

ZERMA

THE HOME OF SIZE REDUCTION

Granulators // Shredders // Pulverizers //
Hammer mills // Accessories // Spare parts

www.zerma.com



ENGLISH

PLASTIC SIZE REDUCTION
RUBBER SIZE REDUCTION
WOOD SIZE REDUCTION
E-WASTE SIZE REDUCTION



ZERMA

COMPANY

The name ZERMA comes from the German word zerkleinerungsmaschinen, meaning crushing machine. Since the company was founded in 1943, this has remained our mission.

ZERMA has traditionally focused on the development and production of size reduction machinery for the plastics industry. However, today ZERMA has expanded into related industries such as tire recycling, e-waste and wood recycling. Our core strength lies as a machinery and component producer. As such we are an ideal partner for systems integrators and OEM projects. We remain committed to the improvement and development of size reduction machinery. The ZERMA product consists of three main machine types; granulators, shredders and pulverizers.

Our granulator product lines cover a full range of sizes and applications. We start from the slow speed, beside the press models of the GSL Series, and the compact soundproofed granulators of the GSC Series. These machines are commonly used in injection, blow molding, and extrusion applications. The large GSH Heavy Duty Granulators are also used in these applications as well as high throughput operations and demanding post consumer recycling.

Our second machine category is the ZERMA Single Shaft Shredders. Again, we are able to cover a wide range of applications. We offer the small ZBS Series for purgings, the ZSS and ZIS Series for general applications, and the ZXS Series to achieve high throughputs. Our shredder offering also includes the ZWS Series for wood and regenerative fuels.

An important milestone was the development of the ZRS Pipe Shredder Series. These machines allow the processing of pipes with up to 1200 mm diameter and 6 m length without the need for pre-cutting. There is no comparable product available on the market today.

The ZERMA PM Series pulverizers are produced for extrusion and rotational molding applications. We offer a complete range of machines as well as evacuation and screening equipment to insure quality of the finished product.

ZERMA also offers machines for specialized markets. This includes ZHM Series hammer-mills and GRF Series compact granulators fitted with roller feeding devices.

The most recent addition to the ZERMA family of products is the ZTS Tire Shredding System. These machines are designed to process used car and truck tires. We offer complete systems to produce separated crumb or powder.

In order to better service our customers in different markets, we have established ZERMA-Europe, ZERMA-UK, ZERMA-Thailand, ZERMA-North America, ZERMA-Latin America and ZERMA Australasia. These subsidiaries work with more than 100 agencies world wide to ensure quick delivery, optimal service, and timely support. We call it the ZERMA family.



COMPANY MILESTONES:

- + 1943: Founding of ZERMA in Radebeul, Germany
- + 1995: Move to Sinsheim, Germany
- + 1999: Founding of ZERMA Shanghai and start of production in China
- + 2001: Founding of ZERMA Thailand to support the South East Asian market
- + 2002: Start of cooperation with harbor group in the U.S.
- + 2002: Founding of ZERMA UK
- + 2008: Founding of ZERMA Latin America
- + 2010: Founding of ZERMA Australasia







PRODUCTION

The main production and engineering facility for ZERMA machines is based in Shanghai. All ZERMA machines are developed and manufactured here by an international team of experienced engineers in close cooperation with our partners and customers.

Everything is manufactured by ourselves, we are avoiding suppliers and out sourcing wherever possible. This has only be made possible by modern machining centres and experienced and well trained staff. This independence makes it possible to quickly develop and test prototypes for our R&D team.

Quality control is an integral part of the manufacturing process, our team of inspectors controls all production steps and makes sure each machine is tested with its original voltage and frequency before leaving the factory. All machines are manufactured to comply with the national safety standards and guidelines of the customer.

In order to improve delivery times for the customer and accommodate special needs basic machines can be customized according to the requirements by our subsidiaries from their stock of standard machines.

	GRANULATORS
	SHREDDERS
	PULVERIZERS
	HAMMER MILLS
	ACCESSORIES
	SPARE PARTS





ZERMA
PLASTIC
SIZE REDUCTION



INJECTION MOLDING

PROCESS OVERVIEW

Injection molding is used to create many things such as wire spools, bottle caps, automotive dashboards and so on. Injection molding is the most common method of part manufacturing. Some advantages of injection molding are high production rates, repeatable high tolerances, the ability to use a wide range of materials, low labor cost, minimal scrap losses, and little need to finish parts after molding. In the injection process melted plastic is forced into a mold creating the part. Most polymers can be used for injection molding, most common it is polyethylene (PE), polypropylene (PP) and Polyvinyl Chloride (PVC).

TYPICAL CHALLENGES IN RECYCLING

The main challenges in the injection molding technology are recycling at the machine and central recycling of rejected parts and purges. Due to the big range of materials and additives used, recycling directly at the press is the most efficient solution.

The most common is the recycling of runners, sprues and rejected products directly at the injection machine. Here the GSL slow speed granulators are an ideal solution. The low rotor speed results in a low noise operation and less fines in the regrind. The unique machine design combines a staggered rotor which is directly driven by a geared motor creates a high torque with low power consumption. The ground material is then directly reintroduced into the injection process via a blender or a proportional valve. Another big challenge is the grinding of plastic lumps and head waste accumulated during start-up, color and material changes. The ZERMA ZBS single shaft shredders have been specifically developed for this scenario. These shredders are used to shred these pieces into smaller particles that can be processed further down in a smaller possibly already existing granulator. The compact GSC and GSE granulators can be used as central granulators to process larger rejected parts. On top of that the Heavy Duty Granulators of the GSH range can be used to process start up lumps as well.



01
GSL slow speed granulator working inline next to the injection machine



02
Reject part being fed into GSC granulator

FILM- AND THERMOFORMING

PROCESS OVERVIEW

Thermoforming and film blowing are processes in which generally thin products are created mainly for the packaging. Common products include shopping bags, packing film, agricultural film, food packaging as well as thicker thermoforming parts for the automotive industry or in household articles such as fridges or bathtubs. In the thermoforming process a plastic sheet is heated to a pliable forming temperature, formed to a specific shape in a mold, and trimmed to create a usable product. The film blowing process basically consists of an extruding a tube of molten thermoplastic and continuously inflating it to several times initial diameter, to form a thin tubular product that can be used directly, or slit to form a flat film.

TYPICAL CHALLENGES IN RECYCLING

For the in-house recycling of scrap from both processes the granulators of the GSE, GSC and GSH series are commonly used. The ground material is then conveyed by a blower system to a storage location or processed in an extruder to create pellets that can be reused. In thermoforming or sheet extrusion applications inline recycling solutions are a very efficient solution, here the skeletal waste or edge trim created in these processes is ground directly next to the machine. The granulators of the GRF series fitted with roller feeding devices are used to automatically feed the material and offer an optimal solution in these cases. These granulators are based on the GSC series and are soundproofed compact machines. For offline recycling a shredder/granulator combination is commonly used, when using a shredder it is possible to grind complete film bales, rolls or loose film. Used thermoformed and other film products are commonly found in post consumer waste and can be processed with ZERMA equipment as well.



01
GRF granulator with roller feeding system



02
Bales of production waste from blow film production



03
ZSS shredder grinding film bales

BLOWMOLDING

PROCESS OVERVIEW

Blow molding also known as blow forming is a manufacturing process by which hollow plastic parts are formed. In general, there are three main types of blow molding: extrusion blow molding, injection blow molding, and stretch blow molding. The blow molding process begins with melting down the plastic and forming it into a parison or preform. The parison is a tube-like piece of plastic with a hole in one end in which compressed air can pass through. The parison is then clamped into a mold and air is pumped into it. The air pressure then pushes the plastic out to match the mold. Once the plastic has cooled and hardened the mold opens up and the part is ejected.

TYPICAL CHALLENGES IN RECYCLING

Most blow molding is done in the packaging industry for common products such as bottles, barrels and bulk containers for the chemical industry, as well as technical parts such as tables or automotive parts. Mostly recycling in these industries is done in-house. For small bottles the slow speed GSL machines are very well suited. Bigger bottles and canisters can be processed in the compact and soundproofed GSC series, these can be used to recycle PET preforms as well. Larger parts such as barrels, car tanks, tables and so on can be processed with the heavy duty granulators in the GSH series, which are able to handle the mostly solid top and tail flush as well. For extremely big volume parts such as IBCs a shredder/granulator combination is commonly used, here the ZIS shredders with their large volume hoppers offer an optimal solution.

01
GSH 800/2000 Heavy Duty granulator with screw type force feeder

02
Typical blow molded products

03
Baled PET bottles



EXTRUSION

PROCESS OVERVIEW

Pipe and profile extrusion is defined as a process of forcing the polymer melt through a shaping die. The extrudate from the die is sized, cooled and the formed pipe is pulled to the winder or a cut off device. Prior to this, the plastic material in the form of polymer granules is fed into the hopper, conveyed by a rotating screw through a long cylindrical barrel. This is subjected simultaneously to high temperature and pressure, forcing the melt through the die at a predetermined rate. After PVC, PE is the most widely used thermoplastic piping material.

TYPICAL CHALLENGES IN RECYCLING

The main challenge lies in the length of the extruded products, commonly pipes and profiles are metered off at 6m length. ZERMA offers a solution for all parts accumulated during extrusion processes. For thin walled PVC pipe and profiles the GSP pipe and profile granulators provide a single step solution. Due to their low feeding height these granulators are especially well suited for the grinding of long parts such as window profiles or small diameter pipes. Even at lengths of more than 6 m these parts can be fed easily into the almost horizontal hopper.

For pre-cut pipes of medium diameter the granulators in the GSH series are a one step solution, here the machines are equipped with a special pipe hopper ensuring that the pipes are entering the rotor at an optimal angle for best results. Alternatively these pipes can be processed in a two step shredder/granulator combination as well. The best recycling solution for large diameter pipes and profiles are the ZERMA ZRS shredders specifically designed for this task, in these shredders pipes of up to 1200 mm diameter and 6 m length can be processed safely and efficiently. To create PVC powder from the ground pipes or profiles the Pulverizers of the PM series can be used.

01

6 m long pipe can be easily fed into the ZRS pipe shredder without pre cutting

02

PVC window profiles and pipe

03

GSH heavy duty granulator with special pipe hopper



01



02



03

ROTOMOLDING

PROCESS OVERVIEW

Rotational molding, also known as rotomolding, rotocasting or spin casting, is a molding process for creating many kinds of mostly hollow items. More than 80% of all the material used is from the polyethylene family. Typical products created in a rotational molding process include large volume water tanks, childrens playgrounds, barricades and traffic cones. A heated hollow mold is filled with a charge or shot weight of material, it is then slowly rotated causing the softened material to disperse and stick to the walls of the mold. In order to maintain even thickness throughout the part, the mold continues to rotate at all times during the heating phase and to avoid sagging or deformation also during the cooling phase.

TYPICAL CHALLENGES IN RECYCLING

Due to the large volume of most parts a two stage shredder granulator combination is commonly used when recycling rotomolded products such as water tanks. In this case the ZIS shredders with their increased hopper volume are very well suited. Granulators of the GSH, GSE and GSC series can be used as a single step solution or second stage grinder as well.

The pulverizers of the PM series play a very important role in the rotomolding process. Firstly they are used to create the necessary powder from the virgin Polyethylene pellets. Here a screening machine is used to create the right size, distribution and flow rate needed in the rotational molding process. Further they can be used to create powder from regrind of recycled parts to be reused in the rotomolding process.



01-03 Typical rotomolded products

04 PM pulverizer single piece grinding disc

05 Complete system consisting of a PM pulverizer including suction group and screening machine



GENERAL RECYCLING

GENERAL DESCRIPTION OF RECYCLING

The general recycling is the oldest form of recycling. In the plastic industry it started pretty late compared to the much longer existing scrap metal and paper and card board collectors and recyclers. Also the achieved recycling rate at around 25% is much lower than in the two longer existing areas. This on the other hand makes the field very interesting as there's a lot of growth potential especially with raising oil prices. One thing which makes plastic recycling more and more difficult is the vast amount of different plastics and their blend with at least the same amount of possible additives and fillers. This industry is traditionally divided into two groups:

The Contractors: Getting waste from the plastic manufacturing industry to process it for an agreed price into re-usable products like re-grinds and/or compounds. As in this case the source and the user of the recycled material are the same and the recycled material goes straight back into the production.

The independent Recyclers: Buying waste from all kind of sources and selling it to 3rd parties. In this case the recycled materials usually are used for a lower grade product as the buyer often does not know the source and real material specification.

Common products to be processed in both fields are usually rejected parts, runners, lumps and purgings. The input materials can be very different in their physical properties as well as in their dimension and shapes. This makes it very important to choose the right machine for each application not just to match the required throughputs but also to be able to handle the parts given.

OUR SOLUTION

ZERMA offers for this field a wide range of shredders, granulators and pulverizers. We are one of the very few recycling machinery makers to have the whole spectrum for this under one roof and all made by ZERMA, no OEMs. This gives us the advantage to put together just the right set up to get your job done the best and most economical way.

Together with our auxiliaries equipment like belt conveyors, separators and air conveying systems we can realize complete recycling systems to create a valuable product from virtually any initial infeed material.

ADVANTAGES:

- + we cover the whole range of machines to cover the whole process from large parts to fine powders
- + all machines and components are made in house, no OEM
- + thousands of installations world wide which gives us knowledge of almost every recycling applications
- + close cooperation with many recycling companies to generate new solutions and ideas for the ever changing plastic recycling market.



01

01

The ZERMA flat 'E' style rotor with the specialized knife holders and stator knife

02

The hydraulic screen cradle on the ZERMA shredders eases maintenance and screen changes

03

ZERMA ZSS shredder with feeding and discharge conveyor



02



03

POST CONSUMER RECYCLING

DESCRIPTION OF THE PROCESS

As the latest way of recycling the post consumer recycling is also one of the fastest growing markets, caused by shortage of resources and soaring energy costs. On one side new products are made from daily waste we produce and on the other side refused products with good caloric values are turned into e.g. fuels for boilers.

In the case of turning waste into new raw materials the plastic stream is usually pre-sorted by either the consumer himself, through waste sorting plants or through independent waste collectors as it is often the case in developing countries. As the source of such materials is usually spread all over a country there are normally lots of small and medium sized collection centres to guide the waste stream into the final processing facilities. To reduce transport costs it arrives there mostly baled or sometimes pre-shred. Only then it is when the final, mostly manual, sorting is done; different kinds, colours and grades of materials etc. From this point onwards the recycling is then more or less automated and big varieties of input materials are turned into re-usable granules, powders etc. Depending on the grade of purity they are turned then into high valuable products like new bottles, or less valuable things like flower pots.

When waste is turned into energy then it is usually not only the plastic fraction but all other things with caloric value as well. In this case the purpose of shredding the input material is to get a homogeneous mix, which is easier to handle, to store and to feed into the next step. For this kind of operation it is necessary that shredding is as efficient as possible. Because of that a shredder should always run on the biggest screen possible to get maximum output at rated current. The biggest problem is the

high level of contaminants as the boilers usually don't care about mineral and metallic particle. But for the lifetime of the cutting tools and the wear and tear of the shredder itself a clean as possible input material is necessary.

OUR SOLUTION

For both cases ZERMA is able to provide just the right equipment to make your operation as profitable as possible. Our shredders are tough built and with a large range of machines and drive options we can achieve output capacities just as you require. And if you wish all in wear resistant executions. Rough sizing with our shredder range, granulating with our granulator range or even micronizing with our pulverizers; all from on hand. Further we do all the other things needed to complete the set up, like conveyors, feeders, separators, blowers, cyclones etc.

ADVANTAGES:

- + sturdy design we can offer machines for all steps of the size reduction either as a complete line or as replacements for existing systems**
- + high market share in this field**
- + low investment costs against highly efficient machines**
- + extremely wear resistant package variable**
- + high output solutions**

01

Recycling of foam in 2 ZXS 3000 shredders

02

Baled post consumer plastic bottles

03

ZERMA GSH 1100/2400 with special designed suction system to achieve high throughputs



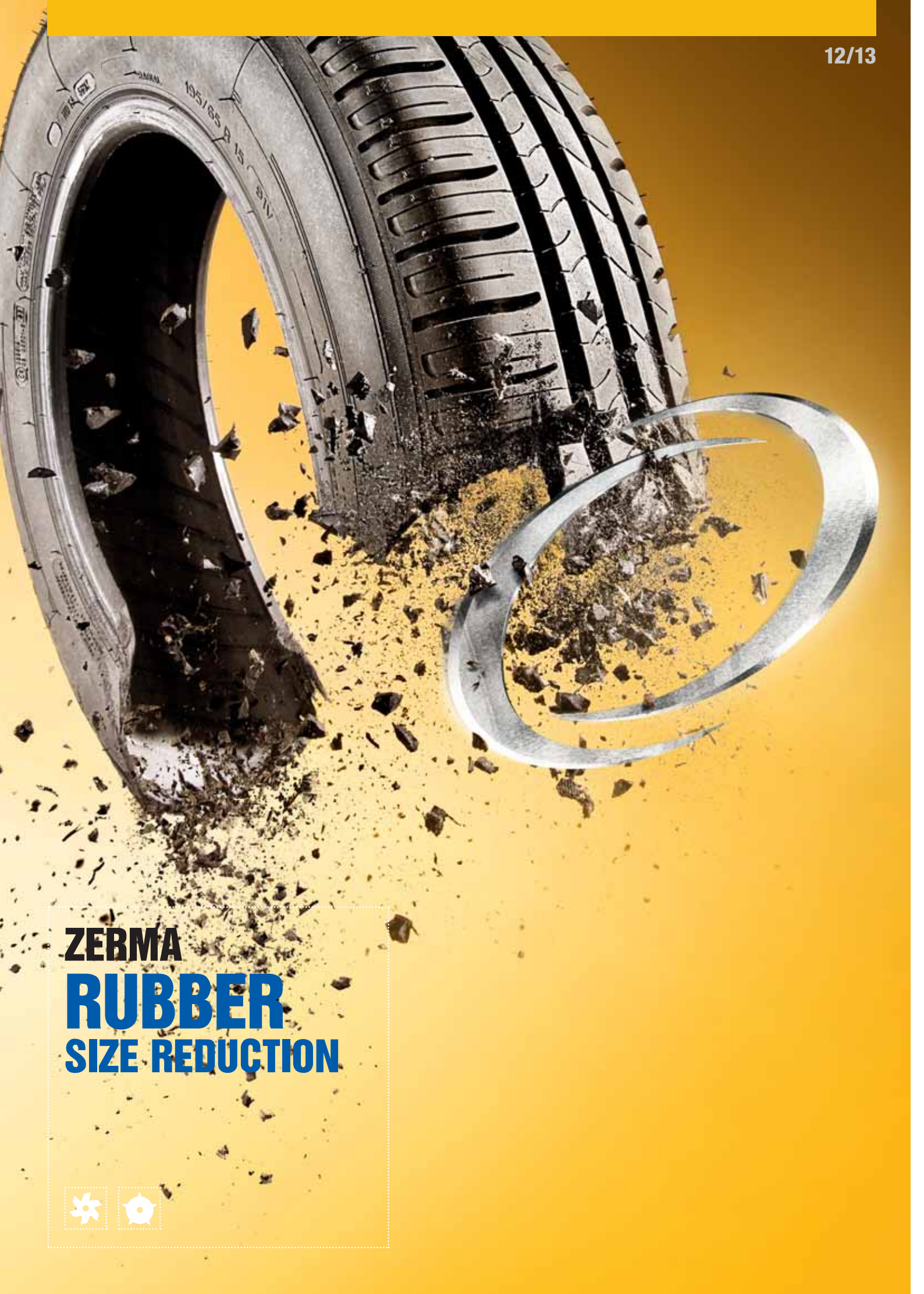
02



01



03



ZERMA
RUBBER
SIZE REDUCTION



RUBBER

OVERVIEW

Due to the increasing number of cars and trucks all over the world, used tires are available in large quantities at very low cost. With a bit of clever recycling, you can get a whole lot out of used tires: granule in various sizes, steel and profit. The sales income naturally depends on the quality of the output material a process that is as efficient as possible. ZERMA designed a system dedicated to tyre recycling, which ultimately produces very high-quality materials for recycling. Final products could be either shreds for thermal recycling, predominantly in the cement industry and crumb rubber of about 5 mm size used in various applications.

SHREDDING AND METAL SEPARATION

The first step is the newly developed ZERMA ZTS Tyre shredder which can shred passenger car tires of up to Ø 800mm into strips and pieces of approx. 150 mm – 300 mm. ZERMA tyre shredders are heavy duty single shaft shredders with gravity infeed specifically designed for the grinding of tires. They feature additional wear protection compared to other shredders. The machine is equipped with a flat rotor, made of highly wear resistant steel with added weld on hard facing for longer lifetime. The cutters used in these shredders are made from a newly designed, specialized material to ensure long life time and optimal performance. As opposed to other systems, the ZERMA system does not require the tires to be de-beaded. For larger truck tires we modified our proven ZXS Shredder. The so called ZXS "T" can shred truck tyres of up to Ø 1500 mm into shreds of approx. 150mm – 300 mm. In both cases these shreds are discharged by a conveyor belt and transferred to the next ZTTS second stage tyre shredder. This shredder is than shredding the material into pieces of about 20 mm.

This step helps to separate the tire rubber from the steel. A combination of cross belt magnetic separators and magnetic drums helps to split the various fractions at this stage in the process. During metal separation we can take out about 99% of the total steel content. The steel free granule can then be packed and used as refuse derived fuel or transferred to the granulating process.

GRANULATING AND SIFTING

After shredding and steel separation the tyre shreds will be transferred to the granulation process. For granulating of the rubber shreds we are using our heavy duty GSH granulators with a special closed H-rotor to reduce the rubber down to a size of < 5mm in two steps. Throughout this process the material is classified on ZERMA CS screening machines and the last metal contamination is eliminated by additional magnetic drums.

01

Tyre shreds after the first step in the ZTS tyre shredder

02

Rubber crumb after the second step in the ZTTS tyre shredder

03

Truck tyre being shred in a ZXS 2000 T



01



02



03



ZERMA
E-WASTE
SIZE REDUCTION



E-WASTE

PROCESS OVERVIEW

In light of the raw material prices for precious metals as well as plastics all types of electronic waste recycling have become more and more important lately. Talking about e-waste we mostly refer to 'white goods'. Used home appliances such as fridges, washing machine, coffee makers and so on. These products generally contain high value plastics and precious metals, in most countries they are collected separately or taken back by producers and dealers. But another important part of electronic waste recycling is recycling of all sorts of cables.

TYPICAL CHALLENGES IN RECYCLING

ZERMA offers a wide range of machines well suited for electronic waste recycling. Generally the recycling process starts by dismantling large parts like compressors or transformers. Then the whole product is shred in ZXS or ZSS single shaft shredders, after this step a rough separation of plastics, metals and other materials is possible. The materials are then further reduced in hammer mills and granulators, to achieve a

finer separation. As the whole process of separating and classifying the materials is very complex and includes specialized equipment we generally work with system integrators and engineering companies to provide them with high quality size reduction components to be integrated into their systems.

In the case of cable recycling, the complete cables are first shred to a size of about 30 cm in a ZSS or ZXS shredder and then ground down to their final size of 3mm in a GSH heavy duty granulator. This size allows for the best separation of metal and plastic on our separation tables. The separation tables split the plastic and metallic fractions in a process involving both movement and airflow.

Furthermore our machines are used by producers of electronic parts and components to destroy sensitive media, faulty products or prototypes. In these cases just a shredder or a combination of shredder and granulator is used depending on the required final size.



01



02



03

01
Mixed electrical waste after being processed in the ZHM hammer mill

02
The ZHM rotor with the single piece rotor tools

03
A ZERMA cable recycling system consisting of GSH granulator and separating table



ZERMA
WOOD
SIZE REDUCTION



WOOD

DESCRIPTION OF THE PROCESS

Recycling in this industry means mostly to convert the input materials into a homogeneous product, which is then normally used as a fuel for any kind of boilers. Input materials usually come in the form of cut offs from p.e. joineries and similar sources. But it also can include other organic products, like husks, coconut shells etc. The final size of the product is very much depending on its use and can be large chunks, medium to small size chips and small chips, p.e. to be used as fillers.

OUR SOLUTION

As we have a large range of machines to suit such applications we are able to serve the whole industry with just the right machine, from the little joinery to the large pellet producer and we are further able to get a final product of virtually any size, from chunks to wood dust. For the pre-breaking and rough sizing ZERMA offers a wide range of shredders, from 15kW to 320kW drives. These shredders can handle all kind of input materials at ranges from 200kg/h to 10t/h. Commonly the output chip size is about 50mm but also smaller sizes can be achieved. Those machines are not very vulnerable to contaminations like nails etc., which can be removed afterwards with by magnets like cross belts magnets or magnetic head drums.

For the next step of size reduction to take the chips down to saw dust we offer several granulators and hammermills. The granulators are usually the better choice when the pre-shred material is free of all ferrous and mineral contaminations as they provide a precise cut and therefore a uniform output material. The machines ZERMA offers for this step are ranging from 11kW up to 400kW with matching outputs of 300kg/h to 10t/h. If the pre-shred material has a high level of mineral contaminants then we suggest the use of hammermills. Those machines are invulnerable to abrasive particles and will help to free them from the organic input materials. They are also highly effective in opening up the inputs to a nice fibrous end product which has very good bonding abilities as they are needed e.g. when making pellets. To round up our supply abilities we have a large choice of standard and customized auxiliary products like conveyors, separators, blowers and cyclones which enables us to offer whole turn key set ups or complete your existing recycling lines

ADVANTAGES:

- + wide range of machines for all steps of the size reduction rigid design to handle all kind of input materials at a large range of throughputs
- + turn key solutions from simple stand alone machines to highly automated processing lines
- + reliable key components like gears, motors, hydraulics and control components
- + short down times for maintenance due to well engineered tool fixing systems

01

ZERMA ZWS shredder including discharge and magnetic separation system

02

ZERMA briquetting press to create pellets from the shredded wood scrap



01



02

ZERMA

THE HOME OF SIZE REDUCTION

Granulators
Shredders
Specialized machines
Accessories
Spare parts



GRANULATORS



GSL



PLASTIC
SIZE
REDUCTION

GSL 180
GSL 200
GSL 300

The slow speed granulators in the GSL range are mainly used in injection and blow molding processes as beside the press machines to grind runners and sprues. The machines can be used for rejected products in the inline recycling process as well. Different hopper and base frame designs make it possible to integrate the machine with most types of injection molding machines and robots.



GSE



PLASTIC
SIZE
REDUCTION

WOOD
SIZE
REDUCTION

GSE 300
GSE 500
GSE 700

The GSE series of machines are designed as economical granulators for in-house recycling. The aggressive tangential infeed and advanced cutting geometry of the GSE series allows bulky hollow parts to be ground. THE whole GSE granulator line achieves a high quality regrind independent of the material type or form such as injection moulded parts, blow moulded parts, profiles, sheets, film, etc.



GSC



PLASTIC
SIZE
REDUCTION

GSC 300
GSC 500
GSC 700

The GSC series of compact soundproofed machines are mainly used in inline operations or as central granulators for processing of hollow thin walled products, or runners and sprues. The integrated sound proofing makes it possible to easily place the machine in existing operations. With different rotor designs and a wide variety of options the machines can be tailored for many different applications.



GSH



PLASTIC
SIZE
REDUCTION

WOOD
SIZE
REDUCTION

GSH 350+
500
GSH 600+
700
GSH 800
GSH 1100

The wide range of rotors and hopper styles allow the GSH machines to be tailored to almost every application in the plastic recycling field. The GSH heavy duty granulators are mainly used as central granulators for in house recycling applications to process thick walled parts in one step or as a second step granulator after a shredder to reach higher throughput rates.



GSP



PLASTIC
SIZE
REDUCTION

Conventional granulators have substantial problems handling long pipes and profiles. Therefore ZERMA developed the GSP range. Thanks to the almost level feeding hopper, long pieces can be fed easily. While the machine is operating there is no risk of blocking, in case of congestion no more material will be accepted by the machine. Once the grinding chamber is empty the machine will accept material again.

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Granulators
Shredders
Specialized machines
Accessories
Spare parts



SHREDDERS



ZBS



PLASTIC
SIZE
REDUCTION

E-WASTE
SIZE
REDUCTION

ZBS 600
ZBS 850

The ZBS shredders have been designed for in house recycling of small lumps and purges from injection and blow molding processes. The typical input materials are small and medium sized cakes such as head waste. The material can be shred to reduce the volume or processed further in a granulator to be re introduced into the production process immediately.



ZSS



PLASTIC
SIZE
REDUCTION

WOOD
SIZE
REDUCTION

E-WASTE
SIZE
REDUCTION

ZSS 850
ZSS 850+
ZSS 1200
ZSS 1500
ZSS 2000

The ZSS shredders have been designed for a wide array of applications and industries such as in house and general recycling, electronic waste and post consumer waste handling with a wide variety of input materials. Depending on input material and the following process the shredded material can be used directly or go into the next step of size reduction for example in a GSH granulator.



ZIS



PLASTIC
SIZE
REDUCTION

WOOD
SIZE
REDUCTION

ZIS 1200
ZIS 1500
ZIS 2000

The ZIS shredders have been designed with big volume parts such as IBCs, pallets and big barrels in mind. While it can be used for in house recycling in big volume blow moulding operations it is also versatile enough to be used for general recycling in the plastic and wood industry. Like all ZERMA shredders the ZIS can be equipped with a wear package for processing of highly abrasive or filled materials.



ZXS



PLASTIC
SIZE
REDUCTION

RUBBER
SIZE
REDUCTION

WOOD
SIZE
REDUCTION

E-WASTE
SIZE
REDUCTION

ZXS 1500
ZXS 2000
ZXS 3000

The ZXS shredders have been designed for the most demanding and high throughput applications in recycling industries. The input materials can be all kinds of plastics, wood, paper, cardboard, e-waste, post consumer waste, rubber, etc. in various shapes and sizes. Typical input materials are: fridges, purges, tires, pallets, bales, drums and barrels, pipes, film and so on...



ZRS



PLASTIC
SIZE
REDUCTION

ZRS 800
ZRS 1000
ZRS 1500

The main focus of the ZRS shredders is the shredding of large diameter pipes or bundles of smaller pipes and profiles made from HDPE, PP and all kinds of PVC. Further the machines can be used for recycling of other plastic parts, such as large lumps, stacked wheelie bins and pallets. In combination with other ZERMA size reduction equipment such as granulators and pulverizers we are able to provide a complete turn key recycling solution.

ZERMA

THE HOME OF SIZE REDUCTION

Granulators
Shredders
Specialized machines
Accessories
Spare parts



SPECIALIZED MACHINES



ZTS/ ZTTS



**RUBBER
SIZE
REDUCTION**

**E-WASTE
SIZE
REDUCTION**

**ZTS 1500
ZTS 2000
ZTS 3000**

The ZTS with its single row of stator knives is used to pre shred complete car tires or large chunks of pre processed tires down to a size of about 150 mm. The twin rows of stator knives and screen in the ZTTS enable it to take the tire shreds down to a any required size > 20 mm. The unique machine design combined with the variable cutting gap create an optimal separation of rubber and steel fractions.



GRF



**PLASTIC
SIZE
REDUCTION**

The granulators in the GRF series are based on the proven GSC series of machines. They are fitted with roller feeding devices specifically designed for the recycling of edge trim from sheet extrusion or skeletal waste in thermoforming applications. The compact soundproofed design allows these machines to be used inline where the regrind can be reintroduced into the production process immediately.



ZWS



**WOOD
SIZE
REDUCTION**

**ZWS 600
ZWS 850
ZWS 1100
ZWS 1400
ZWS 1700
ZWS 2000**

The ZWS light duty wood shredders are single shaft shredders specifically designed for the wood industry. They can be used to grind small quantities of off-cuts in a joinery or to create sawdust from all kinds of waste wood to be used as fuel directly or further processed in a briquetting press to create heating pellets.



ZHM



**PLASTIC
SIZE
REDUCTION**

**WOOD
SIZE
REDUCTION**

**E-WASTE
SIZE
REDUCTION**

**ZHM 600/
800
ZHM 800/
1200**

The main purpose for the ZERMA ZHM hammer mill is the processing of electronic waste, such as whole computers, white goods and ICBs. The main advantage in these processes lies in its insensitivity to contamination and abrasive materials while being able to achieve a rather small output material. Through the high degree of disintegration it is possible to achieve good separation results in the following processes.



PM



**PLASTIC
SIZE
REDUCTION**

**WOOD
SIZE
REDUCTION**

**PM 300
PM 500
PM 800
PM 500H
PM 800H**

One of the main fields of use for the ZERMA PM Pulverizers is the pulverization of PVC regrind in pipe and profile recycling. Working in line with a shredder and granulator to have a balanced and efficient system to handle in house production waste. Another application is the grinding of PE for Rotomolding applications, here the PM Pulverizer is used in the production process to create the powder needed in the process.

ZERMA

THE HOME OF SIZE REDUCTION

Granulators
Shredders
Specialized machines
Accessories
Spare parts

ZERMA



ACCESSORIES



CONVEYORS

ZERMA offers a large variety of conveyor belts, either as feeding belts for shredders and granulators, or as discharge belts to move material from the first step of shredding to a granulator in a two step recycling process. All belts are built very sturdy and feature standard options such as a corrugated side wall further they can be equipped with a metal or magnetic free zone for the installation of a metal detector or cross belt magnet.



BLOWER SYSTEMS

ZERMA offers a complete program of suction systems to discharge material from the machines. These systems include blowers, piping, cyclones and bag filling stations. Additionally we offer separation equipment to separate fines from the material flow. All blower systems can be equipped with components manufactured from highly wear resistant steels for use in abrasive applications.



METAL DETECTION AND SEPARATION

In order to create the best output material it is important to make sure the material is free from contamination such as metal. ZERMA offers a wide range of products to detect and remove various kinds of metal contamination. This ranges from magnets used to separate ferrous metals to all metal detectors and separators to detect and separate all kinds of metal contaminants from the material stream.



SCREENING

It is always important to achieve a well defined output size. ZERMA offers a range of screening solutions for different materials and throughputs. Due to its' small size the ZERMA rotary screening machine is well suited to be integrated into PM Pulverizer setups especially in rotomolding applications. The conventional horizontal screening machines offer a higher throughput and the possibility to classify different material sizes.



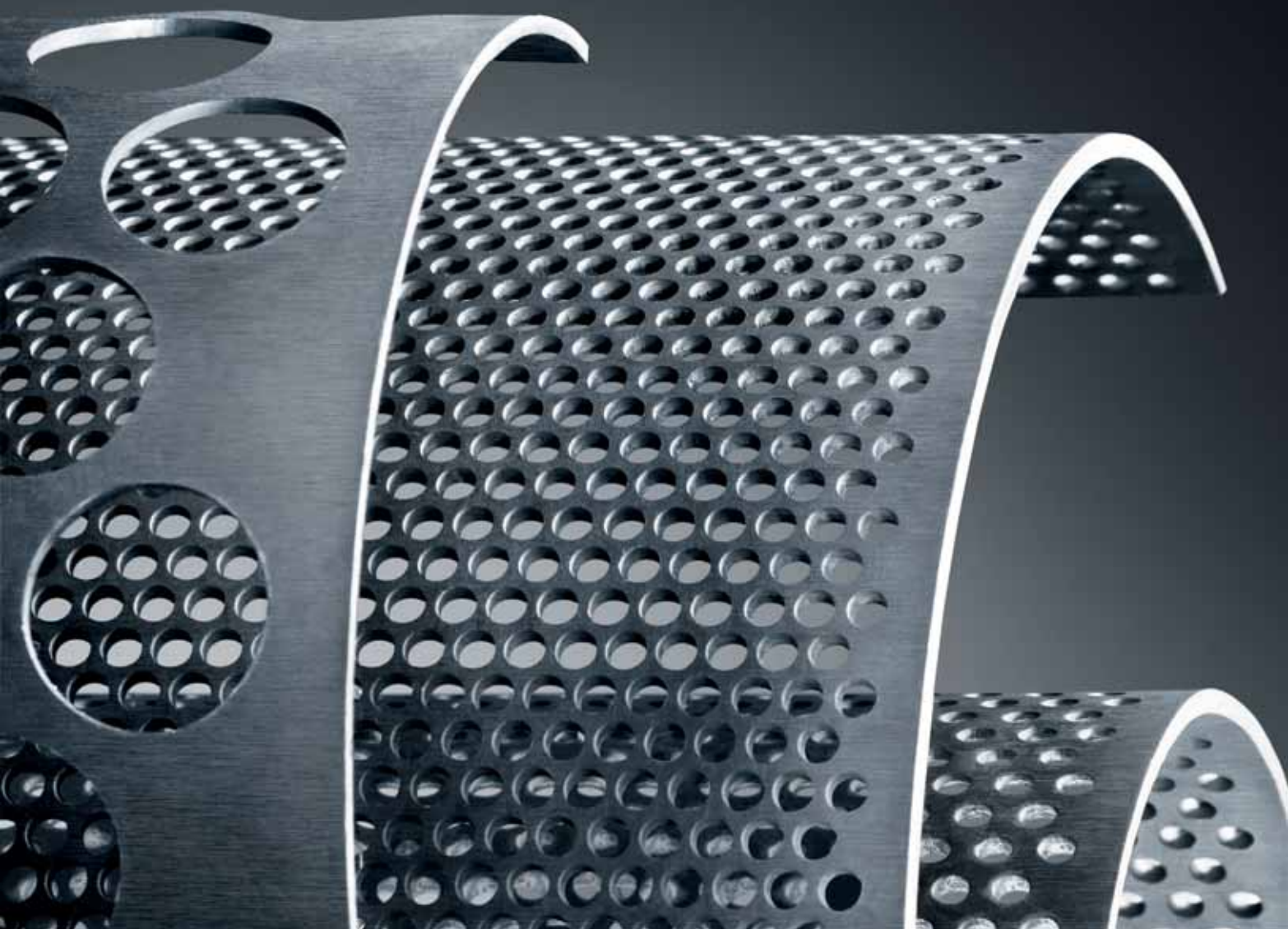
FORCE FEEDING

To increase the throughput of the ZERMA GSH granulators when used with loose materials such as bottles, we developed the force feeding system. This system forces the feeding material into the cutting chamber and avoids the common problem of material 'dancing' on the rotor. Adding one of these force feeders increase the throughput greatly. The force feeders are available in two basic designs: Screw and paddle type.

ZERMA

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SPARE PARTS



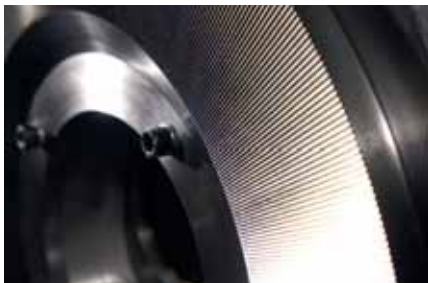
GRANULATOR BLADES

A granulator performs best and most economical when the blade is sharp. Regular knife changes and correct setting of the cutting gap help ensure a good final result and reduced power consumption. We keep blades in stock, as do our subsidiaries and agencies all over the world to supply you with a fresh blade whenever you need it.



SHREDDER KNIVES

The ZERMA shredder knives can be turned once one side is worn out, this helps increase the blades lifetime. If you need new blades contact your local ZERMA agency and they will be able to supply them to you.



PULVERIZER TOOLS

The Pulverizers can be equipped with either segments or one piece grinding discs, both can be resharpened. If you need help resharpening or replacing them, your local ZERMA agent will be able to help you.



SCREENS

The right screen size can make a big difference in the performance of a machine, and sometimes you just need a new screen fast. Most standard screen sizes are available in stock, or can be manufactured quickly. This includes screens made from wear resistant materials or stainless steel.



OTHER STANDARD PARTS

From bolts to V-belts, there are many more parts to a ZERMA machine than knives, screens and rotors, but the spare part service is the same. We keep most standard parts in stock available for a fast delivery, should you need it. Contact your local agent for more information and quick deliveries.

ZERMA
THE HOME OF
SIZE REDUCTION

WWW.ZERMA.COM

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PLASTIC SIZE REDUCTION
RUBBER SIZE REDUCTION
WOOD SIZE REDUCTION
E-WASTE SIZE REDUCTION



ZERMA