

TRANSFORM

NEWSLETTER
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PRODUCT NEWS

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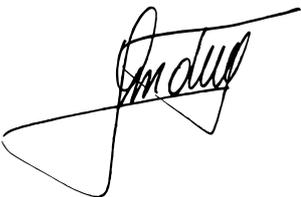
MASTERING CHALLENGES TOGETHER.

The first half of 2020 was certainly unique. Out of the blue we had a pandemic sweeping across the globe and in the blink of an eye half the planet ceased to operate. Even now the global figures are still anything but reassuring and the economic implications are causing headaches in many places.

Nevertheless, we are convinced that together we will master this challenge. Although there will be some changes – in our industry, too – that isn't necessarily a bad thing. History teaches us that the greatest progress has always come in the wake of severe crises. The lessons that we have already learned and that we still continue to learn shall bring a paradigm shift in many areas and tremendous opportunities for the future.

It is evident that modern technologies, connected working and digital solutions in particular are becoming ever more important. As a result, the efficiency of production facilities and services will increase enormously. And there is a return to traditional values such as economic stability and honest and reliable business partners.

Especially now during Covid-19, it has become clear that thanks to our long-standing partnerships, motivated team and the successes of recent years we are able to face the future with confidence.



DI Manuel Lindner
CEO



Mag. Michael Lackner
Managing Director

SAFELY OVERCOMING THE CRISIS THANKS TO THE SUCCESSES OF RECENT YEARS

The situation at the beginning of the Corona crisis suggested a standstill in many places. But that didn't stop the annual financial reports for the year 2019 from being published in spring. Among them was that of the Austrian specialist for waste processing solutions and shredding technology Lindner Recyclingtech. The figures speak for themselves and leave no doubt that the company will overcome the crisis in a positive light.

Standing in front of Lindner headquarters during the outbreak of the pandemic, it quickly became clear that things were different and still are nowadays. Like everywhere else, information on hygiene regulations and safety measures is displayed next to the omnipresent disinfectant dispenser. Also, due to teams being divided into several locations or working from home, it was quieter in the office building than normal. However, if you listened closely, you noticed quickly that work on the production floors was still in full swing.

The group of companies around Lindner Recyclingtech markedly exceeded revenues of €100 million last year and was able to start 2020 with full order books. In April the annual financial report for the past year was finalised which allows CFO Hans Sagerschnig to

look confidently at the current situation: 'In recent years, it has become apparent that the demand for our innovative and sturdy technology is increasing. Since 2016, sales have risen by roundly 70%. Needless to say, we are very pleased about this development. But what is much more important in view of the Covid-19 crisis is our strong equity ratio of more than 65%. That makes us a stable and reliable partner for our clients even in challenging times. Thanks to our entire team's good performance and camaraderie, we are certain to successfully overcome the crisis and continue to be a dependable employer in the future.' Tying in with the financial report, the current Creditreform rating was also published. Here too, the Lindner Group was given the top rating, proving that the company stands on a firm footing. ■



Hans
Sagerschnig

LINZ AG HAVE ONCE AGAIN PUT THEIR FAITH IN LINDNER'S MIURA 1500 – THIS TIME WITH A TRACKED CHASSIS

Lindner Sales Manager Clemens Jäger (1st from left) with the Linz AG team around Operations Manager Franz Grottenthaler (5th from left) at the commissioning of the new Miura 1500 DK mobile shredder



LINZ AG HAVE ONCE AGAIN PUT THEIR FAITH IN LINDNER'S MIURA 1500 – THIS TIME WITH A TRACKED CHASSIS

In as early as 2017, LINZ AG was one of the first clients to start up the then brand-new Lindner Miura 1500 at the waste treatment facility in Linz's Gaisbergerstrasse. The Miura's high performance and quality was so impressive, it soon led to another order for a mobile primary shredder. Now, once again, LINZ AG opted for Lindner Recyclingtech and the Miura 1500 shredder – this time the recently launched DK version with crawler tracks.

With over 3,000 people working for the Austrian company, LINZ AG is one of the largest multi-utility providers in this industrial region along the River Danube. LINZ AG's tasks include the supply of energy and drinking water, the provision of telecommunications solutions, public transport and the management of wastewater and waste. The company has been relying on Lindner's equipment for its waste management since 2010. What began with several of Lindner's secondary shredders from the Komet series has now grown into a complete set with mobile primary shredders from the Miura series. In the end, the deciding factor was the machines' high flexibility.

Thanks to Lindner's FX fast exchange system, the cutting unit can be changed on site in a minimum amount of time and adapted to suit different shredding needs – from special shafts for shredding waste wood to obtain standardised particle sizes for energy recovery to particularly robust tools for mixed construction waste. Ing. Franz Grottenthaler, Operations

Manager adds: 'As a regional waste management company in an industrial region, we have to process a wide variety of materials. In addition to MSW and bulky waste, we also process a great deal of C&I waste. With the Miura shredder the great advantage is that we can react very quickly to the most varied input materials of different grades. As we often have to process tough materials with non-shred-dables, robustness is, of course, also crucial. That's where the Miura shredder truly outshone the competition. For our latest purchase we decided on the new crawler-tracked version. This gives us the additional advantage that we can manoeuvre the machine comfortably without having to have additional equipment on site.'

In addition to the new version with a tracked chassis and Lindner's typical sturdiness, the latest Miura 1500 sports powerful and economical Scania Euro-5 engines and highly efficient hydraulic components to ensure one thing above all else: maximum productivity in mobile twin-shaft shredding. ■



LINZ AG, which provides energy, telecommunications, transport and municipal services, is a management holding with three operative subsidiaries. The LINZ AG subsidiary, LINZ SERVICE GmbH is responsible for the waste management of the provincial capital and the 63 surrounding municipalities and offers services such as water supply and wastewater management. The business area WASTE includes different facilities such as the waste-to-energy plant, which makes it possible to independently treat the majority of the region's waste. The portfolio includes services ranging from municipal solid waste to bulky waste collection and container service, all the way up to around 380 waste collection points for paper and board, light and metal packaging as well as glass.

www.linzag.at

THE LINDNER FILM EXAMINER: IMPROVEMENT OF OUTPUT QUALITY IN FILM WASHING SYSTEMS

In recent years Lindner Washtech has evolved into a technological leader in the field of PE film recycling, now with over 50 washing systems installed worldwide. Many new developments such as the patented pre-washing system Rafter have set new standards in the industry and are now an integral part of every Lindner washing system.

The latest in a series of developments for PE film recycling from Lindner Washtech is the Film Examiner. It is placed directly in front of the extrusion phase as a final process to improve the product quality. The device reliably separates small hard contamination particles which are extremely difficult to remove using traditional methods within the washing line due to their specific density and size. These include in particular rigid plastic particles of PP or HDPE, and in addition light aluminium particles and small wood flakes.

The Film Examiner is mounted directly in the air stream after the thermal drying process, utilizing the different flow characteristics between small contamination and the light film flakes in order to achieve reliable separation. The air flow is adjustable by means of sliding gates in order to optimise the separation process. The contamination separated simply falls into the collection bin which can be easily monitored and emptied.

Georg Krenn, technical manager of Lindner Washtech: „Improving output quality is our customer’s focus today. The Film Examiner without doubt provides a compact and inexpensive solution to further improve product quality and reduce operational costs supporting our customer key goals. Retrofitting of existing plants with the Film Examiner is fast, easy and highly cost-effective.“ ■



LINDNER WASHTECH

Lindner Washtech, the worldwide operating subsidiary of Lindner Recyclingtech, is a world-leading manufacturer of industrial washing and sorting systems for film and hard plastics.

More information: www.lindner-washtech.com

NOTHING'S IMPOSSIBLE! IN SPITE OF COVID-19: COMMISSIONING OF SHREDDERS USING MODERN TOOLS

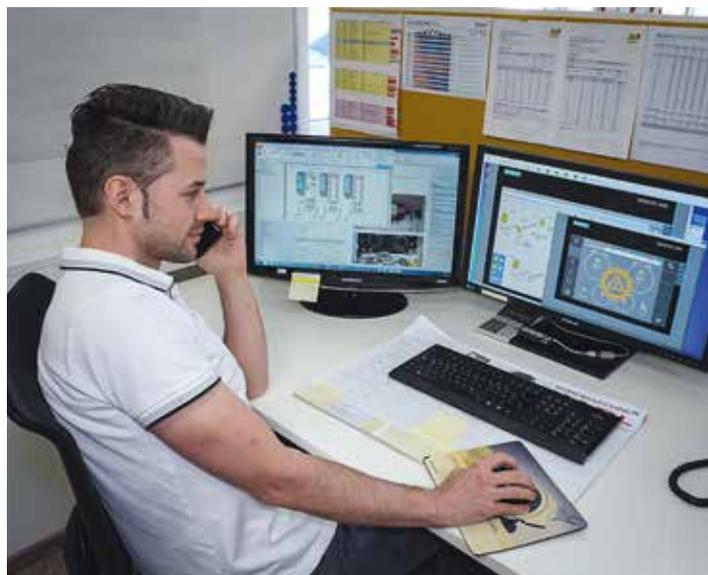
A new shredder to transform waste into alternative fuels had been ordered and delivered, the facility's retrofitting was in full swing – and then came the coronavirus lockdown. That was the problem facing the German waste management company Hündgen in Swisttal-Ollheim. But thanks to state-of-the-art communication software and remote service tools, the new Lindner Micromat 2500 is running smoothly and as scheduled.

Every single minute that delays the commissioning of a new facility comes with a price tag. This well-known truism poses a challenge to many a company even under normal circumstances. What it means in light of a global crisis is something that Christian Hündgen, CEO and Plant Manager of Hündgen Entsorgung GmbH & Co. KG, knows all too well: 'Our new Lindner Micromat 2500 shredder was delivered in March, when the construction of our facility was well under way. When we were told that due to Covid-19 and the associated travel restrictions, no Lindner service technicians could start up the machine on-site, we were already

expecting delays. We were faced with an enormous problem, since there's material we need to be processing and we're bound by contract to do so.' To overcome this seemingly impossible situation, Lindner opted for an unorthodox but smart solution. The Lindner Service Centre helped with video analysis and online support to install the machine on-site. Account Manager Manfred Eßmann: 'One of the fundamental values at Lindner is to be a reliable and trustworthy partner. Right now we are doing everything we can to support our customers with all available means and keep to agreements that have been made. Thanks to modern technology,

our service team can do a great many things remotely and give instructions via video call for commissioning equipment on-site. It works amazingly well. I am sure that this installation method will be used even after the crisis is over.'

The Micromat shredder has now been up and running for 200 operating hours without any issues. And the facility is in full operation. Christian Hündgen is also relieved: 'Despite all the adversities, the scheduled construction time was maintained and production is on time. We would like to thank Manfred Eßmann and the Lindner Recyclingtech team for their exemplary commitment to our project.' ■



With the assistance of the Lindner Service Centre via video analysis and online support, the shredder Micromat 2500 was installed on-site at Hündgen Entsorgung GmbH & Co. KG

ACTIVE PREVENTION OF FIRES CAUSED BY DAMAGED BATTERIES DURING ALTERNATIVE FUEL PRODUCTION THANKS TO LINDNER'S FIRE PREVENTION SYSTEM (FPS)



Lindner's Fire Prevention System (FPS) sensor instantly detects overheated particles after the first shredding unit

ACTIVE PREVENTION OF FIRES CAUSED BY DAMAGED BATTERIES DURING ALTERNATIVE FUEL PRODUCTION THANKS TO LINDNER'S FIRE PREVENTION SYSTEM (FPS)

One of the most pressing recent issues in the mechanical processing and conversion of waste into solid recovered fuels (SRF) is the high fire risk. This is largely due to a constantly increasing number of lithium batteries in the general waste collection. If damaged, a chemical reaction is often initiated, which leads to incredibly high temperatures. This may cause severe damage to facilities and plants and, in the worst case, start a major fire. To minimise such fire hazards, Lindner's FPS (Fire Prevention System) detects overheated particles in the material stream, cools them to a safe temperature and makes sure that objects that cannot be cooled can be safely removed by hand.

Whether smartphones, cars or toothbrushes – in today's digitalised, mobile society it's hard to imagine life without batteries. Billions of them are used for countless applications. According to the Austrian Chamber of Commerce's information website 'lithium-info.at' (Austrian Chamber of Commerce, 2019), about 4,700 metric tons of rechargeable batteries are sold annually in the Alpine Republic, 40% of which are lithium batteries. Only about 45% of all batteries are disposed of correctly and, according to the University of Leoben, an estimated 1.4 million of them end up in the general waste collection every year (VOEB, 2019). The University also estimates that this figure will double in the medium term to 2.8 million (VOEB, 2019). Consequently, the risk of fire increases exponentially during mechanical processing, when converting waste into alternative fuels. Due to the technology used, lithium batteries, along with other highly flammable materials such as tar-soaked textile waste, have therefore become one of the most common hazards for serious fires.

PROBLEMS CAUSED BY MECHANICAL BATTERY DAMAGE

Just like any other energy storage cell, lithium-ion batteries (LIBs) consist of an anode and a cathode, separated by a Li-ion permeable membrane and a non-conductive electrolyte. Energy is released when the ions flow between the two electrodes or

is stored in the anode when over-voltage is applied. Compared to other technologies, lithium-ion batteries have one of the highest energy densities thanks to the very high working voltage that can be generated between the anode and cathode. Ultimately, this is the problem when the battery is mechanically damaged and short circuits. If mechanical processing ►



Batteries damaged during mechanical processing, when converting waste into SRF, pose an enormous fire hazard

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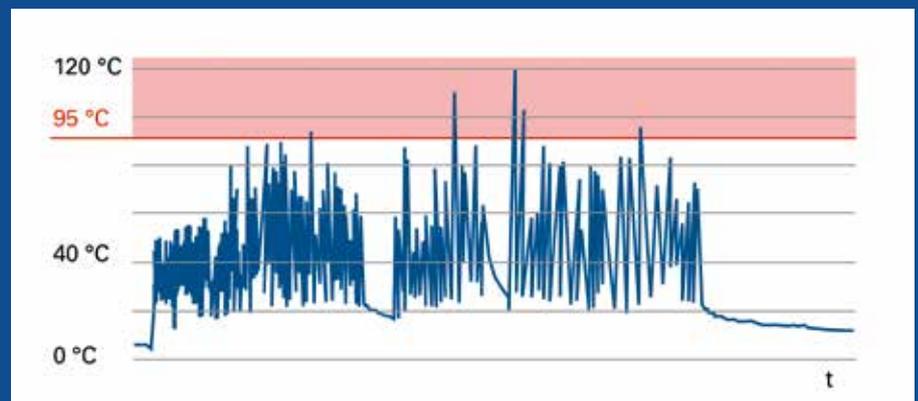
bends or severs the cell this could destroy the separator, producing a short circuit. This causes the voltage between the poles to drop to zero, releasing the stored energy as heat at different points. Even with apparently run-down, used batteries, the remaining energy is so high that temperatures of over 600 C may occur. Under certain circumstances this leads to an unstoppable chain reaction: the thermal runaway. The temperature spikes cause neighbouring cells in the battery to overheat and within milliseconds, to release their stored energy. This results in a fire or explosion that is almost impossible to extinguish. In this context it's particularly problematic that the thermal runaway is delayed and cannot take place immediately after the mechanical damage. In SRF production this means a higher risk of fire throughout processing. The worst-case scenario is for the damaged battery to end up in the fuel storage bunker, where it could cause a devastating fire. Even if the battery burns by itself and doesn't cause an explosion, the resulting temperatures are an enormous problem due to the fuel's ignition point of 319 – 460 C (Lorber, 2010).

LINDNER'S FIRE PREVENTION SYSTEM (FPS) ACTIVELY PREVENTS FIRES

The continuous, process-related monitoring of surface temperature at several relevant points has proven to be highly successful in combatting potential fire hazards and actively improving safety in facilities that produce

solid recovered fuels (SRF). Lindner's Fire Prevention System (FPS) therefore sports optical sensors that constantly monitor the temperature on the conveyor belts and trigger a water sprinkling system to cool over-

heated particles in the material stream automatically. Thanks to the very early detection of these particles, most hazards are identified at the start of a thermal reaction keeping the required amount of water low. ▶



Typical temperature curve of an SRF production facility



Cooling after the first sensor was triggered

ACTIVE PREVENTION OF FIRES CAUSED BY DAMAGED BATTERIES DURING ALTERNATIVE FUEL PRODUCTION THANKS TO LINDNER'S FIRE PREVENTION SYSTEM (FPS)

Furthermore each unit has its own control sensor detecting objects that cannot be cooled, such as lithium-ion batteries where the thermal runaway has already been initiated. This triggers an alarm, stopping the conveyor belt under an active cooling nozzle so the hazard can be manually removed. Depending on the application the threshold value can be chosen freely. To counteract even a delayed reaction of the energy cells, it's possible to install as many sensor pairs as needed depending on the size of the facility. Lindner's FPS is designed as a space-saving plug&go solution to facilitate the integration of the system in existing facilities. Its heated box version also makes it perfect for cold environments.

BEST PRACTICE EXAMPLE – MAYER RECYCLING GMBH

One of the first companies to try out this innovative solution was Mayer Recycling GmbH in Upper Styria, Austria. The data collected since mid-2019 clearly demonstrates the benefits of this sophisticated technology. Figure 2 shows the temperature on the conveyor belt during typical SRF production. On average, over 350 overheated particles in the material stream are detected per month. Of these, approximately 10% were still too hot for further processing, triggered the alarm and were manually removed. Of the removed materials, around 70% were batteries that were already undergoing a chemical reaction. The remaining system triggers were colorable materials such as metal particles that got too hot after shredding. To summarise, the data collected clearly shows that Lindner's FPS substantially reduces the fire risk in SRF production facilities. ■

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