Scrap Processing

DEDICATED TO PERFORMANCE

SICON
SICON – Exceptionally flexible!
Extremely adaptable!
360°-view!

As a dynamic company we are proud to be pioneers in the field of innovative recycling solutions.

Today SICON has the ability to change the scrap processing and metal separation business. Our mission is to build the most reliable and efficient systems for the recycling industry, contributing to our partners’ economic success without compromising ecological factors. Our strategy is defined by the drive to develop processes that allow complete resource recovery from scrap. SICON harmonizes economic features with ecological aspects.

SICON’s core competence is the innovative processing of scrap and shredder residues; additionally we have successfully adopted our competence to density-based separation of plastics. All SICON systems have been designed, built and operated in our own pilot plant undergoing extensive testing for efficiency, wear and tear.

As a result, we supply what our customers really need, independent from any specific product range. Our range of services is not limited to machinery, but further includes addition of new equipment into existing processes or facilities as well as consultation throughout each step of a project-planning, commissioning and service. We know the materials, we know how it is to operate a recycling facility, we understand your business and are continuously monitoring related market dependencies.

At SICON we strive to deliver better solutions, utilizing the best minds, and implementing superior processes making us the undefeated Processing Experts.
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The basis for a more efficient shredder process

Processing shredder feedstock with the aid of EcoRip always makes good sense both technically and economically. The SICON EcoRip Pre-Shredder is characterized by a high output at defined particle sizes and is also especially easy to maintain. That makes the EcoRip the benchmark in terms of technology and efficiency when it comes to processing shredder feedstock. The EcoRip is ideal both for pre-shredding mixed scrap with optional integrated screening step as alternative to a guillotine shear as well as for pre-shredding shredder input material prior to loading onto a shredder infeed conveyor. The SICON EcoRip can also be flexibly used as an effective standalone solution or can be subsequently added to an existing system at any time.

Its key advantages include an improvement in the performance of the main shredder by up to 30 % with increased reliability (reduced wear and tear and decrease in emissions) as well as lower energy costs with improved quality of scrap (higher density). An ideal implementation calls for the control system of the main shredder to be adapted by an expert from SICON. The advantages posed by the SICON EcoRip are reflected in the considerable improvement in the operational efficiency of the shredder line. EcoRip will make your shredder process considerably more competitive.
Advantages at a glance

EcoRip as upstream addition to a shredder line for the pre-shredding of shredder input material

- Pre-shredding of bales, auto bodies, mixed scrap – use of bales is thus also possible in smaller shredders
- Separation of inert fines with the aid of integrated screens upstream of the main shredder
- Increase in performance of main shredder (by up to 30 %) with corresponding adaptation of electronic control system of the main shredder
- Significant decrease in wear and tear of main shredder
- Prevention of explosions occurring in the main shredder, thus decrease in emissions
- The combination of EcoRip and main shredder enables SICON’s dry AirTuning® exhaust purification process. Fully automatic operation of entire shredding system possible
- Segmented rotor for simplified maintenance
- Power-controlled hydraulic pumps reduce the speed at high torque
- Protection against risk materials, standstill and damage caused by non-shredable parts are avoided

Input Material

<table>
<thead>
<tr>
<th>Variation</th>
<th>EcoRip 200</th>
<th>EcoRip 250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed width [mm]</td>
<td>2,000</td>
<td>2,500</td>
</tr>
<tr>
<td>Input power</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top rotor (slow moving) [kW]</td>
<td>90</td>
<td>200</td>
</tr>
<tr>
<td>Bottom rotor (fast moving) [kW]</td>
<td>250</td>
<td>2 x 250</td>
</tr>
<tr>
<td>Flipper [kW]</td>
<td>22,00</td>
<td>22,00</td>
</tr>
<tr>
<td>Speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top rotor (adjustable) [min–1]</td>
<td>3-6</td>
<td>3-6</td>
</tr>
<tr>
<td>Bottom rotor (adjustable) [min-1]</td>
<td>14-18</td>
<td>14-18</td>
</tr>
<tr>
<td>Hydraulic drive</td>
<td>Bonfiglioli</td>
<td>Bonfiglioli</td>
</tr>
<tr>
<td>Output [t/h]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed scrap, ELVs</td>
<td>Up to 50</td>
<td>Up to 100</td>
</tr>
<tr>
<td>Bale density &lt; 0.8 t/m³</td>
<td>Up to 40</td>
<td>Up to 90</td>
</tr>
<tr>
<td>Bale density &lt; 1.0 t/m³</td>
<td>Up to 30</td>
<td>Up to 80</td>
</tr>
</tbody>
</table>
EcoShred® Compact

Shredding made simple

For many years, large-capacity shredding installations were reserved primarily to a small group of financially larger scrap processors. The advent of the EcoShred® Compact made shredder technology also available to small to medium-sized scrap processors and automobile recyclers. With EcoShred® Compact, SICON relies on state-of-the-art shredder technology integrated in a modular and economically viable system. Both the technical characteristics and the low necessary infrastructure costs are impressive.

The EcoShred® Compact is equipped with an integrated pre-shredder, which is implemented as a twin-shaft shredder system with flipper. The combination of pre-shredder and main shredder entails significant advantages.

### Advantages of an integrated pre-shredder

- Scrap is comminuted in the pre-shredder and then optimally compacted in the main shredder.
- The risk of explosions is decreased significantly
- Unshreddables do not enter the shredder, which results in an improved operational reliability
- Prevention of any peak loads in the main shredder (uniform power consumption)
- Bales can also be processed with a driving power of 1,000 kW

Shredding was never easier

EcoShred® Compact, that is innovation in combination. With a system based on finely tuned components, SICON focuses on better performance and energy efficiency. Pre-shredder and shredder combined in one system results in a significant reduction of the specific energy consumption per ton of shredded scrap. The finely tuned shredding stages lead to a fully automatic operation. That means, the system can be monitored by a single crane operator. It is no longer necessary to install a separate operation container. The entire concept is designed with extraordinary ease of operation and maintenance in mind. In addition to that, the EcoShred® Compact offers many features that make working on and with the shredder more economic and safe than with all other machines available nowadays on the market.
Especially versatile

The EcoShred® Compact process results in a high and consistent scrap density and thus a correspondingly good material preparation – with clear advantages for the recovery of non-ferrous metals. EcoShred® Compact forms the basis for the efficient operation of a shredder system.

Advantages at a glance

- Shredder with integrated EcoRip pre-shredder in a system
- High scrap density and very good material preparation by means of full box shredding
- Prevention of explosions through material preparation upstream of main shredder
- Heavy components are already identified and separated in the pre-shredder – that protects the rotor elements in the main shredder from any damage.
- Prevention of peak loads with optimum energy management system
- Fully automatic operation reduces personnel costs
- Significantly higher output by means of an intelligent system combination as conventional shredder with the same driving power
- Easy but safe access for changing wear parts with maximum operator safety
- Significant decrease in investment with regard to power supply (low voltage 400 V / 460 V instead of high voltage 6/11 kV)
- Quick and easy installation as a result of reduced requirements on infrastructure (for instance, a simple foundation slab is sufficient and no separate operations building is required)
- Motor Redundancy: No stop of operation in case one motor break

Input material
- end-of-life vehicles
- motor/engine scrap
- mixed scrap
- scrap bales

Output material
- Shredded scrap
ScrapTuning® (Ferrous Downstream)

The solution for better quality of Shredded Scrap

Every steelmaker and shredder operator is interested in generating a low-copper shredded scrap on a reliable quality basis at no additional costs. With ScrapTuning® SICON has developed a system that meets this requirement. The innovative combination of ideal separation of long elements, an optimized air sifting and meatball separation leads to a cleaner shredded scrap. SICON AirSort® separation system reliably separates debris and exposed copper strands/cables. Copper-rich fractions are separated from low-copper shredded scrap with the aid of a ballistic meatball separator. For instance, only 25% of the otherwise usual quantity of material are supplied to a manual sorting process. The integration of a SICON XT-Sorter completely eliminates the need for manual sorting.

SICON ScrapTuning® can also be integrated in existing systems. An offline installation is also possible and is very interesting for steel mills when it comes to improving the quality of shredded scrap. The SICON team provides individual advice and adapts the system to the specific local conditions.

SICON considers both disadvantages unacceptable in times of intense competition and cost pressure. SICON offering Shredder operators an efficient alternative in every respect: the permanent magnet SICON MagSpin. The permanent magnets for the Ferrous Downstream are available in widths of up to 2,200 mm and a diameter of up to 1,600 mm, suitable for every shredder size.

High recovery of NF metals

SICON ScrapTuning® not only has a positive effect on the quality of the shredded scrap, but increases at the same time the recovery of non-ferrous metals. The fact that significantly less copper is lost in the shredded scrap means that there are more non-ferrous metals available for the non-ferrous downstream. The additional amount of non-ferrous metals recovered pays for the ScrapTuning® process within a short period of time, in many cases within just a few months.

Contact our specialists to obtain further information. They would be happy to prepare a business case for you!

The separated copper meatballs can be prepared using by the SICON meatball process (EcoShred® Vertec) and separated into copper and ferrous metals.
Clean exhaust air – less emissions

Shredder emissions are a ubiquitous challenge for all shredder lines. Many shredding plants hardly comply with regulatory requirements or have to restrict the range of scrap they accept because they fail to meet them. That fact fundamentally contradicts the principle of a shredding plant which is designed and made for processing mixed scrap and composite materials. Many plant operators whose facilities are operated without any exhaust air treatment, are faced with the challenge of how to integrate exhaust air treatment into existing plants and still earn a profit.

The patented AirTuning® process from SICON embodies a modular dry shredder dust removal system that meets all common requirements placed on dust, VOC and dioxin emissions. The combination with EcoRip, the new SICON pre-shredder, and the systematic and controlled injection of water in the rotor chamber of the main shredder makes a scrubber unnecessary. Efficient cyclone separation with integrated explosion protection and downstream dry filter generates a constant low flow of emissions at unmatched low costs. Adjustments can be made to satisfy specific local regulatory requirements.

SICON also delivers conventional dust removal systems with cyclone separator and scrubber. Even this SICON technology stands out from competing systems due to its distinctly better scrubbing water filtration which, in addition to improving operational safety, also improves the efficiency of the scrubber. In turn, emissions are reduced compared to standard system concepts.

Advantages at a glance

- Lower wear rate in the shredder and in the dust removal system thanks to the integrated screening of inert fraction in the EcoRip pre-shredder
- Considerable reduction in risk of explosion
- Reduced operating costs by eliminating need for scrubbers
- Reliable reduction of VOCs and PCBs as required by the regulatory authorities in coordination with the customer
- Modular system designed for later expansion to further reduce emissions – AirTuning® is a safe investment for the future
The EcoShred® Vertec is used in many applications. For example for processing pre-shredded metal scrap from twin shaft shredding systems. These machines aggressively reduce the size and densify pre-shredded material whilst liberating the various different fractions and allowing for better downstream separation. For applications like processing of meatballs or electric motors the rotor is designed to achieving a maximum of liberation.

The breakers in the upper part of the chamber smash the material until it is small enough to enter the gap between the milling rings or hammers (depending on the application) and chamber liners. Three stages of liberation and compacting create a product which is both clean and of high bulk density suitable for further separation or recycling. By adjustment of the rotor speed as well as the gap between the stator lines and hammers the machine is precisely adjusted to the customer’s needs.
Typical applications include

- Aluminium – Castings, Profiles, UBC's etc.
- Steelscrap – Pre-shredded steel sheets, metal drums etc.
- Meatballs
- Electric Motors
- Household Appliances
- Generation of nuggets/ Coolant Scrap

Standard Features

- Strong welded construction from heavy gauge, wear resistance steel plate.
- Integral, annealed and CNC bored two piece chamber for quick access and simplified maintenance.
- Durable, wear resistant, replaceable breakers, milling rings and chamber liners
- Oversized, spherical rotor bearings with advanced seal protection – prevents bearing damage due to product migration
- Adjustable product size control
- Replaceable wear plates in the chamber
- Stand Alone Electrical Control Panel
- Tested, Approved and Certified to the applicable CE, UL, ULC safety standards
- Frequency controlled drive optional
- Adjustable gap between liners and hammers optional

Advantages at a glance

- Vertical shredder with throughputs of up to 1–15 tph
- Individually adaptable to realizable requirements including feed, exhaust handling and downstream systems
- Complete preparation of metal composites (meatballs and electric motors)
- Complete recovery of properly separated copper and ferrous scrap
- Quick ROI due to low investment, obtainable high product quality and easy marketing of the products
- Sturdy welded construction - All parts of the machine that come in contact with scrap are equipped with wear-resistant liners.
- Simple to maintain thanks to the fact that wear tools are very easy to access and replace
- Generously dimensioned rotor ball bearings for long plant life
- Plants and systems can be designed to customer requirements
- Fully automatic operation
- Implementation to customer specifications also possible, including scrap feeding and separation of materials
Input material

- Electric motors
- Meatballs
- Mixed scrap
- Metal sheets

Output material

- NF (Copper, Alu)
- NF (Copper, Alu)
- Shredded scrap
- Coolant scrap
- FE
- FE
With the modular SICON solutions for metal processing, the EcoShred® Vertec is the ideal addition for the scrap processing sector. One example is the processing of electrical and electronic scrap: after gentle pre-crushing by the rotor shears and separation of contaminated components, further more careful processing takes place in the EcoShred® Vertec for subsequent plastic and metal separation.

The EcoShred® Vertec and modular downstream options offered by SICON now present the scrap and metal industry with a uniquely flexible processing solution.
HMS Cleaning

Clean scrap for improved meltshop efficiency

Purposely improving the quality of steel scrap is for SICON the driving force behind the heavy metal scrap (HMS) preparation process. HMS is cleaned intensively and any non-ferrous metals that are still present are separated. The result is a scrap quality with a considerably higher ferrous content and reduced non-ferrous parts (specifically copper and aluminium).

A highly efficient and reliable scrap screening process with integrated metal recovery step that was specifically developed for this application enables a significant improvement in quality while delivering additional scope of metal recovery at the same time. The innovative combination of efficient SICON screening and magnetic separation produces optimum results.

SICON’s HMS concept is built on a modular design and as a result can be implemented gradually. The SICON NF separation unit that was specifically developed for this application can also be integrated in the HMS processing step for refining separated non-ferrous metals and screened fraction (fines). Of course, these solutions can also be implemented separately and offline.

Advantages at a glance

<table>
<thead>
<tr>
<th>Operative advantages</th>
<th>Metallurgical advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficient cleaning (screening and magnetic separation) of cut scrap (HMS)</td>
<td>Higher metallurgical yields in the melting process due to higher ferrous content in the scrap with lower slag output</td>
</tr>
<tr>
<td>Most efficient system for the separation of (magnetic and non-magnetic) fines</td>
<td>Reduced quality risk due to integrated separation of non-ferrous metals (primarily copper separation)</td>
</tr>
<tr>
<td>Additional proceeds from separated non-ferrous metals</td>
<td>Decrease in the required specific smelting energy</td>
</tr>
<tr>
<td>Reliable technology for high throughputs</td>
<td></td>
</tr>
<tr>
<td>Delivery to customer specifications, including structural steel and infeed belt</td>
<td></td>
</tr>
<tr>
<td>Quick return on investment (ROI)</td>
<td></td>
</tr>
</tbody>
</table>
Service Value

Scheduled Maintenance & Service ensure that all equipment remains in excellent condition and avoid unscheduled down-time. SICON Offers customized maintenance & service solutions, including consultation, trouble-shooting, rotor repairs & Rebuilds as well as service jobs with spare parts delivery and emergency support.

With twenty years of experience, SICON offers operators complete service solutions out of one hand to ensure processing operations without any surprises!
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Extremely adaptable!
360°-view!