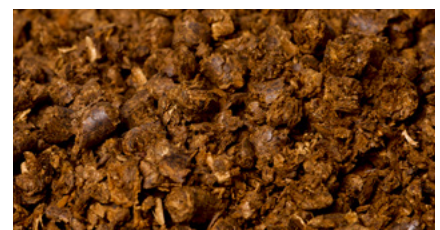
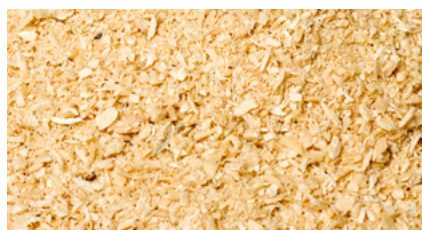
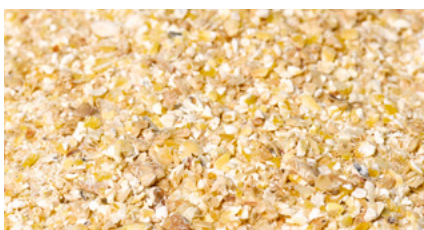
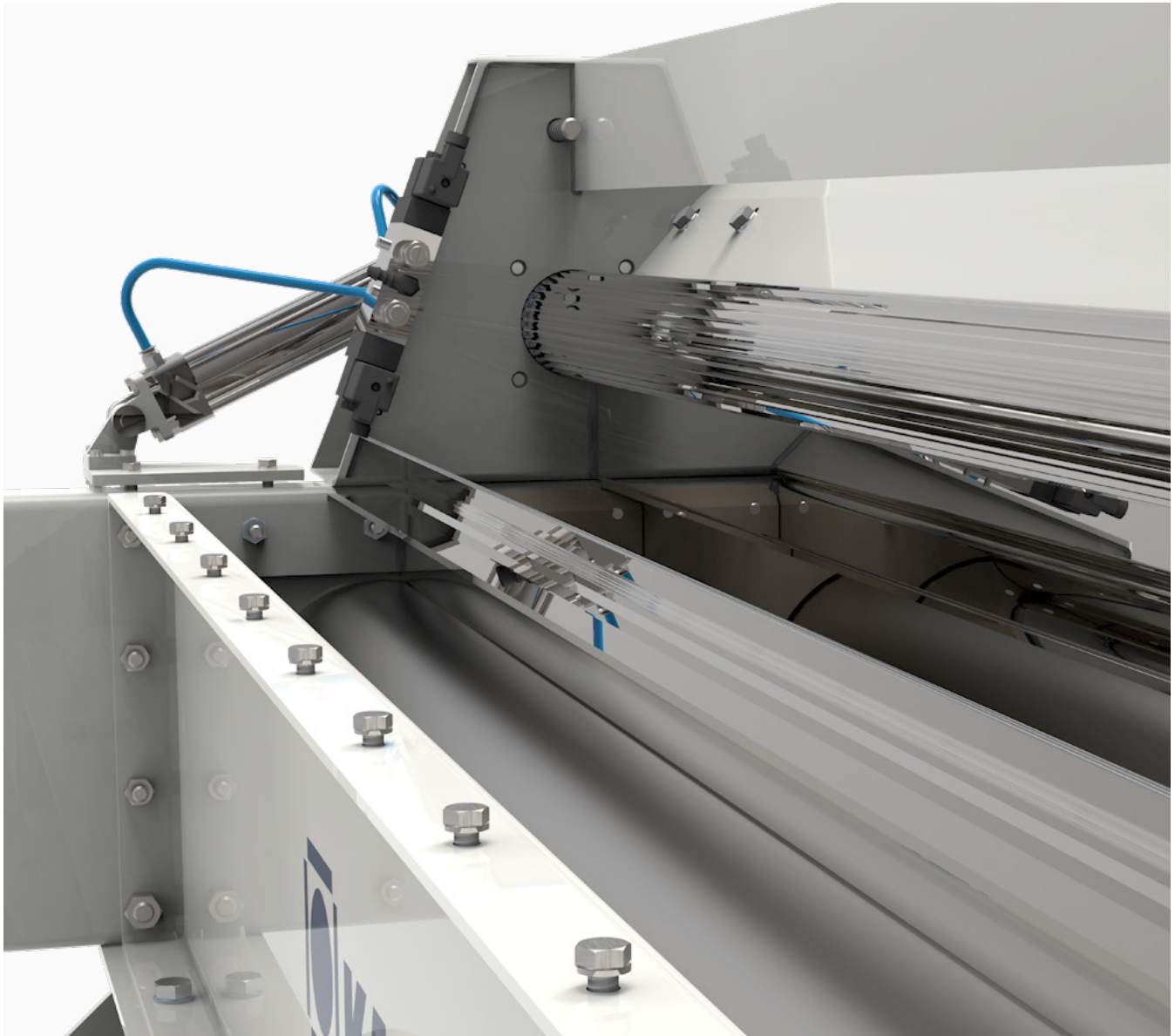


SIZE REDUCTION

GRINDING AND CRUSHING





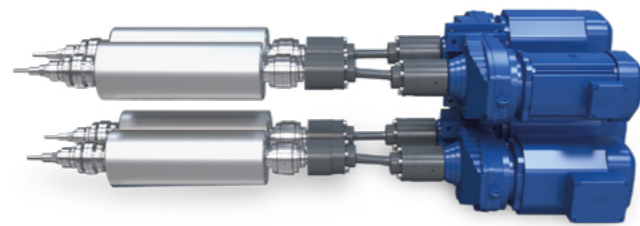
AMANDUS KAHL ACCOMPANIES YOU

on your way to the right decision

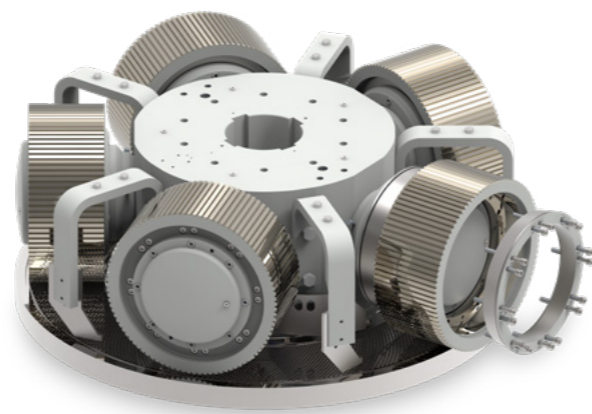
Efficient size reduction is an important factor in the production process in many industries. In the feed industry, individual size reduction is the basis for animal welfare, animal health and fattening success. The benefits of an adapted size reduction for the biomass industry are, for example, higher energy efficiency, more economical drying, and improved pelleting.

AMANDUS KAHL supplies four different size reduction machines, which are used in various industries, namely the pan grinder mill, the crushing roller mill, the crumbler and the hammer mill. The machine and plant manufacturer offers the perfect size reduction equipment for every application.

AMANDUS KAHL looks back on more than one hundred years of experience in machine and plant engineering. The complete equipment is characterized by robustness, durability, energy efficiency and flexibility. Hence, customers benefit from AMANDUS KAHL's vast know-how in size reduction technology.



↑ Crushing roller mill (pair of rollers)



↑ Pan grinder head on the die



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PAN GRINDER MILL

An energy-efficient machine for crushing and defibration of wood, recycling products, rubber and many more



The KAHL pan grinder mill defibrates lumpy biomass, waste tyres or industrial and municipal waste in an energy-efficient way and independent of the moisture content. The capacity ranges from a few hundred kilograms to 40 t/h per pan grinder mill. In addition to its low energy consumption, the pan grinder mill is also characterized by silent operation and a small footprint. Neither aspiration nor cyclone, filters or exhaust air systems are necessary.



The KAHL pan grinder mill defibrates and compacts your product at the same time.



↑ View into the pan grinder mill

Applications of the pan grinder mill

- Wood chips, wood shavings, sawdust and other lumpy biomass
- Waste tyres
- Industrial and municipal waste



↑ Wood chips G50



↑ Defibrated wood chips



↑ Waste tyre shreds



↑ Waste tyre crumb



PAN GRINDER MILL

Overview of the machine types

Type	33-390	33-500	33-600
Die diameter mm	390	500	600
Roller diameter/width mm	230/up to 75	230/up to 75	230/up to 75
Number of rollers	2	3	3-5
Kollergeschwindigkeit m/s	2,5	2,4	2,5
Drive motor kW/min-1	15-30/1500	15-30/1500	15-30/1500



Type	37-850	38-600	38-780
Die diameter mm	850	600	780
Roller diameter/width mm	350/up to 130	280/up to 100	280/up to 100 or 350/up to 100
Number of rollers	3-5	3-4	3-5
Roller speed m/s	2,5	2,5	2,5
Drive motor kW/min-1	132-160/1500	55-90/1500	75-110/1500



Type	39-1000	45-1000	45-1250
Die diameter mm	1000	1000	1250
Roller diameter/width mm	350/up to 154 or 450/up to 154	450/up to 154	350/up to 130 or 450/up to 190
Number of rollers	3-5	3-4	3-6
Roller speed m/s	2,5	2,5	2,5
Drive motor kW/min-1	160-200/1500	200-250/1500	200-315/1500



Type	55-1500	65-1250	60-1500
Die diameter mm	1500	1250	1500
Roller diameter/width mm	450/up to 240	450/up to 190	450/up to 240
Number of rollers	4-6	4-5	4-6
Roller speed m/s	2,5	2,5	2,5
Drive motor kW/min-1	160-315/1500	2x250-315/1500	2x160-220/1500

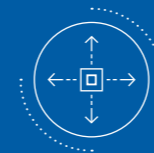


ADVANTAGES OF THE KAHL PAN GRINDER MILL



Advantages offered by the machine

- High robustness
- Long service life and low wear
- Low consumption of operating materials
- Low lubricant requirement
- Low operating costs
- Fast and easy die change
- Low space requirement and footprint
- Low noise
- Large grinding chamber for voluminous products
- Large pan grinder rollers with low circumferential speed
- Adjustable pressure due to hydraulic system and thus easier machine start
- Product feeding by gravity
- Low maintenance – remote diagnosis possible
- Axial face seals of the pan grinder rollers



Advantages for the products to be defibrated

- No lubricant in the product
- Highest flexibility in crushing raw materials
- High quality of chips and granules
- Suitable for production of wood chips up to class G50
- Pre-grinding for fine grinding without difficulties in conventional hammer mills



Advantages offered by AMANDUS KAHL

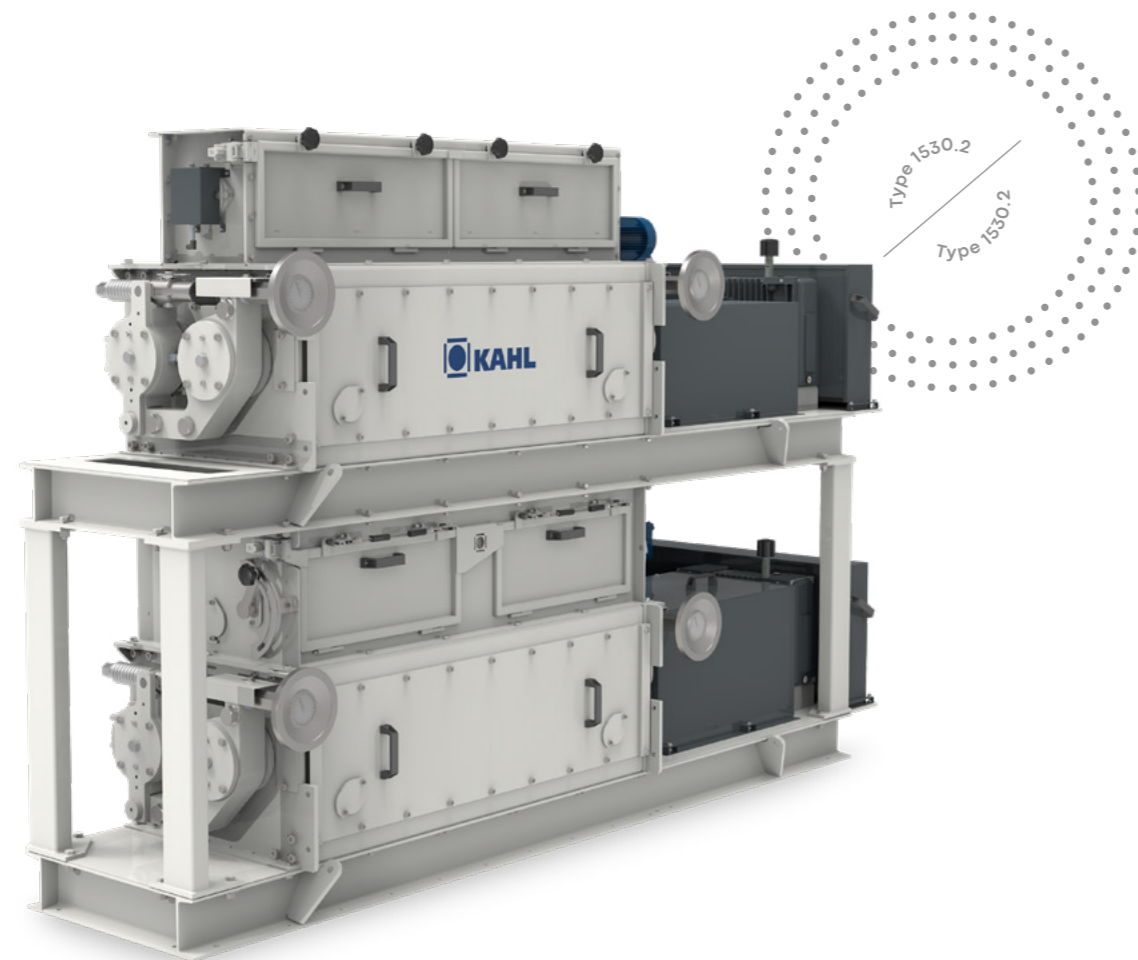
- High vertical range of manufacture
- Long-term service also after commissioning
- 12 different pan grinder mill sizes





CRUSHING ROLLER MILL

Economical, energy-efficient crushing method providing a specific structure



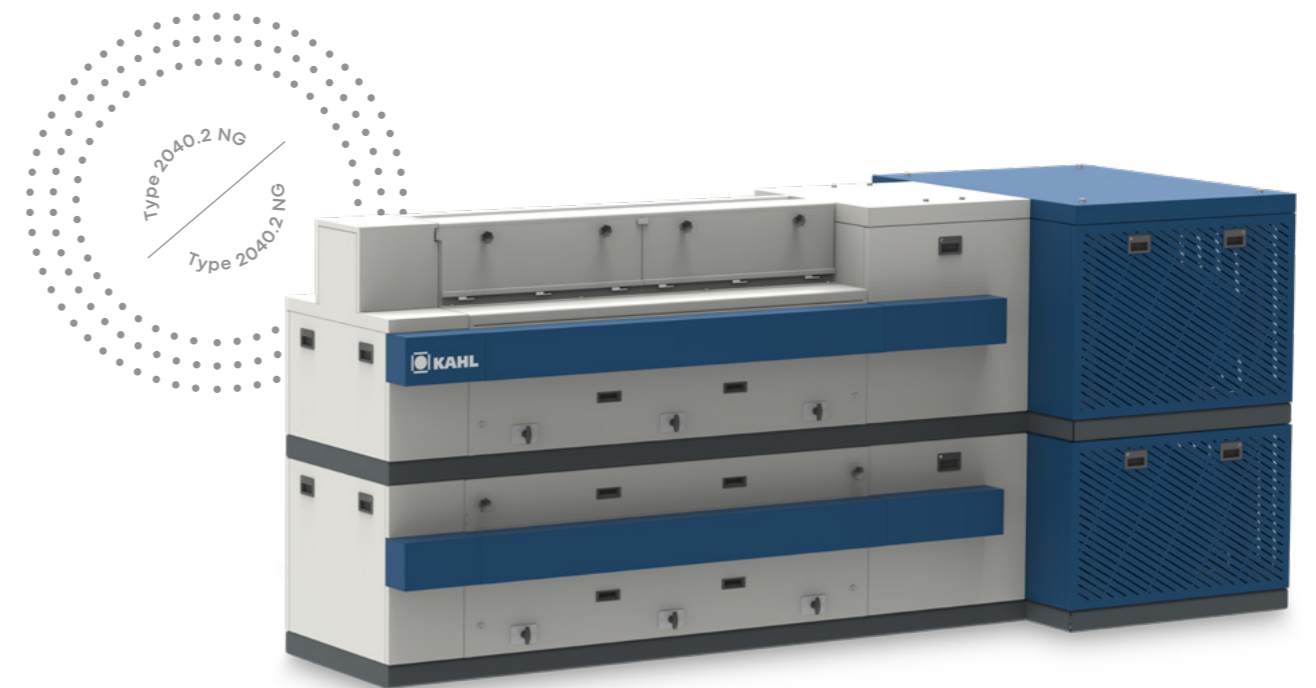
Fields of application

The feed structure is one of the most important factors for successful animal nutrition. KAHL crushing roller mills break the grain into smaller particles with an as low as possible fines content. They are therefore ideally suited for economic grinding of different products, particularly for grain and other feed components. Single-stage or two-stage crushing can be performed.

- Monocomponents (maize, oats, wheat, barley, etc.)
- Oilseeds and legumes (peas, rapeseed, beans, lupins, soybeans, etc.)
- Feed mixtures



CRUSHING ROLLER MILL WITH INDIVIDUAL DRIVE



↑ For continuous variation of the transmission ratio

Advantages for animal nutrition



↑ Poultry feed

- **Cattle feed:** slow starch degradation in the rumen, better bacterial digestion of the crude fibres, more effective crude fibres in the rumen
- **Pig feed:** less pathological changes in the gastric system, less diarrhoea, a lower mortality rate, and healthier pigs
- **Poultry feed:** improved development of the muscular stomach, drier manure thus better housing environment, longer retention time in the intestine, higher meat quality



CRUSHING ROLLER MILL

Overview of the machine types

Type	1030.1	1530.1	1540.1
Roller diameter mm	300	300	400
Roller length mm	1000	1500	1500
Throughput t/h	up to 20	up to 30	up to 35
Crushing	single-stage	single-stage	single-stage
Connected load kW	22–37	37–55	45–55
Drive type	Central drive	Central drive	Central and individual drive



Type	1030.2	1530.2	1540.2
Roller diameter mm	300	300	400
Roller length mm	1000	1500	1500
Throughput t/h	up to 30	up to 45	up to 50
Crushing	two-stage	two-stage	two-stage
Connected load kW	44–74	74–110	90–110
Drive type	Central drive	Central drive	Central and individual drive



Type	2040.2 NG
Roller diameter mm	400
Roller length mm	2000
Throughput t/h	up to 65
Crushing	two-stage
Connected load kW	110–150
Drive type	Individual drive



ADVANTAGES OF THE KAHL CRUSH- ING ROLLER MILL



Advantages offered by the machine

- Frequency-controlled feed roller
- The special roller geometry ensures a uniform feed of the roller pair
- Smooth operation, low power requirement
- A magnet on the opposite side removes metals
- Grinding gap easily adjustable by hand
- Optional: automatic remote adjustment with gap measurement
- Due to the individual drive with frequency converter it is possible to operate the roller pair "sharp to sharp" or "dull to dull" – depending on the required final product
- Material: Special steel
- Surface-hardened 51–58 HRC (different qualities possible)
- Roller can be re-fluted up to 5 times, depending on the fluting and wear of the rollers
- Various corrugations possible
- Thanks to the modular design, the ideal solution can be offered for individual needs
- Optional: roller exchange cassettes for shorter downtimes
- 2-stage design increases flexibility in crushing
- Suitable for individual components and mixed products

Advantages of the individual drive

- More specific and individual crushing of feed for adequate animal nutrition
- Automatic gap adjustment and various differential speeds between the rollers are possible
- Wide variation of granulations with individual drive, the right particle size for every animal age
- More benefits for animal health, animal welfare and higher growth efficiency



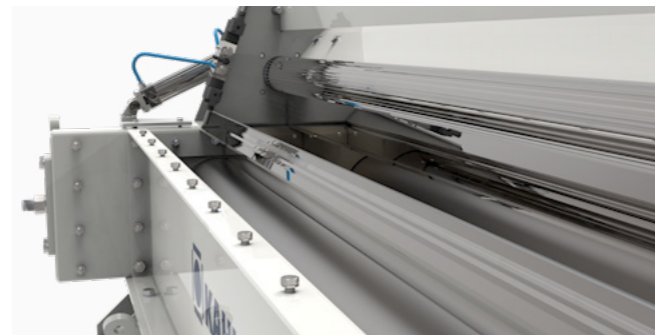


CRUMBLER

For crumbling pellets



↑ Easy opening of the machine



↑ View into the roller chamber

The finished pellets are crumbled without breaking-up the components again. The individual drives with speed control are a unique selling point of the KAHL crumbler. Furthermore, KAHL does not use a belt drive, which makes assembly much easier.

Fields of application

- Compound feed production
- Tea processing
- Coffee processing



↑ Advantages of crumbles: optimum feed conversion in the animal

Design of the crumblers

The rollers are mounted in a flat base frame, so that installation in existing plants is possible without difficulties due to the low construction height. If necessary, two crumbling roller pairs can be assembled to form a double crumbler.

The design allows easy removal of the rollers to the front or to the side. Direct drives for each roller without chains, belts or gears ensure quiet running, low wear, and easy maintenance.

One roller is spring-mounted. The adjustment of the roller gap and the initial spring tension is realised by means of screw spindles. The gap width can be read on both sides at the dial gauges.

Operating principle

Via the discharge device of the cooler or an additional feeding device the pellets are fed continuously into the crumbler across the whole roller width. Corrugated rollers with different speeds crumble the pellets into the preset grain size. Due to the type of roller corrugation and the gradation of the speeds, the fines percentage which is returned to the pellet mill after screening is very low.

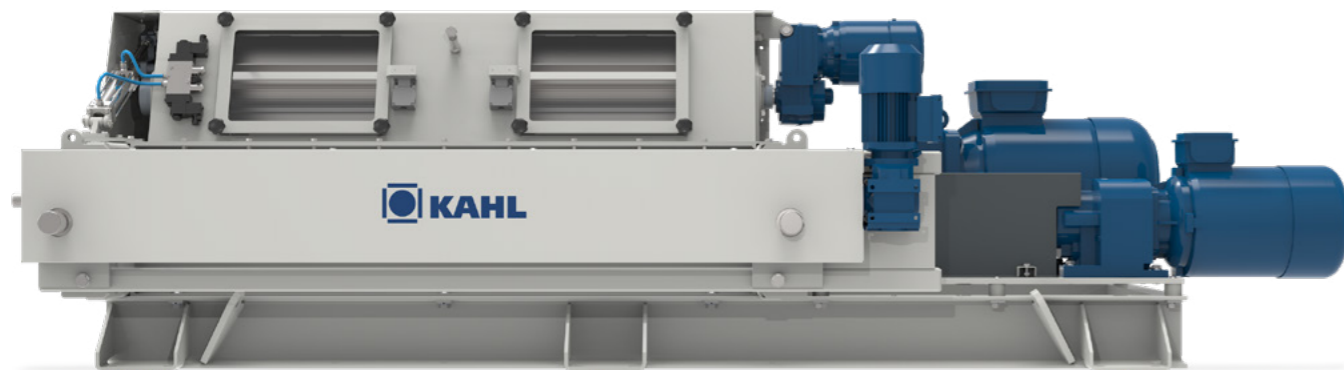
A change of the initial spring tension influences the particle size range. Besides, one roller can give way in case of ingress of hard foreign particles.

The rollers are driven at different speeds.



CRUMBLER

Overview of the machine types



Types and rough dimensioning

Type	Roller diameter	Roller length	Connected load	(Approximate) dimensions		
				Length	Width	Height
	mm	mm	kW	mm	mm	mm
GE 400*	160	400	4+2.2	1535	775	575
GE 800*	200	800	7.5+3	2050	890	800
GE 1400*	200	1400	11+5.5	2850	890	820
GE 1750*	200	1750	18.5+7.5	3275	890	820
DGE 1400	200	1400	11+5.5 (2x each)	2850	1580	820
DGE 1750	200	1750	18,5+7.5 (2x each)	3275	1580	820

* each available as GER (drive side on the right) or GEL (drive side on the left)

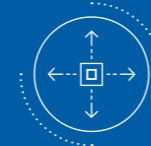


ADVANTAGES OF THE KAHL CRUMBLER



Advantages offered by the machine

- Modular design
- Direct roller drive
- Significantly reduced noise emission
- Continuously adjustable and controllable roller gap
- Easy operation and maintenance
- Feeding either directly from the cooler or via proportioning rolls



Advantages of crumbles

- Optimum feed conversion in the animal
- Prevention of feather pecking
- Easy product flow in the automatic feeder
- Even products with a high energy content (fat) that are difficult to pellet can be transformed into crumbles
- Energy savings through combination of pelleting and crumbling
- Specific adjustment of the crumble sizes



Advantages offered by AMANDUS KAHL

- High vertical range of manufacture
- Long-term service also after commissioning
- 4 sizes of the single crumbler, 2 sizes of the double crumbler



HAMMER MILL

Highest flexibility in throughput and product individuality



The hammer is suitable for grinding individual products as well as product mixtures, such as feed components, feed mixtures, all types of grains, straw, and even wood. Hammer mills are characterized by a high throughput capacity and product variability.

In compound feed plants, a distinction is made between grinding individual components and grinding component mixtures. The hammer mill can be used for both purposes.

Do you have questions regarding the KAHL technology?

We will be happy to answer them and can be reached here:

info@akahl.de
+49 (0)40 727 71-0
akahl.com



APPLICATIONS OF THE HAMMER MILL

Grinding of individual components

- In case of high proportions of components in the formula, e.g. 60% maize
- In the preparation of individual components
- In roughage plants for voluminous products, e.g. straw, bagasse

Advantages of grinding of individual components

- Screen perforation can be adapted to the product
- Easy handling
- Downtimes due to malfunctions or maintenance do not impede continuous production
- Lower energy consumption, as mealy components do not pass through the hammer mill
- High fineness is possible

Grinding of mixtures

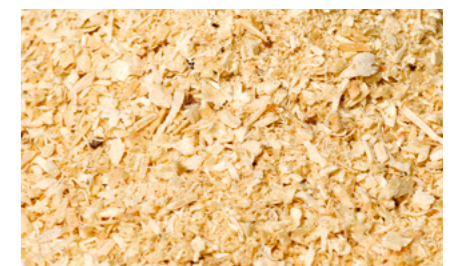
- Simultaneous grinding of different raw components
- Grinding of mealy components with lumps and coarse particles

Advantages of grinding of mixtures

- No additional silo cells required
- When control screens are used, a defined particle size spectrum can be obtained
- High fineness is possible



↑ Wood chips downstream of the hammer mill



↑ Pine wood downstream of the hammer mill

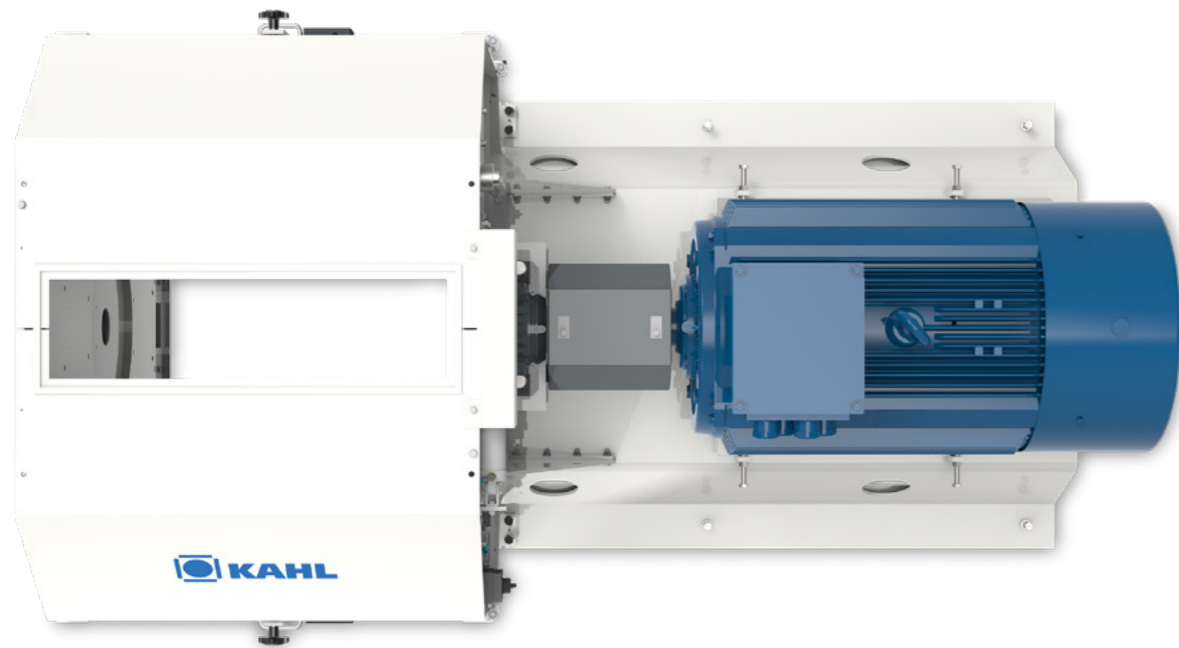


↑ Safflower straw downstream of the hammer mill



HAMMER MILL

Overview of the machine types



Types and rough dimensioning

KAHL type	AKANA	Grinding chamber		Motor			Screen surface gross	(Approximate) dimensions		
		width	∅	min.	normal	max.		length	width	height
		mm	mm	kW	kW	kW	m ²	mm	mm	mm
HM S/R	07.05	500	700	55	90	110	0.71	2200	1200	1200
HM S/R	07.08	800	700	90	132	160	1.1	2400	1200	1200
HM S/R	07.10	1000	700	132	160	200	1.5	2700	1200	1200
HM S/R	13.06	600	1250	160	200	250	1.8	2600	1800	1800
HM S/R	13.10	1000	1250	200	250	355	2.9	3000	1800	1800
HM S/R	13.12	1250	1250	250	315	400	3.6	3200	1800	1800

ADVANTAGES OF THE KAHL HAMMER MILL



Advantages offered by the machine

- Can be used for different products
- Simple operation
- Easy handling
- Due to the use of different screen perforations, beater designs, beater arrangements and speeds, the mills can be adapted to the customers' grinding requirements, e.g. in terms of structure and fineness
- Hammer mills work according to the principle of crushing by multiple impact
- The most efficient size reduction is achieved by direct impact of the hammer mill beater on the product
- The circumferential speed of the beater tip is approx. 100 m/s, which is equivalent to approx. 360 km/h
- The particle size is determined by the screen hole diameter and the mill speed
- The product does not leave the grinding chamber until it is smaller than the screen hole diameter. Typically, about 95 % of the ground product is smaller than half the screen hole diameter.



Advantages offered by AMANDUS KAHL

- High vertical range of manufacture
- Long-term service also after commissioning
- 6 different types of hammer mills





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