

Metso –
your waste
shredding
expert

WHY RECYCLING – how to set up a recycling business

Why recycling?

Recycling is one of the best ways for you to have a positive impact on the world in which we live. Recycling is important for the natural environment and people. We must act fast as the amount of waste we create is increasing all the time.

The amount of waste we create is constantly increasing because:

- Increasing wealth means that people are buying more products and ultimately creating more waste
- Increasing population means that there are more people on the planet to create waste

- New packaging and technological products are being developed, many of these products contain materials that are not biodegradable
- New lifestyle changes, such as eating fast food, means that we create additional waste that isn't biodegradable

Environmental importance

Recycling is very important as waste has a huge negative impact on the natural environment.

- Harmful chemicals and greenhouse gases are released from waste in landfill sites, recycling helps to reduce this pollution



- Habitat destruction and global warming are just some of the effects of deforestation
- Huge amounts of energy are used when making products from raw materials. Recycling requires much less energy and therefore helps to preserve natural resources.

Importance for people

Recycling is essential for cities around the world and the people living in them.

- No space for waste. In some countries like the UK landfill sites are filling up fast
- Reduce business costs. Making products



- from raw materials costs much more than if they were made from recycled products
- Preserve natural resources for future generations. Recycling reduces the need for raw materials; it uses less energy, therefore preserving natural resources for the future.
 - When learning about the process of recycling it helps to remember that most materials can be recycled but certain products (i.e. cell phones and computers) are more of a challenge to remanufacture.
 - On the other hand, products such as paper, plastic, glass, tin and some textiles are all relatively easy to process and thus the recycling process becomes highly efficient.

- Easily recyclable items share organic materials just as certain foods and plants do. The procedure for recycling food and plants is known as composting rather than recycling.

The recycling process - Benefits

- The reason for recycling is important for a number of reasons. One of the most obvious reasons lies in reducing the amount of natural resources that are consumed for every new product. Since recycling conserves energy the process produces a smaller carbon footprint, thereby helping the environment.

- The recycling process also prevents water as well as air pollution while preventing the build-up of rubbish accompanied by the proliferation of landfill sites. Since materials are brought to a recycling facility they do not wind up in areas that do not have a place for them.
- Furthermore, if the recycling procedure is perfectly efficient it would be possible to convert all old waste products into similar amounts of new products.

Shredding is big business

To the man on the street the term shredding most likely brings to mind the transformation of business documents, bank and credit card statements into a bird's nest of paper, a practice we now rely on worldwide to prevent fraudsters accessing our personal financial data and sensitive information. But to waste industry professionals the term brings to mind a whole spectrum of equipment and, a world of new technology. It means big business, as shredding of waste is common practice across almost all areas of the waste industry.

Shredding is a disposal technique for everything from agricultural to household waste and electrical to industrial waste. Put simply, shredding is breaking down waste into smaller parts.

The overall trend in today's market tends to be 'shred first and sort later'. Shredding of waste material as a precursor to sorting is useful for two reasons. It reduces the size of the waste, allowing for greater ease of transportation, but perhaps more importantly at a time when recycling as much material as

effectively as possible is paramount it allows for more effective sorting afterwards. And logically, effective sorting equals greater opportunity for recycling.

The particular shredding process used will be dictated by the material that needs shredding, and there is a multitude of options that are undergoing constant refinements and updates.



M&J shredder applications

Biomass

Companies engaged in biomass processing are increasingly adopting stationary shredders to increase the delivery of consistent, specific carbon-neutral biomass energy products. This selected fuel is attractive to operators of incineration facilities who are keen to reduce their overall carbon emissions.

Incineration plants

Worldwide focus on recovering as much energy out of waste as possible, has led to waste processing being an important growth market for shredder technology at WTE plants. Numerous technologies now exist to produce fuels and energy from waste. Incineration is the most common WTE conversion but to maintain a consistent flow, increase combustion efficiency, improve emission and reduce costs, it is essential that the waste is pre-shredded.

Processing lines for RDF

Waste is considered a potential energy source and an important growth market for stationary shredders. Most plastic and paper waste Refuse Derived Fuel (RDF) plants have specific requirements regarding shredding capacity, grain size and operating reliability to ensure reliable and consistent production.

Cement factories

The cement industry is energy intensive. A cement plant requires thermal as well as electric energy for production. Electricity is used to grind the raw materials as well as the finished cement. Thermal energy, mainly from coal is consumed in the kiln for the pyro-processing of limestone to produce clinker (raw material for cement). The cement industry is the third largest consumer of coal in India. More cement plants around the world are going to partly use Refuse-Derived Fuel (RDF) instead of natural gas and coal as a fuel for the cement kiln.

Landfills

However enormous a landfill site first appears, it is surprising how quickly – and how ineffectively – it can become full. Regardless of how bulky, resilient or abrasive your waste may be, effective shredding makes best use of the space available by considerably reducing the volume, which also helps accelerate the transformation processes of the shredded waste.

Transfer stations

The cost of waste transportation is an important factor. To save money it is important to shred waste to a manageable size at or near the point of collection. In the future, transfer stations could be equipped with material

recovery facilities and with localized mechanical biological treatment systems to remove recyclable items from the waste stream.

Recycling plants

M&J shredding equipment is often used to process waste. As waste flows can be heterogeneous with unpredictable and varying characteristics, there is heavy demand for stationary pre- and fine-shredding equipment.

MBT plants

A mechanical biological treatment system is a type of waste processing facility that combines a sorting facility with a form of biological treatment such as composting or anaerobic digestion. MBT plants are designed to process mixed household waste as well as commercial and industrial wastes.

M&J shredders can also be used in custom installations for:

- Glass
- Destruction of dead animals
- Paper factories
- High-performance shredding of municipal solid waste (MSW)
- Tree stumps
- Hazardous waste
- Composting
- Construction and demolition waste plants

Cases



Vinagro Farms (US)

Line of business: Transfer station

Operates: M&J PreShred 4000M

Vinagro Farms is a third generation family-owned recycling business that accepts trash for most of the state of Rhode Island. They shred a wide range of materials like mattresses, construction waste, carpets and general household goods. Without missing a beat the Metso shredder ate through the material with ease, reducing the volume to a third of its original size. "It performed flawlessly", says distribution manager Eric Bjornson. After three hours of feeding solely mattresses and carpets the shredder once again performed flawlessly, handling the carpets and mattresses without getting jammed.

Closed Loop recycling (UK)

Line of business: Recycling PET bottles

Operates: M&J PreShred 1000 S

Metso Denmark supplied a M&J PreShred 1000S unit to process large bales of compacted plastic bottles. Stephen Corbett, Factory Manager at Closed Loop Recycling, has been impressed with the M&J PreShred 1000S, commenting, "It was one of the best and most cost effective purchases on the whole HDPE upgrade project." He continued, "Just put the bales in with the wires and let the unit do the rest. There is really no damage to the bottles and no noticeable clumps that affect the process."

a2a Ambiente S.p.A.

Line of business: MBT process

Operates: M&J PreShred 6000S

"Primary and secondary shredders are fundamental components of our MBT process and SRF production facilities. Reliability, flexibility and capacity are the characteristics we are looking for and Metso shredders combine these in a good mix" says Pietro Agustoni, a2a Ambiente S.p.A. - Gruppo a2a



ACC (India)

Line of business: Cement plant

Operates: M&J PreShred 4000S

“Partnership with the right equipment supplier is very critical to setting up the facility for co-processing. We chose Metso as we have been working with them around the globe. They understand the complexity of the business and deliver the right solutions”, says Mr. Ulhas Parlikar. The M&J shredder has been ACC’s first choice for waste co-processing in its cement plants. “Most organizations get into the trap of initial costs rather than value. We cannot have our operations held up due to faulty equipment or something which requires a lot of maintenance. M&J shredders have been performing exceptionally in demanding conditions. The service is top-notch which adds value to the entire equation of partnership.” M&J shredder series is specially designed for continuous use with hard abrasive materials.

Kim Hock Corporation (Singapore)

Line of business: Shredding wood

Operates: M&J PreShred 4000S

“The shredder is installed in our biomass wood waste to energy plant, and is size reducing urban wood waste in form of green waste (tree branches, logs and root stumps) from horticultural maintenance industry, construction and demolition wood waste, logistics wood waste – pallet/boxes. We have for sure made savings – as we do not need to pre-cut tree stumps and bigger size tree trunks – it can be directly feed into the waste shredder” says Lim Teck Siang

Kouki (Japan)

Line of business: Cleaning up after a natural disaster

Operates: M&J PreShred 6000S

Metso pre-shredders helped to clean up 7 million tons of waste in Japan’s tsunami region. The coastline was divided into sections, with Ishinomaki as the largest, and the Ishinomaki government did face the difficult task of eliminating 7 million tons of waste. This particular waste contains all sorts of debris from the sea, mixed up with structural components of houses and a lot of mud. The gigantic of 7 million tons of solid waste was processed by four M&J PreShred 6000 machines, employing around 300 persons per shift says Metso Japan’s Customer Support Manager, Mr. Kanno

Service cases and service offerings

Moerdijk

(Incineration plant, The Netherlands)

At another Attero plant two Lindemann rotor shears had been replaced by modern M&J waste shredders several years ago, resulting in a number of unexpected positive side effects. Based on the success of the new Metso shredders there, Attero's management team began a feasibility study to decide if it would be worth replacing a rotor shear with a modern waste shredder at the Moerdijk plant. Benefits: Waste is reduced to < 450 mm and the particles are very homogenous thereby helping furnace management with temperature control; shredded waste produces less slack which reduces costs; the reduction in size also has a positive effect on emission control; ferrous and non-ferrous metals can be separated before incineration; and the advantages gained by managing the entire waste stream on-site far outweigh the investment costs.

Allington

(Incineration plant, UK)

At Allington in UK three older M&J PreShred 4000S were upgraded to the larger 6000 version. The upgrade included the cutting tables, hoppers and conveyors, increasing capacity significantly. Prior to the upgrade, the three units processed around 2000 tons of waste a day, now the two new units process over 2000 tons of waste in the same time. This allows more time for servicing within normal working hours and reduces the pressure on the facility. The 400kwh PreShred 6000 also delivers power savings; running for 20 hours a day this represents a significant saving over the lifetime of the units. "A slower rotating speed of the knives on the cutting tables also means less wear, longer service intervals and increased savings!" says Phillip Christensen, Manager, Technical Service & Sales Support

E.ON, Norrköping

(Incineration plant, Sweden)

We were looking for the most robust shredder on the market. A good working environ-

ment for our employees was also a high priority. Our processing operations mean we can't avoid dust completely, but we do aim to keep it to a minimum. We've found that the best way for us to achieve this is by using low-speed shredding machinery like the two M&J PreShred 6000 units we currently operate. We also find that these units are more resistant than most – and minimise the risk of fire" says Benny Broman

Metso service

M&J PreShred units are normally the first step in treating mixed and difficult wastes. This means they are often directly exposed to all the impurities and unwelcome surprises in the incoming waste stream. M&J shredders often have to deal with extremely tough operating conditions. Even the sturdiest units therefore have to be maintained and serviced properly to make sure they perform at maximum efficiency and to keep expensive downtime to a minimum. To achieve this, we offer our customers an exceptionally strong service concept with a rapid response service program.

Service throughout the shredder lifetime

When you invest in a new generation of shredding equipment, it's important to bring your new systems into operation as quickly and efficiently as possible. Metso Waste Recycling service technicians are available anywhere in the world to help you get your new M&J Shredder installed and commissioned effectively, and train your staff to operate it well.

24/7 service and support

When using a M&J Shredder as part of your operations, you need to be able to rely on it – completely. That's why we focus considerable resources on providing you with the best possible service and support.

To help protect your operations from the effects of any unscheduled downtime, we maintain a permanent inventory of the most critical spare and wear parts, all exceptional quality and guaranteed.

Help in tackling changing needs

Your business and your operations will – inevitably – develop and change over time, and both inputs and customer requirements alter. To help you tackle these changing requirements, we provide a range of specialist services.

We offer replacements and upgrades as for PreShredders:

- Cutting table replacement. Replace the complete unit with the latest technology.
- Cutting table refurbishment, so you can maintain maximum efficiency.
- Shredder upgrades – modular designs make it easy to achieve greater output and greater efficiency.

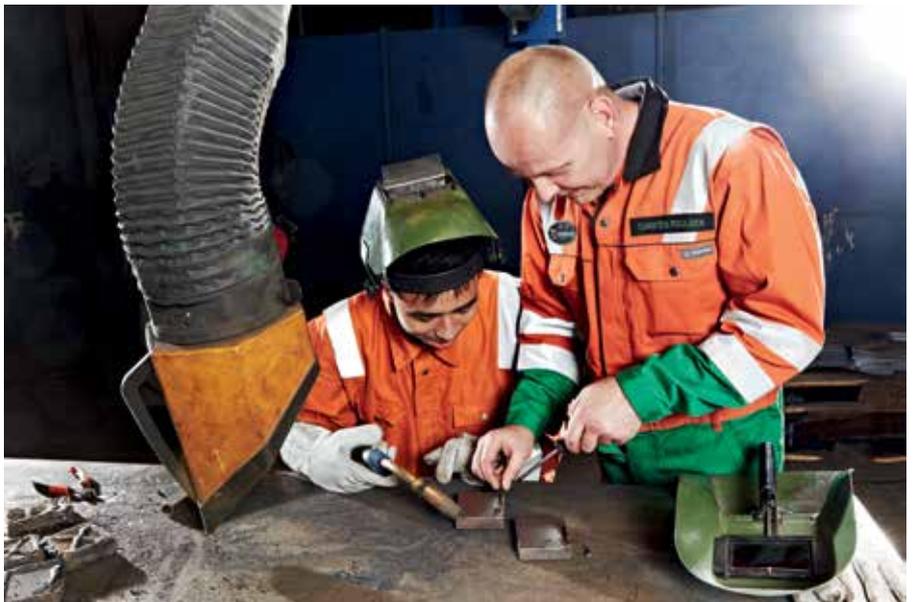
Service agreements

To make it easy for you, we provide three distinct kinds of standardized service agreements for M&J PreShred, choose one and get a significantly better return on investment.

Preventive action pays off

You don't have to sign up for a Metso Recycling service agreement when you purchase an M&J PreShred. But the benefits are considerable.

- Lower life cycle costs of your shredding equipment
- Avoid disruptive downtime and lost revenue
- Keep your energy costs to a minimum
- Benefit from all the latest shredder technology updates and improvements.



We offer

	Premium Service Agreement	Extra Service Agreement	Regular Service Agreement
Regular service interventions every 500 operating hours including filters, grease, gear oil, hydraulic oil, oil samples, working hours, travel and accommodation.	✓	✓	✓
Regular hard surface welding every 500 hours on rotating shafts and stator knives in cutting table including welding material.	✓	✓	
All repair work including all spare and wear parts needed for 10,000 hours of operation (including replacement of cutting table).	✓		

Our market offering – line of equipment

We offer both Pre- and FineShredders. Below is a short description of our solutions.



General characteristics for **PreShredders**, available in stationary or mobile models, powered by an electro-hydraulic or diesel-hydraulic power unit, and grain size depends on the number of knives

The 1000 range is the smallest shredder for limited quantities and designed to avoid bridging. Two powerful twin shafts run asynchronously – shredding in both directions to keep the material constantly moving.

The 1000 mobile is ideal on sites with no electric power, or when it is necessary to move the shredder around. Available in hook-lift or semi-trailer versions.

The 2000 stationary is a stationary single-shaft shredder that features PLC-controlled automatic reversal. Shredding in both directions prevents material wrapping, eliminates stoppages and prevents breakdowns.

The 4000 range is our most versatile model. It is designed to deal with a wide range of input materials – in terms of both size and composition – including unexpected and

highly awkward items. A very large cutting table and the twin-shaft design handle shredding with no bridging problems and a consistent output flow.

The 6000 range is among the largest shredders in the world and can tackle large volumes of waste as well as very bulky waste.

Is equipped with two 4-metre-long shredding shafts. It is ideal for unusually bulky or very heavy inputs and large volumes.

General characteristics for **FineShredders**
The modular design of these machine means the knife configuration can be chosen to suit customers' needs. The unique design of the cutting area ensures minimal friction on the shaft.

The key benefits of a M&J FineShred are: Homogeneous output, minimal fine particles, minimal dust emissions, no heat generation and easy maintenance.

These FineShredders are ideal for any recycling purpose, and can handle a wide range

of different materials in bales, rolls, bricks or loose. They generate homogenous outputs 10 to 100 mm in size.

We offer our FineShredder as both a single and double shaft version.

Single shaft FineShredder series consist of one-shaft shredders ideal for any recycling purpose. It handles a wide range of different materials be it in bales, rolls, bricks or in loose. Main applications are PET, WEEE, nylon, Kevlar, paper, PEHD and PELD

Double shaft FineShredder series consist of two-shaft shredder for continuous material input. Can handle difficult materials such as sticky bitumen, fabrics and foams. Main applications are RDF, PET, WEEE, wood, bitumen, nylon, kevlar and paper



Our history and quality standard

We are a proud long-established company

Set up in 1857 in Horsens, Denmark, as a foundry under the name "Møller & Jochumsen", Metso Denmark of today has a long tradition of designing and manufacturing industrial components and equipment.

Up until the Second World War, the company was one of Denmark's leading manufacturers of steam engines: we also produced industrial diesel engines as well as turbines, petroleum engines, generators and complete water towers, plus a wide variety of machinery and equipment for railways and other industries.

We listen

The basis of any good co-operation lies in an in-depth understanding of our customers' requirements and respect for individual preferences. We believe that close co-operation with customers and suppliers, based on mutual respect and trust gives the best results – to the benefit of all concerned.

We encourage quality performance

A high level of quality is a key element in all Metso Denmark's activities, both internal and external - we want our customers to return, not our products. Our objective is to ensure our customers always have complete confidence in Metso Denmark. Your satisfaction is fundamental to our long-term development. Our employees, together with supportive participation from all levels of management, work hard to ensure you a good experience when working with us.

Our level of quality is achieved by

- Fulfilling the requirements of ISO 9001 and thereby continuously improving the effectiveness of the quality management system.
- Having a zero-defect strategy and focusing on error prevention. If errors do occur we will correct them and find a way to ensure that they never occur again.
- Ensuring our suppliers allocate adequate resources and the required competence so we can both reach the level of quality Metso Denmark expects and ensure cost-efficiency and continuous improvement in quality.
- Working as "One" in all our processes and teams to create value not only for our customers, but also for our employees.
- Relevant training for all levels of personnel.

Our organization, both management and staff, are committed to the above philosophy and directives. We take steps to communicate, deploy and implement this policy.

About Metso Waste Recycling

Metso Recycling specializes in the design and manufacture of shredding equipment to effectively and reliably reduce the size of all material. Through more than 700 installations worldwide and continued focus on R&D, Metso Recycling is one of the world's leading suppliers of shredders for the recycling and waste industry. Our position also stems from our customer focus. We endeavor to supply you and your business with the best shredder solution; we always do our best to understand your current situation, and your future needs.

Our customers include companies that work with incineration, hazardous waste, waste-to-energy, recycling, landfills, cement production and RDF.

We use components from internationally recognized suppliers, to ensure maximum performance and durability.

What now?

If you are interested in our shredder series you can read more about it on www.metso.com/recycling.

For more information, contact your local Metso Recycling representative, or contact your dealer directly.

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We reserve the right to make changes and improvements without notice.