



**LINDNER**

**NATURALLY BEST IN CLASS:**

**SYSTEM  
SOLUTION  
WASTE WOOD.**





# BRUTALLY CONVINCING.

## **IT'S ALL ABOUT THE END PRODUCT – ENERGY FOR 25,000 HOUSEHOLDS**

The Altenstadt power plant in Upper Bavaria, Germany, can support this claim: Lindner designed and supplied an on-site solution that combined a Urraco 95 shredder as the heart of the biomass facility with a special downstream star screen. The Altenstadt power plant went into operation in 1999 and today supplies more than 25,000 households with electricity. Since then, more than one billion kilowatt hours of electricity have been fed into the public grid. The CO<sub>2</sub> savings during this period – measured in terms of the electricity produced – amount to more than 620,000 metric tons.

‘Supplying 25,000 households with power is a huge responsibility. Lindner’s solution impresses us on a daily basis.’

**Bernhard Schuster**  
CEO

Heizkraftwerk Altenstadt GmbH & Co. KG  
Germany



# THAT'S THE PLAN.

## UTILIZING WASTE WOOD PROPERLY



## RECYCLING

The majority of recycled waste wood goes to the chipboard industry. There it is used to make everyday products, so it's important to process only materials that are free from substances that are harmful to the environment or human health, like organohalogen compounds. These adhere to surfaces and consist of halogens such as fluorine or chlorine in combination with hydrocarbons. Although most of these materials are now banned, they can still frequently be found in some waste wood batches in the form of e.g. PVC coatings or wood preservatives.

### UNTREATED WASTE WOOD



This category is the perfect material for recycling. It contains virgin, only mechanically processed products such as pallets and packaging. Nails and screws can be easily separated during processing.

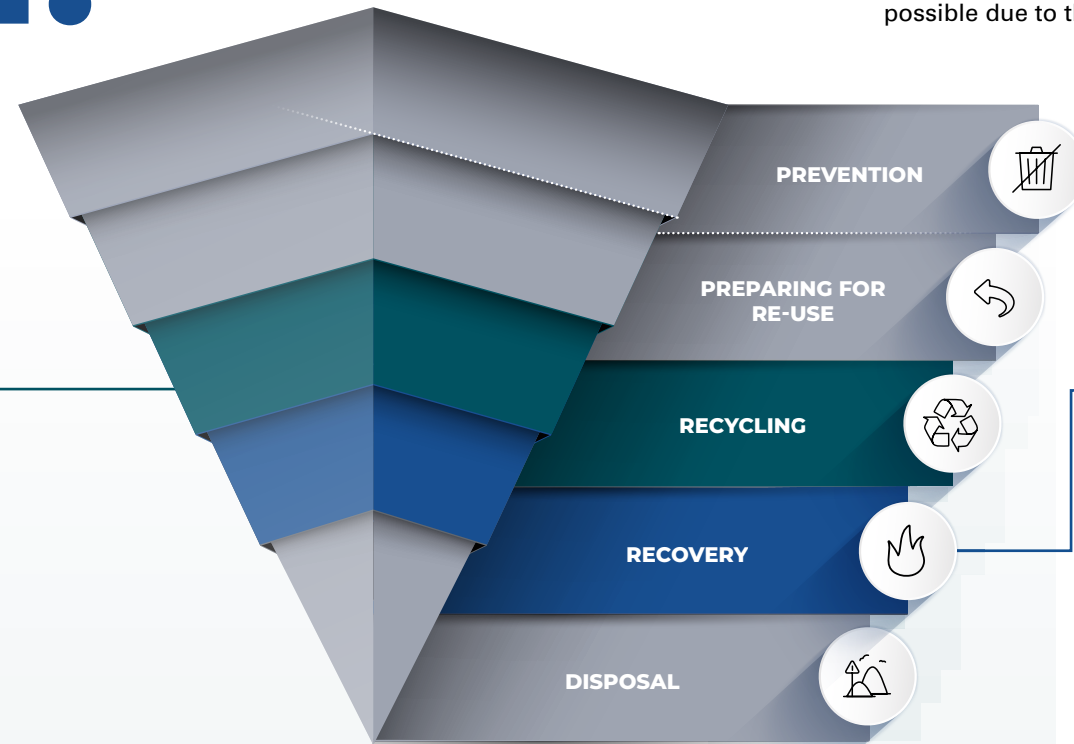
### WASTE WOOD, NO ORGANO-HALOGEN COMPOUNDS



This is glued, painted or coated engineered wood that is mainly used in furniture manufacturing. It is not contaminated by PVC or other organohalogen compounds and has not been treated with wood preservatives.



Internationally, environmental protection and the sustainable use of resources are becoming increasingly important. The five-step waste hierarchy, for example, gives a good overview and shows quite clearly where waste management is heading. Apart from preventing waste, it is paramount to extend a product's life cycle. This means reusing or recycling products that are no longer needed. Only when these two options have been exhausted should waste be sent for recovery. If that's not possible due to the waste's composition, it has to be landfilled.



## RECOVERY

The way some waste woods are treated makes them difficult or impossible to recycle. Here, wood preservatives for products that are exposed to severe weather conditions and stress, and in particular organohalogen compounds, play an important role. To avoid wasting this residual wood, under the right conditions it can be the ideal raw material for generating heat and energy.

### WASTE WOOD TREATED WITH ORGANOHALOGEN COMPOUNDS



This is mainly waste wood with organohalogen coatings or edge banding. If it can be removed, the waste wood is recyclable. If it's not possible to eliminate the halogens, it is used for fuel production.

### HEAVILY CONTAMINATED WASTE WOOD



Due to heavy contamination these materials cannot be recycled. It is, however, possible to incinerate products such as railway sleepers soaked in creosote, old windows and other materials impregnated with wood preservatives, as well as fire-damaged wood, and recover energy from it if the threshold values are respected.



# GOOD JOB.

## COMPACT WOOD LINE 30 – THE PROCESSING LINE FOR UP TO 30 T/H

CWL is what Lindner calls their Compact Wood Line. With an output of up to 30 metric tons per hour, this system's fully integrated bypass gives customers the option to produce cleaned, roughly shredded material and precisely defined fine particles with one single line. Exactly the material you need – for productive recycling or efficient incineration.



### 1 PRIMARY SHREDDING

After initial pre-sorting, the waste wood is processed in the first shredder. The machine transforms pallets, chipboard, demolition timber and other bulky wooden parts into homogenous, well-broken-down material so that foreign parts can be extracted.

### 2 MAGNETIC SEPARATION

In the second step, a magnet fitted above the discharge conveyor is used to safely extract ferromagnetic parts such as nails, scrap iron and other scrap metals, which can be sent directly for recycling.

### 3 NON-FERROUS METAL SEPARATION

Non-ferrous metals such as aluminium or copper are separated from the waste wood with an eddy current separator to obtain a clean fraction and protect downstream equipment. After being discharged, the metals can be recycled.

### 4 BYPASS

Now free from foreign objects, the primary shredded waste wood can be discharged here to ensure the facility's maximum flexibility. This makes it possible to market the roughly shredded material as an additional product without having to invest in additional equipment.

### 5 CLASSIFICATION

In the classification stage, a screen separates the remaining oversize fraction post-primary shredding from the sufficiently shredded particles. Thus, only the necessary material is fed to the next shredder to produce medium-sized particles, the total output of the plant is increased and top efficiency is guaranteed.

### 6 FINE SHREDDING

Free from non-shreddables and metals, the primary shredded waste wood enters the second shredding stage. Here the material is shredded to the final particle size that is ideal and as homogeneous as possible for the next process. Continuously high quality for subsequent production is guaranteed.



# BRAINIAC.

## COMPACT WOOD LINE 60 – THE SMART LINE FOR MAXIMUM PRODUCTIVITY

Incredible power used intelligently: with a throughput of up to 60 metric tons per hour, modern sensor technology and active operating data analysis enable process optimisation, help facilities to operate safely and ensure productivity at the highest level.



### 1 PRE-SHREDDING

### 2 FERROUS AND NON-FERROUS METAL SEPARATION

### 3 BYPASS

### 4 CLASSIFICATION

### 5 FINE SHREDDING



### READY FOR THE DIGITAL FUTURE

The tool for the waste management of tomorrow has arrived: The networking of precise sensor technology and intelligent control using the latest communication standards provides the basis for a digital, highly automated production process. This not only makes it possible to keep the facility at the ideal operating point at all times, but also provides the necessary data to continuously optimise the process and thus increase productivity and yield to a maximum. Depending on the respective input material, analysis tools and additional units to separate foreign objects can be directly integrated into the system to continuously produce an end product of the highest quality.



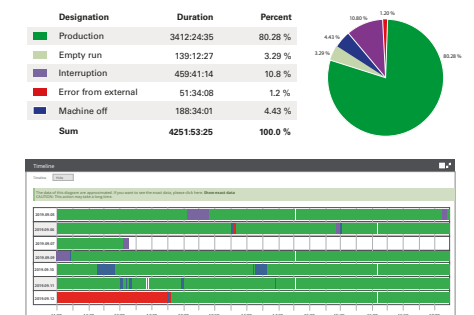
### MAXIMUM SAFETY

Always be on the safe side with Lindner's Fire Prevention System (FPS). Overheated particles in the material stream are immediately detected on the conveyor and automatically cooled. Additionally, the control sensor ensures the controlled powering down of the system for the safe removal of inextinguishable matter such as accumulators and batteries.



### THE ULTIMATE OVERVIEW

With the right information at the right time, Lindner Bridge delivers all relevant performance data and valuable additional information neatly arranged and straight to your desk, smartphone or directly to the information boards in the facility – for full transparency, minimum downtime and maximum output.





# A CUT ABOVE.

## YESTERDAY'S WOOD FOR TOMORROW'S PRODUCTS

### FUELLED BY WASTE WOOD – ELECTRICITY AND HEAT FROM BIOGENIC FUELS

To produce heat and electricity in a power plant, homogeneous, defined particles are essential, since conveying and firing technologies are always designed for a standardised particle size. It is particularly important to avoid oversized particles, as these can cause blockages in the material feed or in the back-burn protection system. Too many fines also negatively impact the process. Extra small particles burn quickly and inefficiently in the combustion chamber and can clump together in the screw channel. These deposits ultimately cause the screw conveyor to float, which interrupts the material feed and, in the worst case, causes damage or breakage.

As a basis, the ISO standard 17225-1 describes in detail the specifications regarding required sizes as well as the percentages of finely and roughly shredded materials.

#### TYPICAL PARTICLE SIZES IN LINE WITH EN ISO 17225-1

Class	main fract.	max. coarse fract	max. length	% fine fract.
P63 F05	60% < 63 mm	10% > 100 mm	350 mm	< 5% < 3,15 mm
P100 F05	60% < 100 mm	10% > 150 mm	350 mm	< 5% < 3,15 mm
P200 F05	60% < 200 mm	10% > 250 mm	400 mm	< 5% < 3,15 mm

(excerpt)



WASTE  
PROCESSING

## RECOVERY



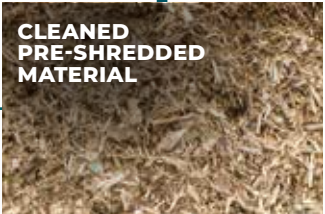
POWER PLANT

### THE PERFECT CHIPS FOR NEW IDEAS – NEW PRODUCTS MADE OF ENGINEERED WASTE WOOD

To keep the product's quality, for example in the chipboard production, consistently high, the purity of the processed waste wood from waste collection is crucial. To ensure that this is the case, it's important that the input material is optimally segregated and the ideal separation technology is used.

Basically, ferrous and non-ferrous metals are separated from the roughly shredded waste wood. Most non-shreddables are screws, nails or fittings. They can damage downstream equipment and thus stop production.

Depending on the source material, an automatic removal system for film or rigid plastic parts as well as separators for heavy materials such as stones, for example, may also be necessary. Clean materials free from these non-wood parts significantly reduce cleaning efforts in chipboard production, increase the value of processed waste wood and the yield for waste processors.



## RECYCLING



CONSUMER



FURNITURE MANUFACTURER



CHIPBOARD FACTORY



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