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Trends in today's recycled plastic products

by MAURA KELLER

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From flexible plastic packaging to sportswear to landscaping products, the use of recycled plastics in new and innovative products is on the rise, providing a significant growth opportunity within the recycling industry.

According to Raegan Kelly, head of product and sustainability, and founding member of Better for All, we consume around 40 percent of all plastic as packaging, and a large majority of packaging is discarded within a year. Because packaging is often lightweight, soiled after use, and made of a mix of materials, only approximately nine percent of all plastic is recycled each year – the rest is incinerated, landfilled or escapes into the environment.

“To address these issues specifically, bioplastics designed to compost at end of life entered the market in the early 2000s in the form of polylactic acid (PLA), which is a relatively stable compostable material made from plant starches,” Kelly said. “PLA is commercially compostable, meaning it will be consumed by microorganisms that live in the soil.”

As Kelly pointed out, just in the last decade, state-of-the-art sustainability in plastics has moved from recyclable petroleum plastics to plant sugar-based commercially compostable PLAs to fermented PHAs, and from lab-scale material production to material available at industrial scale.

“Bio-based products have different performance parameters and processing requirements than petroleum products, and lack the substantial subsidies and lobbying infrastructure in place for petroleum plastics,” Kelly said.

PFAs, or Per and Polyfluoroalkyl substances are a case in point. Banned under one name – Teflon – in 2013, PFA manufacturers slightly modified their formula and flooded the market with nonstick additives and coatings under new names.

Plant fiber containers and paperware are sometimes lined with petroleum plastic to prevent leakage. When bio-based container brands and their customers requested plastic-free containers that didn't discolor with food oils or absorb liquid, manufacturers reached for PFAs.

“Today's consumers, especially Gen Z, demand more than incremental product improvements when it comes to issues like single-use plastics,” Kelly said. “As a generation coming of age in the midst of a global pandemic and climate crisis, Gen Z has emerged as a demographic that is deeply committed to principles such as sustainability and social responsibility. These digital natives are the most sophisticated and critical generation of consumers to date.”

So, what about PVC plastics



Industrially compostable plastic products are designed to biodegrade under specific, controlled conditions in industrial composting plants.

recycling? LeeAnn Chen, global product director at Orbia Polymer Solutions (Alphagary) said industry reporting shows that overall use of recycled PVC plastics has grown steadily over the years. In fact, according to the Baker Institute, there was a 40 percent increase in vinyl recycling from 2014 through 2020.

“While manufacturers of industrial products have traditionally looked for cost savings by using recycled content, we are seeing increased interest from global organizations looking for end uses or recycled content in products such as flooring, roofing, multi-layer piping, and electrical cables,” Chen said. “The addition of recycled content will enable them to generate added value in meeting their ESG goals.”

In her role, Chen sees environmental awareness, government policies, voluntary industry participation, and ESG-focused governance as some of the key driving forces towards the increased use of recycled materials. In addition, she's also noticed that consumer demand has been driving more eco-friendly options (for example, in consumer products like footwear and home products).

Recycled Plastics in Packaging

Alison Keane, president & chief executive officer of the Flexible Packaging Association, said flexible plastics are being mechanically recycled through programs such as Material Recovery for

the Future, Bag2Bag, and Hefty ReNew.

Film and flexibles from these projects are made back into bags (Bag2Bag); roof cover board (MRFF); and plastic lumber (Hefty ReNew), for example. As Keane explained, even 10 years ago, this would not have been the case.

“Added to these programs is the drop-off program for clean and dry films, which you can drop off at store bins. This is then combined with clean film from the back of the store (pallet wrap and shipping stretch film), which also is made into other durable goods like plastic decking and concrete block,” Keane said. Chemical recycling is taking film and flexibles to the next level. Since we are particularly significant in food, health and medical packaging, incorporating post-consumer recycled content (PCR) back into our packaging is more complex. However, processes like pyrolysis and gasification can bring post-consumer plastic back to its raw state and made back into plastic resins that are identical to virgin resins. ExxonMobile, Dow, and the Consortium for Waste Circularity all have processes to bring more PCR to the film and flexibles industry. In the next 10 years, this will be the new reality.”

For flexibles, Keane said end markets still need to be identified and scaled. She pointed out that if brand owners are going to meet their goals and statutory

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Trends in today's recycled plastic

■Continued from Page A1

mandates, we are going to need a lot more PCR and we are going to need highly engineered film and flexibles that are food and medical-grade compliant.

“The lowest hanging fruit, the ridged plastics, already have collection, sortation, and end-markets after processing. This is not true for flexibles; investment not only in scaling the technology, but the collection and sortation infrastructure is needed to bring recycling to fruition,” Keane said. Given that flexibles are second only to corrugated cardboard in the U.S. and much of that has a “plastic component, recyclers should see this as an opportunity and work with the supply chain to ensure they are part of that investment. Others looking to enter the market should see flexible plastics as the ultimate goal.”

One of the biggest challenges facing the recycling of flexible plastics packaging resides in consumer perception. According to Keane, traditionally, recycled content products have been seen as lower grade. In fact, it usually takes more funding and resources to make these products, but they are marketed as such. In addition, they generally have significant environmental benefits – from reducing virgin material use to less waste going to landfills, however, they are usually not marketed as such.

“Use of advanced recycling technologies, such as pyrolysis and gasification will change this,” Keane said. “A consumer will not be able to tell the difference between recycled content packaging and virgin material use. Color, clarity, feel, and shelf-impact of packaging will be the same and consistent from product to product, which will make consumer acceptance much easier.”

Plastic Recycling Trends to Watch

Many brands and institutions are tackling the issue of single-use plastics. Companies like Better for All, Sun and Swell, VEJA, Kaneka BioPolymers, and Blueland (an eco-friendly kitchen cleaning tablet from which customers dissolve in water to avoid single-use cleaning products) aim to change the game for single-use plastics.

Kelly said that by addressing Gen Z's environmental concerns, businesses, and governments are not just driving change, they are inspiring a shift in consumer behavior towards more conscious and responsible choices.

“More than ever, manufacturers such as Orbia Polymer Solutions rely upon consistent high-quality and cost-effective recycled materials,” Chen said. “As the percentage of recycled content in products increases, it is critical that new recycled PVC-containing products look as good and perform as well as the products made with 100 percent virgin material.”

She continued to point out that, in general, consumers are becoming more aware of plastics recycling as they can take part in the recycling lifecycle and feel good about how their dollars have magnified impact on the planet, from choosing the materials they buy to helping dispose of them once used, through recycling.

“Especially when buying big ticket



items for homes, consumers are looking for information on the composition of what they're buying and how it helps them play their part in a circular economy,” Chen said.

Of course, Kelly explained that there are challenges aplenty surrounding plastics recycling. Namely, bio-based products have different performance parameters and processing requirements than petroleum products, and lack the substantial subsidies and lobbying infrastructure in place for petroleum plastics.

“Today, bioplastics tend to be more expensive than petroleum plastics. Furthermore, we run bio-based materials through machines that have been running petroleum plastics for decades, in factories that use toxic chemicals and additives to increase productivity (and decrease cost),” Kelly said.

Because of this, Kelly stressed that we must radically reduce our use of single-use packaging and find ways to build workable reuse systems, which will require a complete rethinking of the way we deliver and consume food, drink, clothing, home, and personal care products.

“This economy will be circular and foreground a wide variety of bio-based inputs, materials, and technology,” she said.

Based on Orbia's experience thus far, the biggest challenges surrounding new products that use recycled PVC include ensuring parity in quality, performance, consistency, and cost compared to products using 100 percent virgin materials. Additionally, Chen said that the assurance of supply, consistent supply quantities, and infrastructure required to process recycled PVC are also critical for the ramp-up and greater incorporation of recycled materials into new products.

In the realm of PVC plastics recycling, Chen expects the traditional applications that incorporate recycled PVC to continue to grow, such as window profiles, footwear, and other consumer goods. Industries such as fashion and textiles, electronics, furniture, and interior design are increasing the use of recycled plastics.

“As companies find that they can offer quality products with recycled content and that consumer demand is there, we expect to see widespread segment growth,” Chen said. “Regulations, including incentivizing the collection, separation, and recycling of plastics, will play a positive role. And of course, the transition to a circular economy will help promote the use of recycled plastics by prioritizing recycling and reuse.”

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NextCycle Michigan selects recovery projects to promote recycling

The NextCycle Michigan business accelerator has announced 17 teams selected to participate in its next cohort focused on advancing solutions for organic material recovery and innovative technologies for recycling.

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) program offers four accelerator tracks throughout the year, two of which selected teams to receive support over the next six months, and two of which opened their applications process already.

The Recycling Innovation Technology (RIT) track is focused on projects that advance new material recovery technologies, waste minimization techniques, or other advancements in sustainable materials management that source high-quality, local materials before they end up in landfills.

The Food, Liquids, and Organics Waste Systems (FLOWS) track is designed for projects that transform any aspect of organics recovery in Michigan, from food donation to food scrap recovery to new market development for finished compost. NextCycle Michigan chose nine teams (listed below) for the new cohort.

The other two tracks – Intergovernmental Initiatives and Public-Private Partnerships (I2P3) and Recycling Supply Chain (RSC) – are now accepting online applications through March 31.

The newly selected RIT-track teams and their projects are:

- Design Declassified, LLC, of Grand Rapids plans to expand collection of plastic waste from residential and commercial sources to manufacture plastic sheets used for building materials such

as wall panels, partitions, and tiles.

- Fibarcode of Ann Arbor plans to demonstrate and validate fiber barcoding as integrated textile labels to improve end-of-use sorting and recycling of garments.
- Great Lakes Recycling of Oak Park plans to expand capabilities to receive, process, and recycle electric vehicle batteries.
- Liquid Ion Solutions, LLC, of Pittsburgh, Pennsylvania, plans to expand the use of ionic compatibilizers to recycle rigid polypropylene (PP) by identifying recycled PP feedstock and end markets in Michigan.
- Nowhere Collective of Chicago plans to develop a Michigan-focused digital marketplace where makers and consumers can engage and purchase reclaimed materials and upcycled goods.
- PittMoss of Ambridge, Pennsylvania, plans to develop a Michigan facility to use locally sourced recycled paper fibers for manufacturing soilless gardening mixes, soil amendments, and animal bedding.
- Prairie Robotics, Inc., of Buffalo, New York, plans to scale the use of on-truck cameras and artificial intelligence algorithms to identify contaminants and recoverable materials to reduce landfill burden and improve recycling.
- Chippin In of Detroit plans to increase collection of foil-lined products like chip bags and candy bar wrappers to upcycle into sleeping bags for people experiencing homelessness.
- Takeout Takeout of Lansing plans to partner with restaurants and food businesses to rent reusable takeout

containers with strategically placed collection containers, at-home pick up, and swapping containers with delivery drivers.

The new FLOW-track teams and their projects are:

- Bioworks Energy of Grand Blanc plans to connect with generators of food waste streams and marketing partners to develop anaerobic digestion facilities for food waste processing and renewable energy production.
- The City of Detroit and Wood Work Detroit plan to assess feasibility and develop business strategy to collect wood from urban tree removal, standing dead and dying trees, and pruning to be repurposed into furniture, wooden products, and musical instruments.
- Eastside Compost of Lansing plans to scale operations around food scrap collection locations; volume and quality of compost produced; and engagement with communities, businesses, and consumers.
- The Emmet County Department of Public Works and Recycling of Petokey plan to create a comprehensive and scalable business plan for organics operation, focusing on screening and grinding activities, shared equipment contracts, expansion of marketing materials, and development of an operational calendar.
- Hemp 4 Humanity of Three Rivers plans to develop a comprehensive business plan and align with partners to set up infrastructure that will process industrial hemp production waste, agricultural waste, and building deconstruction waste into viable building

materials for developments dedicated to disabled low-income residents.

- New Horizon Property Management of Marshall plans to develop a facility to process yard waste, brush, tree trimmings, and plant waste from local licensed marijuana growing facilities.
- St. James Township on Beaver Island plans to develop organics and food waste collection and processing operations on the island.
- Sanctuary Farms of Detroit plans to expand food waste processing and compost cultivation operations with additional site development.

NextCycle Michigan received a total of 36 applications for the RIT and FLOWS accelerator tracks. Review included vetting for eligibility by RRS, creator and facilitator of NextCycle Michigan, followed by scoring from the Challenge Track Innovation Panel of industry and business leaders, then approval from EGLE representatives.

Selected teams will participate in NextCycle Michigan's six month program that provides individualized business and technical support to move projects toward investment-attractive and implementation-ready status. Programming starts with a two-day workshop-based event, followed by several months of strategic training opportunities and access to expert coaches. There is no fee to apply or participate, and no equity share is required.

The program culminates in a showcase event where participants pitch their projects to a live audience and judging panel with the chance to attract investors, win monetary awards and generate publicity.

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Eldan Recycling A/S and Picvisa partner to revolutionize recycling solutions



Eldan Recycling, a leader in the provision of high quality recycling solutions since 1956, and Picvisa Machine Vision Systems, a front-runner in optical separation technology, have announced a historic partnership. This alliance is set to reshape the landscape of the recycling industry, combining Eldan's vast experience with Picvisa's innovative machine vision technologies.

Eldan Recycling has been a dominant force in the recycling industry, offering a wide array of recycling solutions for various materials such as nonferrous, refrigerators, industrial waste and municipal solid waste. With a robust portfolio that includes the installation of over 1,200 complete systems and 8,100 individual machines worldwide, Eldan has cemented its position as a global powerhouse in recycling equipment offering solutions mainly in the tire, cable, electronic waste and nonferrous areas.



Picvisa, a part of Calaf Grup, brings to the table 20 years of excellence in the design, manufacture and supply of optical separation equipment for material sorting and waste recovery mainly in the glass, plastic packaging and textile sectors. Their recent certification as a Bcorp emphasizes their commitment to sustainability and innovation in all aspects of their operations.

The partnership is a strategic response to the evolving needs of the recycling market. It represents a significant leap forward, allowing Eldan to integrate Picvisa's unique optical sorting technology into its processes. This collaboration will result in the development of new lines of sorting equipment - the MPS and SPS, tailored for efficient sorting in various applications, particularly in WEEE, nonferrous and mixed metal scrap systems.

This move not only solidifies Eldan's position as a comprehensive provider in the recycling industry, but also enhances Picvisa's global reach and influence in markets where Eldan is well established. The introduction of MPS and SPS demonstrates the companies' joint commitment to innovation, offering solutions that are both sustainable and technologically advanced.



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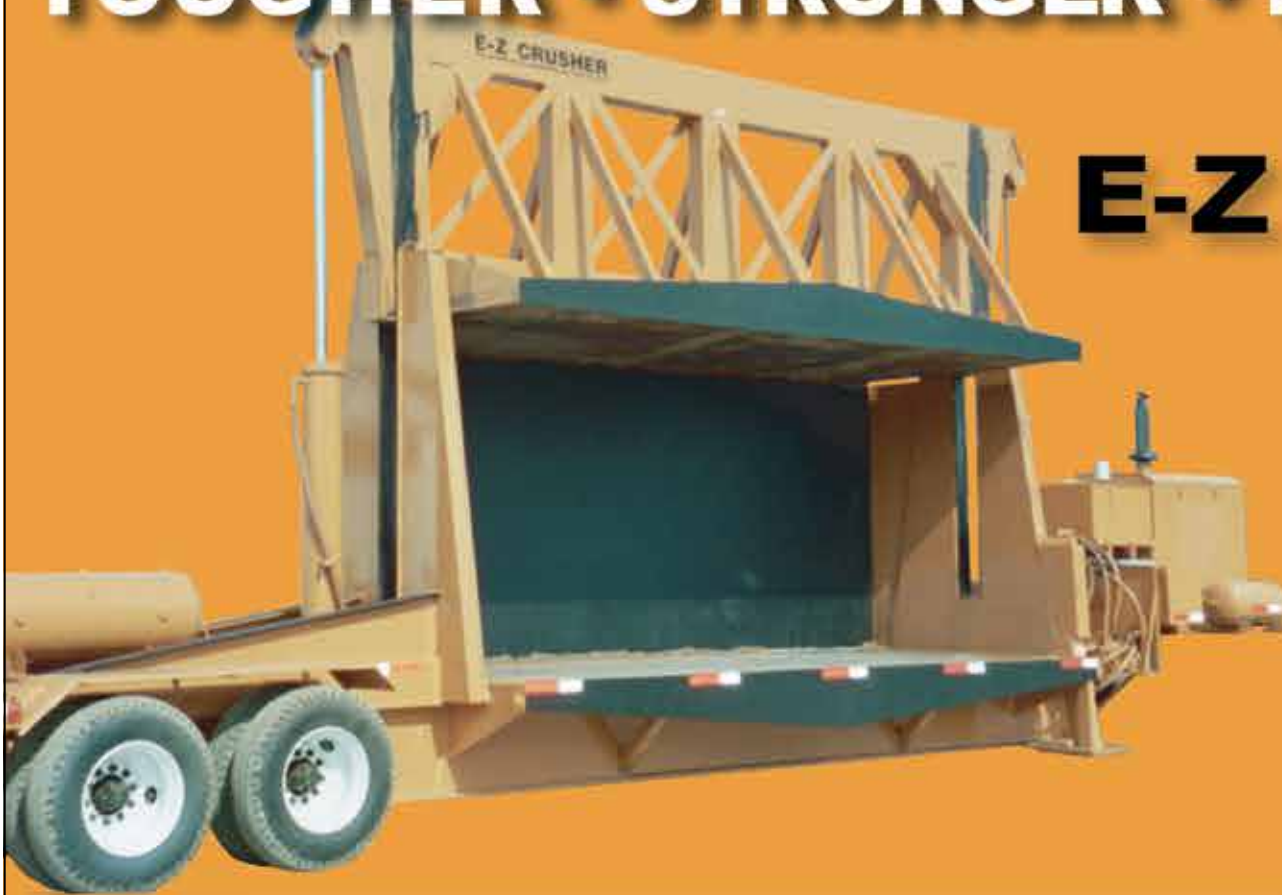
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Republic Services opens recycling center to serve Phoenix and Valley communities



Republic Services and local community leaders celebrate the grand opening of the Salt River Recycling Center.

Republic Services, Inc. celebrated the opening of Republic's state-of-the-art Salt River Recycling Center. The new facility will play a vital role in helping improve recycling rates in the valley with higher capacity and more modern technology than its predecessor.

The 51,000 sq.ft. recycling center, located in the Salt River Pima-Maricopa Indian Community, will manage recyclables from approximately 1.4 million residents and more than 2,000 businesses throughout the Valley. The facility will process up to 40 tons, or 8 truckloads, of recyclables per hour, including paper, cardboard, plastic bottles and jugs, metal food and beverage cans and glass bottles and jars.

"The new Salt River Recycling Center reinforces Republic Services' commitment

to circularity, sustainability and the community," said area president Javara Perrilliat.

The facility leverages cutting-edge recycling technology, including five optical sorters that use digital recognition to identify and separate paper or plastic in milliseconds and artificial intelligence to help reduce contamination. AI system data also enables operators to make real-time adjustments to maximize the volume of materials recycled.

Plastics from the Salt River Recycling Center will be transported to Republic's new Polymer Center in Las Vegas, the first facility of its kind in North America. The Polymer Center's processes will grind, sort and wash the plastics so they can become new bottles, jugs and containers, enabling true bottle-to-bottle circularity.

SWANA approves new container deposit return system policy

In a pivotal stride toward environmental sustainability, both the U.S. and Canada have recently intensified their focus on recycling refund programs, with a keen eye on fostering responsible consumer behavior and minimizing the environmental impact of discarded containers.

The spotlight is now on Container Deposit Return Systems (CDRS), which have emerged as a robust mechanism to incentivize recycling efforts. As federal attention converges on these programs, discussions surrounding potential legislative measures and the expansion of existing frameworks have gained momentum. Policymakers on both sides of the border are exploring innovative solutions to enhance recycling rates and reduce the ecological footprint associated with disposable containers.

The board of directors of the Solid Waste Association of North America (SWANA) recently approved a new Technical Policy regarding CDRS, often referred to as bottle bills or recycling refunds. The SWANA Sustainable Materials Management (SMM) Technical Division Advocacy Committee worked together to update the previous policy and bring this policy up to date.

SWANA Technical Policies serve as a resource for members and as guiding documents for SWANA's positions.

"The SMM Legislative Advocacy Committee took on several important initiatives in 2023, not the least of which was the revamped Container Deposit Return System policy," said technical


division director to the board Allison Trulock. "Bringing the policy into the 21st century, especially considering potential federal legislation on the topic, included several discussions with a wide range of points of view that ultimately resulted in consensus around the new policy. Kudos to the entire committee for their tireless efforts on this and other SMM policy initiatives."

Summary of Container Deposit Policy

While CDRS may apply to many different types of containers or materials, SWANA's updated Policy (Policy Number T-2.2) focuses on "single-use" beverage containers.

SWANA endorses the concept of deposit return systems if they factor in the key points outlined in the policy with the goal of a deposit return system implementation resulting in positive outcomes. The policy describes several factors for a successful system, including an emphasis that existing recyclers should be allowed to participate, that ownership of the materials should be held by whoever possesses the material, that deposit value should be high enough to incentivize return, and that funds generated should be reinvested.


It states that the deposit return systems should incentivize container design that works effectively with the systems and that the system should be designed to mitigate potential for fraud. In addition, the policy addresses practical operational concerns around site selection and the importance of safety for workers and visitors.




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Meridian Waste, an integrated, non-hazardous solid waste services company, announced a three-year scholarship commitment to support the Wake Tech Career Fields and Transportation education and certification program. The \$15,000 scholarship will support six semesters of required industrial educational training. The Meridian Waste Scholarship for Clean Communities will be available for the Wake Tech Fall 2024 semester by application through Wake Tech Foundation.

The Diesel and Heavy Equipment Technology program prepares individuals to apply technical knowledge and skills to repair, service, and maintain diesel engines in vehicles such as heavy-duty trucks over the one-ton classification, solid waste collection vehicles, buses, ships, railroad locomotives, and equipment, along with stationary diesel engines in electrical generators and related equipment.

Students will receive instruction in engines, hydraulics, electrical, electronic, and powertrain systems, among other topics. Coursework may include transportation systems theory, braking system, climate control, design parameters, drivetrains, electrical and electronic systems, engine repair, engine performance, environmental regulations, materials, product finish, safety, steering and suspension, transmission, transaxles, and sustainable transportation, depending on



the course major and studies chosen.

Graduates of the program should be prepared to take professional licensure exams, which correspond to certain areas of study to become entry-level technicians in the transportation industry.

Heavy Equipment and Transport Technology (HEATT) programs are designed to provide the knowledge and skills to operate, troubleshoot and repair landfill and transfer stations equipment, construction equipment, agricultural equipment, and trucks. Graduates should qualify for entry-level employment in businesses that operate and repair these types of equipment in the solid waste and construction industries.

“To Meridian Waste, the first step in creating and maintaining clean communities is for the responsible, safe and environmentally sound collection, transportation, and disposal of our community’s solid waste,” said Patrick Messinger, Meridian Waste’s area president in North Carolina.

Clean Earth and Veolia partner to treat hazardous waste

Clean Earth, a division of Enviro Corporation and Veolia North America have executed a long-term collaborative agreement for significant incineration capacity at the new state-of-the-art thermal facility in Southwest Arkansas. The five-year agreement, structured to provide guaranteed access for Clean Earth by Veolia, is a first-of-its-kind in the industry and a positive advancement for the waste management industry and customers as the new facility, opening in 2025, will provide much-needed additional capacity.

Fred Van Heems, Veolia North America’s president and chief executive officer, said, “Demand is growing across the U.S. for the safe, sustainable management of complex waste streams from the resurgent growth of research and manufacturing in North America. In addition, the facility will provide needed capacity to support contaminants of emerging concern. This agreement provides a solution for the gap

in the industry. We have a long-standing relationship with Clean Earth, and we are pleased to work together to solve some of the country’s most difficult environmental challenges at our new facility.”

Veolia’s new facility will be powered by local decarbonizing energy generated directly on-site, North America’s first for a hazardous waste plant. The power will be supplied by capturing waste heat recovered from a boiler and steam turbine and generating five megawatts of on-site solar power per hour, creating a more sustainable option for the marketplace and benefiting consumers and the public. A plan to reforest nearly 1,500 acres surrounding the property will sequester carbon emissions, provide protection for local habitat, and prevent erosion.

Veolia North America will increase waste treatment access for Clean Earth throughout 2024 to ramp up activities for a smooth transition in 2025.

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WASTE

CARDS Holdings acquires Missouri waste company

CARDS Holdings, LLC, Fayetteville, Arkansas, has acquired Oregon County Public Waste (OCPW), marking the company's third Missouri acquisition in 30 days, after acquiring C&R Disposal Inc. and Pedersen Trash Service LLC in January.

OCPW has supported Southern Missouri through its residential subscription, municipal curbside and commercial service offerings. They have become a community partner with long-standing relationships with many customers, all of whom will continue to be prioritized under the CARDS brand. Equally important, CARDS procurement of OCPW marks a significant milestone for customers, adding additional value through CARDS roll off offerings and ability to meet market growth demands.

"With this strategic local acquisition, CARDS aims to enhance our subscription residential and commercial services by providing the inventory necessary to grow," CARDS chief executive officer, Dan Christensen said. "In addition, our ability to compete in municipal curbside contracts, permanent and temporary roll-off opportunities and serve an even larger list of local clientele is very beneficial to our organization. By building upon the strengths of both entities, CARDS looks forward to delivering unparalleled services and solutions to all its current and future clients."

The financial terms of the deal were not disclosed.

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PLASTICS

Goodwill's Green Works receives grant from Foam Recycling Coalition

Goodwill's Green Works, a non-profit industrial recycler and subsidiary of Goodwill Industries of Greater Detroit, Michigan, received a \$50,000 grant from the Foodservice Packaging Institute's Foam Recycling Coalition (FRC). The grant enables approximately one million residents in Detroit and neighboring communities in Wayne, Washtenaw and Oakland counties to recycle materials such as foam polystyrene (PS) cups, plates, bowls, take-out containers, egg cartons and block packaging foam.

The FRC grant assisted with funding the purchase and installation of a foam densifier, used to compact foam products into foam blocks or ingots. Green Works will sell the foam ingots to end markets to be manufactured into thermal insulation panels for foundations, walls and roofs, as well as picture frames and crown molding.

Residents can take their polystyrene foam to receptacles located at Goodwill's thrift stores and donation centers in Canton, Commerce Township, Dearborn, Livonia, Woodhaven and Ypsilanti. Thanks to a partnership with Dart Container and Recycle Here!, Detroit residents can recycle polystyrene foam at the Lincoln Street Recycle Here! drop-off location. The collected foam will be transported to Green Works' 94,000 square foot facility in Detroit.

Green Works is also adding responsible appliance disposal (RAD) practices to repair, resell or reuse old appliances, reducing the amount of waste sent to landfills. The appliance program along with the polystyrene foam recycling will provide second-chance employment to individuals looking to redirect their lives in a more productive and meaningful way.

"Goodwill's Green Works is expanding recycling access to a large population of Southeast Michigan, and we are proud to be a part of that effort," said Natha Dempsey, president of the Foodservice Packaging Institute. "Goodwill Green Works' positive impact can be seen through environmental benefits, but also through efforts to improve local communities and help individuals looking for a second chance."

The grant is made possible through contributions to FRC, which focuses exclusively on increased recycling of post-consumer foam polystyrene. Its members include Americas Styrenics; Chick-fil-A; CKF Inc.; Dart Container Corp.; Dyne-A-Pak; Genpak; INEOS Styrolution America LLC; Lifoam Industries, LLC; Pactiv Evergreen; and Republic Plastics.

Goodwill's Green Works is the 34th grant recipient to receive FRC funding since 2015.

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PLASTICS

Rumpke and Eastman join forces to expand recycling of PET waste



Rumpke Waste & Recycling and Eastman, are partnering to help address the global plastic waste crisis. Later this year, Rumpke will begin collecting and sorting hard-to-recycle and colored PET packaging waste, materials that are largely unaddressed in today's recycling ecosystem. This will provide 100 percent of this waste stream as feedstock to Eastman's molecular recycling process. Eastman will then turn this waste stream into virgin quality polyesters with its molecular recycling technology, to be used across a range of packaging applications and to expand the circular economy for polyesters.

"The world is currently grappling with a significant problem, with a large portion of plastic waste either not being collected for recycling, or deemed non-recyclable by traditional methods," said Jeff Snyder, director of recycling at Rumpke. Colored and opaque PET is used across a range of

consumer applications, including personal care and cosmetic packaging, detergent and soap packaging and various dairy and food packaging. Historically many of these applications have been unable to transition to fully circular packaging. Through Rumpke's investment in innovation processing and Eastman's molecular recycling technology, this partnership will enable circularity for many applications. By diverting this waste from incineration or landfill, both companies are making significant strides toward their shared vision of a world without waste.

This partnership comes as Eastman is nearing the start-up of the world's largest material-to-material molecular recycling facility at its Kingsport, Tennessee site. Set to begin shipping its first products in the coming weeks, the Kingsport plant will recycle 110,000 metric tons of hard-to-recycle plastic waste annually.

GLASS

Arglass invests to expand glass recycling capacity

Glass container manufacturer Arglass has secured over \$230 million in capital to build a second furnace on its campus in Valdosta, Georgia. Arglass raised a combination of structured equity and debt to finance the construction.

The new Arglass facility is planned to produce up to eight different glass container types simultaneously for maximum flexibility, enabling smaller production runs, faster reaction to market demands, lower inventory levels and reduced investment in molds.

Projected to be completed in Q2 2025, the new facility is expected to be capable of producing over 350 million sustainable glass containers annually. This state-of-the-art manufacturing plant will embody the future of glass with a fully integrated production network, driven by AI-integrated real-time data monitoring, predictive modeling and fully automated closed-loop production and quality assurance systems.

These cutting-edge capabilities are planned to be backed by some of the most extensive sustainability infrastructure of any glass manufacturing plant in the world. The plant is expected to be powered by a hybrid gas, electric and hydrogen oxy-fuel furnace capable of melting 490 metric tons of glass per day. An additional five megawatts of power will be provided by a solar power installation.

"Our new furnace will aim to further establish Arglass as the most innovative, flexible and sustainable glass manufacturer in North America," said Arglass chairman and chief executive officer, José de Diego Arozamena. "Glass is already the most sustainable, recyclable and healthy packaging material, and the only packaging material classified as 'generally recognized as safe' by the FDA. I am incredibly proud to be leading the industry to new heights in sustainability."

Other sustainability measures include the use of green hydrogen to reduce CO2 emissions, a closed-loop water system to minimize industrial waste and an on-site post-consumer glass recycling plant. The recycling plant will provide post-consumer glass cullet for use in the production of new containers. Arglass also produces glass using its proprietary Arglass Biogenic® glass composition, which replaces traditionally mined material with a naturally renewing, carbon-negative, biogenic component gently harvested from the ocean.

The construction, which is expected to begin as soon as possible, will be supported by the Valdosta Lowndes Development Authority and the Georgia Department of Economic Development. Arglass plans to hold a groundbreaking ceremony for the new plant on the company's campus in Valdosta.

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BUSINESS BRIEFS

INEOS Styrolution names authorized distributors

INEOS Styrolution, a supplier of styrenic materials, revealed a strategic shift in its authorized distribution network for the U.S. and Canada, effective April 1, 2024.

As part of the company's sales and market channel strategy, INEOS Styrolution has announced their new authorized distribution network, demonstrating its commitment to ensuring the highest standards of service and product availability for its valued customers.

The authorized distribution partners for INEOS Styrolution's styrenic materials in U.S. and Canada effective April 1, 2024, are:

- Entec Polymers: Authorized for all product lines, excluding polystyrene.
- Formerra: Authorized for all product lines, excluding polystyrene.
- M. Holland: Authorized for all product lines.
- Nexeo Plastics: Authorized for polystyrene.

Liberty Tire Recycling names new president

Liberty Tire Recycling, Pittsburgh, Pennsylvania, has hired Andrew Meurer as president and chief commercial officer.

Meurer joined Liberty after more than 12 years at Michelin. Prior to Michelin, Meurer was employed at Procter and Gamble and Kimberly-Clark.

Meurer will focus on cost-effective solutions and better end markets for end-of-life tires that align with the sustainability goals of both tire retailers and manufacturers.

Wendt expands sales force

Wendt Corporation added Ben Brackmann to its regional sales team and promoted Kodey Hayes within the growing aftermarket division. These moves reflect the company's commitment to enhancing its market presence and meeting the growing demands of its customers.

As the newly appointed regional account manager for the Western U.S., Brackmann joins a team of four other regional representatives and brings a wealth of experience and knowledge built over many years of service in the scrap recycling industry. His expertise will be instrumental in further strengthening Wendt's position in the market and expanding its reach in key regions. With a focus on driving sales and fostering stronger customer relationships in the region's Wendt serves, Brackmann is well-equipped to contribute to the sales success.

Wendt's aftermarket division has also experienced growth since its launch last April. To support that growth, Wendt has expanded its resources dedicated to aftermarket with the internal promotion of Hayes to sales engineer. Hayes has been with the company for two years and has consistently demonstrated a deep understanding of customer needs and a commitment to delivering high-quality solutions. Having initially joined the engineering team, Hayes' proven skills and commitment have paved the way for his elevation to the role of sales engineer.

Hayes will be responsible for bridging the gap between sales and engineering. Working closely with the regional sales team, and a focus on the aftermarket division, Hayes will work with customers to define project scope, present solutions, and expand WENDT's Aftermarket footprint.

BASF Environmental Catalyst and Metal Solutions acquires Arc Metal AB

BASF Environmental Catalyst and Metal Solutions (ECMS) has completed the acquisition of Arc Metal AB in Hofors, Sweden. The asset purchase adds toll smelting and processing of spent automotive catalyst in Europe, Middle East and Africa. This further complements ECMS's existing global precious metal recycling operations in Cinderford, UK, Seneca and Spartanburg, South Carolina, and Caldwell, Texas.

The additional smelting capacity at the Sweden site will also increase utilization of new refinery capacity in Seneca, South Carolina. Recycled catalysts go through a smelting process and are then refined to produce the high purity precious metal needed to make new catalysts and other end use products, supporting a circular economy.

In addition, the acquisition bolsters ECMS's ability to deliver its 100 percent recycled metal offering Verdium™, which is based on mass balance. Recycled platinum group metals can lower carbon emissions by up to 97 percent, in comparison to refining mined or primary materials. One kilogram of Verdium saves over 30 metric tons of carbon, enabling customers to verify their carbon reduction, track progress to their sustainability goals and help lower their Scope 3 emissions.

Rumpke Waste & Recycling names new general counsel

Rumpke Waste & Recycling has named Michael Cappel as its new general counsel.

In his role, Cappel oversees various legal functions at Rumpke. He will actively litigate cases and direct external counsel on corporate, and real estate cases including corporate and real estate acquisitions, contracts, employment, zoning, and other matters. Rumpke has 4,000 employees and nearly 3,000 vehicles working daily to service millions of customers throughout Ohio, Kentucky, Indiana, and West Virginia.

Cappel was previously a partner at Keating, Muething & Klekamp (KMK), where his practice involved all aspects of litigation, including tort litigation, business and commercial litigation, and appellate practice. While at KMK, he represented Rumpke for more than a decade.

Cappel is actively involved in many professional and civic organizations, including the Cincinnati and Ohio State Bar Associations, Cincinnati community development organizations such as HomeBase, the College Hill Community Urban Redevelopment Corporation, the City of Cincinnati's Economic Inclusion Advisory Council, and Mercy-McAuley High School, to name a few.

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BUSINESS BRIEFS

Sebastian Ward named key accounts manager for TOMRA Recycling Sorting

TOMRA Recycling Sorting, hired Sebastian Ward as the key accounts manager for North America. In his new role, Ward is tasked with working closely with larger recycling operations throughout the U.S. and Canada to provide sorting solutions unique to the needs of customers with multiple systems working at different locations. He will also lead key initiatives with plant building and technology partners to expand the applications for TOMRA's advanced sorting solutions.

Ward offers more than 25 years of experience in sales and marketing and has excelled in building brands and operations for companies in the cabinet, lab instrument and material recycling industries.

3R-Machinery and Screenpod partner to elevate product offerings

3R-Machinery, a provider of waste management equipment, and Screenpod Design & Manufacturing, a pioneer in material processing solutions, announced an exclusive partnership set to elevate the 3R-Machinery product offering.

3R-Machinery will be distributing the Screenpod range of density separation, dust control and recycling machines many of which will complement the current 3R machinery lineup.

The collaboration between 3R-Machinery and Screenpod brings together two dedicated recycling industry entities, each known for their commitment to service, quality, innovation, and customer success. This strategic alliance aims to leverage the unique strengths of both companies, providing clients with state-of-the-art solutions.

Steel shipments unchanged in 2023



American Iron and Steel Institute

The American Iron and Steel Institute (AISI) reported that for the month of December 2023, U.S. steel mills shipped 7,082,921 net tons, a 2.6 percent increase from the 6,901,567 net tons shipped in December 2022. Shipments were down 1.3 percent from the 7,175,177 net tons shipped in the previous month, November 2023. Shipments for the full year 2023 are 89,338,472 net tons, down 0.1 percent vs. 2022 full year shipments of 89,469,132 net tons.

A comparison of shipments for the full year 2023 to the full year 2022 shows the following changes: hot rolled sheet, up 14 percent, cold rolled sheet, up 4 percent and corrosion resistant sheet, up 1 percent.

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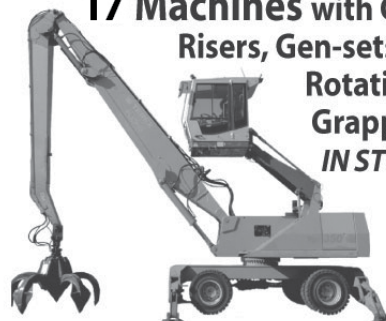
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The new focus on copper

by MAURA KELLER
mkeller@americanrecycler.com

In August 2023, the U.S. Department of Energy (DOE) added copper to its list of critical materials as the U.S. shifts towards cleaner energy sources such as solar and wind. Copper's addition to this list makes those who produce it, eligible for government subsidies under the Inflation Reduction Act.

Eric Saderholm is the managing director of exploration, company co-founder, and director of American Pacific Mining Corp., a precious and base metals explorer and developer focused on opportunities in the Western U.S. with projects in Alaska, Montana and Nevada. According to Saderholm, the global and U.S.-domestic copper recycling market and its efforts to maximize output stream will see increased attention in the coming decade, but these will never exceed or match the output or production of worldwide copper mines. New copper production will always be the key provider of copper due to finite copper recycling scrap inventories.

"No doubt, the two supply chains need to be utilized in tandem as present copper demand outstrips supply. Current hard rock mining and processing are not able to meet the escalating worldwide copper demand levels without strong input from copper recycling," Saderholm said. "Copper recycling has been an important source of market copper for well over 30 years, now approaching 30 percent of the world supply for the red metal. That number may increase by 5 to 10 percent over the next 25 years."

Saderholm added that this uptick in recycled sourcing comes at a time when worldwide yearly copper demand is now over 25 million metric tons and is expected to exceed 50 million metric tons by 2045. Plus, copper mines worldwide face increased production costs, closures and geopolitical challenges – just when these operations are under pressure to ramp up output.

"This means efficient recycling will not only be convenient, but essential for commercial and industrial manufacturing," Saderholm said.

As the director of Heaton

Manufacturing, Martin Heaton understands metal utilization and recycling. According to Heaton, the categorization of copper as a critical material is a significant development.

"This status reflects copper's essential role in modern technology and renewable energy solutions and the challenges in its supply chain," Heaton said. "At Heaton Manufacturing, we've seen firsthand how this designation reshapes sourcing strategies and emphasizes sustainable practices."

In terms of the implication this designation has on the metal recycling industry, Heaton said this shift elevates the importance of efficient recycling processes and innovation in recovery techniques.

"My experience has led me to advocate for advanced sorting technologies and improved recycling infrastructure to meet the growing demand for high-purity recycled copper," Heaton said. "The critical material status of copper reinforces our commitment to recycling and innovating in ways that reduce the ecological footprint of metal manufacturing and usage."

The DOE adding copper to its list of critical raw materials has a profound impact on Heaton's approach to the copper recycling market.

"It highlights copper's crucial role in modern technology and renewable energy, emphasizing the challenges in its supply. This means a greater focus on efficient recycling processes and innovations in recovery techniques. There's a significant opportunity here to meet the growing demand for sustainable copper sources."

Christophe Allain, vice president, global nonferrous metals portfolio at Nexans, said copper being labeled as a critical mineral has a trickledown effect on the recycling market.

"Now, recycled copper will be considered a critical mineral in the same way virgin copper is. Hence, it's commercialization outside of the U.S. might face challenges," Allain said. "It could, for instance, be considered too strategic to let go as an export outside the country."

Allain further explained that from a U.S. perspective, the main challenge for the recycling market is that the supply of scrap far surpasses demand.

"Capacity to use scrap in North



Copper's addition to cleaner energy sources makes it eligible for government subsidies under the Inflation Reduction Act.

America, similar to Europe, is somewhat limited. If scrap cannot be exported and local demand is not sufficient, the value of copper will drop until investment occurs," Allain said.

At Nexans, after aluminum, copper is the main conductive material used. The company uses it to transmit electricity and data from power cables (low voltage/medium voltage/high voltage) to telecoms (LAN Cable). Copper is used in cables across many different sectors.

"In the world of decarbonized electrification to fight climate change, demand for copper will continue to grow significantly," Allain said.

Hurdles Aplenty

The newest designation of copper is expected to further increase interest in recycling copper, but the ability to do so is multifaceted.

In Heaton's experience, the major hurdles include:

- Developing advanced technologies for efficient and precise sorting and recovery of high-purity copper.
- Addressing supply chain complexities to ensure a consistent supply of recyclable copper.
- Maintaining the quality of recycled copper to make it suitable for high-tech applications.
- Navigating evolving environmental regulations and ensuring compliance.
- Raising public awareness about the

importance of copper recycling and encouraging participation.

At Heaton Manufacturing, copper plays a pivotal role in their operations, especially considering its status as a critical material. The company is heavily invested in developing and employing processes that maximize copper's efficient and sustainable use. This involves implementing innovative recycling techniques to reclaim high-quality copper from various sources, which is utilized in their manufacturing processes.

Saderholm further pointed out that copper recycling has been in place for quite some time but sourcing has been somewhat limited. As he explained, most recycled copper has historically been recovered simply by melting down old cathode-grade copper and reusing it once the impurities are eliminated (e.g., wiring, cables, electric engine components, etc.).

"It is a relatively simple, cost-effective procedure, and stockpiles of this type of material have remained either static or have slightly decreased since 1990," Saderholm said. "The technology and processing capacity for this 'simple' class of material are in place and are keeping up with their scrap delivery and reprocessing demands for copper."

In the future, major challenges will be in how we process copper-bearing scrap metals and alloys that are less

See FOCUS ON COPPER, Page B6

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Alcoa to supply Nexans via revolutionary process



Nexans and Alcoa announced that Alcoa will supply Nexans with aluminum rod produced from a revolutionary process that eliminates all direct greenhouse gas emissions from the traditional smelting process.

Nexans will be the world's first cable manufacturer to use metal from the breakthrough ELYSIS™ process, which replaces all greenhouse gas emissions with oxygen. The technology uses proprietary materials, including inert anodes, first developed at the Alcoa Technical Center near Pittsburgh. That research and development work became the technological basis for ELYSIS, a technology partnership that is working to ramp up the process to commercial scale.

Several Nexans facilities in Western Europe and Scandinavia will use aluminum produced from the ELYSIS process to start qualifications for the metal's use in various types of cables (low, medium, high

voltage). Aluminum rod produced with this breakthrough ELYSIS technology could eliminate a significant portion of carbon dioxide emissions in the future.

Since the launch of ELYSIS in 2018, the technology company has produced R&D quantities of the metal. Alcoa is marketing and selling its share of the ELYSIS metal, which has also been used for the wheels on the Audi eTron GT, the automaker's first electric sports car. Apple is also an investor in the technology and has used ELYSIS metal for some of its products.

ELYSIS is a key component in Alcoa's technology roadmap of research and development projects that also includes projects such as the ASTRAEA™ metal purification process and the Refinery of the Future.

This agreement fully highlights Nexans' position at the forefront of the sustainable electrification of the world and of crucial issues such as low-carbon emissions.

Steel imports down 8.7 percent in 2023

Based on preliminary Census Bureau data, the American Iron and Steel Institute (AISI) reported that the U.S. imported a total of 2,082,000 net tons (NT) of steel in December 2023, including 1,614,000 NT of finished steel (up 2.6 percent and 7.7 percent, respectively, vs. November 2023). Full year 2023 total and finished steel imports were 28,156,000 and 21,694,000 NT, down 8.7 percent and 14.1 percent, respectively, vs 2022. Finished steel import market share was an estimated 20 percent in December and is estimated at 21 percent for full year 2023.

Key steel products with a significant import increase in December compared to November are oil country goods (up 52 percent), hot rolled sheets (up 38 percent), plates in coils (up 28 percent), line pipe (up

27 percent) and cut lengths plates (up 21 percent).

Products with a significant increase in imports for the full year of 2023 vs. 2022 include cut lengths plates (up 20 percent) and ingots, billets and slabs (up 16 percent).

In December, the largest suppliers were Canada (539,000 NT, up 1 percent vs. November), Brazil (335,000 NT, down 12 percent), Mexico (291,000 NT, up 18 percent), South Korea (269,000 NT, up 91 percent) and Germany (106,000 NT, up 103 percent). For full year 2023, the largest suppliers were Canada (6,885,000 NT, unchanged vs. 2022), Mexico (4,184,000 NT, down 21 percent), Brazil (3,942,000 NT, up 54 percent), South Korea (2,637,000 NT, down 6 percent) and Japan (1,189,000 NT, down 6 percent).

U.S. Imports of Steel Mill Products by Country of Origin
(thousands of net tons)

COUNTRY	DEC. 2023 PRELIM	NOV. 2023 PRELIM	% VAR. DEC. VS. NOV.	FULL YEAR 2023	FULL YEAR 2022	% VAR. 2023 VS. 2022
Canada	539	534	0.9%	6,885	6,860	0.4%
Mexico	291	247	18.0%	4,184	5,302	-21.1%
Brazil	335	380	-11.9%	3,942	2,568	53.5%
South Korea	269	141	90.8%	2,637	2,817	-6.4%
Japan	78	86	-8.3%	1,189	1,261	-5.7%
Germany	106	52	102.6%	1,042	1,126	-7.5%
China	32	37	-11.5%	598	651	-8.2%
Taiwan	24	48	-50.6%	579	1,038	-44.2%
Vietnam	36	50	-27.3%	560	936	-40.2%
Algeria	0	25	-100.0%	526	509	3.4%
Netherlands	35	52	-33.3%	508	594	-14.6%
Italy	16	22	-26.8%	440	452	-2.6%
Romania	34	26	31.2%	375	483	-22.3%
Thailand	15	12	19.0%	362	250	44.9%
India	14	15	-6.9%	335	684	-51.1%
All Other	258	303	-14.8%	3,994	5,318	-24.9%
Total	2,082	2,030	2.6%	28,156	30,849	-8.7%
memo EU-27	303	268	13.1%	4,000	4,409	-9.3%

Novelis reports improved income for third quarter

Novelis Inc., a sustainable aluminum solutions provider and the leader in aluminum rolling and recycling, reported results for the third quarter of fiscal year 2024.

"Novelis delivered a substantial year-over-year improvement in Adjusted EBITDA and Adjusted EBITDA per tonne margin, in line with our expectations of continued margin recovery this fiscal year," said Steve Fisher, president and chief executive officer, Novelis Inc.

Net sales decreased 6 percent versus the prior year period to \$3.9 billion for the third quarter of fiscal year 2024, driven by lower average aluminum prices as shipments were in line with prior year levels. Total flat rolled product shipments were 910 kilotonnes in the third quarter of fiscal year 2024 compared to 908 kilotonnes in the prior year period. Shipments were flat due to a decline in specialties

product shipments from muted economic conditions in some markets, though more than offset by continued growth in automotive shipments and a return in demand for beverage packaging sheet.

Net income attributable to their common shareholder significantly improved versus the prior year to \$121 million in the third quarter of fiscal year 2024, due primarily to higher Adjusted EBITDA. Adjusted EBITDA increased 33 percent versus the prior year to \$454 million in the third quarter of fiscal year 2024. This significant improvement was primarily driven by favorable metal benefit from recycling, higher pricing, and lower operating costs than the prior year, which was heavily impacted by high inflation and geopolitical instability.

Net cash flow provided by operating activities was \$420 million in the first

9 months of fiscal year 2024 compared to \$309 million in the prior fiscal year period, primarily due to favorable changes in working capital. Adjusted Free Cash Flow was an outflow of \$517 million in the first nine months of fiscal year 2024, higher than the prior year period outflow of \$170 million due primarily to higher capital expenditures, partially offset by higher cash flow from operating activities. Fiscal year-to-date 2024 capital expenditures total \$960 million and reflect the planned increase in strategic investments in new rolling and recycling capacity under construction.

The company had a strong total liquidity position of \$2.1 billion, consisting of \$787 million in cash and cash equivalents and \$1.4 billion in availability under committed credit facilities, as of December 31, 2023.



Novelis is constructing a state-of-the-art, greenfield rolling and recycling plant in Bay Minette, Alabama, that they anticipate will be able to initially produce 600 kilotonnes of finished goods for the beverage packaging and automotive markets in North America. This is the first fully integrated aluminum plant built in the U.S. in nearly 40 years, and the largest project in company history. With a high level of project engineering complete, and all key equipment and the majority of materials contracted, the project capital cost is now expected to be \$4.1 billion, and to commission in the second half of calendar year 2026.

Pandora shifts to recycled silver and gold for jewelry

Pandora, a large jewelry brand, has changed its precious metals supply and is now sourcing only recycled silver and gold for all its jewelry.

The shift avoids significant greenhouse gas emissions, as mining requires more energy and resources than recycling. The carbon footprint of recycled silver is one-third compared to mined silver, while the recycling of gold emits less than one percent of the carbon emissions from mining new gold. By sourcing recycled metals, Pandora avoids around 58,000 tons CO2 per year.

“Precious metals can be recycled forever without any loss of quality. Silver originally mined centuries ago is just as good as new, and improved recycling can significantly reduce the climate footprint of the jewelry industry,” said chief executive officer Alexander Lacik.

Silver and gold are the most used precious metals in Pandora jewelry. In 2020, Pandora set a target to source 100 percent recycled silver and gold by 2025, and now the company has reached this milestone earlier than expected – by the end of 2023 – thanks to strong commitment from its suppliers.

All suppliers have had to switch their operations to only source materials that are certified recycled according to the Responsible Jewelry Council Chain of Custody, one of the strictest standards in the industry. For many, this has introduced



new processes and equipment to ensure complete segregation of mined and recycled metals across the entire supply chain including sorting, melting, and manufacturing. More than 100 Pandora employees have been involved in the transition work.

Allowing time for the depletion of existing inventory of metals, Pandora expects that it will craft all new jewelry with 100 percent recycled silver and gold from the second half of 2024. In 2023, 97 percent of the silver and gold sourced for Pandora’s jewelry was recycled.

Today, less than 20 percent of the world’s silver supply comes from recycled sources, typically from discarded electronics, old jewelry, silverware, manufacturing scrap and other waste from industry. Once collected, recycled silver undergoes a refining process where impurities are removed, and the metal is recast to be used again.

Aurubis terminates executive board contracts

Aurubis AG company management will be restructured with new appointments in 2024. The supervisory board has agreed with chief executive officer Roland Harings, chief financial officer Rainer Verhoeven, and chief operating officer custom smelting & products Dr. Heiko Arnold to prematurely terminate their current executive board contracts. The three executive board members are thus taking accountability for the unique challenges Aurubis faced in the past fiscal year, in particular in light of the serious cases of fraud and theft at the Hamburg plant and incidents in occupational safety.

Arnold will end his tenure on the executive board on February 29, 2024. Rainer Verhoeven will leave the company on June 30, 2024, and Roland Harings on September 30, 2024. This phased exit will ensure continuity in the realization of the company’s strategic growth initiatives. Based on a comprehensive legal opinion from the Hengeler Mueller law firm on the responsibility of the three executive board members, the supervisory board has also decided not to pursue compensation for damages against the three executive board members at this time.

Inge Hofkens, who joined the Aurubis executive board in January 2023 and heads the recycling division, including all activities in the U.S., will continue in her role on the executive board and assume overall responsibility for the commercial division.



Effective March 1, 2024, Prof. Dr. Markus Kramer was dispatched from the supervisory board to round out the new executive board team, assuming Dr. Heiko Arnold’s key responsibilities until September 30, 2024. Kramer will also serve as chief transformation officer, be responsible for human resources, and assume the role of director of industrial relations. He will advance the measures already introduced to strengthen plant and company security and occupational safety, as well as the ongoing development of a corresponding security and safety culture at Aurubis.

The supervisory board has begun the process for timely new appointments to the executive board with the assistance of recruitment consultants. The three executive board members will step down gradually to ensure good corporate governance and the systematic handover of their divisions to a successor.

With Kramer, the supervisory board is deploying a manager with many years of international experience in the processing industry. While based in Hong Kong, he served as president of the dispersion & pigments division for global chemical industry leader BASF.

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#1 Bundles	per gross ton	410.00	397.00	435.00	449.00	452.00
Structural	per gross ton	370.00	369.00	368.00	370.00	380.00
#1 & #1 Mixed Steel	per gross ton	323.00	327.00	325.00	365.00	375.00
Crushed Auto Bodies	per gross ton	216.00	217.00	220.00	221.00	258.00
Shredded Auto Scrap	per gross ton	401.00	405.00	425.00	425.00	449.00
NON FERROUS						
#1 Copper Bare Bright	per pound	3.69	3.68	3.65	3.66	3.80
#2 Copper Wire & Tubing	per pound	3.55	3.57	3.50	3.51	3.61
Aluminum Cans	per pound	.68	.67	.69	.65	.65
Al/Cu Radiators	per pound	1.84	1.83	1.84	1.85	1.88
Aluminum Radiators	per pound	.49	.55	.58	.59	.60
Heater Cores	per pound	1.47	1.48	1.46	1.45	1.49
Stainless Steel	per pound	.61	.62	.63	.64	.64

All prices are expressed in USD. Printed as a reader service only.

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*Why were the early days of history called the Dark Ages?
Because there were so many knights.*

EQUIPMENT SPOTLIGHT

Eddy Current Separators

by MARY M. THORNTON

maryt@americanrecycler.com

Eddy current separation (ECS), a process used throughout the scrap recycling industry, sorts nonferrous metals from nonmetallic material. The process is based on the principle that a time-varying magnetic field will induce electrical current to flow throughout a conductive particle. This current then reacts to the applied magnetic field, exhibiting a pronounced force of deflection and the material is efficiently separated and the result can even be environmentally beneficial. Various ECS designs have been used through the years but a belt-driven, rotary drum variety is one of the common methods used.

Dings Co. Magnetic Group has custom built eddy current separators, magnetic drums, self-cleaning overhead magnetic separators and other magnetic solutions for the recycling industry for 125 years. "When it comes to nonferrous metal recovery such as aluminum, copper and brass, we have eddy current models engineered for every process," said Steve Tanzilo, magnetic group sales manager.

He described how as a piece of nonferrous metal such as aluminum passes over an ECS, the magnets inside the rotor rotate past the aluminum at a high speed, forming eddy currents in the aluminum and creating a magnetic field. The polarity of that magnetic field is the same as the rotating magnet, causing the aluminum to be repelled away from the magnet. This repulsion makes the trajectory of the aluminum greater than that of the nonmetallic material, allowing the two material

streams to be separated.

"Our ECS products are available in concentric and eccentric versions. Dings' concentric ECS is ideal for recovering aluminum cans and other, larger, nonferrous metals. Our eccentric eddy current models are specifically engineered to remove fractional sized, nonferrous metal from mixed material streams. The concentric design involves a triple shell layer of ceramic tile, fiberglass, and a heavy duty stainless steel shell that protects the rotor assembly and reduces maintenance and replacement costs. The machine is manufactured with a heavy duty, structural steel I-beam frame and support structure, oversized shafts and bearings, and a heavy-duty drive package," Tanzilo stated. He continued, "The eccentric model design concentrates the magnetic field, which releases ferrous materials sooner in the process. It is engineered with Dings' double shell layer design, which provides maximum protection of the rotor assembly. This design also significantly reduces overall maintenance and replacement costs of the ECS. Both versions of our ECS have a removable access panel, making maintenance and removal of the polyurethane or nitrile wear-resistant belt, easier and faster."

Adam Floyd, process and business development director of Orbcon, noted that "Eddy current separators are one of the most efficient recycling tools to maximize profits and yield very fast ROIs. They are able to process high volumes and separate even the finest nonferrous metals. IMRO has been the home of eddy currents for over 30 years with thousands



IMRO Maschinenbau GmbH

of eddy currents shipped all over the world from our manufacturing facility in Germany and U.S. Orbcon distribution centers. With a 44 pole high frequency and an up to 100" width, the IMRO RCSX F-240 Condor eddy current can recover nonferrous metals of even 0.5 mm. This ECS spins at 3,800 rpm and is equipped with a patented horizontally and vertically adjustable electrical divider with memory function."

Floyd claims that a key ECS element for effective separation of nonferrous metals is the proper sizing of the material to be processed, prior to ECS use. If the material to be processed is narrowly sized, it greatly improves ECS performance. As a rule of thumb, it is important to maintain a 3:1 size ratio (or smaller) between particles. If this ratio increases to 4:1, the recovery or quality of the nonferrous metals could be impacted.

He cited some other important factors to consider when procuring an ECS: belt thickness, magnetic strength and frequency. "With the proprietary technology within IMRO products, we are able to address these three key variables to significantly increase metal recovery and product quality when compared to our competitors." Floyd added, "By designing two new types of eddy currents, IMRO offers a unique purifying system, which is a solution to the biggest industry challenge: achieving the highest possible metal recovery and purity levels.

Proper maintenance is important for ECS longevity, Floyd also said. A typical

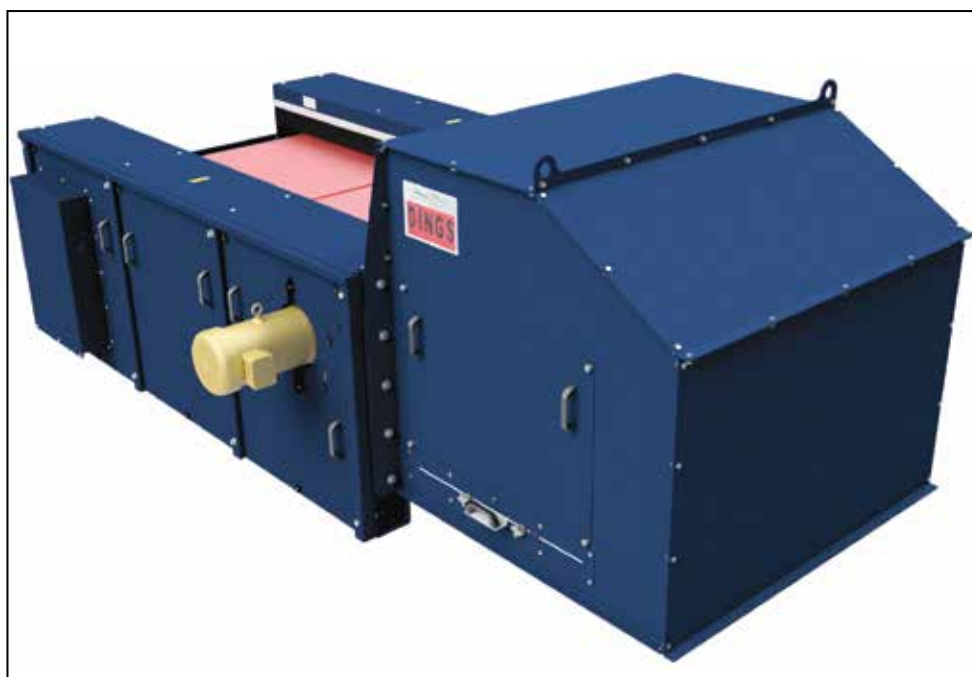
ECS life span is about 15 years when properly maintained. IMRO recommends that at the 12 to 15 year mark, checking the Gauss reading on the pole drum of a machine, to confirm the strength of the magnetic circuits. Exposure to high and seasonal fluctuating temperatures over time can affect the strength of the magnetic fields of an ECS.

Floyd stated how "Eddy currents contribute greatly to the reduction of CO2 emissions, through the replacement of primary metal ore resources. A given carbon footprint can be reduced by up to 90 percent if aluminum is separated, recovered and recycled via an ECS. The use of an IMRO ECS can greatly benefit MRF, RDF, e-scrap, IBA, ASR, metallurgical slag and wood processing operations, glass, plastic and textile recycling operations."

STEINERT is a leader in sensor sorting and magnetic separation, and claims the ECS they manufacture is an efficient, effective solution for separating metals. "Recovering nonferrous metals – those that contain aluminum, copper, zinc or brass – is the economic basis of countless recycling systems. Our separators, with an eccentric pole system, provide optimal recovery of those metals," said Robert Broughton, president of STEINERT. It is no coincidence that more than 4,000 of them are in use worldwide; thanks to the high extraction volumes and the durability they offer."

A STEINERT ECS produces a mixture of nonferrous metals, derived from different sorting materials. As the market favors

See EDDY CURRENT, Page B5



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Eddy Current

■ Continued from Page B4

pure metal fractions, for most customers, additional sorting steps are required to extract, for example, pure aluminum from a nonferrous metal mix. STEINERT's XSS® T EVO 5.0 x-ray sorting system helps to solve this challenging task by detecting material-dependent differences in the absorption of x-rays and then classifies and uses them for sorting into density classes.

"Eddy current separators recover nonferrous metals from end-of-life vehicles, e-waste, incineration bottom ash, and other post-consumer scrap," Broughton said. "STEINERT achieves extraordinary separation results through the use of neodymium-iron-boron magnets, a thin conveyor belt, and an electrically non-conducting drum shell made of composite fiber materials. These ensure maximum field strengths and, thus, precise, efficient sorting – a technology



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that plays an important role in preserving resources. Our products help keep increasingly scarce resources in circulation. Together, we work with our customers to build a circular economy to ensure the world won't run out of resources."

Dating back more than 130 years, STEINERT's family-owned business is

based in Germany. The firm offers some of the world's leading experts in sensor sorting and magnetic separation for waste and metal recycling as well as mining. With subsidiaries in Germany, Australia, Brazil and the U.S., the company also has 50 sales partnerships and joint ventures across the globe.



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American Recycler News is not responsible for non-inclusion of manufacturers and their equipment. Manufacturers are to contact American Recycler to ensure their company is listed in the Equipment Spotlight.

The new focus on copper

■ Continued from Page B1



Copper can be recycled repeatedly without loss of performance.

straightforward – containing copper together with other metals and materials that are harder to recycle.

“Stockpiles of this type of material have increased by around 400 percent in that same 30 year span and are clearly outpacing processing capacity,” Saderholm said. Called end-of-life alloys, these metal alloys were originally manufactured for specific purposes with little consideration as to how to recycle them when the product’s life had terminated (e.g., a cradle-to-grave lifecycle). They include scrap brass and bronze that may contain tin, manganese, zinc, aluminum, lead, nickel and various other alloy additions.

As Saderholm explained, freeing the copper from these alloys for reuse can sometimes be problematic, especially when it comes to lead removal. Lead, a common component of brass, is toxic and is strictly limited in how much can remain in the final product after recycling.

“In the last 20 years, regulations on the amount of lead content remaining in final products have become quite restrictive,” Saderholm said. “Segregating these copper alloys into separate processing streams and minimizing costs will be essential for the economic processing of these rapidly increasing stockpiles and resources.”

Saderholm pointed to additional challenges including process location and capacity, adequate space for stockpiling, permitting concerns, environmental stewardship, social license and acceptance, ease of transport of scrap, and waste management and disposal.

“These recovery processes can be very energy consumptive and access to energy and proper infrastructure will be vital,” he said.

Now that copper has been labeled as a critical raw material, Heaton expects

recycled copper playing an increasingly vital role.

“It’s importance in achieving sustainability, especially in manufacturing and renewable energy sectors, cannot be overstated,” Heaton said. “As the global community moves towards reducing environmental impact, the demand for recycled copper will inevitably rise.”

Allain said recycled copper will continue to play a significant role in the future. “One third of refined metal already comes from scrap, but now that it is labeled critical, scrap might not be exported as frequently as they have in the past and the use will need to be operated locally,” Allain said. “In the past, the U.S. has exported billions of dollars’ worth of scrap to other countries, but we will see a reduction in this trend.”

Saderholm expects that demand for copper is going to steadily increase to levels we have never seen before, at a rate that even many professionals and experts in commercial and industrial operations cannot fathom.

“Designating copper as a critical metal is a necessary first step that is long overdue; surprisingly, it took this long to receive the status,” Saderholm said. “Critical metal programs for all these designated metals (e.g., lithium, cobalt, gallium) will receive increased government funding, grants and possible tax breaks to make sure they become a robust and reliable source of future products.”

For copper recycling and reclamation, process refinement and improved metallurgical techniques are ongoing and being tested in real time.

“With additional awareness, public education, funding, and increased processing capacity,” Saderholm said, “the growth of this marketplace can be greatly expedited to meet our ever-increasing global copper demands.”

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Mecalac, a global designer, manufacturer and distributor of compact construction equipment for urban environments, offers the AX1000 articulated loader. Combining heavy-duty performance with self-stabilizing maneuverability and a sleek design, the AX1000 – and all models in the AX articulated loader series – features maximum benefits in one cost-efficient package for utility, construction, landscaping and recycling. Mecalac offers a \$1,299 monthly payment, and five-year operating lease through DLL.



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www.sercoloaders.com

SERCO LOADERS LAUNCHES 8500 SERIES LOADERS

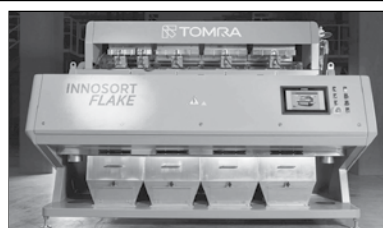
Serco Loaders, a leader in material handling equipment, has launched its groundbreaking 8500-SR32 and 8500-SR34 series loaders. These cutting-edge, double extend boom loaders represent a significant leap forward in the world of material handling, offering unmatched efficiency, versatility, and performance. Made in the United States and featuring the strongest and longest reach in their class as well as the fastest boom extension speed, these machines stand as a testament to innovation and power.



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www.stellarindustries.com

STELLAR INTRODUCES NEW NXT40 HOOKLIFT

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Cleveland-Cliffs reports full year 2023 results



Steel producer Cleveland-Cliffs Inc. reported full-year and fourth-quarter results for the period ended December 31, 2023.

Full Year Consolidated Results

Full year 2023 consolidated revenues were \$22.0 billion, compared to the prior year's consolidated revenues of \$23.0 billion.

As previously foreshadowed in Cliffs' 2022 10-K, full year results included a goodwill impairment charge totaling \$125 million, related to the tooling & stamping business within the other businesses segment, primarily driven by revised investment plans and higher discount rates. For the full year 2023, the company generated GAAP net income of \$450 million, or \$0.78 per diluted share, with adjusted net income of \$545 million and adjusted EPS of \$1.07 per diluted share. This compares to 2022 net income of \$1.4 billion, or \$2.55 per diluted share, with adjusted net income of \$1.4 billion or \$2.74 per diluted share. For the full year 2023, Adjusted EBITDA was \$1.9 billion, compared to \$3.2 billion in 2022. The reduction was primarily driven by lower steel index pricing in 2023 compared to 2022, partially offset by higher sales volumes and lower operating costs.

In 2023, the company recorded cash flows from operations of \$2.3 billion and had capital expenditures of \$646 million, equating to free cash flow of \$1.6 billion. During 2023, the Company reduced its

net debt by \$1.3 billion, using the majority of its free cash flow for this purpose.

Lourenco Goncalves, Cliffs' Chairman, president and chief executive officer, said: "2023 was another great year for Cleveland-Cliffs, in which we accomplished several goals in commercial, operations, finance and human resources. Steel demand remained healthy throughout the entire year, with our most important market – the automotive sector – performing well. Even with the UAW labor strike late in Q3 and into Q4, automotive steel demand remained consistently strong, as we anticipated. After it was clear that the strike was not creating any real issues in the marketplace, non-automotive clients de-stocking their inventories and betting on lower steel prices, were compelled to buy steel at higher prices."

Goncalves added: "Our 2023 total steel shipments of 16.4 million tons set a record since we became a steel company in 2020. We now have four consecutive quarters with steel shipments above 4 million tons. We generated robust free cash flow of more than \$1.6 billion and primarily used it to continue to pay down debt, while also repurchasing more than 10 million shares at an average price of \$14.68 per share. Our net debt of \$2.9 billion at the end of 2023 is below our publicly stated target of \$3.0 billion, and our liquidity is now at an all-time high of \$4.5 billion. We ended 2023 with a zero balance on our ABL, as planned. Going forward, and assuming a fair scrap marketplace – free from artificial, provoked and hard-to-explain moves – with scrap demand growing and scrap supply shrinking, there is no good reason for scrap prices to go down. If true supply and demand for scrap in the U.S. prevails, there is no good reason for HRC prices to go below \$1,000 per net ton."

December 2023 crude steel production

World crude steel production for the 71 countries reporting to the World Steel Association (worldsteel) was 135.7 million tonnes (Mt) in December 2023, a 5.3 percent decrease compared to December 2022.

Crude steel production by region

Africa produced 1.9 Mt in December 2023, up 17.7 percent on December 2022. Asia and Oceania produced 96.4 Mt, down 9.7 percent. The EU (27) produced 9.1 Mt, up 2.7 percent. Europe, Other produced 3.9 Mt, up 19.4 percent. The Middle East produced 4.9 Mt, up 9.6 percent. North America produced 9.3 Mt, up 5.3 percent. Russia & other CIS + Ukraine produced 7.1 Mt, up 11.8 percent. South America produced 3.2 Mt, down 3.2 percent.

The 71 countries included in this table accounted for approximately 98 percent of total world crude steel production in 2022.

Top 10 steel-producing countries

China produced 67.4 Mt in December 2023, down 14.9 percent on December 2022. India produced 12.1 Mt, up 9.5 percent. Japan produced 7.0 Mt, up 1.1 percent. The U.S. produced 6.8 Mt, up 7.6 percent. Russia is estimated to have produced 6.0 Mt, up 4.3 percent. South Korea produced 5.4 Mt, up 2.7 percent. Germany produced 2.6 Mt, down 2.3 percent. Turkey produced 3.2 Mt, up 21.2 percent. Brazil produced 2.5 Mt, up 0.9 percent. Iran produced 2.9 Mt, up 12.1 percent.

Top steel-producing countries

	Dec 2023 (Mt)	% change Dec 23/22	Jan-Dec 2023 (Mt)	% change Jan-Dec 23/22
China	67.4	-14.9	1,019.1	0.0
India	12.1	9.5	140.2	11.8
Japan	7.0	1.1	87.0	-2.5
United States	6.8	7.6	80.7	0.2
Russia	6.0	4.3	75.8	5.6
South Korea	5.4	2.7	66.7	1.3
Germany	2.6	-2.3	35.4	-3.9
Turkey	3.2	21.2	33.7	-4.0
Brazil	2.5	0.9	31.9	-6.5
Turkey	2.9	12.1	31.1	1.8

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Acerinox to acquire Haynes International

Acerinox, a company in the manufacturing and distribution of stainless steel and high-performance alloys, has entered into a definitive agreement under which Acerinox's wholly owned U.S. subsidiary – North American Stainless (NAS) – will acquire Haynes International, a U.S. leading developer, manufacturer and marketer of technologically advanced high performance alloys, in an all-cash transaction. Under the terms of the agreement, Acerinox will acquire all the outstanding shares of Haynes for \$61.00 per share in cash, which represents a fully diluted equity value of \$798 million, and a premium of approximately 22 percent to Haynes's six month volume weighted average share price for the period ending February 2, 2024. The all-cash transaction values Haynes at an enterprise value of approximately \$970 million. The transaction has been unanimously approved by the boards of directors of Haynes and Acerinox.



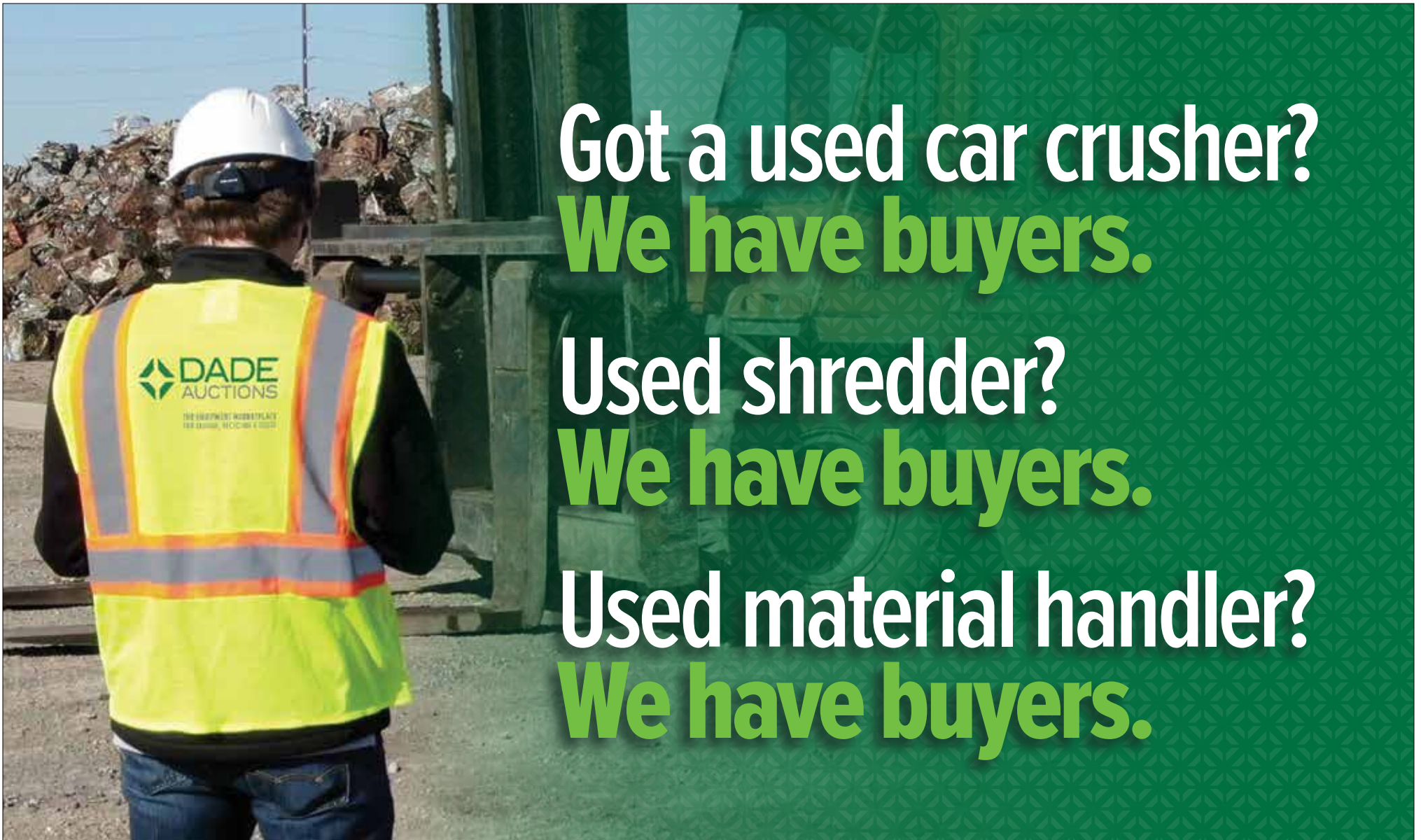
"This acquisition is aligned with Acerinox's key strategic priority of enhancing our focus on value-added products with an emphasis on excellence and sustainability, building on our successful acquisition of VDM Metals in 2020," Carlos Ortega Arias-Paz, chairman of the board of Acerinox, said. "The Haynes team has built a leading high performance alloys business that will now be supported by Acerinox's global operating and financial strength."

Acerinox plans to finance the transaction using existing available cash on its balance sheet. The transaction includes

the absorption of Haynes's debt and other adjustments of approximately \$172 million. The pro-forma debt of Acerinox is expected to reach 1.5x NFD/EBITDA in 2024, and then fall to 1.2x in 2025, in line with Acerinox's target through the cycle.

The transaction is expected to be immediately accretive to Acerinox's earnings per share in its first year of ownership, even prior to the realization of \$71 million in estimated annual synergies. In addition, the return on capital employed (ROCE) target of 15 percent is expected to be reached in year one.

The transaction is expected to close in the third quarter of 2024, subject to receipt of regulatory approval and the satisfaction of customary closing conditions, including approval by Haynes shareholders. Upon completion of the transaction, Haynes's shares will no longer be traded on the Nasdaq, and Haynes will become a wholly owned subsidiary of Acerinox.



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