









LANDFILL MINING

Komplett. Durchdacht.





ALLRECO. KOMPLETT. DURCHDACHT.

It all started in Niederberg in the "Bergisches Land" region. Hedwig, Werner, and Josef Doppstadt established the "Doppstadt" agricultural contractor company. Today the passion for technical innovations, inventiveness and the perception of market requirements are still the fundamental motive forces for the successful creativeness of the Langenberger Innovation

Group (LIG) with the 2nd generation of shareholders. ALLRECO, with a long Doppstadt history, is directly owned by the LIG since 2021.

Our core business includes machines and plants for the processing and separation of waste wood, MSW, commercial and industrial waste, biomass processing and refuse-derived fuel production. We are a team of highly qualified and experienced employees, and we can offer our customers tailor-made highquality machines and completely thought-out plant solutions to meet their requirements.

With a lot of flexibility and inventiveness, we are ready to move great things with you!

At a glance:

- Residual waste has a high recycling potential due to valuable material such as biowaste, waste paper, waste glass, metals, and packaging waste
- Production of refuse derived fuels for energy utilization and uncontaminated recyclable material flows for material recycling
- The treatment process of mixed waste varies depending on local conditions and waste origin (domestic or commercial)



RESIDUAL WASTE TREATMENT Description of the process

The process of residual waste treatment varies considerably depending on the material properties and its origin. By means of a spiral shaft separator (Splitter UNIT), the fine fraction is already separated prior to shredding.

If not fed with the coarse material of the Splitter, the CERON series shredder can also be charged directly via a wheel loader or an excavator with grab attachment. The metal gets removed by a magnet after shredding, and a trommel screens the material into tree size fractions. Our freely selectable trommel mesh sizes allow the material to be separated into more than two fractions.

Ferrous and non-ferrous materials are separated from the fine fractions of the trommel screen and the Splitter. The oversize of the trommel screen is returned to the shredder for further size reduction. The medium fraction can be processed further with components from the industrial waste and refuse-derived fuel processing.



RESIDUAL WASTE TREATMENT EXEMPLARY PROCEDURES AT A GLANCE



SPIRAL SHAFT SEPARATION

The separation by means of spiral shafts is the most robust screening process in the market and ideally suited for a heterogeneous and wrapping material like this.



MATERIAL INFEED

A constant material infeed can be achieved either by means of a vibrating chute or by a feeding hopper.

AUTOMATIC CONTAMINANT DISCHARGE

Thanks to the reversible collection belt, the contaminants can be discharged in the opposite direction to the shredded product to protect downstream plant components.



SHREDDING -

The shredder of the CERON-series can be loaded with a conveyor belt as well as a wheel loader or a grab. The material is charged directly into the hopper. The flexible shredding system with different tool kits allows an exact adjustment to the desired end product.

The residual waste treatment can be extended by components of the commercial waste treatment and refuse-derived fuel production.





The prescribed sorting and recycling quotas can be fulfilled with a smart system from ALLRECO. The fractions recovered are:

REFUSE-DERIVED FUEL (Windsifter light fraction, image next page, top left)

PLASTICS / WOOD (for material recycling)

FERROUS / NON-FERROUS METALS



COMMERCIAL & INDUSTRIAL WASTE TREATMENT An alternative to hazardous waste landfill

Thanks to its high calorific value and low organic content, commercial and industrial waste is very suitable for refuse-derived fuel production. In the first step, the industrial waste is shred, ferrous metals are removed by means of a magnet and the material is transported to the screening unit.

The oversize can be sorted by hand or returned to the shredder. Non-ferrous metal is separated from the undersize by means of an eddy-current separator. In the secondary screening the fine fraction is screened out, in order to optimize the separation accuracy of the downstream wind sifter. Here the heavy fraction is separated from the material. The light fraction is a refuse-derived fuel with high calorific value above 20 MJ/kg.

For a clean incineration, halogenated plastic is removed by means of a sensor-based sorting, i. e. near-infrared spectroscopy.

cost-effective Our processing solution consists of a three-shift operation of the NIR sorting with a separate dosing hopper, while the rest of the plant upstream to the sorting runs at single-shift operation. The upstream process line meanwhile is dimensioned for one-shift operation. The hopper acting as a buffer in between thus saving operating cost by employing just one shift of workers and investment costs by using a smaller dimensioned sorting line.

At a glance:

- Product specific waste from commercial and industrial sectors as well as from private and public institutions
- Recovery of valuable recyclable fractions such as plastics, foils, wood, paper, and metals
- · Production of high-quality refuse-derived fuels



COMMERCIAL & INDUSTRIAL WASTE TREATMENT

EXEMPLARY PROCEDURES AT A GLANCE





- SCREENING

A trommel screen is well suited for secondary screening. The fine fraction, which otherwise would pollute the wind sifter light fraction, is removed.



WINDSIFTING

High density materials tend to have inferior combustion properties. They are separated to increase the calorific value of the residual fraction.

NON-FERROUS METAL SEPARATION

Deposition of non-ferromagnetic materials.

SPIRAL SHAFT SEPARATION

The separation by means of spiral shafts is the most robust screening process in the market and ideally suited for a heterogeneous and wrapping material like this.







REFUSED-DERIVED FUEL PRODUCTION

Refuse-derived fuels (RDF) are fuels made of waste, which replace fossil fuels in thermal processes of the basic materials industry or in the field of energy conversion.

Refuse-derived fuels can be divided into two groups according to the time and effort of processing:

GROUP 1:

Waste types which are separately collected in the form of mono fractions at the place of origin, and thus can be used for energy generation without any or at least very little processing effort GROUP 2:

Waste flows with high calorific value from industrial waste pretreatment plants, lightweight packaging from sorting plants, as well as high calorific fractions after mechanical and biological treatment

The materials processed in our plants mainly originate from GROUP 2.





At a glance:

- Household similar waste and product specific commercial and industrial waste
- Residual waste from industry production
- Construction site waste
- Bulky waste
- Sorting residues

REFUSED-DERIVED FUEL Production at different preparation depths



OUTPUT < 30 mm Suitable material for solid derived fuel (SRF) - main burner

High demands on fuel properties

PLANT EXAMPLE Pre-shredder -> FE separator-> Screen-> Windsifter-> Post-shredder



OUTPUT <100 mm Suitable material for calciner

Low demands on fuel properties

PLANT EXAMPLE Pre-shredder -> FE separator -> Screen-> Wind sifter-> Post-shredder



OUTPUT < 300 mm Suitable material for power stations

Low fuel quality

PLANT EXAMPLE Pre-shredder -> FE separator



HOW REFUSE-DERIVED FUEL PRODUCTION WORKS





REFUSED-DERIVED FUEL PRODUCTION EXEMPLARY PROCEDURES AT A GLANCE



SHREDDING

Unprocessed commercial, household, and industrial waste are fed to the pre-shredder using a wheel loader, or a grab. The flexible shredding system with different tool kits allows an exact adjustment to the desired end product.



MAGNET

Separation of ferrous metals, e. g. fine or coarse ferrous scrap by means of an over belt magnet or magnetic head drum.



SCREENING

With our screening equipment fine material of mostly mineral composition are rejected to obtain the highest material quality in the oversize. The separation cut is adapted to specific tasks and customer requirements.



For different RDF qualities and depending on the input material, fractions such as plastics can optionally be separated from the heavy material and fed to the secondary shredder.

REFUSED-DERIVED FUEL PRODUCTION EXEMPLARY PROCEDURES AT A GLANCE

With this processing option, waste that has already been pre-treated or Monofractions can be further processed into a substitute fuel fraction with high quality. First, the material is shredded and then separated with an air separator unit. Light fractions are extracted while heavier fractions, such as three-dimensional plastics, remain on the belt. The process can be adapted to the specific input as well aus the output fractions to be produced.





FINESHREDDING

For a defined grain size, the material is shredded with a fine shredder from the AK, CURO or KIMO series.



WINDSIFTING

With the Airlift suction unit, the material is lifted by a bend in the conveyor belt and a super-light fraction is sucked off.





MIXED CONSTRUCTION WASTE TREATMENT Description of the process

The mixed construction waste treatment includes a screen, a windsifter, and a float-sink separation. Depending on the material properties, a shredding, ferrous metal separation and/or, manual sorting can be integrated into the process.

To separate the fine fraction and thus reduce the amount of dust and sludge in the following separation steps, the material is pre-screened by a trommel screen. The fine fraction can be treated further in a separate processing step, or it can be used as backfill material for landfills or road construction. The oversize is density separated in two processing steps. In the wind sifter a plastic film fraction is removed, which can be used for energy generation. The rest of the light fraction can be incinerated in applications with lower demands to fuel quality. The heavy fraction is than further separated into a heavy and a light fraction by means of a float-sink separation. Stones and metal pieces can be recycled. The light fraction, consisting of wood and plastic residues, is washed and, like the medium-density wind sifter fraction, can be used to generate energy.

Depending on the utilization of the different product materials, further treatment processes, for example water or sand processing, can be added to the plant.



Due to the organic components, mixed construction waste cannot be directly dumped on landfill. On the other hand, thermal processing is too expensive. Therefore, the material should be density-separated. Combustible material can be used as fuel and inert fractions can be recycled as backfill material.

REFUSE-DERIVED FUELS (Foils, top left) PLASTIC AND WOOD FOR ENERGY RECOVERY (light fraction, top centre) STONES AND METALS (heavy fraction, top right)

Furthermore, all the above-mentioned product fractions are separated from surface contamination such as fine sand, plaster, or wood dust.

LANDFILL MINING Description of the process

Landfill mining pursues ecological and commercial goals. On the one hand, it is used to remediate soil and ground water. On the other hand, important raw material fractions can be recovered by means of landfill mining. Both, the recycling as well as the use for energy generation are possible after the processing thus making an important contribution to profitability.

The process is composed of a spiral shaft separator (Splitter UNIT) to

screen the landfill material. From the resulting coarse and fine fractions, a magnet separates ferrous materials. Depending on its properties, the coarse fraction can be recovered energetically, deposited, or further processed by means of a windsifter. The fine fraction of the Splitter UNIT is screened a second time with a trommel screen. The oversize is density-separated by a windsifter. The resulting light fraction can be utilized energetically. The heavy fraction can be redeposited or

transferred to a construction waste processing facility. The screened fraction is stabilized with lime in the mixer (DM 215 E) and redeposited in the landfill as well.

This procedure mainly applies to municipal waste landfills. The processing of slag and pit tips will not be considered here.



The biggest contribution to cover the cost of landfill mining is made through the upgrading and provision of future building ground. If the landfill remains, its volume is reduced by removing the useful fractions. So, the landfill capacity increases. Useful fractions, which are extracted are:

REFUSE-DERIVED FUELS (coarse fraction) REFUSE-DERIVED FUELS (light fraction, image below left) SECONDARY RAW MATERIAL (ferrous metal, image below right)

The fine fraction and the heavy materials are redeposited or processed further.



MIXED CONSTRUCTION WASTE **TREATMENT / LANDFILL MINING EXEMPLARY PROCEDURES AT A GLANCE**



SCREENING-

With our screening technique, producing into several fractions is possible, which can be adapted to the specific task and customer. The fine fraction is removed from the process to reduce dust formation in the windsifter and sludge formation in the HDS-S. Screening with a spiral shaft separator (Splitter UNIT) is optionally possible.



MATERIAL INFEED

A constant material infeed can be achieved by a feeding hopper.





FLOAT-SINK SEPARATION

The HDS-S separates stones from the wood. Surface contamination such as sand and soil are removed from the products as well.



MACHINE OVERVIEW



HIGH SPEED SHREDDER



PRE-SHREDDING

FINE SHREDDING

SCREENING

SLOW SPEED SHREDDER LINE CERON - SERIES

HIGH SPEED SHREDDER LINE AK - SERIES TROMMEL LINE SM/SST - SERIES







- Powerful and impurity resistant
- Maximum throughput for difficult shredding tasks
- Highly efficient, speed adjustable drive
- Robust solid steel construction
- Coarse shredding
 (prevention of fines)
- User-friendly access and minimal maintenance
- Low operating costs
- · Low dust and noise emission
- Automatic detection of contaminants and discharge
- Quick-change system for wear parts

- Homogeneous output material
- Swinging flails resistant
 against impurities
- Exposed impurities
- Adjustable throughput
- Quick change basket system
- variable output grain size
 Fully automatic, load-dependent material feeding by a scraper floor and a feed-in drum
- Different flail types available
- Feeding with conveyor belt and/or by wheel loader / grab

- Simple and robust technology
- Flexible results through tailored drums (punched plate, mesh wire, changeable plates)
- Quick drum change
- Maximum throughput
- Almost maintenance-free
- Multiple sieve sections possible
- Proven over a thousand times







SEPARATION / SCREENING WINDSIFTING

POST-SHREDDING

SPLITTER LINE SPLITTER UNIT -SERIES WINDSIFTER LINE WS - SERIES MID SPEED SHREDDER LINE BST - SERIES



- Self-cleaning, wrap resistant thus optimal separation of difficult materials
- Impurity resistant
- No stick grain
- Minimal maintenance and running costs
- Space saving

- Separation in up to three fractions (heavy, light, superlight fraction)
- Trouble free use
- Option disc spreader: Even material distribution over entire sifter width
- Two independent post-pushers
- Efficient jam-free continuous feeding
- Gearless High-torque motor
- High throughput at low wear
- Output 10-100 mm possible
- Feeding with conveyor belt and/or by wheel loader/grab

We would also be pleased to provide you alternative procedures and techniques. Please contact us!



The advantages of recycling with ALLRECO thought-out solutions

- The prefect solution for every application
- Low treatment costs per ton
- Maximum throughput
- Innovative concepts with crushing, screening, and separation for optimal output quality
- Simple handling
- Low proportion of fine grain
- ALLRECO service and quality included



ALLRECO GmbH Steinbrink 4 D-42555 Velbert Germany

+49 2052 6039 0 info@allreco.de



