crimper is controlled by the control box and a level sensor.



### Fraser Scott - DNO Scott, The Chesters, Swarland, Morpeth, Northumberland, England

Fraser Scott was aware of the high cost of drying grain as it is not often that grain in this area can be harvested dry, and the reliance on off-farm storage and processing even though the local grain store borders the farm. Mr. Scott purchased his first machine, a Murska's Korte 1400 in time for the 2011 harvest and ensiled about 2800 t in a corner of the main silage clamp. The crimping process suited the farming system and increased the profitability and performance of the cattle, and so the following year, 2 purpose built crimp clamps of 750t each were added.

### Ramon Codony-Codony Multiserveis, Hostalets d'en Bas, Girona, Catalonia, Spain

Mr. Codony says that the health and well-being of the animals is the reason why his customers choose him as their contractor. Not only does the high quality, crimped maize improve the animal health, it also increases the milk production at the farms. The farmers are happy with crimping: they can feed the animals with quality maize produced at their own farm, which leads to saving money. This way there are no drying or transportation costs for the customers.

### Jarmo Sisso - Kiuruvesi, Finland

"Crimping is the best and most cost effective alternative for processing grain: the harvesting can be done at once and green grains do not disturb." This is the conclusion Jarmo Sisso has come already with the experience of only one season.

Jesper & Jørgen Nielsen's pig farm "We have heard from some colleagues about the success with crimped maize in pig feeding. After that knowledge of good experiences, we started with a little part of the maize in the first year. Next year we bought a new Murska S 2000 for the past four seasons, and we are getting more and more satisfied every year."

### Vasili Bytshkov - FGUP "Kalozhitsy", Volosovo, Leningrad, Russia

Murska technology ensured that they had fodder for the animals during winter: the advantage of this technology is the capability of earlier harvesting when the grain is yellow and the grain's nutrient content is higher.



*Already 50 years*  
*of productivity in harmony with nature*



*It was autumn 1969 in the farm of Aimo and Gunnar Korte in Ylivieska, Finland. Their dryer machine had broken. The brothers were aware that high moisture grains could be ensiled, but it should have crimped at first. There were not machines for the purpose at that time. So they decided to begin constructing the first roller mill together with a neighbor farm. This is how the company started.*

**MURSKA**

**Aimo Kortteen Konepaja Oy**

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