MACHINES AND COMPLETE SYSTEMS

TST
TRENNSO TECHNIK®

OBJECTIVES SERVICES SOLUTIONS

INNOVATION IN SEPARATION

WE MEET THE GREAT WORLDWIDE CHALLENGES WITH INNOVATIVE, SUSTAINABLE SOLUTIONS – FOR A LIVEABLE FUTURE.

Markus Riggenmann
Michael Riggenmann
Managing Directors

VALUES FOR A FORWARD-LOOKING CO-OPERATION

The work of our company is based on the three pillars of quality, customer orientation and sustainability. All employees identify with the shared values formulated in the following.

Quality
To fulfill defined quality parameters at all corporate levels on a permanent basis and set new forward-looking quality standards.

Customer orientation
To consistently tailor all measures and actions to our customers and their customer requirements across all markets.

Sustainability
To protect natural resources and through our actions actively take responsibility for the conservation of a viable environment.

THE FUTURE NEEDS PROVENANCE!

More than 30 years ago, the family-run Bavarian company of TRENNSO-TECHNIK® recognised the elementary challenge of the future: Protect resources, recover valuable raw materials and also save energy. The results of this objective are the pioneering solutions of TRENNSO-TECHNIK® in the field of process engineering and preparation of a wide range of materials. In particular, this refers to the three core competence areas of recycling, bulk material and food.

We implement the projects of our clients with passion and creativity with the aim of achieving maximum cost-effectiveness and purity. To this end, we offer **complete systems** as well as **machines** and **modules tailored to customer requirements** which impress due to their innovative technology and robust construction.

As a shortage of resources is a worldwide problem, we sell our successful products on the growing international market. With this strategy, we have experienced years of growth and thus consistently contribute to the necessary conservation of resources and protection of our environment.

With the various screening machines, separating tables, wind sifters, dispensing systems and conveying technologies, which are implemented as individual machines in modules or in complete systems, TRENNSO-TECHNIK® offers a solid basis for a profitable, valuable investment in the future. We ensure value preservation for you through durability and reliability with high-quality materials, precise machining and state-of-the-art technology.

Existing processing plants can also be supplemented with TRENNSO-TECHNIK® technology and thus sustainably increase the quality of the end-product and value added.

With its entrepreneurial vision and clear principles, TRENNSO-TECHNIK® sets standards in the continual development of dry separation processes: For a future which also offers convincing prospects for future generations with resource-friendly use of materials.

IN OUR TECHNOLOGY CENTRE, WE **CAN TEST EVERY MEDIUM UNDER REAL CONDITIONS** WITH CUSTOMERS AND INTERESTED PARTIES AND THUS **PROVIDE A GUARANTEE OF PURITY** EVEN BEFORE PLACEMENT OF AN ORDER.

TECHNOLOGY CENTRE FOR MAXIMUM PROCESS SAFETY!

As an indispensable process module between planning and production, we have invested in our company's own state-of-the-art Technology Centre. Here, all envisaged solutions are tested for feasibility in terms of separation technology.

The findings thus obtained form the basis for the planning and production of customised systems. These test runs guarantee the customer reliability for optimum process engineering.

We shall be pleased to carry out tests with your product in our Technology Centre.

WE ARE YOUR PARTNER FOR MORE PROCESS EFFICIENCY

The TRENNSO-TECHNIK® process solution expertise is the basis of international success. It is the driving force behind the highly developed innovations resulting from the tasks which we are set and the trends in food processing as well as in general preparation and recycling technology.

Due to the seamless transition of each individual step of the process cycle to the next, we can guarantee our customers efficiency, transparency and high quality. In particular, our qualified engineers specialise in individual projects, as know-how and creativity lead to tailor-made systems in this field.

Your project is supervised by professionals, from consulting and testing in the Technology Centre to planning and design as well as production, delivery, assembly on site and maintenance service. The skills of our team are continually developed through further training. You therefore always have the latest know-how and technology available to you.

You can rely on technical excellence for optimum separating and sorting results with purity of up to 100 %.

ECO-CYCLE SOLUTIONS

1.
CONSULTING

Each project begins with qualified consulting. In this way we clarify your specific requirements.

2.
TESTING PROCESS

In the company's own Technology Centre, we test the potential solutions to your requirements under real-life conditions.

3.
DESIGN

Specific to your requirements, we develop a tailor-made separating and sorting concept.

4.
ENGINEERING AND PLANNING

We engineer and plan your solution, ranging from individual machines and module units to complete systems.

5.
PRODUCTION

For us, a high level of vertical integration is a prerequisite for the fulfilment of maximum requirements in terms of quality and operational safety.

6.
ASSEMBLY

Assembly with experienced professionals ensures high quality and operability.

7.
CONTROL

TRENNSO-TECHNIK® supplies electrical controls which are exactly tailored to specific customer requirements.

8.
COMMISSIONING

We commission the plant together with you and provide you with first-class technology.

9.
SERVICE

The technology of TRENNSO-TECHNIK® is designed for permanent operation, easy to operate and simple to maintain. Our Service Team will be pleased to assist you at any time.

EFFICIENT AND PROFESSIONAL

ENGINEERING

THE **KNOW-HOW** AND **CREATIVITY**
OF OUR QUALIFIED ENGINEERS
LEAD TO **TAILOR-MADE SYSTEMS.**

TRENNSO-TECHNIK® IS YOUR PARTNER FOR PLANNING, DESIGN AND ENGINEERING OF INDIVIDUAL CUSTOMISED SYSTEMS

From individual components to turnkey preparation and recycling systems, we design and plan the perfect system configuration.

- Use of 3D-CAD software Autodesk®Inventor®
- Use of Autodesk® Navisworks®
- Re-design of turnkey systems and modules
- 3D-scan of existing systems, transfer of the scan point cloud to a ReCAP-format as the basis for use in CAD
- Expansion/extension of existing systems with TRENNSO-TECHNIK® technology
- Design of steel platforms and support structures in accordance with national standards
- Preparation of all necessary documents and drawings

A HIGH LEVEL OF VERTICAL INTEGRATION ALLOWS US TO REACT **QUICKLY AND FLEXIBLY** TO SPECIFIC CUSTOMER REQUIREMENTS.

INDIVIDUAL AND FLEXIBLE
PRODUCTION

WITH A STRONG TEAM SPIRIT AND WIDE EXPERIENCE, WE MASTER ALL CHALLENGES

We have always set great store by implementing the central production steps in-house. We thus maintain a high level of flexibility which enables us, even with exceptional requirements, to implement solutions quickly and economically.

Thanks to our high level of vertical integration with all essential machining steps in-house, we are able to meet individual customer requirements quickly and cost-effectively.

Our production processes comprise:

- Drilling
- Turning
- Milling
- Sawing
- Punching
- Welding
- Metalworking
- Pickling
- Surface blasting
- Electropolishing
- Painting
- Powder coating
- Laser cutting
- Water jet cutting
- Assembly

With this combination of mechanical production processes and final assembly, we ensure the high quality of all our systems and machines.

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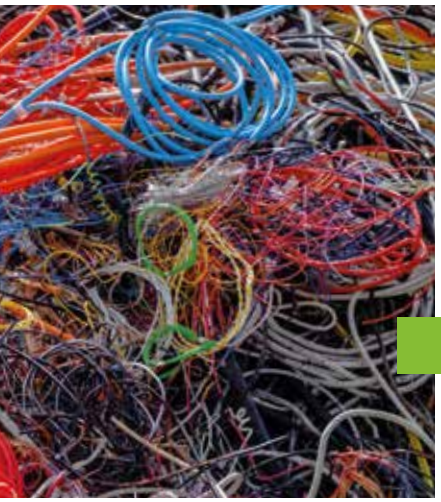

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SOLUTIONS FOR
RECYCLING

> THE FORECASTS FOR THE DEVELOPMENT OF **NATURAL RESOURCES** AND THE DEMAND FOR THEM REQUIRE **PIONEERING, SUSTAINABLE SOLUTIONS.**

On average every person in the European Union produces half a tonne of rubbish per year. Simultaneously worldwide the costs of raw materials are increasing constantly. Due to increased consumption – also in emerging industrial nations – the worldwide trend is also sharply increasing. This is the current situation. We from TRENNSO-TECHNIK® already recognised 30 years ago the tasks facing us in the future: With advanced recycling systems, we counteract the growing volumes of waste and the long-term depletion of raw materials.

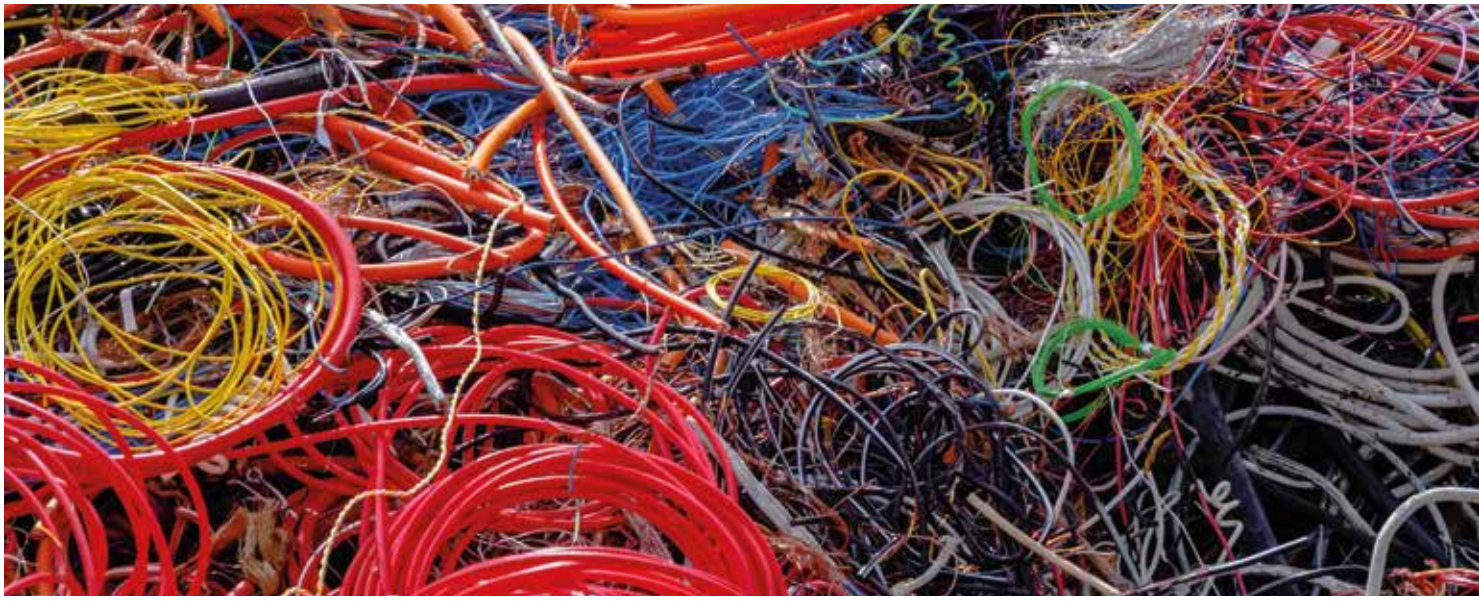
UP TO 100 % PURITY WITH IMPRESSIVE PRODUCTIVITY

Recycling systems as a sustainable solution
Each of the regularly published numbers clearly expresses one thing: The immense potential of recycling as a global economic factor. Based on standards and laws, the volume of raw material recovery is constantly increasing. The forecasts for natural resources and the demand for them require pioneering, sustainable solutions. We contribute to the solution – TRENNSO-TECHNIK® recycling systems for a sustainable future!

In the recycling sector, the quality of the secondary raw materials should be as close as possible to that of the original condition and recovery should also be carried out in an energy-saving way. This is where separating and sorting of the various waste types come into their own, in the dry separation process, the technology of which is the world of TRENNSO-TECHNIK®.

Pioneering dry separation processes and recycling systems from TRENNSO-TECHNIK®
Our machines and systems are designed in accordance with the latest standards for various applications of material recycling. Our product range includes systems for the recycling of

- Electrical and electronic waste
- Electrical and electronic cables
- Non-ferrous metals
- Municipal and industrial waste, compost
- Waste glass
- Scrap tyre
- Waste wood
- Gypsum
- Artificial turf
- Batteries
- Various plastic waste (e.g. PET bottles)



ELECTRICAL AND ELECTRONIC CABLES

Protecting high quality materials

Nowadays, the recycling of electrical and electronic cables and therefore the recycling of valuable raw materials in the economic cycle are more important than ever. Copper fetches maximum prices on the raw material markets and offers the best prospects for operators of systems for electrical cable processing. However, the recovery of plastic sheathing is a central task in view of the development in oil prices and the worldwide climate objectives.

- **Highly efficient processing of electrical and electronic cables, shredder cables, mixed cables**
- **Recovery of valuable raw materials such as copper, red metals, aluminium, light metals, plastic fractions, stainless steel**

Our processing systems are based on a professional multi-stage system. In the individual process steps, the FE fraction is first removed via a pre-shredding stage and a magnet system.

Via further granulation and shredding, the input product is separated into its constituent parts by up to 100 %. The recovery of valuable raw materials is the aim of each preparation process. Supplementing existing customer systems with machines and modules from TRENNSO-TECHNIK® enables, among other things, more efficient processing steps, increases in capacity, higher levels of purity and thus cost-savings and maximum profits.

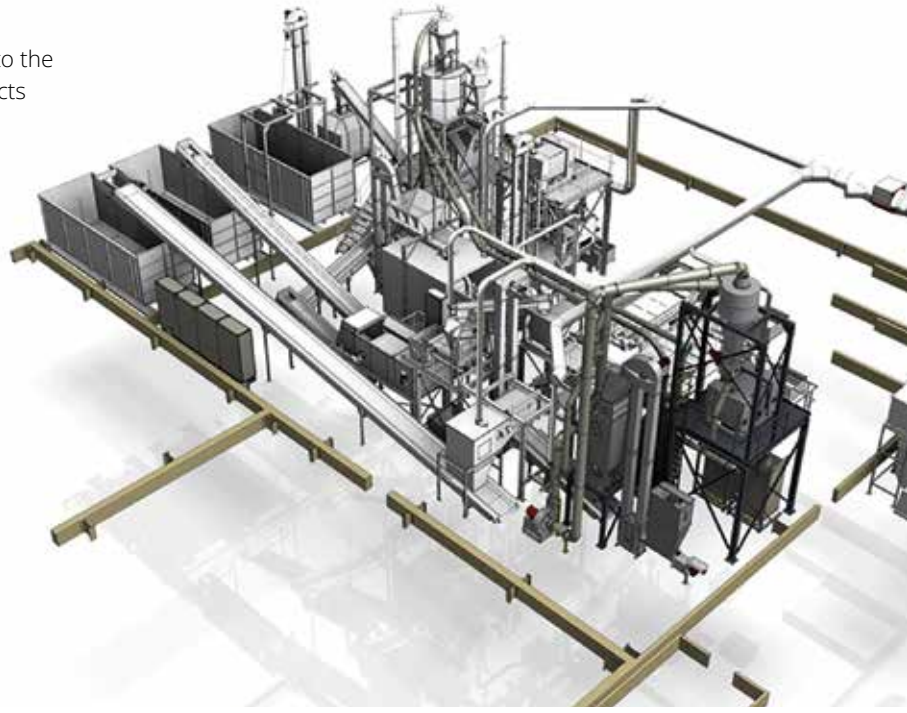
ELECTRICAL AND ELECTRONIC WASTE

Separating valuable raw materials from waste

In Germany alone, the volume of electrical waste is already more than two million tonnes per year, worldwide approx. 40 million tonnes per year and increasing rapidly. The use of mobile devices such as smartphones and mobile phones, the modernisation of society and reduced product life cycles lead to a rapid increase in the amount of electrical and electronic waste as a proportion of the total waste volume.

- **Highly efficient processing of electrical and electronic waste**
- **Recovery of valuable raw materials/fractions, e.g. non-ferrous metals (copper, aluminium), printed circuit boards, cable fractions, plastic fractions, iron and stainless steel**

For the operator of processing systems, in addition to the social challenge, this also results in excellent prospects from an economic point of view.



SHREDDER LIGHT FRACTION AND SHREDDER HEAVY FRACTION

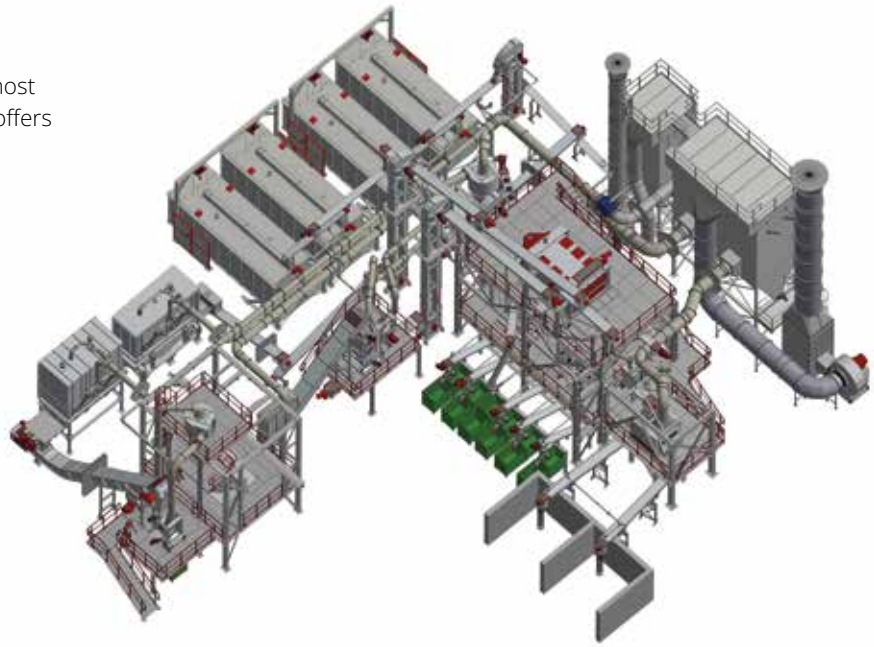
Recovery of recyclable raw materials

Shredder residue is waste usually produced when disposing of used cars. There are over 60 million cars on Germany's roads alone and worldwide approx. 1.5 billion.

With its technology, TRENNSO-TECHNIK® has set itself the target of increasing the proportion of recovery of raw materials from light and heavy shredder fractions. Through various fractioning and separating stages, the input material is separated into its constituent parts by up to 100 %.

Due to the greatly increased world market prices for most raw materials, the technology of TRENNSO-TECHNIK® offers operators of processing plants excellent prospects in economical and ecological terms.

- **Highly efficient processing of light and heavy shredder fractions**
- **Recovery of valuable fractions, e.g. non-ferrous metals, iron, stainless steel, shredder cables and alternative fuels**



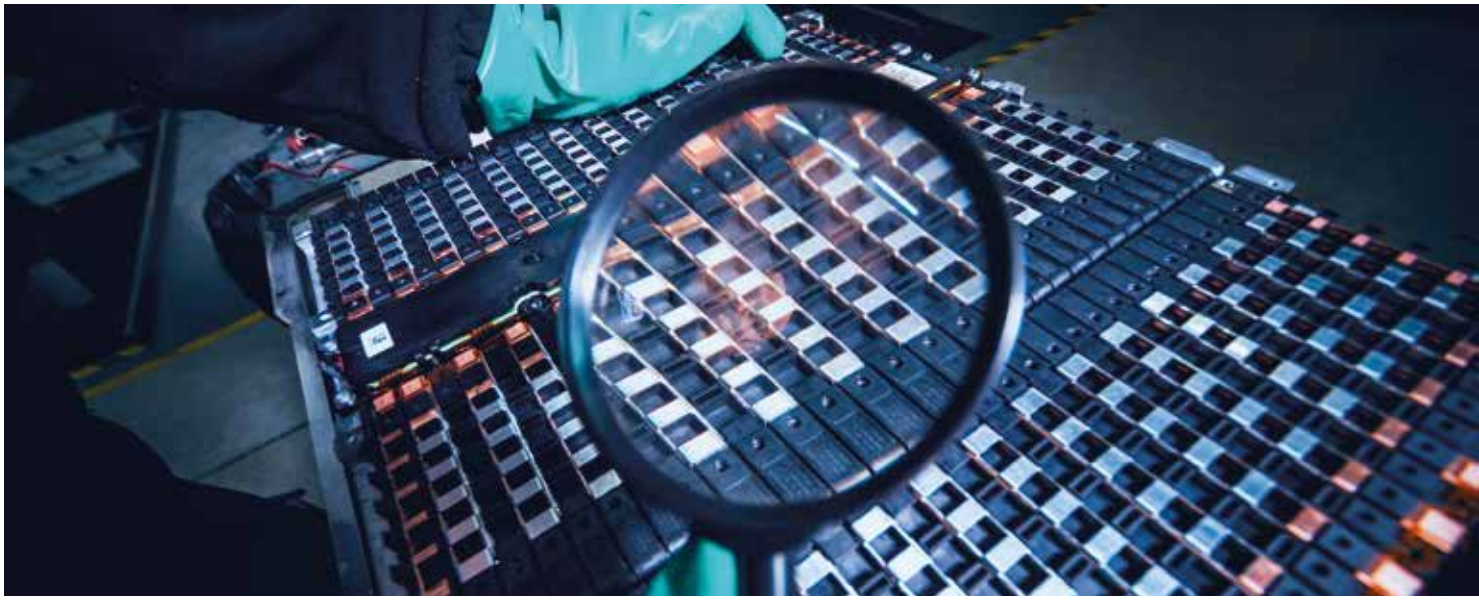
NON-FERROUS METALS

Separation of red metals and light metals

Non-ferrous metals are no less technically and economically significant than iron and steel, which explains the high demand for clean, processed non-ferrous metals on the world market. The value of non-ferrous metals, such as copper and aluminium, exceeds that of iron and steel several times over.

- **Highly efficient processing of non-ferrous metals from cable fractions, slag, shredder fractions, municipal waste and composting plants as well as waste incineration ash**
- **Recovery of valuable raw materials such as copper, red metals, aluminium and light metals**

The separation of non-ferrous metals into red metal and light metal forms one of our core competencies in the area of metal processing. The high degrees of purity of red metals on the one hand and the high degrees of purity on the light metal side ensure additional profits for our customers.



BATTERIES

Returning high quality raw materials to the economic cycle

An important part of mobility transition is to use battery-powered electric cars as the main drive technology in the future. By 2030, up to 75 % of new car registrations are to be electric cars. This development is supported by legislation and EU directives.

The batteries needed for this require raw materials that are only available in limited quantities, such as copper, lithium, cobalt and rare earths for the magnets they contain. The service life of the lithium-ion batteries is also limited, however, and is currently estimated at around 1000 charging cycles. Broad acceptance of electric cars and thus their future prospects depend not only on the charging infrastructure and range but also on the sustainability of this drive technology.
A resource-saving approach also increasingly relies on the environmentally friendly recycling of lithium-ion batteries and supercapacitors.

For the use of efficient and innovative battery recycling at TRENNSO-TECHNIK®, the material must be discharged, dismantled, crushed and dried.

- **Highly productive processing of technology metals**
- **Recovery of valuable fractions such as copper, lithium, cobalt, nickel, manganese, iron/steel, aluminium, plastic from casings**

MUNICIPAL AND INDUSTRIAL WASTE, COMPOST

Recovering secondary materials and mineral fractions

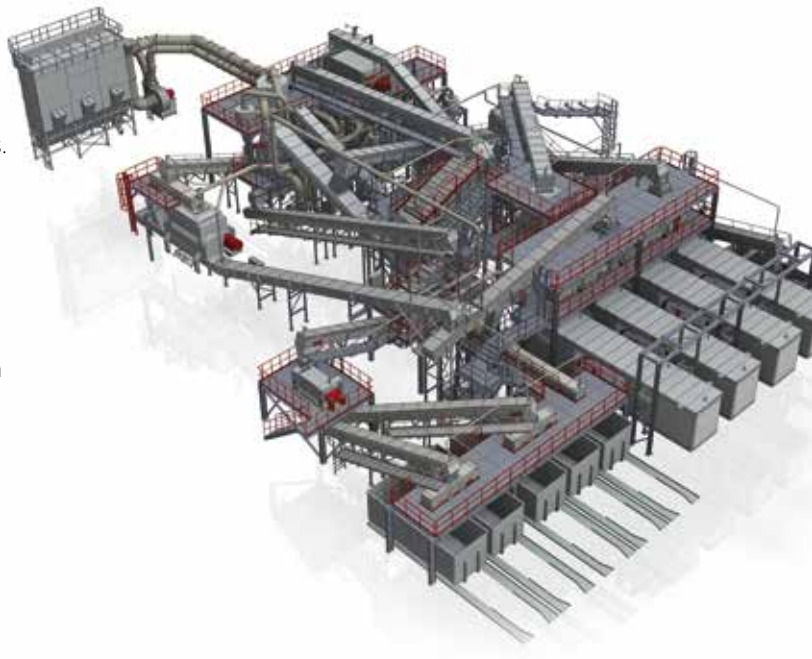
In addition to coarse processing, fine processing is also becoming much more important for operators of waste and waste processing plants for municipal and industrial waste as well compost due to increasing raw material prices and energy development.

- **Highly efficient processing of household and industrial waste as well as compost**
- **Recovery of valuable raw materials, such as glass, non-ferrous metals, iron, cable fractions as well as cleaned compost**

Recover raw materials as well as secondary fuels and mineral fractions with waste processing plants from TRENNSO-TECHNIK®. Save landfill space and generate significant economic advantages.

Our processing plants are based on several separation stages. The input municipal and industrial waste is broken down into its constituent parts, filtered and separated according to customer requirements.

Our plants ensure you highly efficient separating results with automatic exhaust air control. Our processing technologies are of course also available as individual components and can be ideally incorporated into existing plants.



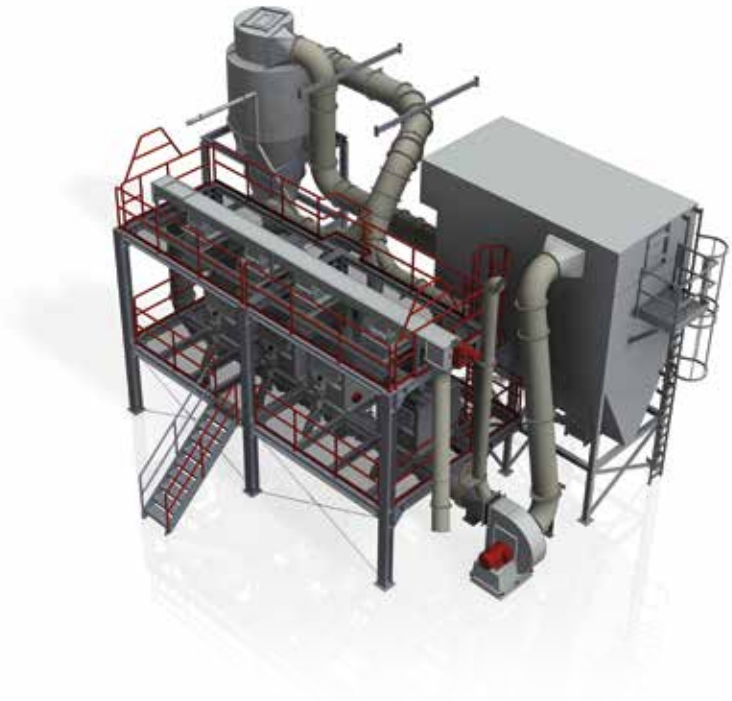
WASTE GLASS

Reintroduction of high quality raw materials to the economic cycle

Nowadays, the recycling of waste glass and production waste of glass production and therefore the recycling of valuable raw materials in the economic cycle is more important than ever. This is especially the case from the point of view of conservation of resources, climate change and increasing costs of raw materials.

- **Highly efficient processing of contaminated glass fractions**
- **Recovery of raw materials**

Our processing machines for waste glass and production waste from glass production are designed to separate glass by chemical composition in order to ensure a high level of purity of the glass fractions for further sorting steps, based on drying, filtering, sifting and density sorting. The professional multi-stage systems are efficiently co-ordinated in order to guarantee the assured purities of end product qualities for the customer.



TYRE RECYCLING

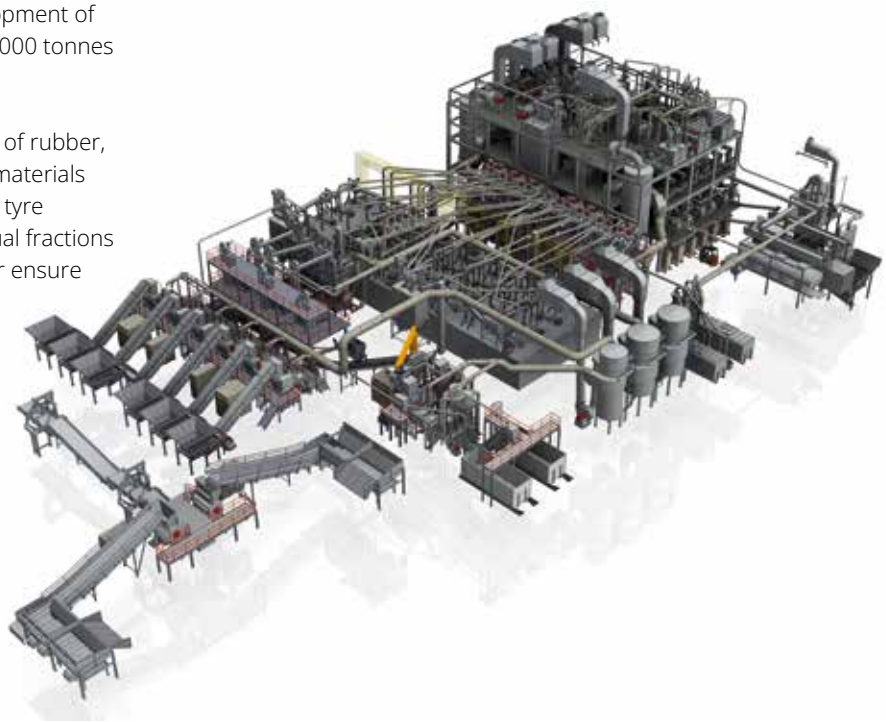
Separation into raw material constituents and residual fractions

Approximately 650,000 tonnes of tyres are scrapped every year in Germany alone. In order to close the cycle of environmentally-friendly recycling, the individual constituents are used after processing of scrap tyres to produce new products.

- **Highly efficient processing of scrap tyres**
- **Recovery of valuable, clean raw materials/ fractions, such as rubber granulate, steel and textiles**

TRENNSO-TECHNIK® is the specialist for the development of individual, customer-specific plants with up to 100,000 tonnes annually.

The separation of tyres into their constituent parts of rubber, steel, textiles and residual fraction stones/foreign materials forms one of our core competencies in the area of tyre recycling. The high degrees of purity of the individual fractions on the one hand and minimum losses on the other ensure additional profits for our customers.



ARTIFICIAL TURF

Processing with a professional multi-stage system

In the last 20 years, artificial turf has been used more and more frequently in public sports and leisure facilities. This trend is continuing to increase greatly. The average product service life of an artificial turf surface is 10 to 15 years depending on use. It is then dismantled and recycled.

- **Highly efficient processing of artificial turf**
- **Recovery of valuable raw materials, such as artificial turf fibres, sand and rubber**

Our processing systems for artificial turf are based on a professional multi-stage system. In the individual process steps, drying stages, shredding stages as well as cleaning stages/separation stages are efficiently co-ordinated in order to guarantee the assured degrees of purity of the end product qualities for the customer.

PLASTICS

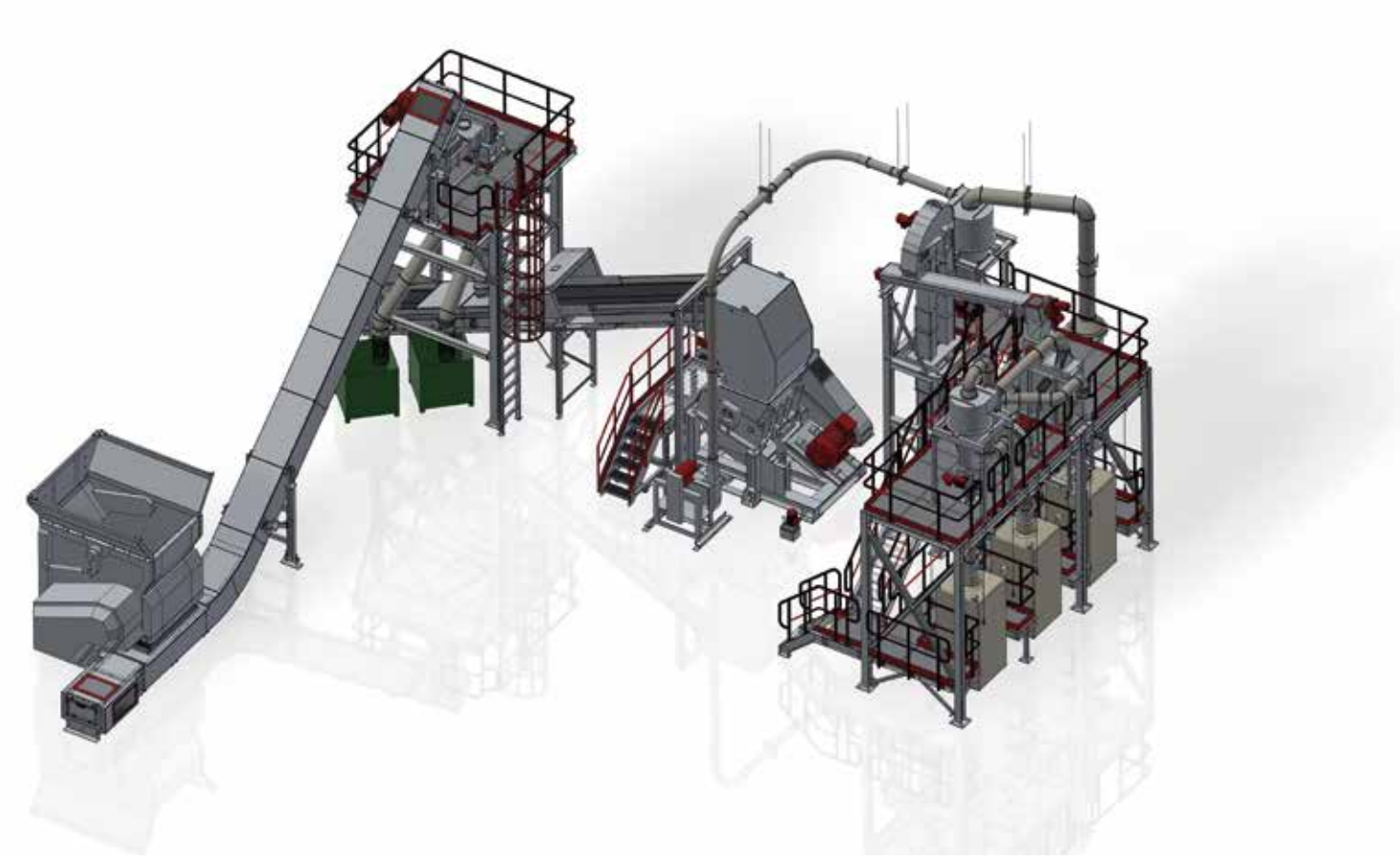
Sustainable circular economy for plastics

In 2018, almost 19 million tonnes of packaging waste were generated in Germany. Various plastics such as PET, PP and PE are found in heterogeneous waste quantities from household and commercial waste. The aim of plastic recycling is to recycle high-quality raw materials from these waste types into new products.

- **TRENNSO-TECHNIK® provides solutions in plastics recycling in the following areas: PET bottles, separation of thick-walled and thin-walled plastics, separation of light and heavy plastics, plastic fractions in the recycling of electronic cables/EEE/ASR**

As good as the durability of plastic is, it is just as bad in terms of its environmental impact. Therefore, a circular economy of plastics is being strived for, which should prevent plastic from becoming waste in the first place, but instead be recycled again and again and used in other applications. For plastics recycling, plastics are separated from household and commercial waste to be first processed into recycled materials. Machines and modules from TRENNSO-TECHNIK® supports efficient plastics recycling, e.g. through the use of air classifiers and separating tables.

In addition to thermal recycling, it is increasingly important to separate valuable plastics from heterogeneous waste types. Consistently high quality of the recycled materials ensures best possible processing and recycling. The dry separation process used by TRENNSO-TECHNIK® stands for a solution that is sustainable in several ways, as water is no longer used as a separating medium.
Processing technology from TRENNSO-TECHNIK® divides and separates the various plastics in the density sorting process by means of wind sifters, screening machines, cyclones and separating tables. Our custom-designed plants guarantee the highest grade purities and are thus the basis for efficient recycling of plastics.



WASTE WOOD

Processing plants for the recovery of valuable raw materials

The demand for biogenic fuels and raw materials and therefore the recycling of wood has continually increased in the last few years. Processed used wood is used more and more not only to generate heat and electricity in biomass power stations but also for the production of particle boards and in the whole of the timber industry.

The excellent efficiency of our machines and modules combined with maximum plant availability and therefore minimum maintenance requirements guarantee our customers extremely economic solutions.

- **Highly efficient processing of waste wood from industrial waste, municipal and commercial waste**
- **Recovery of valuable raw materials, such as wood, iron, non-ferrous metals**

GYPSUM

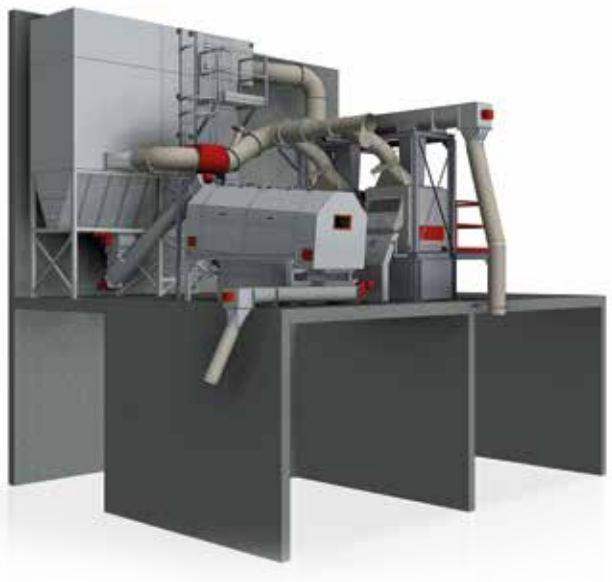
Separation of foreign materials and of the carrier material

The statistically recorded quantity of gypsum-based construction waste alone is approx. 600,000 tonnes per year in Germany today, which consists of approx. 50 % of recyclable material. Current estimates already assume 1,000,000,000 tonnes per year by 2030.

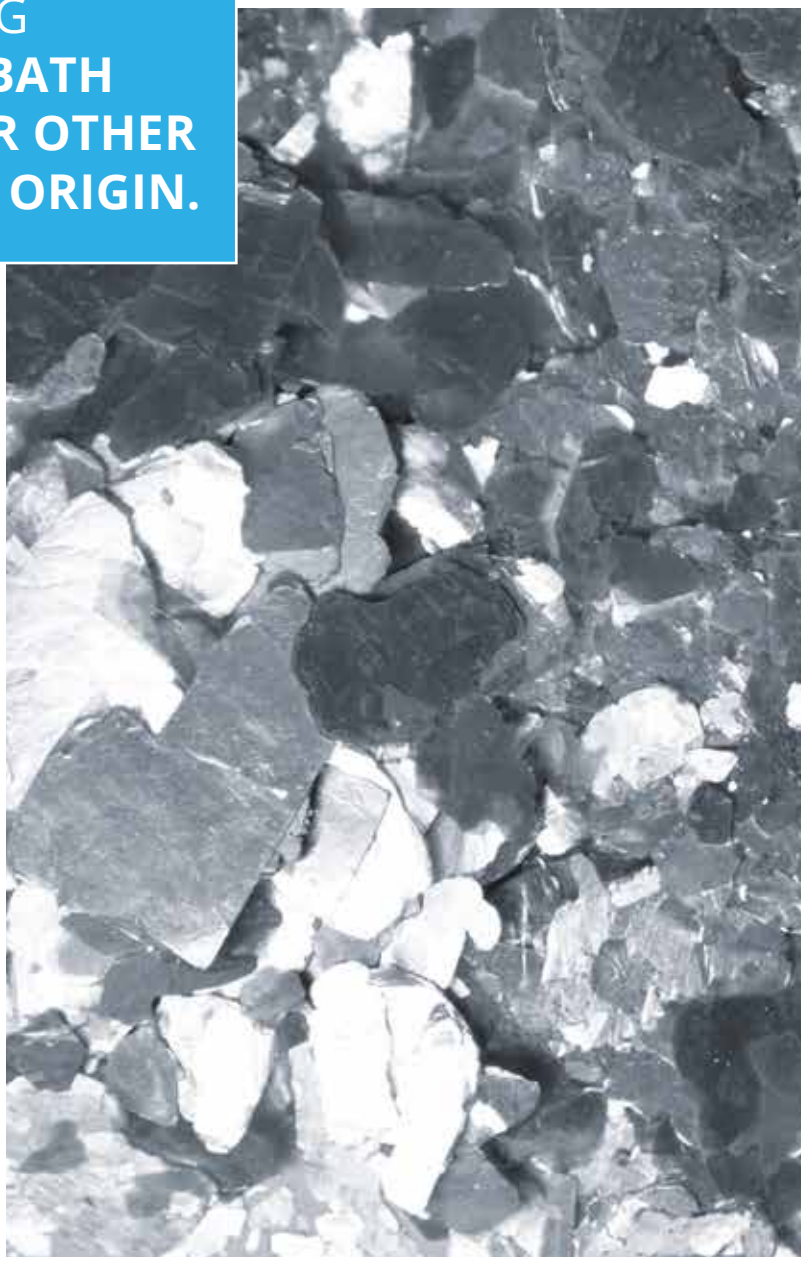
- **Highly efficient processing of gypsum plasterboard from production, industrial and municipal waste**
- **Recovery of the valuable raw material of gypsum**

Our processing plants for waste gypsum plasterboard as well as, among other things, production waste from gypsum plasterboard production are designed for separation of the foreign materials as well as separation of the carrier material (paper/film) in order to ensure high purity of the gypsum fraction for use in cement works.

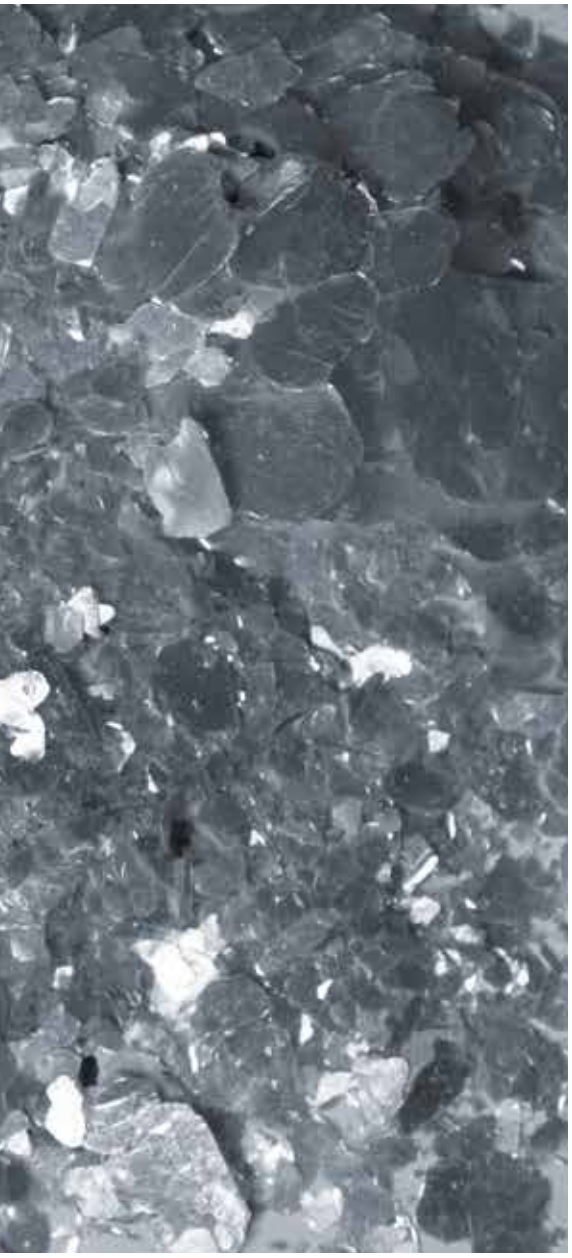
Several separation stages are efficiently co-ordinated in order to guarantee the assured purities of end product qualities for the customer.



THE SERIES OF OUR BULK MATERIAL PROCESSING PLANTS ARE **SUITABLE FOR** SORTING VARIOUS GOODS SUCH AS **BATH SALTS, MICA AND SAND OR OTHER SUBSTANCES OF ORGANIC ORIGIN.**



SOLUTIONS FOR
BULK MATERIAL



PROCESS BULK MATERIALS WITH PROFESSIONAL MACHINES AND PLANTS FROM TRENNSO-TECHNIK®

In the long term, raw material prices are increasing worldwide. In the European Union, every single one of us produces half a tonne of waste per year on average. Increasing consumption worldwide, even in economically developing countries, leads to a further increasing trend. This situation makes one thing clear: bulk material processing has enormous potential as a global economic factor.

Standards and the legal situation form the political framework for increased interest in the recovery of raw materials. Almost daily forecasts for a shortage of resources with a constant development of raw material recovery and demand show that long-term sustainable solutions are required.

With our bulk material processing plants, you obtain secondary raw materials through recovery in a very energy-saving manner. The products more than meet current requirements for quality and efficiency. We at TRENNSO-TECHNIK® have specialised in plant engineering in the separation and sorting by means of a dry separation process.

MICA

Efficient separation of foreign materials

Mica is still a sought-after raw material today. As it withstands temperatures of over 600 °C, mica is preferably used as an electric insulator, e.g. as a carrier material for heating wires in soldering irons, in toasters or electric cookers.

As a board material, it is used in shipbuilding, building construction and in the production of chimneys, but also as a substrate for self-organising monolayers and as a matrix in atomic force microscopy.

Due to these and other fields of application, mica is a sought-after raw material, which, however, can only be further processed in pure form.

TRENNSO-TECHNIK® is specialised in the development of customer-specific solutions for the separation of foreign materials in bulk goods such as mica.

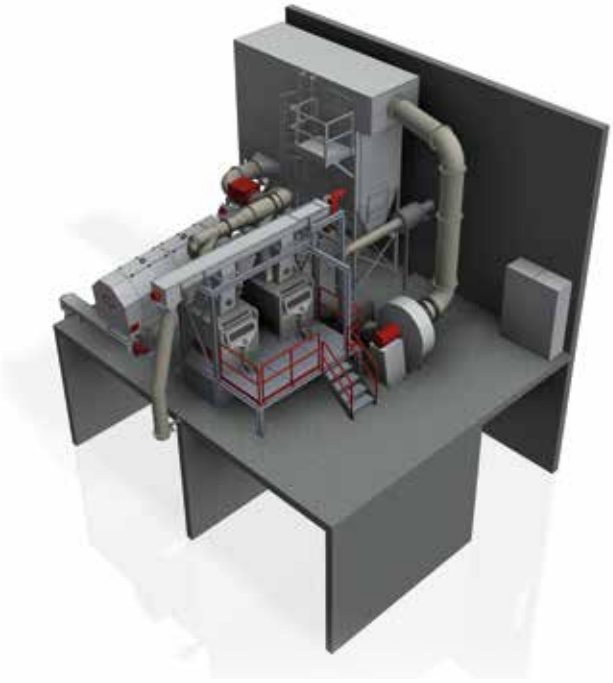
CRUSHED STONE CHIPPINGS

Productive separation processes

Crushed stone chippings are a broken-up mineral material with a grain size of 2 to 32 mm mainly used in roadbuilding but also for spreading in the event of black ice and snow in the winter.

It is used in very large quantities as bulk material, which must ultimately be cleaned of foreign materials before re-use. TRENNSO-TECHNIK® has comprehensive experience in the separation of foreign materials in the case of crushed stone chippings and achieves purity results of up to 100 %.

The type and structure of individually produced plants from TRENNSO-TECHNIK® are based on the requirements of our customers. In the company's own Technology Centre, we are able to test under real conditions.



BATH SALT

Increasing quality

Bath salt is a bulk material which makes maximum requirements for purity before further processing in the cosmetic industry. For a reliable and economic solution in the dry separation process, the definition of pourability on delivery of the bulk material is an important criterion.

As, in addition to a reliable process, economy also plays a major role for normal market volumes, the planning and design of a plant requires great experience.

TRENNSO-TECHNIK® has a large design department with experienced engineers, who also have access to the company's own Technology Centre. There, the required solutions can be tested and optimised under real conditions.

SAND

High purity and even granulation

For the separation and processing of materials of organic origin such as wood or coal as well as alkali-reactive components such as opal sandstone, chalk or flint, the dry separating process of TRENNSO-TECHNIK® opens up ideal possibilities.

TRENNSO-TECHNIK® offers solutions individually adapted to the relevant requirements with complete plant technology. We are able to produce every required grain size in a safe, economic process.

The proven machine and plant technology of TRENNSO-TECHNIK® is used for fractioning of the input materials into the necessary grain sizes. With the density separation process, cleaning of all foreign materials of up to 100 % can be guaranteed.

In the company's own Technology Centre, all pre-conditions are given to test the required solutions with the customer under real conditions.

SOLUTIONS FOR THE
FOOD INDUSTRY

INCREASING QUALITY. TODAY AND IN THE FUTURE WITH TRENNSO-TECHNIK®

Solutions for the food industry is one of four fields of expertise which we serve with our dry separating technology. Dried fruits and dried vegetables, coffee and cocoa, tea, herbs and spices as well as grains and nuts are just some examples of how use of our plants leads to 100 % purity.

The separating and sorting machines are the heart of every plant and form the core competency of TRENNSO-TECHNIK®. In the dry separating process optimised by us, we separate foreign materials from food. Every plant is developed for the individual requirements of the customers so that each one is a masterpiece of functionality and technology. On request, we supply our plants in a turnkey version.

THE DEMAND FOR QUALITY OF FOOD IS INCREASING. CONSUMERS AND THE TRADE EXPECT **MAXIMUM PURITY** OF THE PRODUCTS.

DRIED FRUITS AND DRIED VEGETABLES

Efficient separation of foreign materials

The requirements for purity of dried fruits and dried vegetables are continually increasing on the market. Trade partners and end-consumers expect products which are free from foreign materials or impurities.

The separating and sorting technology of TRENNSO-TECHNIK® offers a very highly efficient and economically attractive solution. From individual machines and modules to complete plants of all sizes, we always offer a solution adapted to customer-specific requirements.

Especially for dry products, great experience and a carefully developed solution are required due to the often varying design and the changing specific part weights.

With its experienced engineers, TRENNSO-TECHNIK® tests every customer requirement in the company's own Technology Centre under real conditions before implementation and thus guarantees maximum process reliability and value added for all customers.

COFFEE AND COCOA

Increasing quality through 100 % purity

The separation of foreign materials before further processing coffee and cocoa beans requires technically perfect and economic solutions.

TRENNSO-TECHNIK® offers not only highly developed technology but also maximum process reliability. 100 % purity for the separation of foreign particles is the result of our performance.

Speak to our specialists about your requirements and your daily quantity throughput. We test your production requirements under real conditions in our Technology Centre and thus create absolute reliability and plannable results already in advance of placement of an order.

TEA, HERBS AND SPICES

Highly productive cleaning processes

The separation of heavy materials and impurities in the processing of tea, herbs and spices is regarded by specialists as the supreme discipline. Careful treatment of the products is paramount for the basic design here.

TRENNSO-TECHNIK® has comprehensive experience in the separation and sorting of foodstuffs with a purity result of 100 %.

With wind sifter modules from TRENNSO-TECHNIK®, the light materials and the heavy particles are separated by down-stream separating tables. Various screening machine types are also available for a possibly necessary or required grain size fractioning. All machines can of course be produced with a food-safe surface quality, e.g. in a stainless steel design, pickled, surface blasted or electropolished.

In addition, our plants stand out due to their maximum economic efficiency and functionality. Here, the production volume of our customers determines the structure and design of the plant of TRENNSO-TECHNIK®. And in the company's own Technology Centre, we are able to test every requirement under real conditions.

GRAINS AND NUTS

Efficient dry separating technology

Cleaning of grains, nuts and other cereals is an important pre-condition for the production of high quality end-products. Here, 100 % of all unwanted impurities must be removed.

TRENNSO-TECHNIK®, with its full know-how, offers various special machines for these challenges, which in addition to maximum functionality also set standards from an economic point of view.

100 % purity is only one criterion which we ensure in advance through tests under real conditions in our own Technology Centre. Highest possible throughput, adapted to your individual requirements and low-maintenance technology ensure daily use for high customer satisfaction.

Trust us with your tasks for separation and sorting of foreign materials.

HIGH-QUALITY AND PRECISE

MACHINES AND MODULES

TRENNSO-TECHNIK® offers various screening machines, separating tables, wind sifters, dosing systems and conveyors. From individual machines to modules and complete turnkey solutions, TRENNSO-TECHNIK® offers a solid basis for a profitable, valuable investment in the future.

Energy-saving, environmentally friendly and without waste water, new standards are constantly being set which are individually and perfectly adapted to the individual materials and specific customer requirements. 100 % varietal purity can thus be guaranteed.

High quality materials, precise processing and state-of-the-art technology guarantee durability and reliability of the machines of TRENNSO-TECHNIK®.

> WITH OUR DRY SEPARATING PROCESS, WE ACHIEVE VARIETAL **PURITY OF UP TO 100 %.**

DENSITY SORTING TECHNOLOGY

MACHINES FOR SORTING DRY BULK MATERIALS AND RAW MATERIALS

Our machines in the field of density sorting technology are impressive thanks to their very efficient processes and results for the separation of dry bulk material and raw materials of different densities. The products, which should not exceed a certain degree of moisture, are separated from each other according to their specific weight and shape.

SEPARATING TABLE TTS

Separation of bulk materials and raw materials

Operating principle:
Via the inlet, the material to be separated is deposited on the distribution unit and working screen, which is driven via an eccentric. The inclination of the screen is variably adjustable. Air is fed through the material to be separated via a pressure blower attached below the screening box. The light particles are thus fluidised and separated from the heavy particles. Depending on the screen motion and incline as well as the air throughput, the heavier particles are transported up through the screen to the heavy fraction outlet and the lighter particles downwards to the light fraction outlet. The output of the pressure blower and the speed of the eccentric can be controlled electronically.

The exhaust air is cleaned via a downstream filter unit and can be fed back into the machine (air recirculation).

Options:
Depending on the individual application or abrasiveness of the material to be separated, various wear housing versions are available, e.g. HARDOX, PU, stainless steel.
Complete design in stainless steel as well as surface treatments according to requirements are also available.

Machine:

The machine separates a wide variety of bulk materials according to their specific weight and form. The products must be pourable and should not exceed a certain moisture limit.

LONGITUDINAL VIBRATION TABLE VLT

Separation of a wide range of various materials

Operating principle:
The material to be separated is deposited on a vibrating distribution chute, which continually distributes the material across the whole working width of the machine. The two following separation tables, which can be adjusted, among other things, in terms of frequency and deflection, then separate the input materials, for example according to specific weight and form.

Machine:

Our newly developed and patented longitudinal vibration table VLT separates a wide variety of materials according to specific weight and form and is impressive thanks to its efficient results and high production quality.

New standards are set with minimal installed capacity and high throughputs. The principle is based on purely mechanical sorting without sensors or similar components. Here the separation of individual materials is completely independent of their degree of moisture.

The complete machine is controlled via a PLC and can be easily integrated into existing processes.

Options:
Complete design in stainless steel as well as surface treatments according to requirements are also available.

WIND SIFTER TECHNOLOGY

WIND SIFTERS FOR VARIOUS AREAS OF APPLICATION

Our range of machines for wind sifter technology comprises two versions of wind sifters which are designed for various sorting processes. With our machines, you can efficiently separate bulk materials and raw materials of various weights and sizes.

Use our Technology Centre for practical tests to define the optimum process technology including machine design.

WIND SIFTER ZZS

Separation of bulk materials according to specific weight

Operating principle:
The material to be separated is fed directly into the zig-zag sifter via a rotary valve and is distributed over the complete sifter channel cross-section. The sorting air generated by the blower flows through the sifter from bottom to top, whereby the bulk material is flushed and separated.

The product must cross through the air flow at every bend of the sifter channel and then bounces off the opposite sifter wall. Here, the material with a higher density sinks in the sifter channel due to gravity. The light fraction is extracted from the sifter channel by means of the upwardly directed air flow.

The air speed of the fan is set by the customer's frequency converter. For maintenance and service work, the zig-zag sifter has maintenance doors on both sides and the rotary valves are equipped with maintenance access.

The depth of the wind sifter is adjustable and can be operated in exhaust air as well as air recirculation mode. The extracted air is cleaned via a downstream filter unit or a cyclone separator.

Options:
Depending on the individual application or abrasiveness of the material to be separated, various wear housing versions are available, e.g. HARDOX, PU, stainless steel, ceramics. Complete design in stainless steel as well as surface treatments according to requirements are also available.

Machine:

The machine separates a wide variety of bulk materials according to their specific weight, form and size.

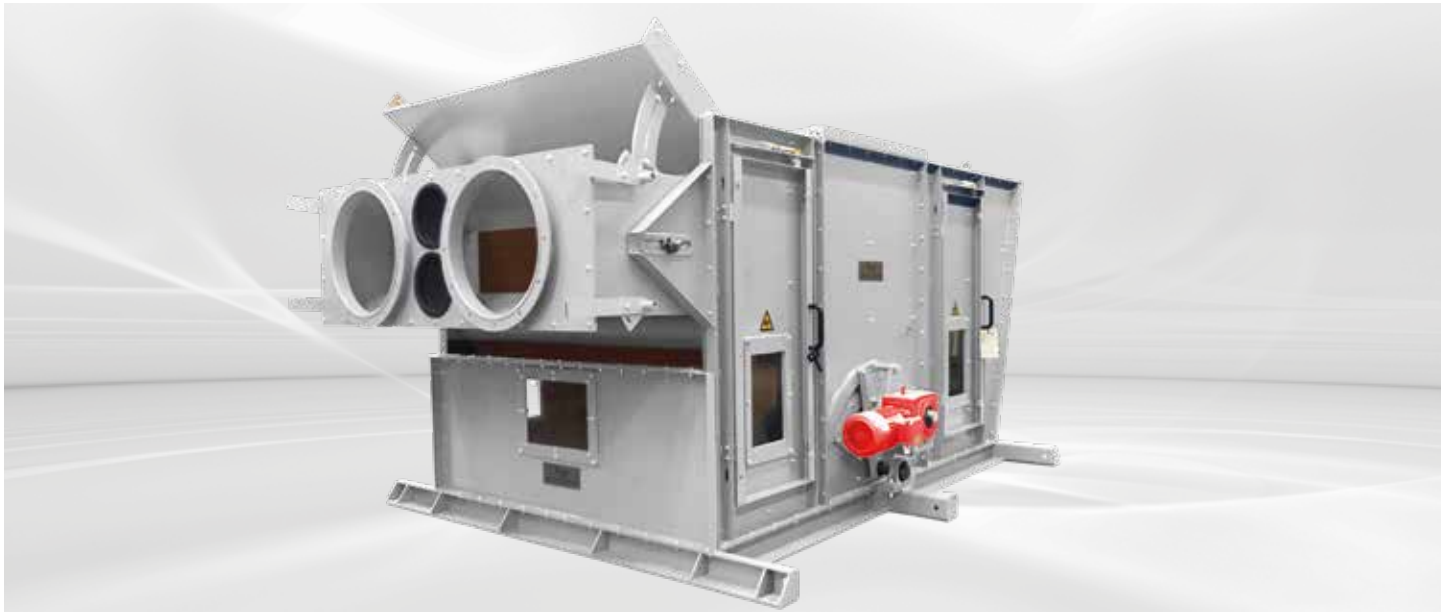
WIND SIFTER QSS

Separation of coarse bulk materials

Operating principle:
The material to be separated is fed into the chute of the crossflow sifter via a vibrating distribution chute and distributed over the complete cross-section of the sifter. The sifter air generated by the blower flows through the sifter horizontally over the complete width of the machine, whereby the feeding material is diverted according to its specific weight and thus separated.

Machine:

The machine separates coarse bulk materials according to their specific weight, form and size.

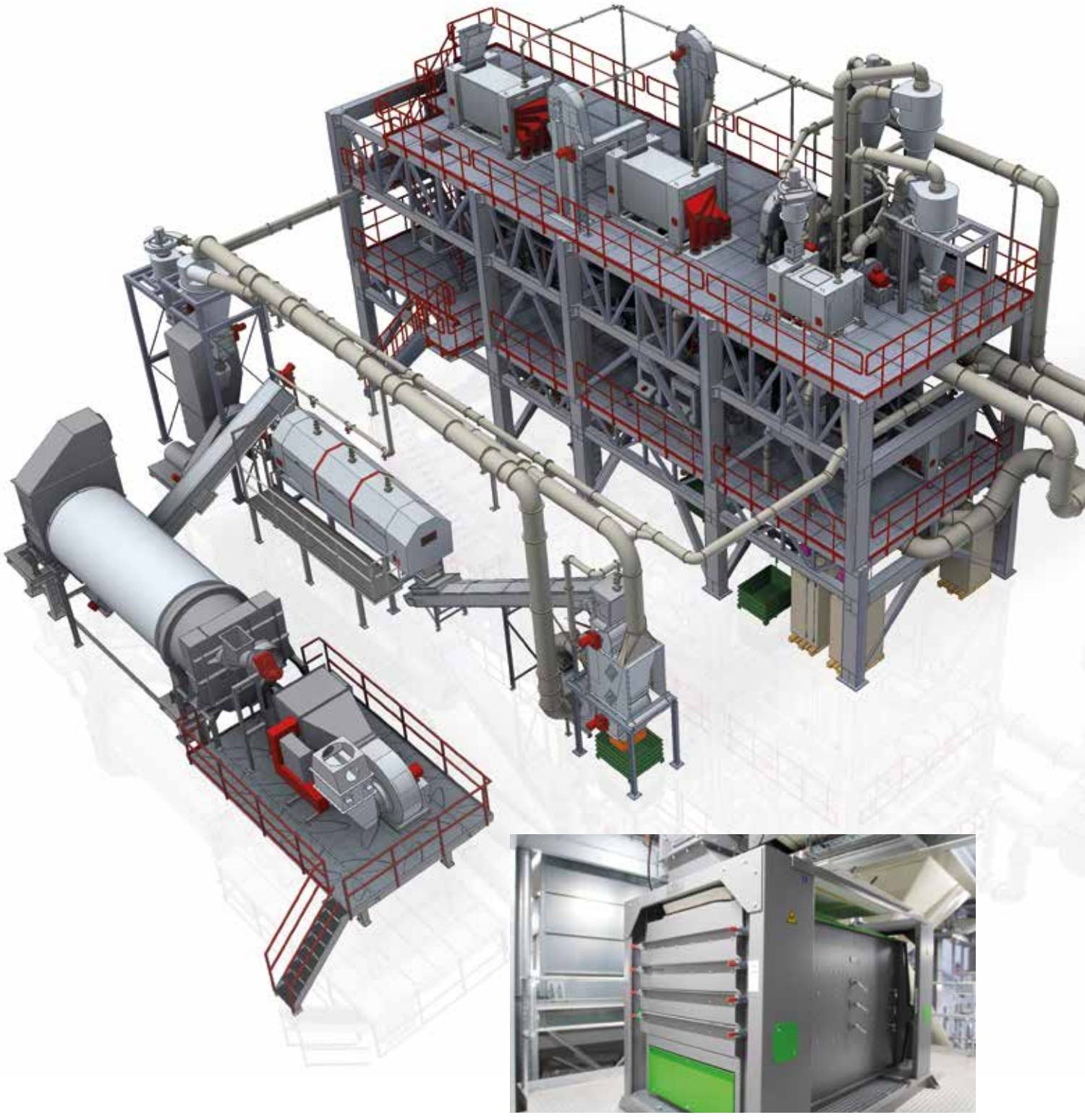


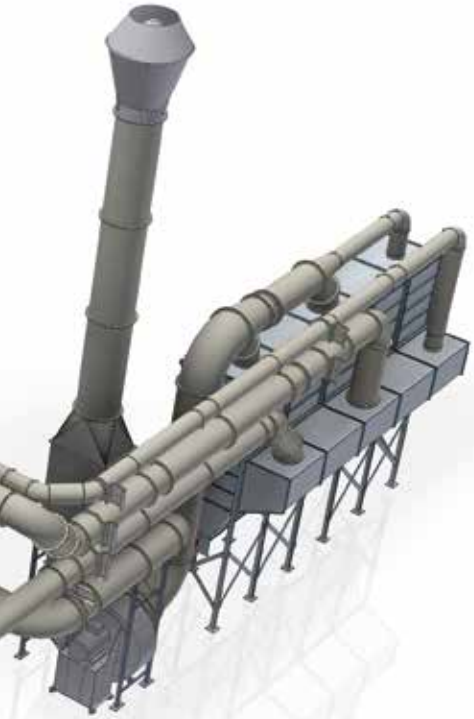
The material with a higher density therefore sinks faster due to the greater gravity and is discharged via the outlet. Medium-weight products are diverted via the horizontally directed air flow and discharged. Light fraction is picked up by the air flow and is removed by aspiration.

The separating steps are controlled via air valves, the positioning of the air injection chute and the air quantity. The wind sifter can be operated in exhaust air mode as well as via air recirculation. The extracted air is cleaned via a downstream filter unit or a cyclone separator.

Options:
Depending on the individual application or abrasiveness of the material to be separated, various wear housing versions are available, e.g. HARDOX, PU, stainless steel, ceramics. Complete design in stainless steel as well as surface treatments according to requirements are also available.

SCREENING TECHNOLOGY





SCREENING MACHINES FOR CLASSIFICATION OF GRANULAR AND FLOURY PRODUCTS

For screening technology, we have various series of screening machines which are suitable for screening bulk products of various grain sizes. Here, the particles should not exceed a defined level of moisture and must be pourable.

In terms of their efficiency, all of our screening machines meet the increasing requirements for quality of industrial recycling.

SCREENING MACHINE SIK

For screening of granular and floury products

Operating principle:
The material to be screened is fed into a free-floating screening box via a distribution unit. This is suspended by steel ropes in a sturdy steel frame with a dust-tight design. The screens can be pulled out of the screening layer level from the front. The screen layer length is divided into segments. This results in minimum space requirements for replacing screens.

Continual screen cleaning is based on cleaning of the spherical bottom. The coverings range from perforated plates to fine-meshed fabrics. The screen surface is kept open by a rubber ball cleaning system. The screening box is horizontally vibrated by an electric motor.

As special equipment, the screening machine has external screen outlets which allow very good accessibility.

The screen can also be connected to an aspiration system. Among other things, ascending sifters and magnets are available as additional equipment for direct attachment.

Options:
Depending on the individual application or abrasiveness of the material to be separated, various wear housing versions are available, e.g. HARDOX, PU, stainless steel, ceramics.
Complete design in stainless steel as well as surface treatments according to requirements are also available.

Machine:

With its variable screen design, the machine sorts bulk material of different grain sizes. The products must be pourable and should not exceed a certain moisture limit.

SCREENING MACHINE TSM

Screening of granular and floury products

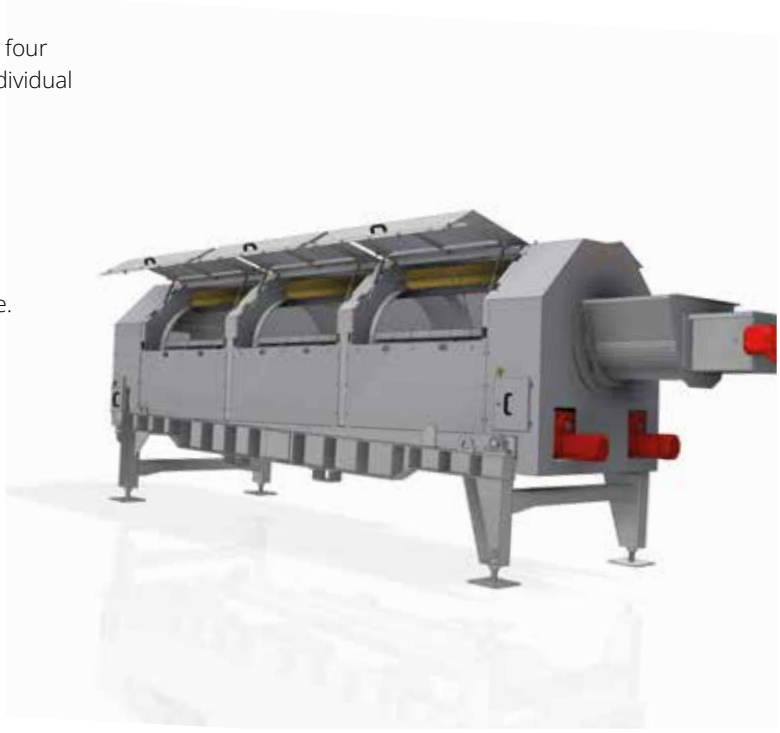
Operating principle:
The material to be screened is fed into the drum screening machine via a feed worm, conveyor belt, elevator or vibration channel. The coverings range from perforated plates to fine-meshed fabrics. The speed can be variably adjusted by the customer's frequency converter. The inclination of the drum screen is variably adjustable depending on the design.

Machine:

With its variable screen design, the machine sorts bulk material of different grain sizes. The products must be pourable and should not exceed a certain moisture limit.

Depending on the design, screening is possible in up to four output sizes. Through large maintenance covers, the individual screen coverings can be easily cleaned and replaced as required.

Options:
Continual screen cleaning is also available on request. Complete design in stainless steel as well as surface treatments according to requirements are also available.



ROLLER DISC STAR RSS

Sorting of materials which are difficult to screen

Operating principle:
The product to be screened is fed onto the roller disc star screen, for example via a conveyor belt, distribution screw or vibration chute. Depending on feed requirements, the screening machine is equipped with various fittings. For example, screening to three different grain sizes is also possible. The screening machine is driven by one or more gear motors, depending on the design.

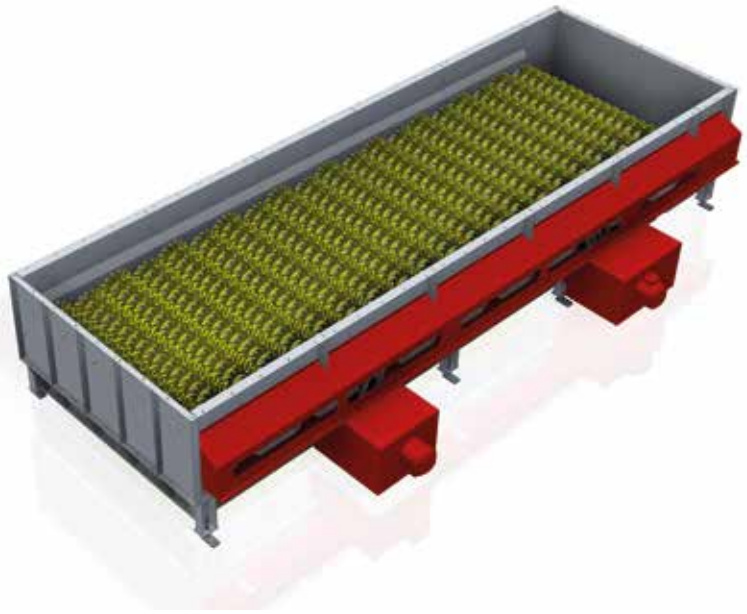
If required, the speed can be adjusted via a frequency converter. The individual screening rollers are connected to each other by chains. In the case of more than one gear motor, screening can be carried out at different speeds. This ensures precise screening of the material along the complete length.

The shafts with the stars or disc can be replaced individually and access is possible via large maintenance access.

Options:
The filter can be designed, for example, with PU stars or discs made of standard steel, HARDOX or stainless steel.
Complete design in stainless steel as well as surface treatments according to requirements are also available.

Machine:

With its variable screen design, the machine sorts bulk materials and difficult to screen material of different grain sizes. The products should not exceed a certain moisture limit. Use our Technology Centre for practical tests as a basis for the selection of the required machine size.



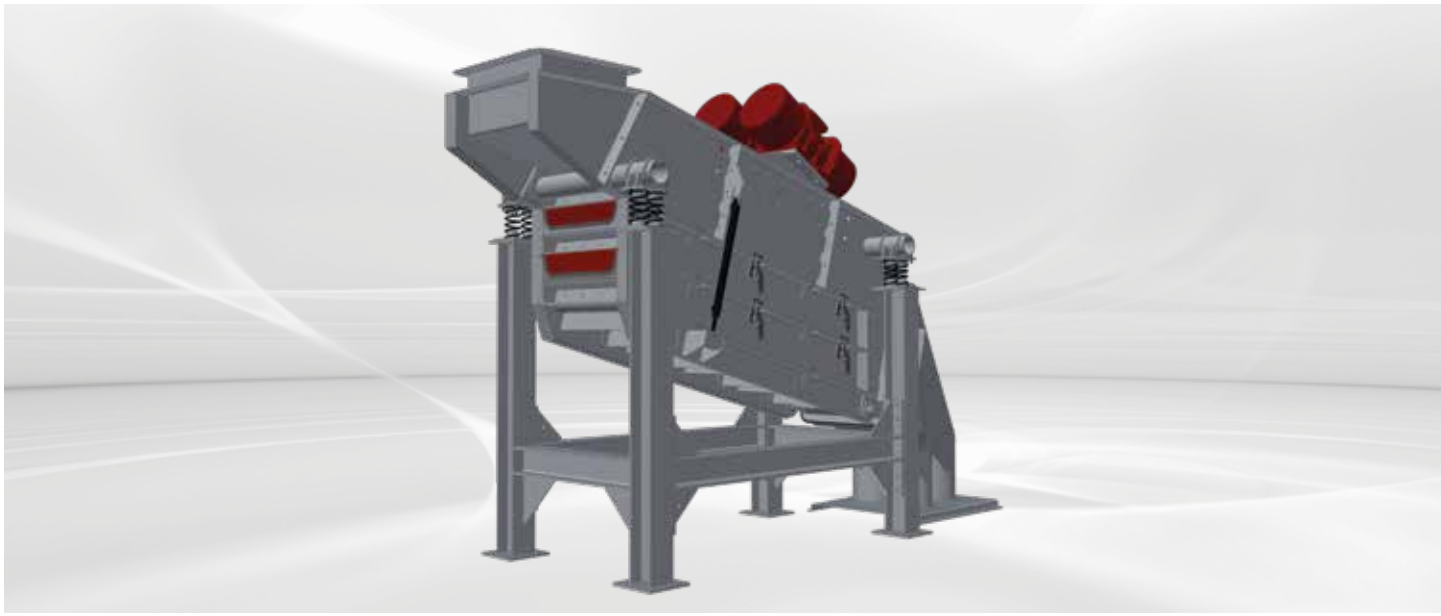
SCREENING MACHINE SIS

For screening of granular and floury products

Operating principle:
The material to be screened is fed into the screening box via a distribution device. This is placed on steel springs on a solid steel frame and made dustproof. Two overhead eccentric motors bring the screening box into vibration. The sieves are pushed into the sieve box and can be easily changed thanks to the unique swivel mechanism.

Machine:

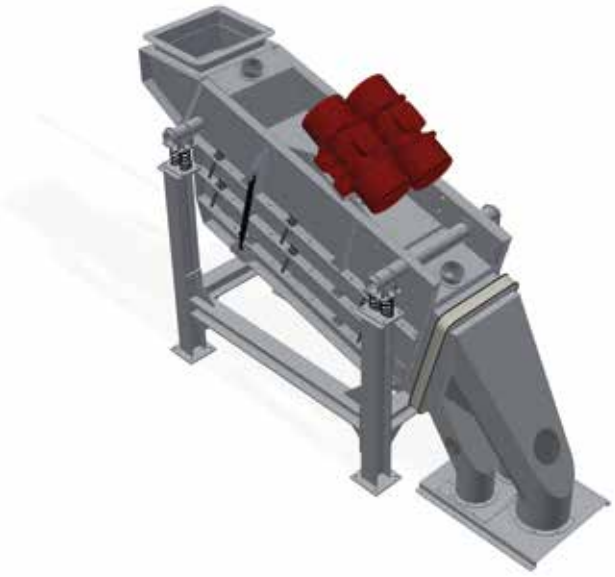
With its variable screen design, the machine sorts bulk material of different grain sizes. The products must be pourable and should not exceed a certain moisture limit.



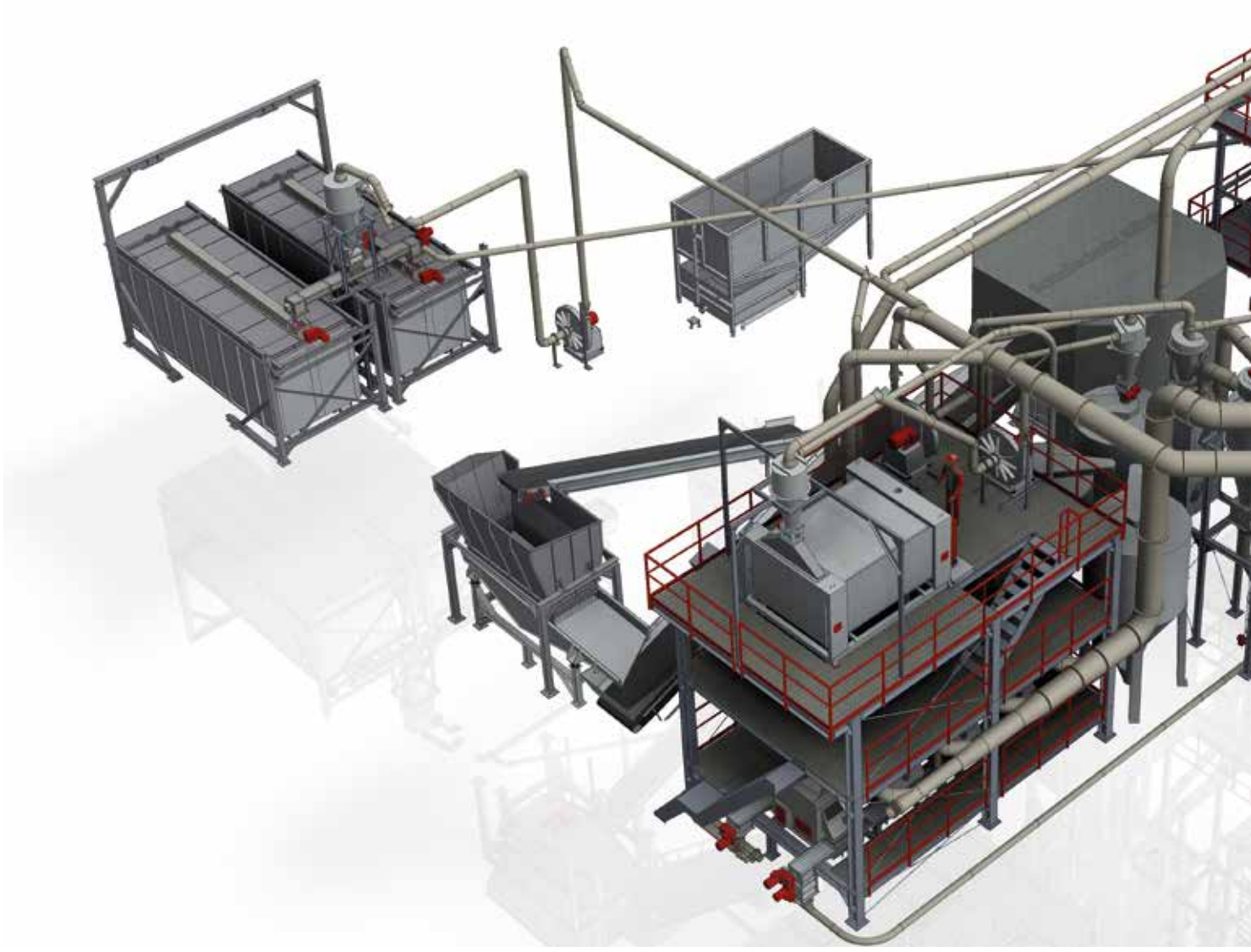
By default the sieving machine consists of two sieve layers. The upper sieve layer is a solid 3D honeycomb sieve, the lower sieve layer a PU expansion shaft. Of course the screen sizes / hole sizes can be freely selected.

Depending on the product, the stroke and speed can be varied freely, to achieve an optimal throughput and exact classification of the material to be sieved. The sieve can also be connected to an aspiration system.

Options:
The machine is available in different widths and lengths. Depending on the application or the abrasiveness of the material to be separated, different wear lining variants are available, e.g. HARDOX, PU, stainless steel.
Complete design in stainless steel as well as requirements-based surface treatments are also available.



CONVEYING AND DOSING TECHNOLOGY



MECHANICAL MEANS OF TRANSPORTATION PROCESS

For horizontal, inclined or vertical transport. Our services comprise individual consulting, design and parts production as well as complete assembly and commissioning. Our many years of experience, in particular also with difficult bulk materials, assures you of optimum, economic plant engineering.

PNEUMATIC CONVEYOR SYSTEMS OF VARIOUS DESIGNS

Our pneumatic conveyor systems are suitable for powdery and granular bulk materials, for vacuum and pneumatic pressure conveying. Where conveying and simultaneous sorting of bulk materials is required without the loss and breakage, we at TRENNSO-TECHNIK® support you in the planning and production of your pneumatic conveying machinery with more than 30 years of experience in the industry.

ELEVATOR EL

For economical vertical conveying

For vertical transport of powdery and granular bulk material, we supply the elevators as standard in normal and stainless steel versions. If required with replaceable protection against wear in different qualities such as HARDOX. All elevators are supplied with large maintenance openings.

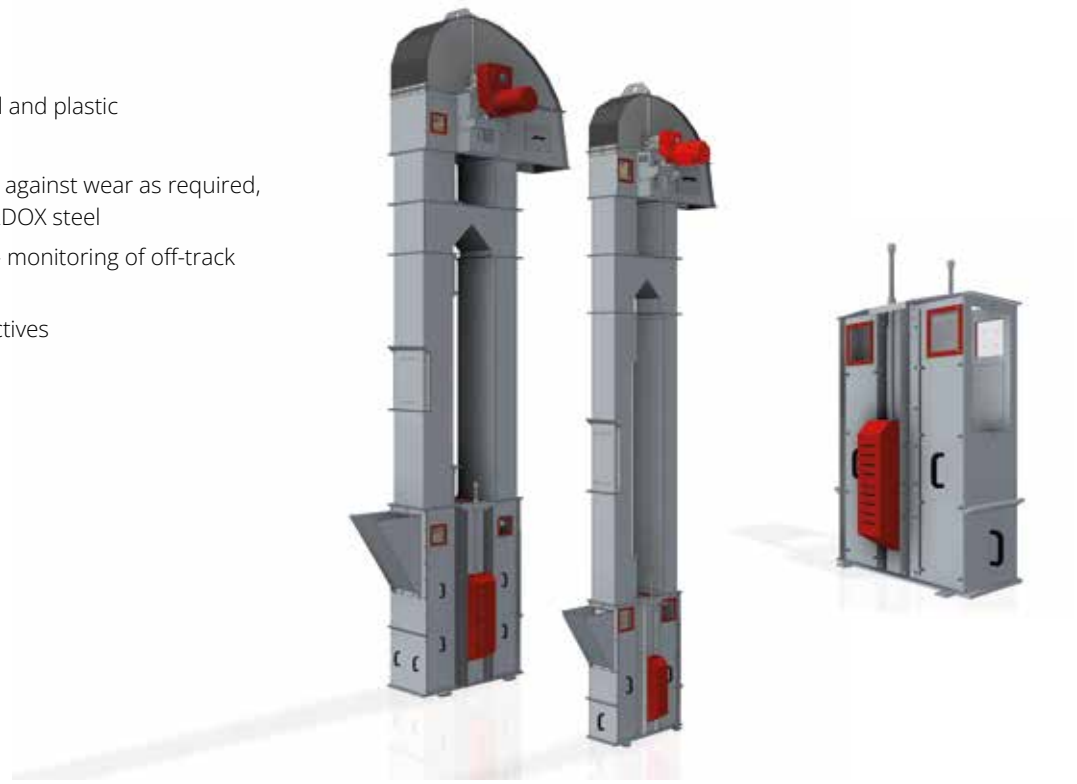
We also offer economical complete solutions for high conveying capacities.

Vertical transport

- **Powdery bulk materials**
- **Granular bulk materials**

Special designs

- Bucket designs in stainless steel and plastic
- Various belt designs
- Various solutions for protection against wear as required, including extra hard, tough HARDOX steel
- Electronic monitoring systems – monitoring of off-track running and speed
- Designs according to ATEX directives



SCREW CONVEYOR TS

For efficient discharge results

Our screw conveyors are suitable for horizontal and inclined transport of raw materials and bulk materials. With a suitable design, process engineering solutions such as dosing, mixing, cooling or loading can also be implemented. With our screw conveyors, even viscous products can be emptied from containers.

Horizontal or inclined transport

- **Powdery bulk materials**
- **Granular bulk materials**

Whether with one or more shafts, the screw conveyors of TRENNSO-TECHNIK® are impressive thanks to their high conveying capacities, low maintenance requirements and low operating costs. If required, the discharge capacity of the conveying elements is steplessly adjustable.

Special designs

- Complete stainless steel design
- Multi-shaft screw designs
- Screw trough design:
  V-trough, U-trough, box trough, pipe screws
- Various solutions for protection against wear in the screw trough, including extra hard, tough HARDOX steel
- Low-wear screw flight, also available in stainless steel, HARDOX steel
- Maintenance/cleaning openings
- Electronic monitoring systems – discharge flaps/speed

TROUGH CHAIN CONVEYOR KF

For efficient transport processes

The trough chain conveyors or drag chain conveyors of our product range are impressive thanks to their high degree of efficiency and profitability. The particularly low maintenance requirements and robust properties benefit the operating procedures of your complete recycling and processing plants. Our trough chain conveyors are suitable for both electrical cable processing and waste and bulk material processing, for example of road chippings or sand.

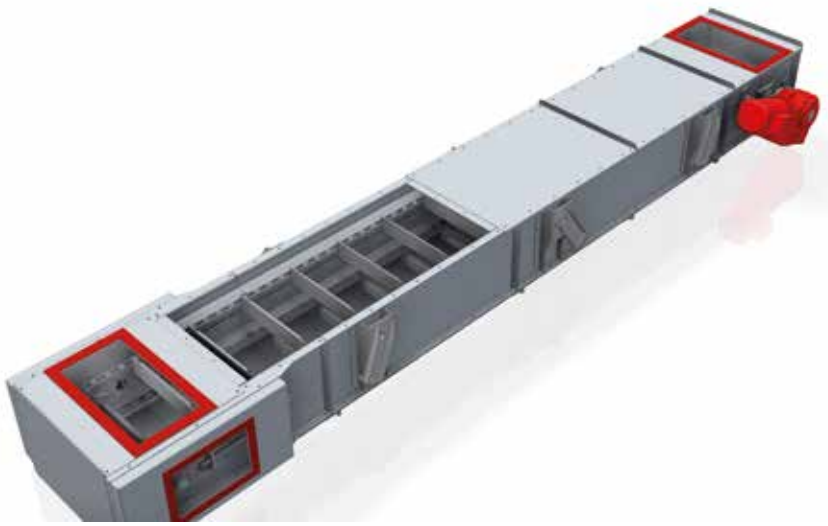
Use the trough chain conveyors from TRENNSO-TECHNIK® for horizontal or inclined transport of your powdery to coarse bulk materials and products and let their conveying capacities impress you. The low-maintenance conveying elements are particularly suitable for sharp-edged and aggressive materials. For use with dusty bulk materials, we recommend our closed systems.

Horizontal or inclined transport

- **Powdery, granular and coarse bulk materials**

Special designs

- Design in complete, virtually dust-tight encapsulation
- Reinforced chain drive
- Protection against wear including extra hard, tough HARDOX steel
- Maintenance and cleaning openings



CONVEYOR BELT FB

For safe transport

Conveyor belts from TRENNSO-TECHNIK® are suitable for horizontal or inclined transport of powdery, granular or coarse bulk materials, in particular for abrasive or also sensitive products. Various designs are available, e.g. flat belts, troughed belts, folding belts or dosing belts.

Horizontal or inclined transport

- **Powdery, granular and coarse bulk materials**
- **Abrasive and sensitive products**

Special designs

- Complete encapsulation with foldable floor
- Reinforced design also in the material feed area
- With belt cleaning/wiper
- Belt quality according to requirements
- Designs according to ATEX directives

CYCLONE ZKE

For pneumatic discharge

As a modular supplement to our processing plants, you can obtain suitable cyclone separators and centrifugal force separators from our product range. With the cyclone filters of TRENNSO-TECHNIK®, products and dust particles are very efficiently separated from pneumatic volume flows.

In addition, our pneumatic conveyor systems have a very robust, low-maintenance design which expertly combines economic efficiency and functionality. We can of course also produce tailor-made solutions for your requirements.

Pneumatic conveying and dosing of

- **Dust**
- **Fine grain or fibrous products**

Special designs

- Stainless steel design
- Maintenance doors in the blow-in area with replaceable wear plates
- Divided cone designs with maintenance openings/doors
- Designs according to ATEX directives

ROTARY VALVE AS

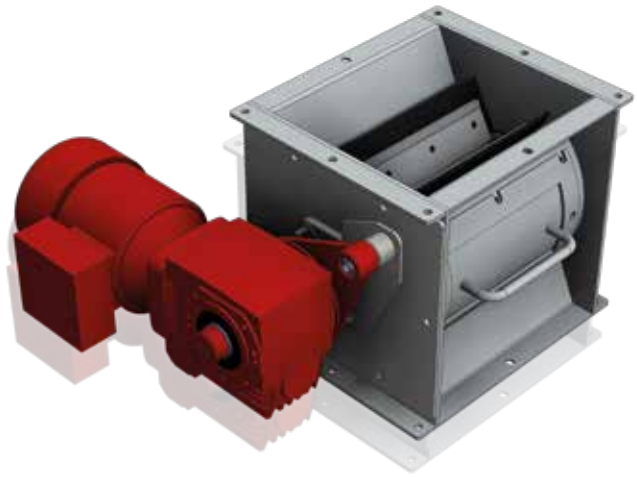
For discharging and dosing

The rotary valves from TRENNSO-TECHNIK® are used wherever bulk materials have to be discharged with a constant throughput. The pneumatic conveying units are also suitable for dispensing and feeding of products or for shutting off on containers and cyclones. The material to be conveyed should in this case be dusty, powdery or granular.

Pneumatic conveying and dosing of

- **Dust**
- **Powdery or granular products**

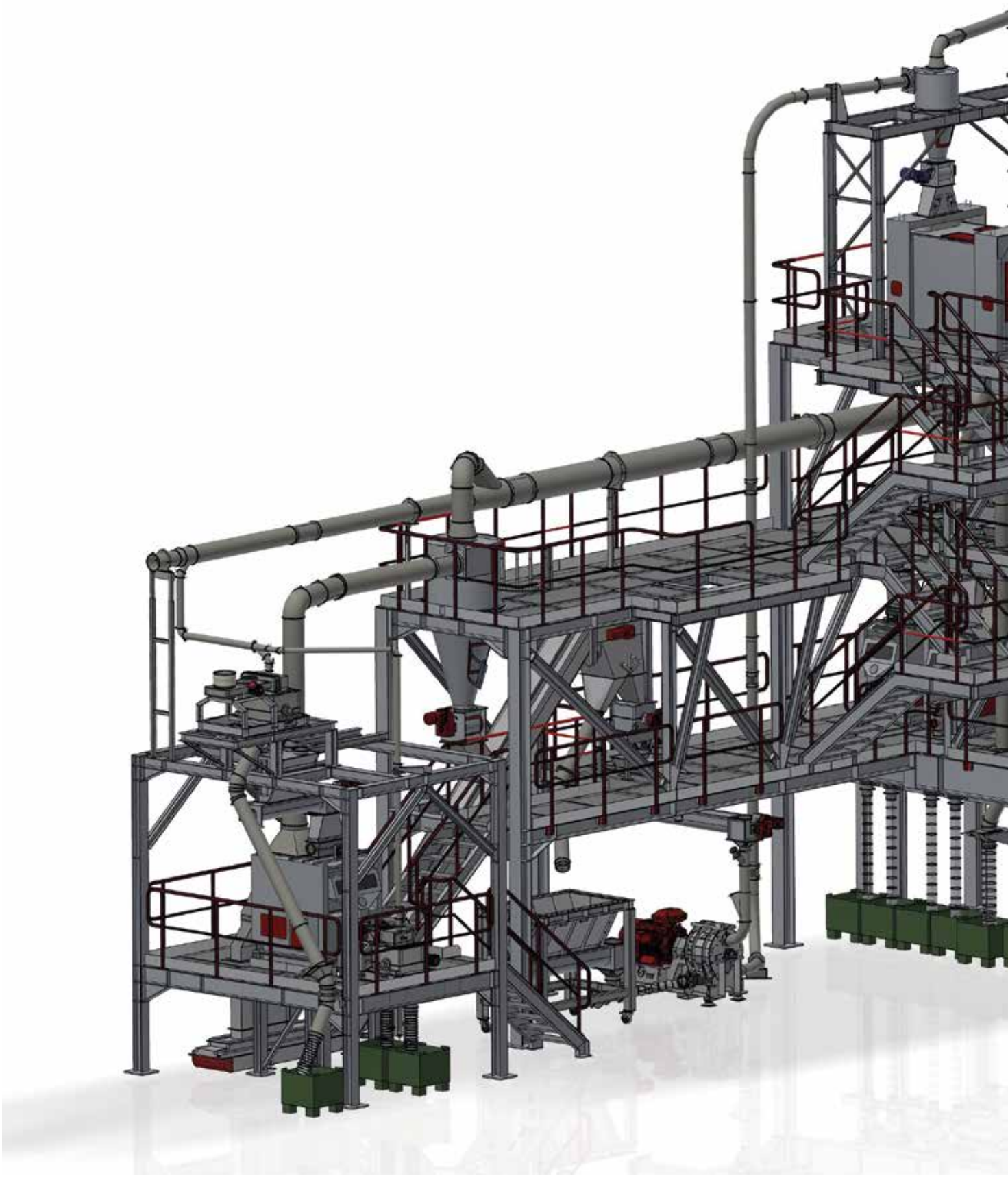
Classic areas of application for our rotary valves are zig-zag sifters, cyclones and silos as well as bunkers for processing in the recycling, bulk material or food industries. The rotary valves are connected, for example, upstream of trough augers or trough chain conveyors in order to reduce the pressure of the silo material. The conveyor elements are also installed in filters or cyclones. Bulk materials can therefore be removed from pneumatic systems with a minimum loss of pressure.

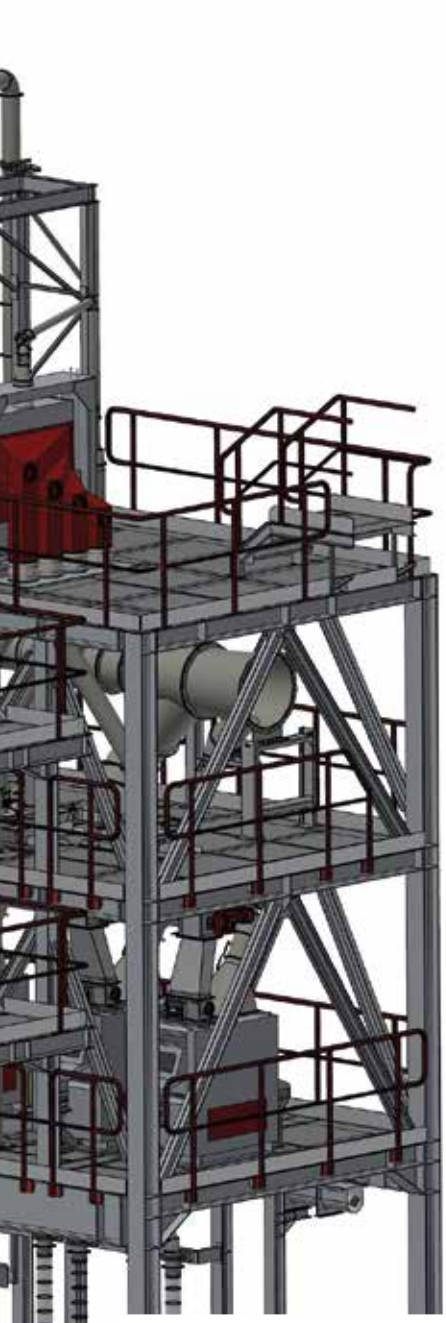


Special designs

- Stainless steel design
- Replaceable stainless steel lock buckets
- Various material designs of the rubber lips
- Various solutions for protection against wear as required, including particularly hard and robust HARDOX steel
- Maintenance access
- Designs according to ATEX directives

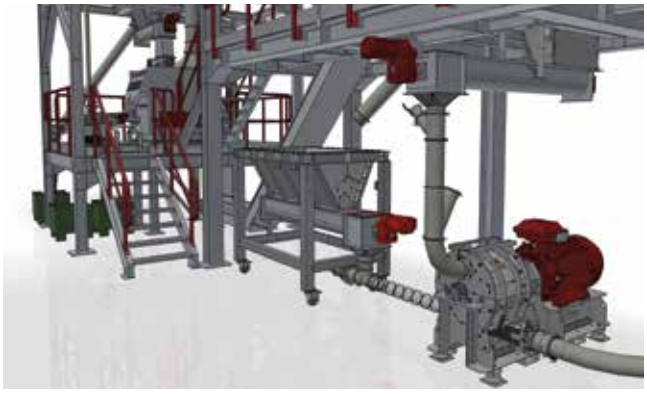
GRINDING

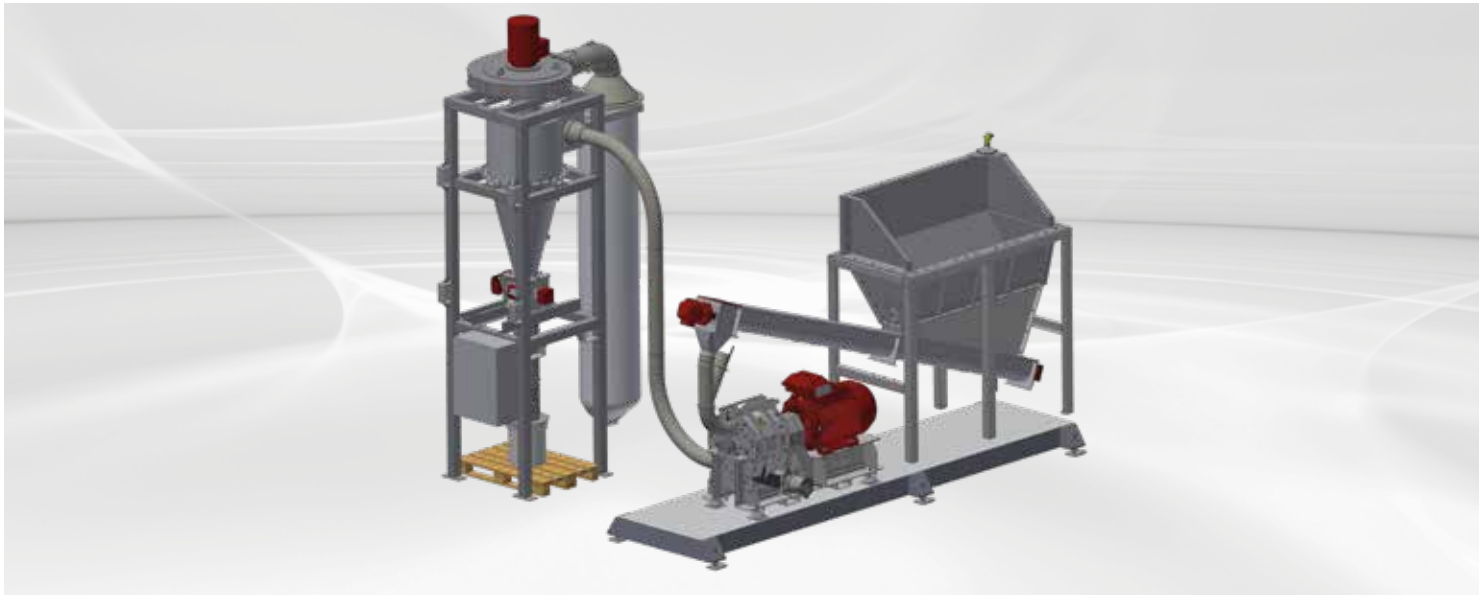




SPECIAL MILLS FOR OPTIMAL PREPARATION

In order to extract even the finest components of raw materials from the feed material, we offer two efficient mills. Based on our decades of experience, we know the perfect material composition for optimum separation. We achieve this thanks to specially designed mills. User-friendliness and minimum set-up times as well as quality are also our top priorities with our mills. All parts subject to wear can be replaced quickly and easily.





FINE IMPACT MILL ARES

Efficient down to the last detail – an individual, innovative milling mechanism

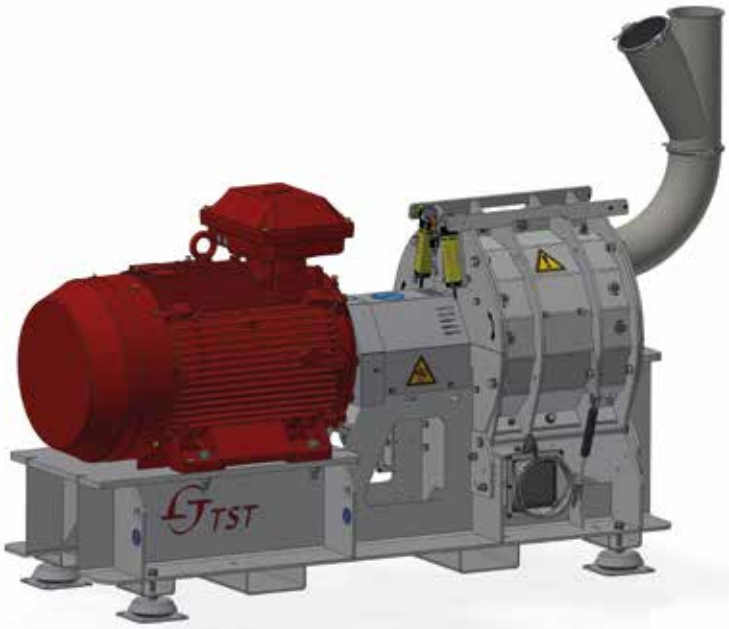
With the bead mill, TRENNSO-TECHNIK® offers an important component for the recovery of even the finest fractions of copper and other metals from waste. This horizontally operating mill works with beater bars on the high-frequency rotor. Thanks to the hinged housing doors on both sides, maintenance and replacement of parts subject to wear can be carried out easily and in a time-saving manner. In combination with separating tables and conveyor technology from TRENNSO-TECHNIK®, we offer a reliable process element in the recycling of non-ferrous metals and other valuable secondary raw materials.

In the horizontal bead mill, the distance between the beater bars and the grinding track can be adjusted to the specific product. The materials used are steel and HARDOX® on the beater bars and grinding track.

The circumferential speed is between 40 - 90 m/sec. and is electronically adjustable. Material is fed in by means of a pneumatic system or a screw conveyor, while material is discharged pneumatically. The individual adaptation of the mill to the material fed, simple and time-saving maintenance and replacement of wear parts make this mill an efficient solution in the modern recycling process.

The bead mill is used, for example, in the recycling of electronic cables and in battery recycling for:

- **plastic metal waste**
- **metal foils from battery recycling**
- **material sizes from 0 - 10 mm / 0 - 15 mm**



WITH **PASSION** AND **CREATIVITY,** WE IMPLEMENT THE TASKS OF OUR CUSTOMERS WITH THE GOAL OF **MAXIMUM ECONOMIC** EFFICIENCY AND PURITY.

WHEREVER YOU DO YOUR BUSINESS, **FIRST-CLASS SERVICE** FROM OUR **EXPERIENCED SPECIALISTS** IS AVAILABLE TO YOU **WORLDWIDE**.

WORLDWIDE AVAILABLE
SERVICE

ASSEMBLY, ELECTRICAL INSTALLATION, COMMISSIONING AND CUSTOMER SERVICE IN ORIGINAL TRENNSO-TECHNIK® QUALITY.

As a globally operating medium-sized company, perfect service is one of our basic pre-conditions for sustainable success.

Overview of our services:

- Assembly
- Electrical installation/Wiring
- Commissioning
- Training support
- Training courses
- Supply of replacement parts
- Worldwide logistics

Naturally, we also offer comprehensive training in our company or on site, so that your employees can work very efficiently right from the start.

Please also contact us if you have unusual requirements – we are sure that we can meet them for you!

INNOVATION IN SEPARATION

TRENNSO-TEC

HNIK®

TRENNSO-TECHNIK®
Trenn- und Sortiertechnik GmbH
Siemensstrasse 3 · 89264 Weissenhorn, Germany

Phone: +49 73 09/96 20-0
Fax: +49 73 09/96 20-30
E-Mail: info@tst.de

tst.de