

SYSTEM SOLUTIONS
SOLID RECOVERED FUELS

# MAXIMUM ENERGY.



# MAKE THE MOST OF WASTE.

SHREDDING TECHNOLOGY AND SYSTEMS ENGINEERING FOR THE RECYCLING INDUSTRY OF TOMORROW.

We believe in transforming waste into precious materials. That's why we invest all our knowledge and innovative power in shredding machines and system solutions that are highly efficient, robust, reliable and easy to maintain. So our clients can transform waste into a valuable and reusable resource – efficiently and reliably.

In-house research and development



In-house electrical engineering department

Consulting, engineering & system construction

Worldwide service network

**Export countries** 



**Employees worldwide** 

Locations worldwide



90

# INNOVATION AS A PRINCIPLE - QUALITY PROMISED AND DELIVERED

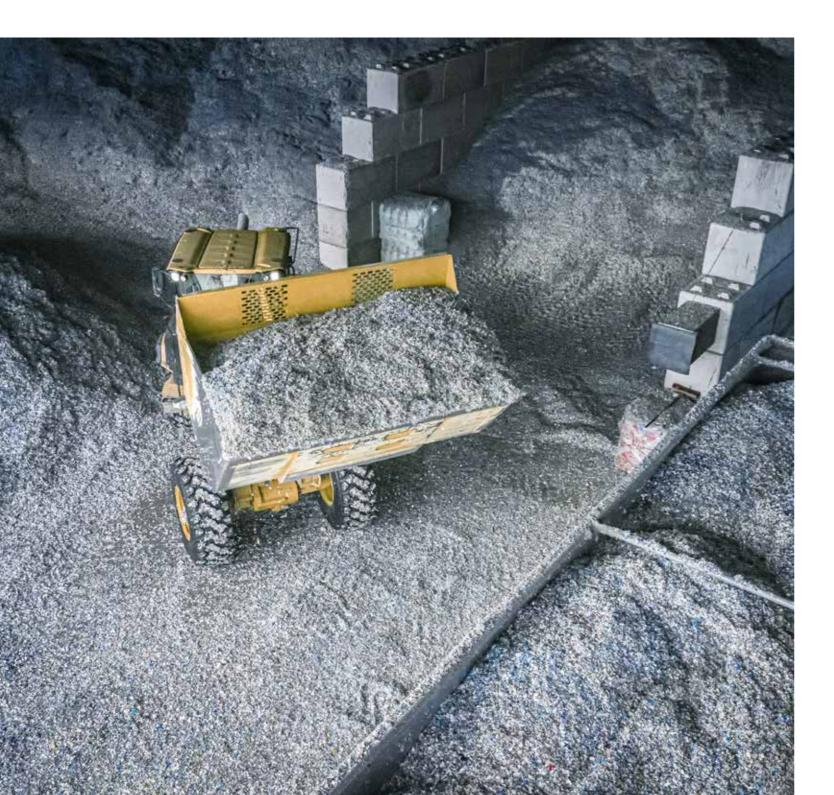
Josef Lindner founded our family business in 1948. He started by planning and producing machines and systems for the wood industry. Today, more than 70 years later, the company is still familyowned, employs over 350 people worldwide and exports to more than 90 countries.

Production still takes place in Austria. In 2022, we moved into our new home of recycling, the new company headquarters in Spittal an der Drau in Carinthia, Austria. We manufacture in line with trailblazing production standards on 14,000 m² using the latest robotics & automation systems. This way, we are able to manufacture the majority of components in-house, guaranteeing our proven Lindner quality and the rapid availability of machines, systems and spare parts.



# POWER HOUSE.

**TURN WASTE INTO A VALUABLE RESOURCE.** 



### **SRF HIGH IN CALORIFIC VALUE FOR MAIN BURNERS**

Premium solid recovered fuels (SRF) are mainly used for co-incineration in the main burners of rotary kilns and contribute to conserving fossil fuels. To be a valid alternative to primary fuels such as oil, coal or gas, the solid recovered fuel must fulfil many quality criteria. A particular challenge is posed by the differently composed input materials that have to be transformed into a highquality, homogenous output. State-of-the-art inline sensors are used to consistently control the parameters that are most important for the production of SRF – including, for example, calorific value, water, ash and chlorine content.

Lindner's processing systems and shredding equipment are in great demand because the output's material properties can be relied upon to meet the highest standards in terms of calorific value, uniform particle sizes and constant throughputs.\*

### Requirements for high-calorific solid recovered fuels\*\*

Particle size	d <sub>95</sub> ≤ 30 (up to 35) [mm]
Calorific value	18 – 25 [MJ/kg]

# **MEDIUM CALORIFIC SOLID RECOVERED FUELS FOR CALCINERS**

In addition to the production of high-calorific solid recovered fuels, secondary firing and with it the production of medium-calorific SRF is becoming increasingly important. The coarser particles and the higher percentage of three-dimensional particles create advantages in terms of the processing as well as making simpler processes and facility layouts to produce SRF possible.

### Requirements for medium-calorific solid recovered fuels\*\*

Particle size	d <sub>95</sub> ≤ 80 [mm]
Calorific value	12 – 18 [MJ/kg]

### Output for use as high-calorific SRF



\* University of Leoben, (2017). Independent report on the performance of different drive systems for shredding machines.

# Output for use as medium-calorific SRF

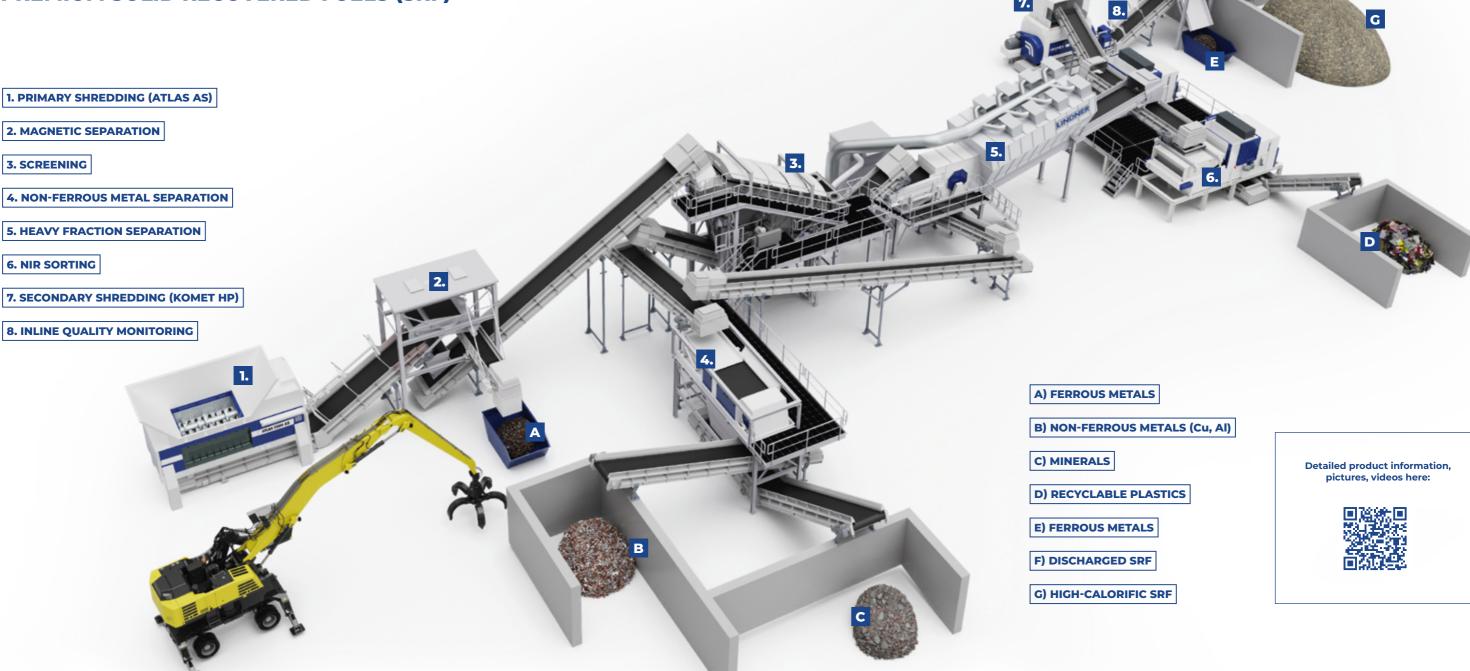


\*\*The exact requirements may vary depending on

# MAXIMUM PERFOR-MANCE.

MULTI-STEP PROCESSING OF PREMIUM SOLID RECOVERED FUELS (SRF)

Lindner has perfected the multi-step processing of mixed municipal solid waste, commercial waste and industrial waste into a high-calorific premium solid recovered fuel. An ideal combination of high-end machines is responsible for primary and secondary shredding as well as efficient separation and extraction, making SRF processing almost maintenance-free, extremely robust and reliable. The resulting SRF is free from non-shreddables such as metals, stones or glass – guaranteeing the highest throughput and maximum output quality. Thanks to NIR technology, analysers digitally analyse the material in real time, ensuring the output material's optimum calorific value. Optical sorting equipment also makes use of this technology to extract recyclables such as plastics from the material stream and return them to the recycling process.



1. ONE-STEP WASTE SHREDDING

3. ACTIVE HEAT DETECTION & AUTOMATED COOLING

4. FPS CONTROL CABINET WITH INTEGRATED WATER TANK

2. CONVEYING

# A PROFICIENT ONE-STEP PROCESS.

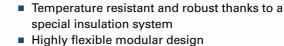
SINGLE-STEP PROCESSING OF MEDIUM-CALORIFIC SOLID RECOVERED FUELS

Lindner's Polaris makes short work of shredding waste thanks to its single-step technology. The production process is more streamlined and cheaper compared to other technologies. It also ensures an output quality so outstanding that it was given its own name: Polaris material. And what's more: the shredding technology is so innovative that it created a new market segment – one-step processing.

# That's how to play it safe:

Lindner's modern out-of-the-box FPS (fire prevention system) solution automatically detects and cools overheated particles in the material stream directly on the discharge conveyor, effectively preventing possible sources of fire. The system adapts the cooling process to the hazardous situation to ensure the facility operates optimally at all times.

- Precise detection of overheated materials
- Comprehensive monitoring of the entire cooling section
- Cooling process adapted to the hazardous situation
- Independent cleaning of the infrared sensors





# IT'S GOT SYSTEM.



# Individual, turnkey solutions from a single source.

For many decades, we have been designing, planning and building recycling facilities for a wide range of applications, such as the production of medium- and high-calorific SRF or plastics recovery. Specialists from process engineering, mechanical engineering, electrical & control engineering and software development ensure that each facility is tailored to individual requirements. From consulting, planning and project management to commissioning, we take care of every detail, no matter how small.

# High reliability with superior value chain depth, decades of experience and the many Lindner in-house services:

- Experienced systems engineering team
- Extensive expertise thanks to more than 300 completed system projects
- In-house electrical and electronic production as well as in-house software development
- 24/7 service & maintenance worldwide

# THERE'S MORE TO IT.



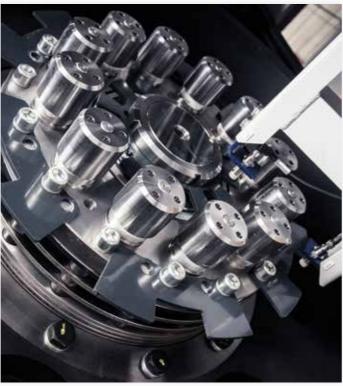
### **ELECTROMECHANICAL BELT DRIVE**

Using an electromechanical belt drive, Lindner has opted for technology that has been tried and tested for decades and does not require any special parts. This means that spare parts are readily available should the need arise. Compared to other systems available on the market, maintenance and repairs can be carried out much more cost-effectively and also very quickly.

# **MECHANICAL SAFETY CLUTCH**

The torque-limiting safety clutch ensures optimal protection of the drive unit thanks to instant mechanical disengagement. The highly precise sensors ensure a controlled machine shutdown and therefore protection for all components.

Flexibly adjustable, the safety clutch can be adapted precisely to the material, preventing false triggering. The machine is restarted normally after the non-shreddables have been removed, without any need for mechanical resetting.





### **EASY MACHINE ACCESS**

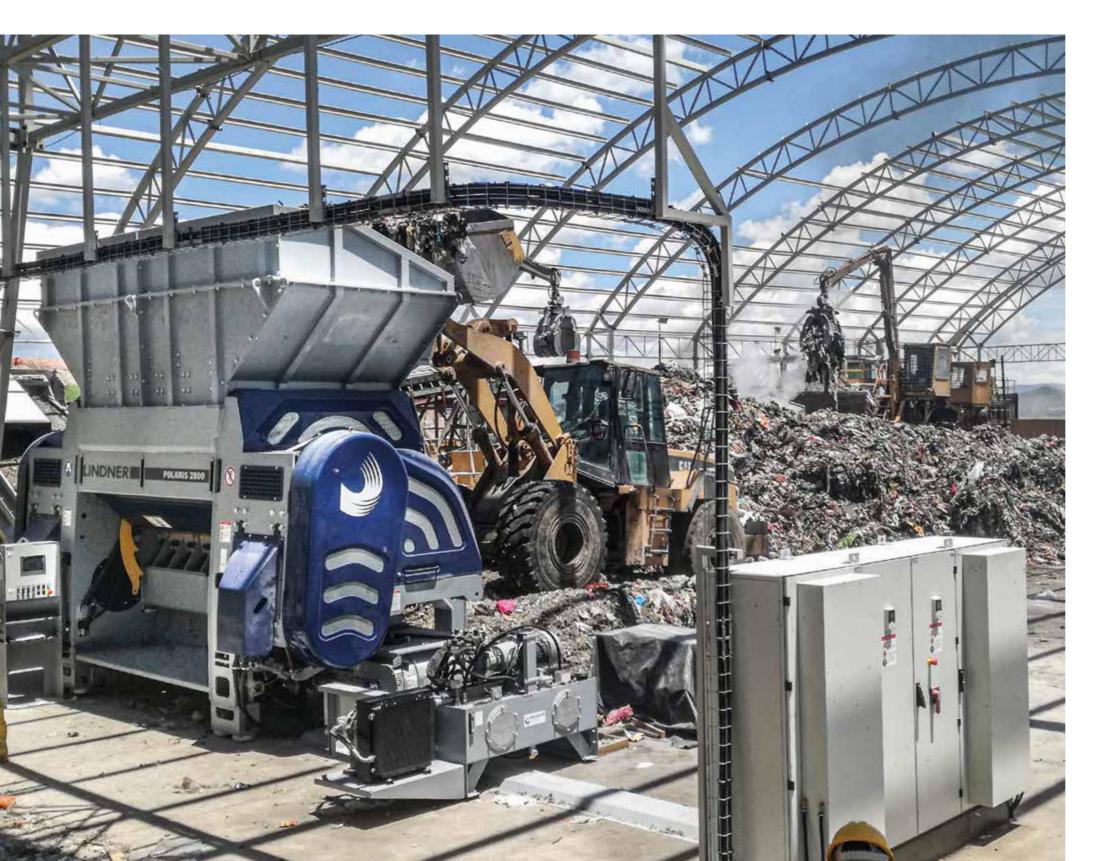
All of Lindner's shredders have two things in common: easy access to the rotor as well as quick and safe access to the screen unit. Thanks to the hydraulically operated, inward-swivelling door for maintenance and non-shreddables removal non-shreddables can be extracted quickly and safely even if the machine is full. Furthermore, the easy access to the rotor makes sure that changing the knives is easy and convenient. The result: maximum availability.

# **SUPERIOR WELDING QUALITY**

Superbly trained employees and investments in state-of-the-art production and automation systems are the key to unparalleled precision and welding quality.



# PERFECTLY TUNED.



# In-house power electronics included.

Lindner's systems and individual machines perform even under the most extreme conditions – 7 days a week, 365 days a year. The secret - apart from decades of experience – lies in the interplay of three essential areas: shredding technology, power electronics and software. This way, all control parameters as well as the mechanical system, the hydraulics and the electronics are always optimally matched and guarantee the best quality and the longest service life.

# All advantages at a glance:

- In-house planning and manufacturing
- Special designs for operation in particularly dusty environments
- Variable speed control thanks to the frequency converter that ensures the optimum operating point
- Low operating costs due to avoidance of power peaks and smooth starts
- High efficiency for low energy consumption



# THE RIGHT SOLUTION.

### **ATLAS 5500 AS**

Primary shredding







and scraper unit



Asynchronous two-shaft sys-

tem with solid welded rippers

Electromechanical belt drive

with planetary gears and

dynamic energy exchange





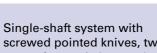


**JUPITER SERIES** 

Primary shredding







screwed pointed knives, two rows of stator knives and defined particle sizes thanks to sickle-shaped or hexagonal screens

Electromechanical countershaft drive and additional flywheel energy storage for particularly tough materials

Electromechanical belt drive. Optional: high-performance (HP) version with an even more powerful drive and additional rows of knives

Speed range:

**Drive:** 

Cutting

system:

22 – 36 rpm

(DEX)

**Particle** sizes:

150 - 400 mm

100 - 300 mm

31 – 87 rpm

10 - 90 mm

# **KOMET SERIES**

Secondary shedding











Single-shaft system with screwed knife rows, two rows of stator knives and defined particle sizes thanks to round hole or hexagonal screens

40 - 120 mm

### **POLARIS SERIES**

One-step shredding





Single-shaft system with screwed knife rows, two rows of stator knives and defined

particle sizes thanks to hexa-

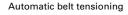
Electromechanical countershaft drive and additional flywheel energy storage for particularly tough materials

67 – 112 rpm

gonal screens











Fire prevention system



158 – 367 rpm

Fast exchange system

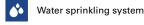


High performance









**ATLAS 5500 AS** 

# **REALLY PACKS** A PUNCH.

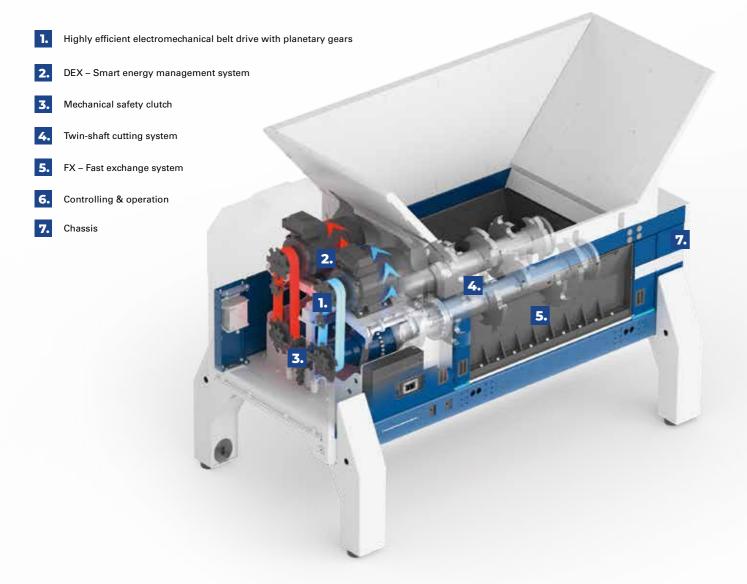


# Mercilessly efficient: Productivity from start to finish.

Based on the proven belt concept, the Lindner's Atlas 5500 AS twin-shaft primary shredder sets new efficiency standards with its high-performance planetary gears, innovative DEX (Dynamic Energy Exchange) energy recovery system and asynchronous shaft control. Delivering consistently high throughput, built for tough applications and equipped with the innovative FX fast exchange system, this shredder provides maximum uptimes and can be relied on to keep the line going.

- Asynchronous ripper rotor principle for continuous material output in both directions of rotation
- Highest energy efficiency thanks to DEX Dynamic **Energy Exchange**
- Ideal particles for downstream sorting processes
- Maximum resistance to non-shreddables
- High operational availability due to extra-long uptimes and the quick exchange of the complete cutting unit (FX)
- Optional: drive unit with convenience & maintenance functions

# **ASYNCHRONOUS TWIN-SHAFT CUTTING SYSTEM WITH DYNAMIC ENERGY EXCHANGE SYSTEM (DEX)**





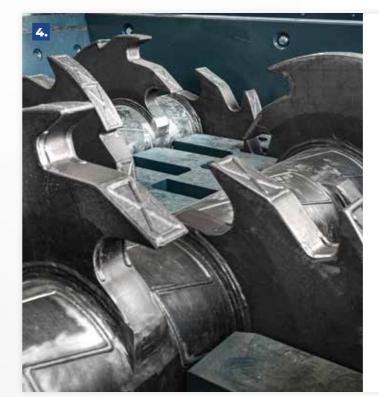












# **ASYNCHRONOUS TWIN-SHAFT CUTTING SYSTEM**

The cutting system of the Atlas AS consists of two asynchronously running, fully welded rotors and a solid scraper unit. The asynchronous ripping (ripping apart, ripping up) at low speeds and high torque combined with the dynamic energy recovery enables:

- Aggressive material intake
- Continuous volume flow
- Highest productivity
- Ideal output material for sorting

# **DRIVE UNIT WITH CONVENIENCE & MAINTENANCE FUNCTIONS (OPTIONAL)**

### Lindner's ATB – automatic belt tensioning system:

- Ensures optimum power transmission at all times
- Belt exchange using a hydraulic tensioning device
- Self and preventive monitoring

### Compressed air ventilation drive unit:

- Protects the drive unit from dirt
- Significantly reduced maintenance activities
- With radial fan and self-cleaning function



# **ATLAS 5500 AS**

# THE ATLAS SERIES SOLID TWIN-SHAFT CUTTING SYSTEM

- Solid twin-shaft cutting system
- Aggressive material intake for highest throughputs optimised for defined output material in the primary shredding stage
- Customised shaft tools for different applications
- Solidly built scraper unit



# Typical input/output materials

### Commercial & industrial waste (C&I)



# Mixed municipal solid waste (MSW)

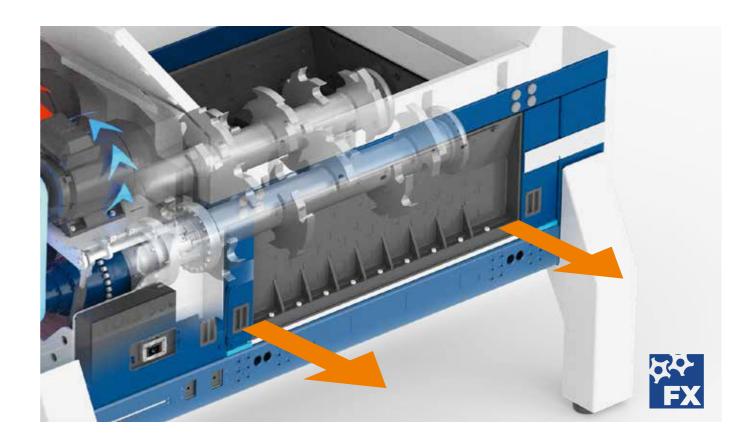


# OUR UNIQUE FAST EXCHANGE SYSTEM (FX)

The Atlas series has been perfected to give you easy access to the cutting unit and provides two options for removing or changing the entire cutting unit or individual components. The components can be removed from the side via the hydraulically operated, swivelling slider or, after removal of the hopper, from the top.



- The cutting unit can be exchanged quickly, ensuring minimum downtime
- The two quick-change options guarantee maximum flexibility
- Easy and fast removal of the hopper



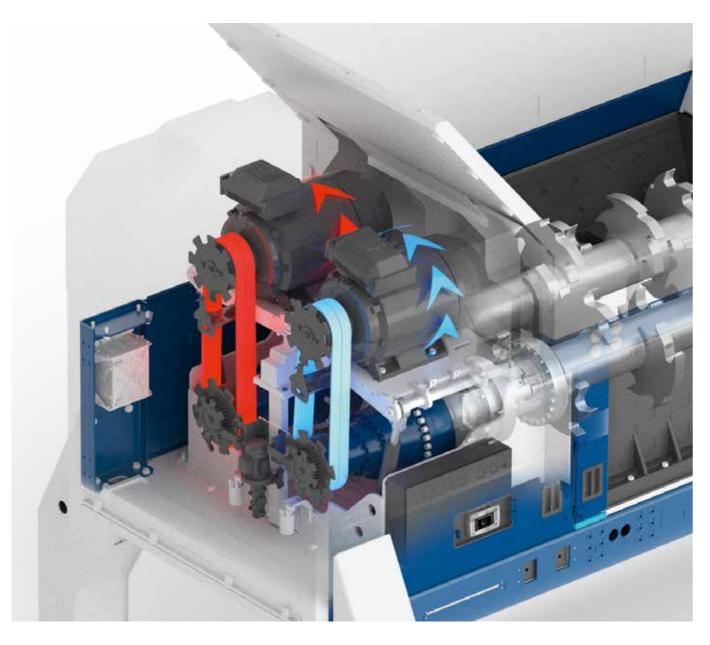


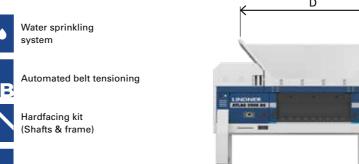


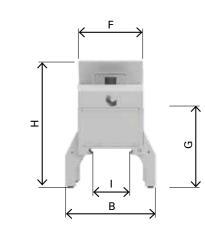
# **LINDNER'S DEX - OUR DYNAMIC ENERGY EXCHANGE SYSTEM - FOR MAXIMUM EFFICIENCY**

Maximum efficiency is achieved by actively using braking energy when reversing one of the shafts. Top productivity is ensured with an instant, power electronics-controlled reversal of the shaft running direction. It can be used anywhere thanks to the ingeniously simple combination of tried-and-tested components.

- Innovative, load-dependent energy management
- Highest energy efficiency in operation
- Maximum agility while changing the running direction, up to 3 times faster







ľΒ	Automated belt tensioning
^	Hardfacing kit (Shafts & frame)
P\$	Fire prevention system
A	Fast exchange system

		ATLAS 5500 AS
DIMENSIONS*		
Measure (LxWxH)	mm	6150 x 3390 x 4810
Hopper opening (DxF)	mm	5470 x 2230
Feeding height (G)	mm	3310
Hopper capacity	m³	18
Outlet width (I)	mm	1510
Total weight	kg	35000
CUTTING UNIT*		
Length	mm	2 x 2380
Speed	min <sup>-1</sup>	36
Standard tool		AS 4.8   AS 4.12.
DRIVE UNIT*		
Motor	kW	2 x 110
Frequency converter		v

<sup>\*</sup>The stated values refer to standard machine versions with a standard hopper (large) and raised feet.

JUPITER 1800 | 2200 | 3200 | 2200 HP

# PRIMARY SHREDDING AT ITS BEST.

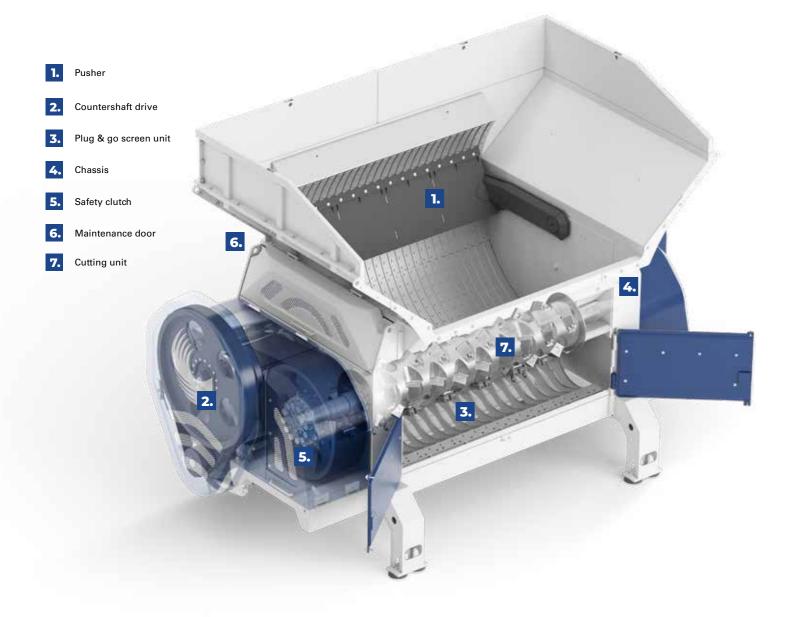


# Gets the process going: Reliably high output and consistent particle sizes.

The Lindner Jupiter single-shaft primary shredder combines everything you need for efficient 24/7 operation: a powerful countershaft drive, a well-engineered machine design and high manufacturing quality. Undefeated by non-shreddables, our tried-and-tested technology ensures a long service life and low maintenance coupled with the necessary power to shred even the toughest materials – year after year and ton after ton.

- Particularly resistant to non-shreddables
- Additional flywheel mass for very tough materials
- Consistently high throughputs thanks to precise cutting action
- Four-fold usable rotor knives

# SINGLE-SHAFT PRIMARY SHREDDER WITH POWERFUL COUNTERSHAFT DRIVE FOR 24/7 OPERATION















7.

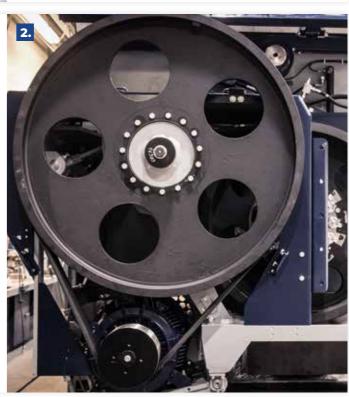
# SINGLE-SHAFT CUTTING SYSTEM WITH FOUR-FOLD USEABLE POINTED KNIVES

- Solidly built knives and knife holders particularly resistant to non-shreddables
- Maximum availability, as knives can be changed quickly
- Easily adjustable cutting gap for optimum output quality

# COUNTERSHAFT DRIVE WITH FLYWHEEL ENERGY STORAGE

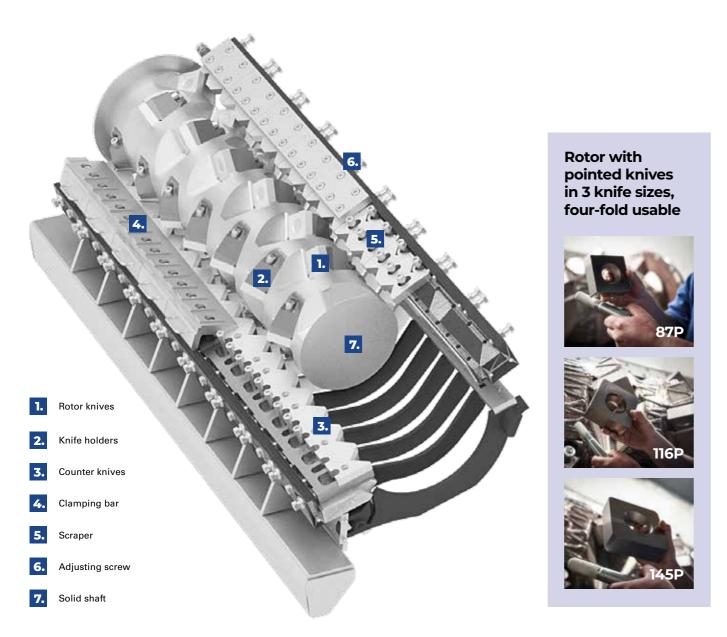
Less energy consumption and more power thanks to the countershaft drive that stores and releases rotational energy depending on the load.

- Highest energy efficiency
- Consistently high throughput even with tough materials
- Spare parts obtainable worldwide
- Also available as a HP model (high performance model) for even more power and throughput



# JUPITER 1800 | 2200 | 3200 | 2200 HP

# THE JUPITER SERIES CUTTING SYSTEM



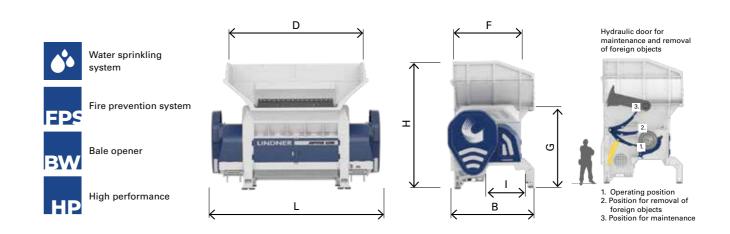
# Typical input/output materials

# Commercial & industrial waste (C&I)



# Mixed municipal solid waste (MSW)





		JUPITI	ER 1800		JUPIT	ER 2200		JUPIT	ER 3200		JUPIT	ER 2200	HP
DIMENSIONS*													
Measure (LxBxH)	mm	4800 x	3270 x 4	340	5500 x	3270 x 48	340	6500 x	3270 x 48	340	5500 x	3270 x 48	340
Hopper opening (DxF)	mm	3750 x	3750 x 3000		4090 x	4090 x 3000		5150 x	5150 x 3000		4090 x	4090 x 3000	
Filling height (G)	mm	3105		3105	3105		3105	3105		3105	3105		
Hopper volume	m³	7,5	7,5		9	9		12			9	9	
Outlet width (I)	mm	1020		1020	1020		1020			1020	1020		
Weight	kg	25800	25800		32750	32750		39000	39000		33750	33750	
CUTTING UNIT*													
Rotor length	mm	1770			2115			3170			2115		
Rotor speed	min <sup>-1</sup>	58/87			51/87			58/87			58/87		
Pointed knives	mm	145P	116P	87P	145P	116P	87P	145P	116P	87P	145P	116P	87P
Number of knives	pcs.	20	22	41	24	28	50	36	42	77	24	28	50
Screens: hexagonal/sickle-shaped		~			~			~			~		
Number of screens	pcs.	4/1			4/1			6/1			4/1		
DRIVE UNIT*													
Motor	kW	1 x 200	)		2 x 132	2		2 x 160	)		2 x 200	)	
Frequency converter		~			~			~			~		

<sup>\*</sup>The stated values refer to standard machine versions with a standard hopper and raised feet. The right to make technical changes is reserved.

KOMET 1800 | 2200 | 2800 | 2200 HP | 2800 HP

# **IMPOSSIBLY RELIABLE &** INCREDIBLY PRECISE.

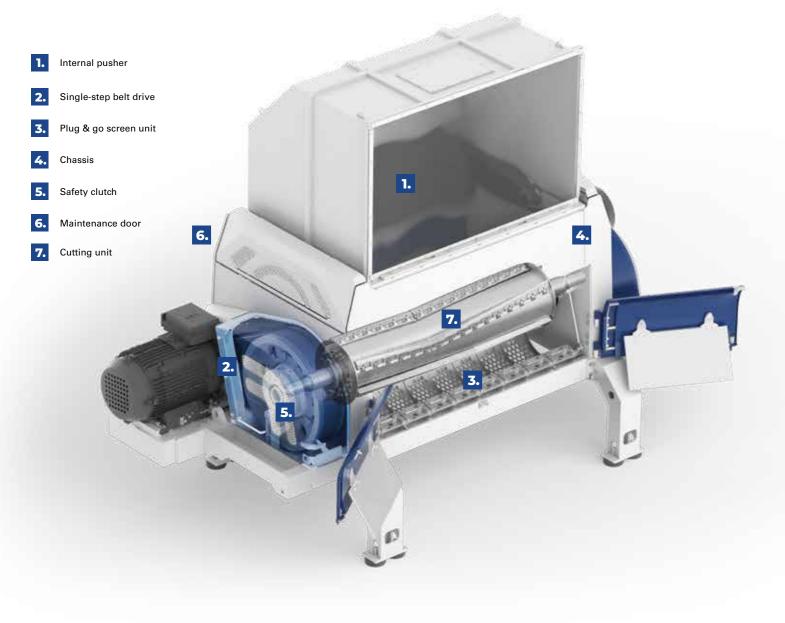


# Precision that's a cut above the rest.

The Lindner Komet sets new standards in single-shaft shredding. Whether you are processing municipal or bulky refuse, industrial or commercial waste, textiles, waste paper or other materials – the Komet ensures smooth processes 24/7 thanks to its robust design, high-precision tools and smart features. Benefit from its first-rate particle quality and superb efficiency.

- The benchmark in secondary shredding
- 24/7 reliability
- Highest precision cutting for outstanding output quality
- HP (high performance) version for even more throughput
- Optional: Drive unit with convenience & maintenance

# HIGHLY PRECISE SINGLE-SHAFT SECONDARY SHREDDER FOR 24/7 PREMIUM SRF PRODUCTION



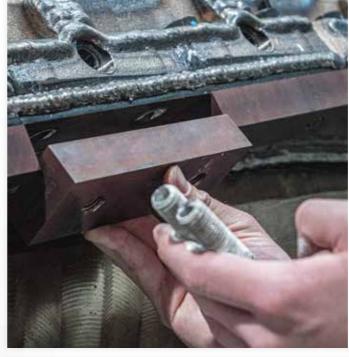












# PRECISE ROTOR WITH SQUARE KNIVES

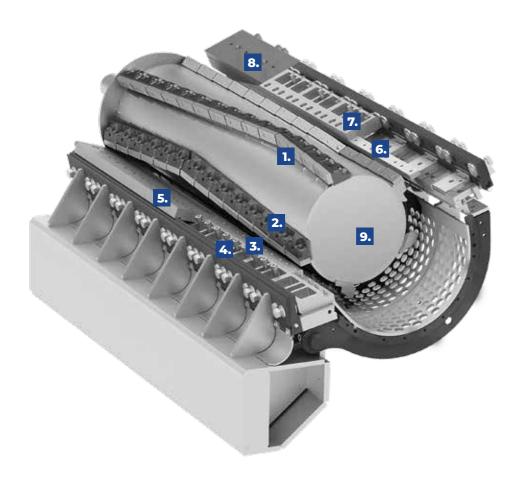
- High throughputs guaranteed thanks to the strategically positioned knife rows
- Consistent particle size with a cutting gap that is fully adjustable even during operation
- Optimised wear parts storage thanks to identical knives for the rotor, counter knives and scraper
- Maximum uptimes ensured by four-fold usable, quick-change knives

# TRIED-AND-TESTED BELT DRIVE

- Efficient, robust and gearless belt drive
- Worldwide availability of easy-to-change standard components
- Mechanical safety clutch for maximum resistance to non-shreddables
- HP (high performance) option for even higher productivity
- Optional: Comfort function for automatic belt tensioning



# **THE KOMET SERIES CUTTING SYSTEM**



# knives – four-fold usable

- 1. Rotor knives
- 2. Knife holders
- 3. Counter knives
- 4. Counter knife slider

- 7. Scraper slider
- 8. Clamping bar
- 9. Solid shaft

# **Rotor with square**



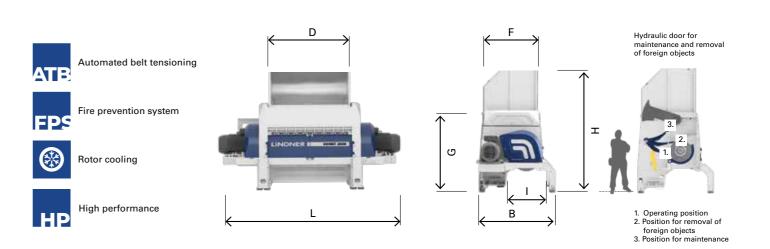
5. Clamping bar

6. Scraper

# Typical input/output materials

Commercial & industrial waste (C&I)



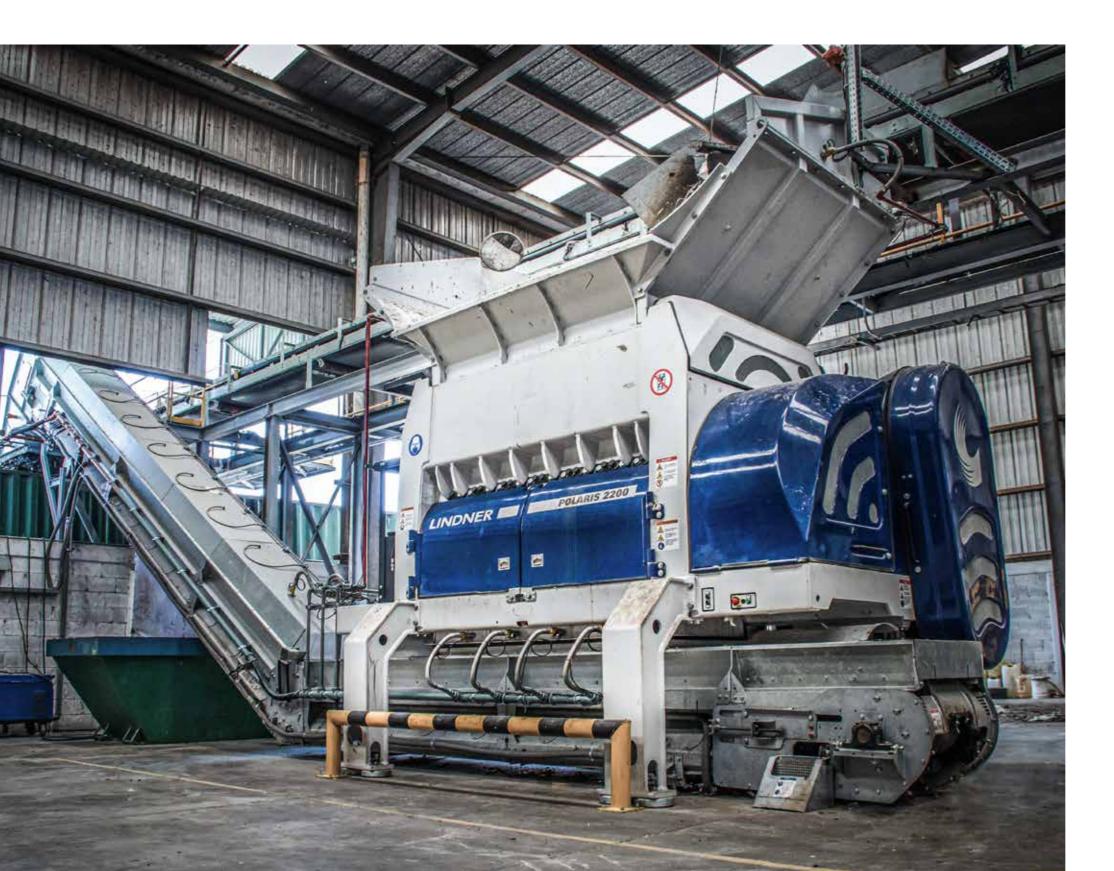


		KOMET 1800	KOMET 2200	<b>KOMET 2800</b>	KOMET 2200 HP	KOMET 2800 HP
DIMENSIONS*						
Measure (LxBxH)	mm	4915 x 2925 x 4840	5755 x 2925 x 4840	6445 x 2925 x 4840	5815 x 2925 x 4840	6700 x 2925 x 4840
Hopper opening (DxF)	mm	1790 x 2030	2135 x 2030	2825 x 2030	2135 x 2030	2825 x 2030
Filling height (G)	mm	3111	3111	3111	3111	3111
Hopper volume	m³	3,3	4	5,3	4	5,3
Outlet width (I)	mm	960	960	960	960	960
Weight	kg	19600	23300	27500	24000	29900
CUTTING UNIT*						
Rotor length	mm	1770	2115	2805	2115	2805
Rotor speed	min <sup>-1</sup>	355	355	355	355	367
Standard: Blade knives		172R	172R	172R	172R	172R
Number of knives	pcs.	50	60	80	84	112
Screens: hexagonal / round		~	~	•	~	~
Number of screens	pcs.	5	6	8	6	8
DRIVE UNIT*						
1-step belt drive		•	~	•	~	~
Motor	kW	1 x 200	2 x 132	2 x 160	2 x 200	2 x 250
Frequency converter		•	~	•	•	~

<sup>\*</sup>The stated values refer to standard machine versions with a standard hopper and raised feet. The right to make technical changes is reserved.

**POLARIS 1800 | 2200 | 2800** 

# **GOES IT** ALONE.



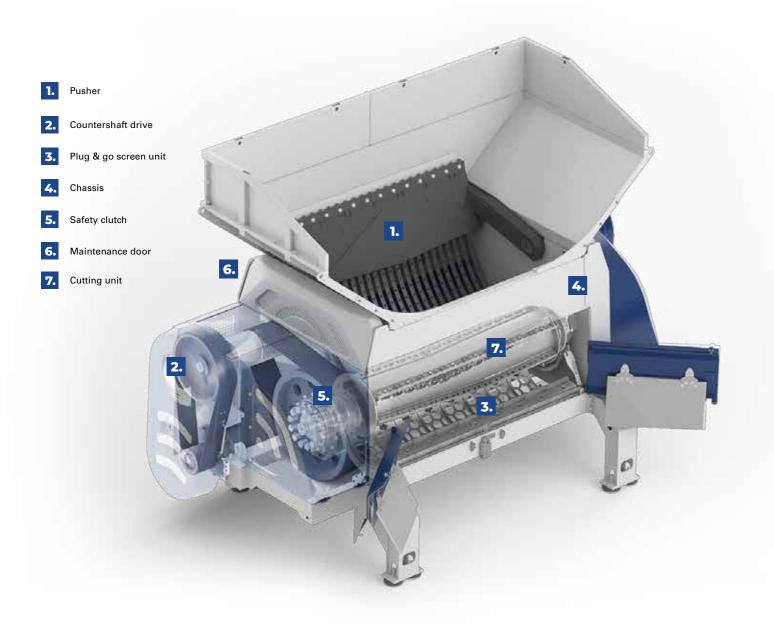
# Makes short work of shredding: Costefficient, highly reliable and only one step.

Nothing can withstand the enormous power of the Lindner Polaris single-shaft shredder. Made for one-step processing of untreated municipal, industrial and commercial waste to obtain mid-calorific fuels (40-120 mm) ideal for co-incineration in calciners at cement works. Sturdy design and low operating costs are the hallmarks of this highly specialised shredder: enjoy uninterrupted shredding excellence 24 hours a day, seven days a week. With maximum efficiency throughout, as demonstrated by a field test: thanks to the countershaft drive, the Lindner Polaris shreds twice as much material as comparable machines in the same period of time.\*

- Powerful, one-step shredding to a defined particle size
- Highest productivity thanks to solidly built knife rows
- Additional flywheel mass for particularly tough materials
- Plug & Go screen to flexibly adapt the material to the desired output size

<sup>\*</sup> University of Leoben, (2017). Independent report on the performance of different drive systems for shredding machines.

# **HIGHLY SPECIALISED SINGLE-SHAFT SHREDDER FOR THE PRODUCTION OF MEDIUM-CALORIFIC SRF**

















# SINGLE-SHAFT CUTTING SYSTEM WITH **FOUR-FOLD USABLE SOLIDLY BUILT SQUARE KNIVES**

- Parts storage made easy thanks to identical knives for the rotor, counter knives and scraper
- Maximum uptimes ensured by four-fold usable, quick-change knives
- Low wear part costs thanks to four-fold usable square knives
- Easily adjustable cutting gap even during operation – for consistently, high-quality output

# **COUNTERSHAFT DRIVE WITH FLYWHEEL ENERGY STORAGE**

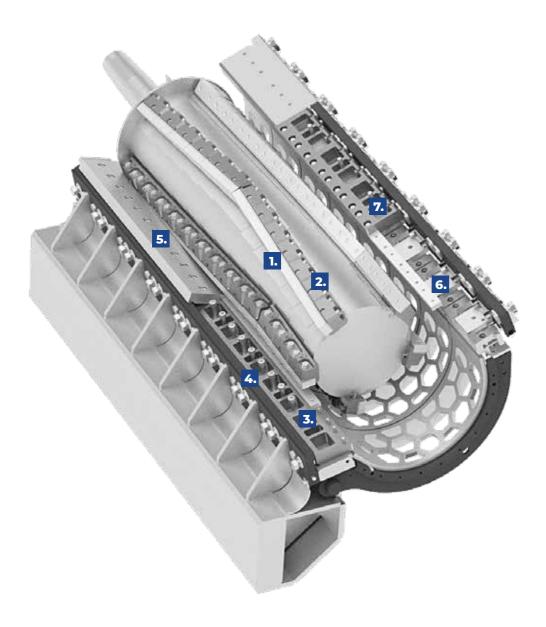
Less energy consumption and more power thanks to the countershaft drive that stores and releases rotational energy depending on the load.

- Maximum energy efficiency
- Up to 2 x more throughput compared to drives without higher flywheel mass\*
- Spare parts available worldwide

\* University of Leoben, (2017). Independent report on the performance of different drive systems for shredding machines.



# **THE POLARIS SERIES CUTTING SYSTEM**



# **Rotor with** square knives four-fold usable

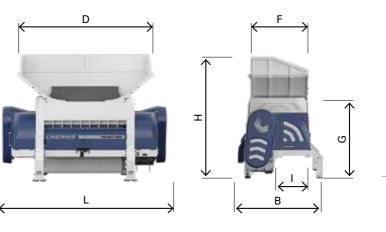
- 1. Rotor knives
- 2. Knife holders
- 3. Counter knives
- 4. Counter knife slider
- 5. Clamping bar
- 6. Scraper
- 7. Scraper slider
- 8. Rotor with square knives
- 9. Solid shaft

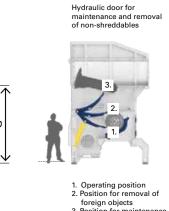
# Typical input/output materials

Commercial & industrial waste (C&I)









foreign objects
3. Position for maintenance

		POLARIS 1800	POLARIS 2200	POLARIS 2800
DIMENSIONS*				
Measure (LxBxH)	mm	4705 x 2925 x 4824	5050x 2925 x 4824	6065 x 2925 x 4824
Hopper opening (DxF)	mm	3745 x 2370	4090 x 2370	4780 x 2370
Filling height (G)	mm	3475	3475	3475
Hopper volume	m³	8	9	10
Outlet width (I)	mm	960	960	960
Weight	kg	24600	26000	33800
CUTTING UNIT*				
Rotor length	mm	1770	2115	2805
Rotor speed	min <sup>-1</sup>	112	112	112
Pointed knives	mm	172RP	172RP	172RP
Number of knives	pcs.	50	60	80
Screens: hexagonal/polygonal		<b>~</b>	·	<b>✓</b>
Number of screens	pcs.	5	6	8
DRIVE UNIT*				
Countershaft drive		•	<b>~</b>	<b>✓</b>
Motor	kW	1 x 160	1 x 200	2 x 132
Frequency converter		<b>~</b>	<b>~</b>	<b>✓</b>

<sup>\*</sup>The stated values refer to standard machine versions with a standard hopper and raised feet. The right to make technical changes is reserved.

# SERVICE FOCUS.



# Lindner's service - simply offering more.

Commitment and professionalism coupled with extensive expertise and original Lindner spare parts made in Austria ensure top quality service and highest machine availability. Individual service solutions mean maximum flexibility and the least downtimes - any day, every day.

### Service à la Lindner:

- Available 24/7 worldwide
- Remote assistance fast help with remote maintenance
- High availability of spare parts thanks to extensive in-house production
- Original Lindner spare parts made in Austria for that extra level of quality

# Maintenance - to keep everything running smoothly:

- Flexible maintenance offers for high machine availability
- Spare part packages for every application
- Qualified shaft reconditioning & hardfacing in line with the highest international standards