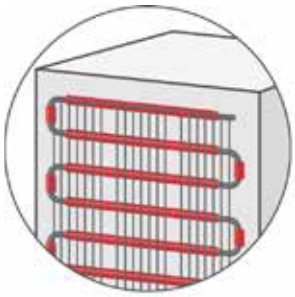
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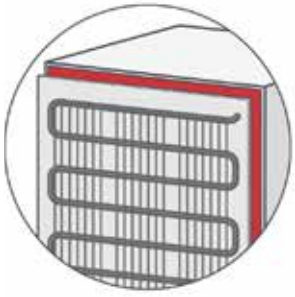
APPLIANCE & HVAC REPORT

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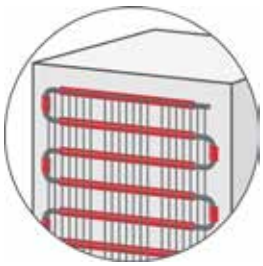
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Mastering High Voltage: The Importance of Accurate Test Equipment

Introduction

Accurate measurement of electrical performance parameters is crucial for the reliability and safety of high-voltage equipment and cabling.

For applications involving tens of thousands of volts, safety risks and demands on test equipment are high. Proper calibration of test instruments is essential to meet strict performance needs and standards, often conducted by certified laboratories with traceability to national standards like NIST.

This article is a synopsis of the full whitepaper available online at Vitrek.com and discusses the importance of high-voltage test equipment calibration and considerations for ensuring measurement accuracy.

HV Measurement Techniques

Various high-voltage measurement techniques have unique advantages and calibration needs:

- Step-Down Transformers: Reduce high voltage to manageable levels.
- Capacitive and Resistive Voltage Dividers: Divide voltage proportionally.
- Series Resistance (Microampere Measurement): Measure current through high resistance in series with voltage source.
- Analog Style Measurement Devices:
  - Sphere Gaps: Measure breakdown voltage between two spheres.
  - Electrostatic Measurement: Quantify electrostatic force between two plates

Why Measure High Voltage?

Measuring high voltage is increasingly important as technology advances. High-voltage systems reduce current carrying requirements and minimize energy loss. Also, in many cases, voltage values determine system performance. This means the voltage sources must be accurate and reliable in order to meet systems specifications. Also, monitoring systems need to be in place to ensure that the systems perform reliably from end-to-end and year-to-year.



Many types of equipment are used for high-voltage measurement.

High-Voltage Applications by Industry

High voltage is used in various fields including:

- Defense/Aerospace
- Manufacturing
- Research
- Power Products
- Inspection
- Medical
- Semiconductor
- And More

Conclusion

As technology advances, the importance of accurate high-voltage measurements will only grow, making it essential for industries to invest in proper calibration practices. Ultimately, mastering high-voltage measurement is about safeguarding both the equipment and the people who rely on it, ensuring a safer and more efficient future for all.

This article is a synopsis of a free whitepaper that provides additional materials including Calibration of High-Voltage Test Equipment and Choosing the right HV Test Equipment for the Application.

View the full article at: https://bit.ly/41XVNSi

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WOMEN INVENTING APPLIANCES

March was Women's History Month. And while the whole concept of Diversity, Equity and Inclusion (DEI) is currently out of favor for political reasons, I thought it would be interesting to learn about the following five women, all of whom were involved in the invention of various appliances. I'm talking about Margaret Colvin, Josephine Cochran, Florence Parpart, Melitta Bentz and The Lady Edison'' Beulah Louise Henry.

Colvin (1820-1894) invented the first rotary washing machine. Consisting of a tub on legs with a hand crank (remember them in real old cars ?) to turn a drum containing the dirty clothes. It was very labor intensive. But less so than the washboard featured in old Western movies!

Josephine Garis Cochran (1839-1913) was born in Ashtabula, Ohio, about an hour from Cleveland, where I reside. She invented a dishwasher using water pressure rather than ''scrubbers'' as they were called, the norm of the time. Her 1872 design was considered the most effective. The Garis-Cochran Manufacturing Co. became part of KitchenAid®, and in 1949, the first KitchenAid dishwasher was introduced to the public.

Florence Parpart (1873-1930) invented the first electric refrigerator, in 1914. It circulated water to keep it cold, revolutionizing food preservation and cooking. She also invented an automated street sweeper (and since power tools are part of our audience we will include it here)

Ever heard of Melitta coffee? Sounds Italian but Melitta Bentz (1873-1950) was of German extraction. Bentz was an inventor and entrepreneur known for revolutionizing the process of coffee brewing with her invention of the coffee filter.

And last but not least, Beulah Louise Henry (1887-1973). Known as The Lady Edison, Henry was granted 49 United States patents over the course of her career and is responsible for over 100 inventions. Her first patent was for a vacuum-sealed ice cream freezer, a device that eliminated the need for manual cranking.

There you have it. These five women, all born in the 19th century, are almost universally forgotten today. But their innovations were an important part of what later became our appliance industry.

Thank you to the National Inventors Hall of Fame www.invent.org whose research helped with the above.

One quick note, different subject. AHR this year had about 51,000 in attendance, up about 2% from 2024. Well done!

Brad Glazer

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APPLIANCE&HVAC REPORT
Reaching Design Engineers at the OEM Level

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at the
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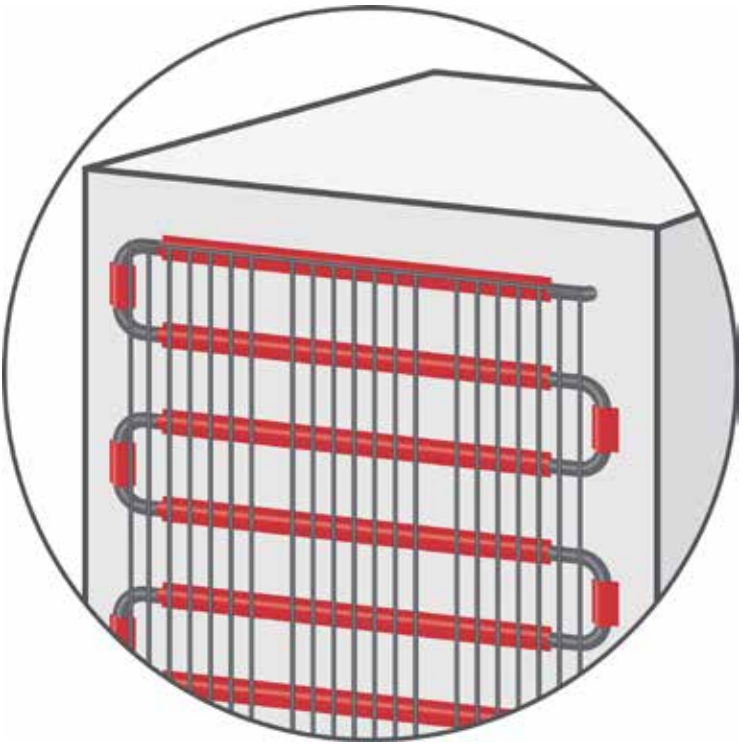
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Pressure-Sensitive Adhesives Key to Whisper-Quiet



Engineers in the appliance industry face many challenges in meeting consumer demand for feature-laden, attractive designs and quiet operation. That's why many designers are using pressure-sensitive adhesive (PSA) tapes to find solutions for residential and commercial appliances, particularly in reducing noise, vibration and harshness (NVH).

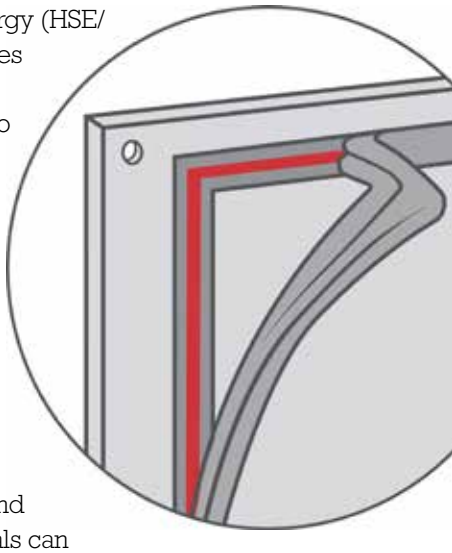
Building quieter machines is important for several reasons. Consumers want a comfortable home free from distractions, especially rumbling appliances. That is especially important for apartment dwellers and residents in smaller homes. In addition, governments are tightening regulations to reduce noise pollution.

Benefits of PSA Tapes

PSA tapes are versatile, as they bond to a wide range of surfaces, including paper, plastic, metal, glass and others. They can also be laminated and die cut into a variety of shapes to accommodate part designs. PSA tapes are available in multiple formats to suit a range of bonding needs, including single-coated, double-coated and transfer tape. PSA tapes are also available in low-odor and low-volatile organic compound (VOC) options.

A wide range of PSA tapes are available to help engineers overcome design challenges. For instance, Avery Dennison offers a portfolio of PSA tapes to further streamline assembly, enhance product durability and improve NVH damping qualities. The portfolio includes a wide variety of constructions, chemistries, and functional additives.

PSA tapes offer a highly durable solution for appliances, providing excellent adhesion, cohesion and tack to ensure a strong and lasting bond even when withstanding extreme temperatures, humidity and UV exposure. Some PSA tapes — known as differentials — are engineered for multi-substrate bonding, including high- and low-surface energy (HSE/LSE) substrates. These tapes feature different adhesives chemistries on each side to bond to that specific type of surface energy.



Ease of application is also a key advantage for PSA tapes. Unlike liquid adhesives, there is no need for special equipment. PSA tapes can be applied by hand or using simple machines to streamline production and reduce costs. NVH materials can be laminated to PSA tapes and applied to critical areas for peel-and-stick ease on an assembly line. Easy-release liners can further facilitate assembly and include constructions with a finger-lift edge.

Versatile PSA Applications for Reducing NVH

PSA tapes are widely used for NVH reduction in the automotive, aerospace and transportation industries. For appliance designers, PSA tapes offer solutions for refrigerators, freezers, stoves, microwaves, dishwashers, washers, dryers, portable heaters, air conditioners and more.

On exteriors, PSA tapes are used to mount small parts, brand emblems, decorative items and plastic trim as well as bonding display and control panel screens. On appliance interiors, PSA tapes are commonly used to bond gaskets, mount evaporators and coils and adhere felt and foam materials that reduce NVH and promote heat dissipation. Examples include:

- **Washing machines:** PSAs bond the outer tub and drum to reduce vibration and noise during the spin cycle.
- **Dryers:** Foam pads laminated to PET absorb NVH caused by spinning drums.

- **Dishwashers:** PSAs secure components and dampen vibrations from the water pump and spray arms.
- **Refrigerators:** PSAs attach insulation and dampen vibrations from the compressor and fan.

In addition to these large appliances, PSA tapes offer solutions for small appliances common in many households, such as hair dryers, coffee makers and more. PSA applications are similar to those for full-size appliances: interior and exterior bonding, heat dissipation and NVH mitigation.

These attributes make PSA tapes a sound option to other bonding choices. Mechanical fasteners – screws, nuts and bolts – add weight and complexity while liquid adhesives are messy and difficult to apply.

Advances in PSA Tapes Offer Innovative Solutions

Recent advances in PSA tapes have further enhanced performance in NVH damping in several key areas. For instance, advanced polymer blends offer superior viscoelastic performance across wider temperature and loading ranges. Designs that include nanoparticles and nanofibers offer improved energy dissipation and damping.

Today's PSAs offer improved shear and creep resistance while incorporating self-healing properties that ensure a long service life. Newer PSA tapes are thinner, lighter and stronger than ever. They integrate structural components to support lightweight, multifunctional assemblies.

Looking Ahead

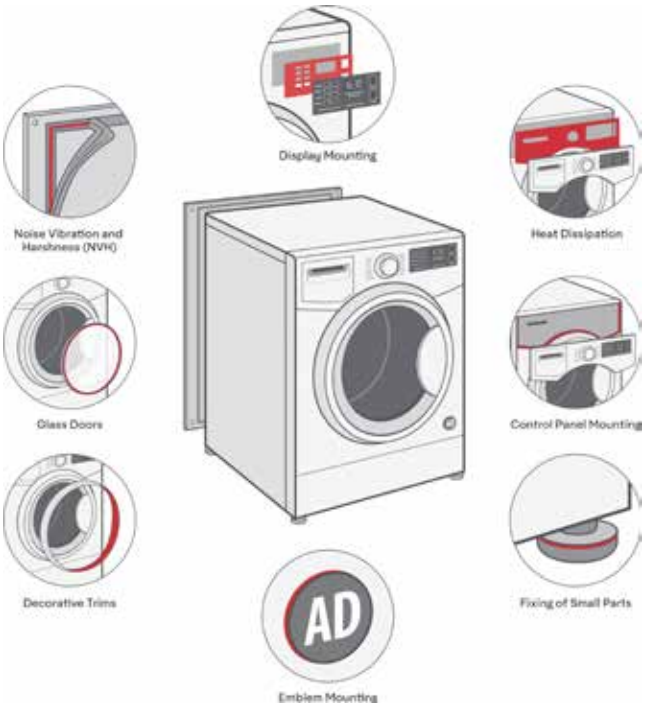
As designers keep pace with demand from consumers and businesses for quieter appliances, the PSA tape industry continues to work on new materials and adhesives. Ongoing research and development efforts seek new polymers, composites, and other materials with enhanced strength, flexibility, and adhesion. Continuing R&D may also develop new adhesives offering continuing improvements in bonding, temperature resistance and sustainability.

Engineers in the PSA tape industry will use more simulation and modeling to drive further improvements. This could include finite element analysis for structural analysis, computational fluid dynamics for fluid flow analysis, and other modeling techniques to predict material behavior and make designs better. These techniques may also yield materials and designs that are lighter with even better performance.

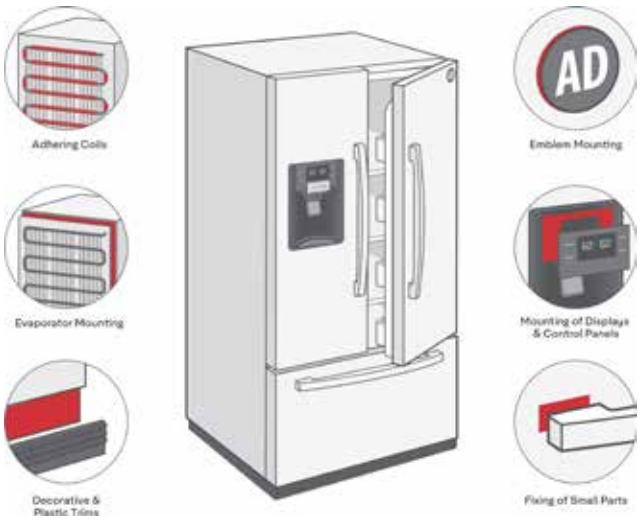
With these continuing advances, PSA tapes will be an increasingly valuable solution for appliance designers far into the future. As appliance engineers continue to drive innovation, PSA tapes will continue to offer the best combination of NVH mitigation, ease of application and durability to meet customer needs.



By Ricardo Soto, Senior Technical Engineer, Avery Dennison Performance Tapes



In washing machines, PSAs bond the outer tub and drum to reduce vibration and noise during the spin cycle.



Refrigerator caption: PSAs attach insulation and dampen vibrations from the compressor and fan to reduce NVH in refrigerators.

Moving from Just-In-Time

to Proactive Wire Preparation for a Stronger ROI

Control panels form the central nervous system of modern HVAC installations. They house the electrical components and control systems that manage everything from basic temperature regulation to complex building automation. Whether it's a simple commercial air conditioning unit or an intricate industrial climate control system, virtually every HVAC installation relies on these control cabinets to coordinate power distribution and signal processing.

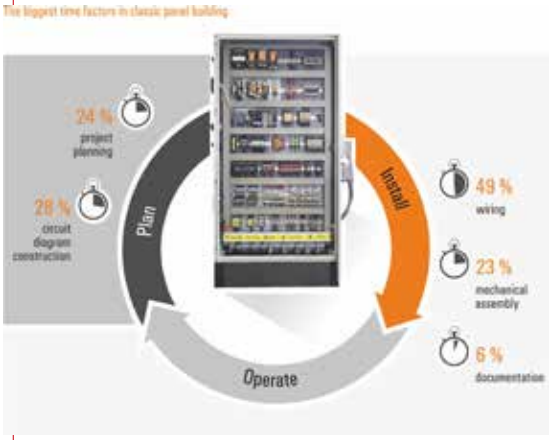
Yet the panel building industry faces mounting challenges. Perhaps most pressing is the widening gap in skilled labor availability. Professional panel assemblers should be able to expertly cut, strip and crimp wires, as well as understand the electrical drawing so they know how to wire the panel correctly. But there's currently a shortage of these critical skills, and it comes at a time when panel builders face intensifying pressure to reduce production times and costs while maintaining exacting quality standards.

The traditional approach to wire preparation – measuring, cutting, and terminating wires as needed during assembly – is increasingly at odds with these modern manufacturing demands. This article explores how moving from this "just-in-time" or "on-the-fly" wire preparation method to a proactive, systematic approach can help panel builders meet their challenges head-on.

Understanding the Wire Preparation Process

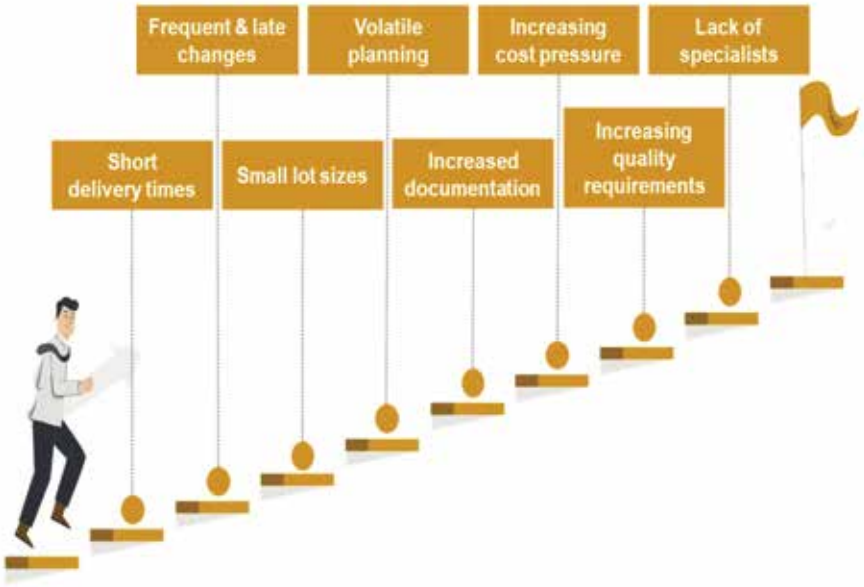
The assembly of control panels involves several critical steps in wire preparation, each requiring precision and attention to detail. A typical control cabinet can contain hundreds of wires, making the preparation process a significant part of the overall assembly time.

Every wire in a control panel requires multiple preparation steps. First, technicians must measure the wire to the correct length for its specific connection points. Next comes cutting the wire to size, typically done with hand tools in traditional panel building. The third step involves stripping – removing the insulation from both ends of the wire to expose the conductor for connection. Following this, technicians must crimp the appropriate connector, such as a ferrule or cable lug, onto each wire end. Finally, each wire needs proper identification marking to ensure correct installation and facilitate future maintenance.



When performed "on the fly" during panel assembly, this process becomes notably time-consuming. Panel builders sit in front of the panel containing a rack of wires with, say, 10-20 different wires in it. For each individual wire, they pull up how many feet of wire are needed and then they cut it and terminate it. This real-time preparation method leads to inconsistencies and inefficiencies. Technicians often err on the side of cutting wires slightly longer than needed to avoid coming up short, resulting in material waste. Moreover, the repetitive nature of measuring each wire individually introduces opportunities for errors and variations in quality.

The impact on cost and production timelines is substantial. This represents a significant



inefficiency, particularly when skilled technicians – who could be focusing on more complex tasks like interpreting electrical drawings and troubleshooting – are tied up with these basic preparation tasks. As panel volumes increase, these inefficiencies compound, leading to longer production times and higher labor costs.

More critically, this approach creates a bottleneck in production. Skilled workers, already in short supply, spend valuable time on tasks that don't require their full expertise. In an industry facing a growing skills shortage, this traditional wire preparation method increasingly appears unsustainable for meeting modern production demands.

Advantages of Proactive Wire Preparation

The traditional "on-the-fly" or just-in-time approach to wire preparation remains common in many panel shops, particularly for one-off projects or small production runs. Proactive wire preparation represents a fundamental shift in methodology. Rather than preparing wires during assembly, this approach moves wire preparation upstream in the production process.

Wires are prepared in advance, often in dedicated workstations equipped with specialized machinery. Modern eCAD systems play a crucial role in this transformation. If panel fabricators do the engineering right, with a proper eCAD program that has wire routing in it, they can extract the true lengths of wires and marking information. This engineering data can then feed directly into automated or semi-automated preparation systems.

While eCAD systems with wire routing capabilities represent the ideal scenario for automated wire preparation, many panel builders—especially smaller shops—may not yet have these advanced tools in place. However, this shouldn't prevent them from moving toward more efficient wire preparation methods. For HVAC panel builders in particular, the standardized nature of their systems creates opportunities for process improvement even without sophisticated software.

This manual documentation process, while initially time-consuming, becomes a valuable one-time investment. Panel builders can create detailed wire lists and specifications through careful measurement and documentation of their standard designs, which can then be used repeatedly for future builds.

Even if only portions of panels are identical across different projects, documenting these common elements can still provide efficiency gains. This approach makes proactive wire preparation accessible to smaller shops that might not be ready for full eCAD implementation, demonstrating that automation and process improvement don't require an all-or-nothing approach.

The advantages of proactive wire preparation are substantial in terms of:

1. Time Savings

By separating wire preparation from assembly, both processes can run more efficiently. In traditional panel building, wiring and mechanical assembly consume a large amount of time in the installation phase. Proactive preparation can significantly reduce this time by eliminating the stop-start nature of on-the-fly preparation.

2. Labor Optimization

Perhaps most importantly, this approach allows for better utilization of skilled labor. Building the panel requires a higher skill level than the field of preparing the wires for installation. This separation allows the more skilled technicians to focus on tasks that truly require their expertise, such as interpreting electrical drawings and performing final assembly.

3. Quality and Consistency

Automated or semi-automated wire preparation systems provide consistent results in cutting, stripping, and crimping operations. This consistency leads to higher quality connections and reduced rework. Also, panel builders get a better quality out of the crimp connection or more consistent quality because the human influence factor is taken out of this equation.

4. Waste Reduction

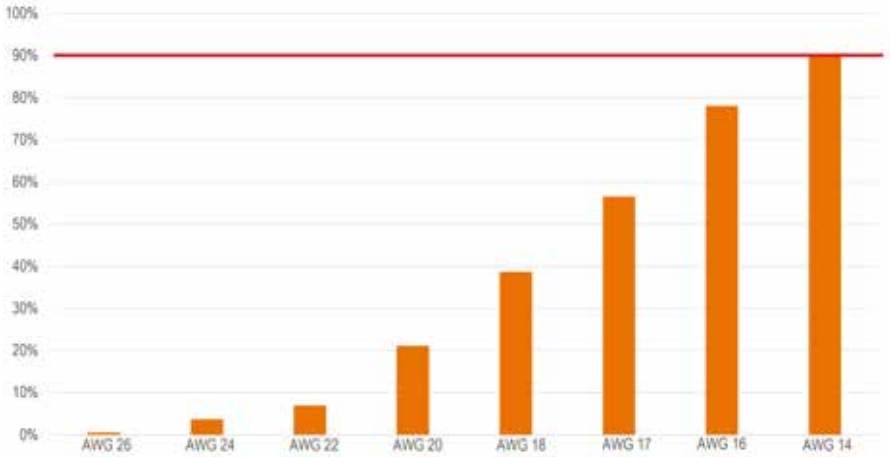
Proactive preparation, especially when coupled with automated systems, results in more accurate cut lengths. This precision eliminates the common practice of cutting wires slightly longer to avoid coming up short, reducing material waste.

Where Automation Makes the Most Sense

Understanding where to implement automation in wire preparation necessitates careful analysis of typical control panel requirements. The data shows a clear pattern: Looking at ferrule sales, panel builders can see that 90% of the wires in a control cabinet are smaller than AWG 14. This concentration of smaller gauge wires presents an ideal opportunity for automation, as these are the wires most frequently handled in panel assembly.

Several automation approaches are available, ranging from basic to comprehensive:

Stand-Alone Machines provide targeted automation for specific tasks like cutting, stripping, or crimping. These machines offer a practical entry point into automation, allowing panel builders to address their most time-consuming





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processes first. They're particularly effective for shops looking to incrementally improve their efficiency without a major system overhaul.

Assisted Workstations, also known as Wire Processing Centers, represent a more integrated approach. These semi-automated systems combine multiple functions under software control, guiding operators through the preparation process. A more inexperienced board builder can easily work it, because there's a screen that guides the operator through the steps of wire preparation. These workstations can handle cutting, stripping, crimping, and marking while maintaining flexibility for different wire types and sizes.

Fully Automated Systems offer the highest level of automation but are typically justified only in high-volume, standardized production environments. While these systems can dramatically increase throughput, they require significant investment and are less common in typical panel shops where flexibility is crucial.

Finding the right balance between manual and automated methods is key to maximizing return on investment. While automation excels at handling the majority of smaller gauge wires, certain scenarios still benefit from manual preparation. Larger wires (beyond AWG 14), which appear less frequently in panels, often don't justify automated processing because it wouldn't be cost-effective.

Perhaps most importantly, automated wire preparation provides scalability for growing businesses. Once established, automated processes can handle increased production volumes without proportional increases in labor costs. This scalability is particularly valuable in the HVAC sector, where standardized designs allow for efficient batch preparation of wires. In the HVAC industry, there is less variation within panels because HVAC units can be duplicated into different buildings. This standardization makes it easier to justify and benefit from automation investments.



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The optimal approach focuses on automating the high-volume, repetitive tasks that consume the most labor time while maintaining manual processes for specialized or low-volume wire preparation. This targeted automation strategy delivers the best balance of efficiency gains and investment returns, particularly in the HVAC

sector where standardized panel designs often mean predictable wire preparation requirements.

Practical Steps for Implementation

Making the transition to automated wire preparation requires a strategic, phased approach. Here's a practical roadmap for panel builders looking to modernize their processes:

- Begin by evaluating your current wire preparation practices through a detailed process audit. Document the types and quantities of wires used in your typical panels, paying particular attention to wire gauges. Understanding these patterns helps identify where automation will deliver the greatest returns. Also analyze which manual tasks consume the most time and create bottlenecks in your production flow.

- Next, focus on your engineering software infrastructure. Modern eCAD systems with wire routing capabilities can transform panel building efficiency. If you do the engineering right with a proper eCAD program that has wire routing in it, wire routing means you can do point-to-point routing. This program can extract the true lengths of this wire and also the mark information. This digital foundation enables seamless data flow from design to production, eliminating manual data entry and reducing errors.

- Start your automation journey with a pilot program. Rather than immediately implementing a comprehensive automation system, begin with standalone machines for your most common wire preparation tasks. Consider a wire processing center that combines multiple functions (cutting, stripping, crimping, marking) under software control, allowing you to evaluate the benefits while maintaining production flexibility.

- Perhaps most crucial is the human element of implementation. Train your workforce not just on operating new equipment, but on understanding the broader benefits of automated preparation. Show technicians how automation frees them to focus on more valuable tasks requiring their expertise.

- Consider cross-training opportunities that allow workers to develop new skills while maintaining production efficiency. This might include training skilled technicians on programming and maintaining automated systems while teaching entry-level staff to operate wire preparation equipment under software guidance.

In Conclusion

Remember that the goal isn't to eliminate manual processes entirely but to find the right balance of automated and manual operations that optimizes your specific production needs. As your comfort with automation grows, you can gradually expand its role in your wire preparation process.



By Niklas Bode, Business Development Manager for Workplace Solutions, Cabinet Products Division, Weidmuller USA



ADVERTORIAL

Readying the Market for A2Ls —From Atoms to Zoning Systems

The HVACR industry finds itself at a pivotal and exciting time, as the transition to A2L refrigerants is no longer on its way—it is underway. Currently, 80% of major air conditioning OEMs in the U.S. have selected R-454B (Chemours Opteon™ XL41), an A2L refrigerant offering a low GWP (AR4 of 467) replacement option for R-410A air conditioners and chillers. Moreover, due to Technology Transition Program regulations implemented under the U.S. EPA American Innovation and Manufacturing (AIM) Act, as of Jan. 1, 2025, certain equipment—including stationary residential and light commercial air conditioning and heat pumps—can no longer be manufactured with R-410A. Consequently, more R-454B equipment is rolling out, as warehouses empty their remaining R-410 equipment.

Chemours is frequently asked if the market is ready for this. We're also asked how members of the industry can be confident that their businesses will progress in step with the A2L transition and remain strong. Yes the market is ready for the transition—and so are businesses. This readiness is rooted in the collaboration taking place through the entirety of the A2L process, from "atoms to zoning systems" (that is, A to Z).







An innovator of next-generation refrigerants, Chemours collaborated early with OEMs and industry associations to understand the critical characteristics of new refrigerants that were necessary to deliver the solutions our customers needed across regions, climates, and applications. Then we went to work in the labs, applying the science required to lower refrigerants' GWP while achieving the optimal balance of sustainability, performance, safety, and other key properties.

As OEMs began to weigh their refrigerant options for new, AIM Act–compliant equipment development, many visited the Chemours Discovery Hub. With the opportunity to experience A2Ls at work and gain a better understanding of attributes like thermodynamic properties, OEMs saw how these refrigerants could support them in engineering technologies to meet demands for improved decarbonization, energy efficiency, and performance.

In 2023 our technical trainers began working with OEMs to train their dealers so they could have informed discussions with customers, support adoption of A2L technologies, and help launch equipment into the market. Simultaneously, our team educated thousands of contractors nationwide—and we continue to do so—creating a large force of technicians ready to install, maintain, and service A2L systems. We collaborated with businesses to meet their technicians where they were, literally in their workplaces or virtually.

Chemours has proudly supported thousands of technicians in achieving NATE certification and in acquiring skills that allow them to work with both A2L and R-410 equipment. We're also grateful for the opportunities to engage with other industry leaders at key positions along the path of the A2L transition—from engineers and OEMs to sales reps and HVAC technicians. This process of collaboration has taken shape for R-454B as well as other A2Ls such as R-454A and R-454C, used for commercial and industrial refrigeration applications. The A2L transition is underway, and the market is ready. We encourage you to get "refrigerant ready" by visiting the on-demand training page at opteon.com or contacting our technical support team with questions.

About Christina Spalding, Americas Sales Manager, OEM and Aftermarket - Thermal & Specialized Solutions, The Chemours Company, FC, LLC

Christina draws on more than 25 years of experience in the refrigerants industry to provide a diverse range of customer solutions rooted in tried-and-true chemistry formulated for today's most demanding performance and environmental needs. After obtaining her chemical engineering degree from the University of South Carolina, Christina began a career journey that gave her expertise in both stationary and mobile refrigeration applications, and established her appreciation for the critical ways refrigerants support society, given their roles in comfort cooling, food storage and transportation, medicine, cold storage, and all applications that require temperature control. Over nearly three decades, Christina has supported the industry through every major transformation—starting with the transition from ozone-depleting refrigerants (HCFCs) to non-ozone-depleting refrigerants (HFCs), then from HFCs to lower-global-warming-potential (GWP) HFOs.



By Christina Spalding, Americas Sales Manager, OEM and Aftermarket, Thermal & Specialized Solutions, The Chemours Company, FC, LLC

CO2 Emissions Associated with Stainless Steels – Facts and Reflections



Like any other major industry, the stainless steels industry consistently works to reduce its production CO2 emissions. Industry direct and indirect emissions have, due to solid industry improvement efforts, progressively reduced over the last decade. However, in order to assess the overall emissions picture when using stainless steels and other materials, it is imperative to also determine the emissions throughout a product's life, i.e.; from 'cradle to grave'. Only through this approach can a valid materials comparison be made.

As a starting point and in order to understand emissions associated with the production of stainless steels, it should be noted that within the stainless steels industry there are essentially two active production systems, namely:

- The scrap-based production system in which the bulk of used raw materials are end-of-life stainless steels and/or similar alloy materials that are recycled to produce new stainless steels. This production system is aligned to geographical locations where the availability of end-of-life materials and scrap is high.
- The Nickel Pig Iron (NPI) production system in which the bulk of the Nickel units required for stainless steel production is not derived from stainless steel scrap, but from extracted Nickel ores which are then converted into NPI. This production system is primarily but not exclusively aligned to geographical locations where the availability of stainless steel scrap is currently low.

There is currently insufficient 'available-to-use' end-of-life stainless steel scrap in all regions of the world to permit only a scrap-based production to exist. This situation is likely to remain for the foreseeable future.

To clarify what production emissions exist and where they originate from and in order to achieve these objectives, we have quantified the CO2 emissions from the accepted three sources.

- **Scope 1** Emissions; covering direct emissions from business-owned or business-controlled emission sources.
- **Scope 2** Emissions; covering indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by the reporting company.
- **Scope 3** Emissions; associated with the extraction, preparation and transport of ores and the subsequent production and transport of ferro-alloys including the energy needed for these processes.

These above-described three sources allow us to provide a cradle to gate view of the stainless steel industry's CO2 emissions.

Within the stainless steel industry, scrap has a high intrinsic value. The only limitation is the availability of scrap, especially in developing economies. Furthermore, the long usage life associated with stainless steels restricts the availability of scrap. For example, when stainless steel is used in buildings, it remains in use there for many decades without degradation.

Stainless steels are 100% recyclable and have the highest recycling rate (95%) of any widely used material.

This feature is illustrated within Figure 1 which shows

the importance of scrap in the production flow of stainless steels. According to the KIT Stocks and Flows study (2022), 95% of end-of-life stainless steels are collected for recycling. Of the collected end-of-life stainless steels, 74% is directly reused to make new stainless steels and 21% is reused to make new Carbon and Low Alloy steels. At an average global level almost 50% of the materials to produce stainless steel are scrap materials and other raw materials make up around 50% of the material used to produce stainless steel.

CO2 Emissions

Recent sustainability studies conducted by worldstainless (between 2007 and 2024) show that emissions from the production and use of stainless steels are generally low. However, and in order to clearly quantify the CO2 emissions during the production of stainless steel, we will identify the CO2 emissions from the categories previously defined as Scope 1, Scope 2 and Scope 3.

Scope 1 Emissions

The current scrap-based producer average is 0.41 tonnes of CO2 per tonne of stainless steel produced. 85% of the producer results sit (normally distributed) in the range 0.20 to 0.50 tonnes of CO2 per tonne of stainless steel produced.

Scope 2 Emissions

The current scrap-based producer average is 0.39 tonnes of CO2 per tonne of stainless steel produced. The figure has dropped from the average figure reported in 2023 which was 0.45. Changes in the regional energy grid mixes have positively impacted on Scope 2 emissions and thereby the figure has started to become lower than was historically seen.

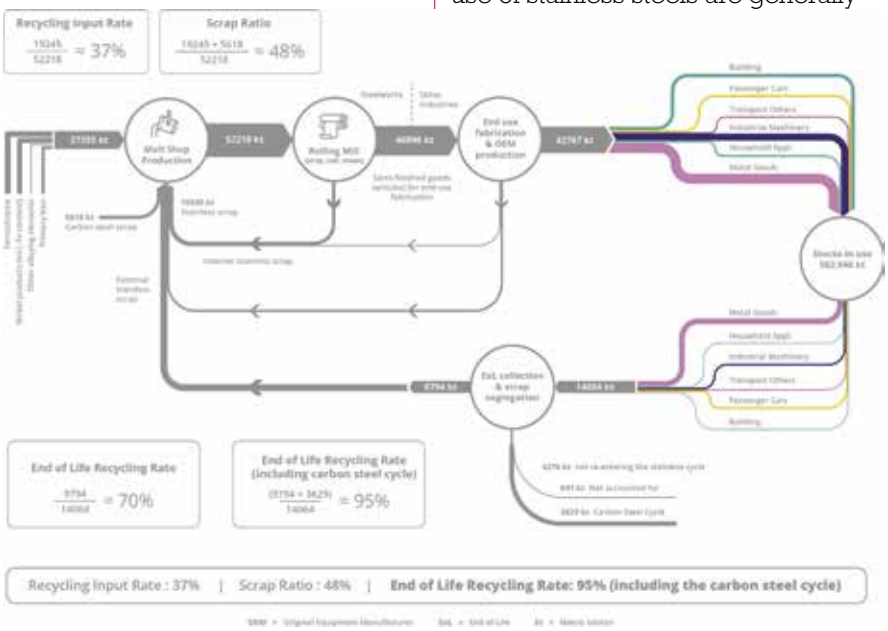


Figure 1 Life cycle of stainless steel for the year 2019.
Source: KIT and Team Stainless 2022

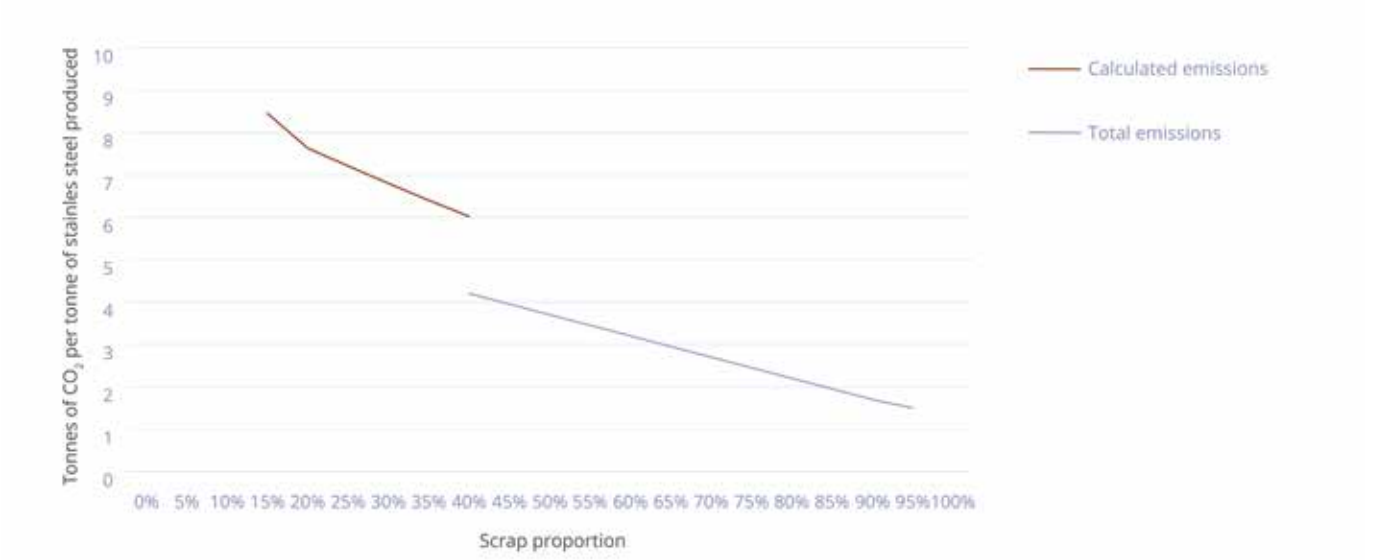


Figure 2: Actual CO2 Emissions for Scrap-Based Production and Calculated CO2 Emissions for NPI-Based Production
Data source: worldstainless, 2024
Please note that the graph contains calculated figures below 40% of recycled content.

	Scrap proportions	tonnes of CO_2/ton of stainless steel	Scope 3 proportions
Scope 1 emissions		0.41	
Scope 2 emissions		0.39	
Scope 3 emissions	85% scrap	1.15	59%
	75% scrap	1.65	67%
	50% scrap	2.90	78%
	30% scrap	6.00	88%
Total CO_2 emissions (ton CO_2) / ton stainless steel	85% scrap	1.95	
	75% scrap	2.45	
	50% scrap	3.70	
	30% scrap	6.80	
Carbon steel CO_2 emissions		1.89	

Table 1: CO2 Intensity data; Production year 2022
Sources: world stainless association 2024; World Steel Association

Scope 3 Emissions

Scope 3 emissions cannot be defined in the same manner. There is a linear relationship between the amount of recycled content (scrap stainless steel and scrap low alloy steels) charged and the magnitude of Scope 3 emissions. The higher the recycled content the lower the Scope 3 emissions.

Furthermore, the available data only covers recycled content (also known as the scrap mix) between 40% scrap and 97% scrap, which yields the following Scope 3 emission levels.

- 0% scrap; 2.90 tonnes of CO2 per tonne of stainless steel produced
- 75% scrap; 1.65 tonnes of CO2 per tonne of stainless steel produced
- 85% scrap; 1.15 tonnes of CO2 per tonne of stainless steel produced

In table 1 we can see how the Scope 3 emissions impact the total CO2 production emissions:

NPI production currently produces emissions in the average range (designated by geographical source) of 60 to 85 tonnes of CO2 per tonne of Nickel produced. This means that if NPI is used to make an 8% Nickel containing stainless steel, the increase in Scope 3 emissions (when compared to a 40% scrap mix) associated with this route will typically be between 4.0 and 6.0 tonnes of CO2 per tonne of stainless steel produced.

NB; For comparative purposes, a 40% scrap mix with zero NPI delivers a Scope 3 emissions level of 2.80 tonnes of CO2 per tonne of stainless steel produced.

Life Cycle Emissions

As stainless steels are reusable, durable, and corrosion resistant materials offering low maintenance needs and a long service lives it is important to consider life cycle emissions, ie; all the Carbon-equivalent emissions released during the different phases of the product life cycle. It is also needed to determine the emissions frequency at each stage over the life

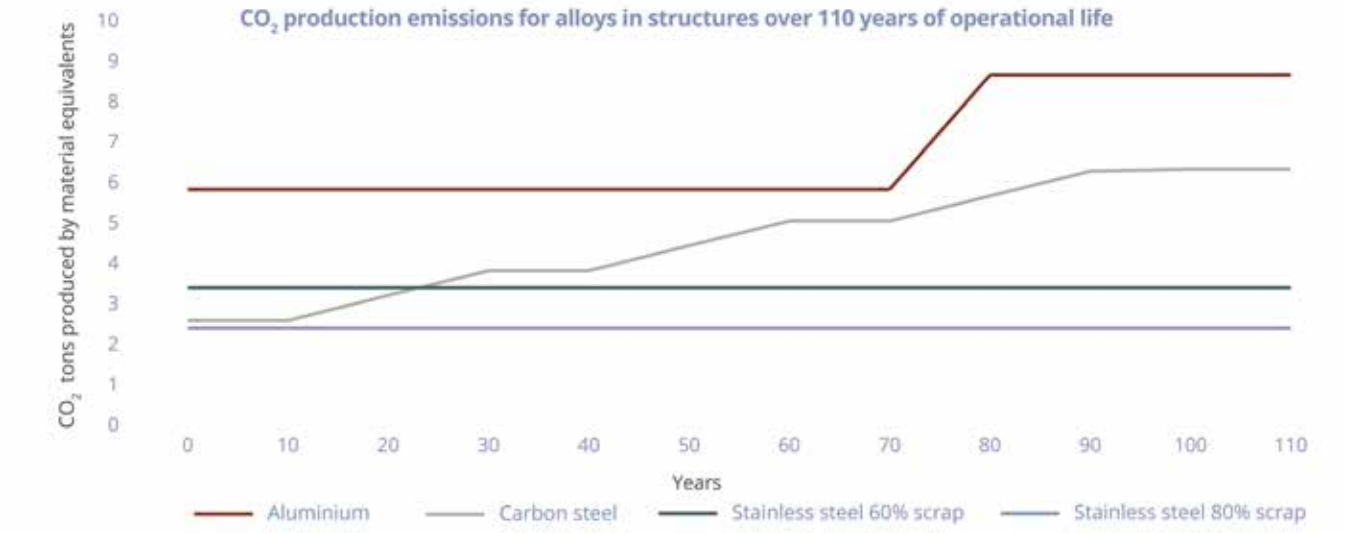


Figure 3 CO2 production emissions for alloys in structures over 110 years of operational life

cycle, covering material production, material transport, material fabrication, fabricated product transport, installation, maintenance, replacement, and recycling.

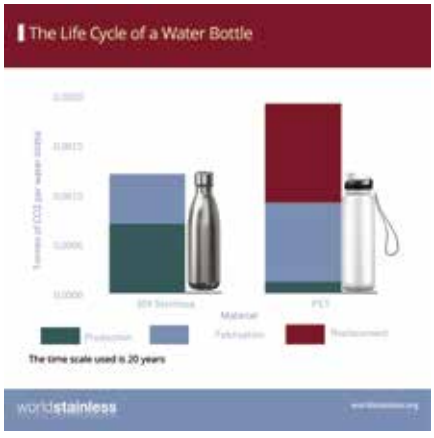
Material Life Cycle Emissions

Figure 3 shows the CO2 production and maintenance emissions for stainless steels, carbon steel and aluminium. Two different stainless steels have been included, namely Stainless 1 which is produced with an 80% recycle content and Stainless 2 which is produced with a 60% recycled content.

The data comprises CO2 tonnes emitted per tonne of material produced plus any CO2 emissions associated with regular maintenance needs. The Carbon steel emissions increase every 10 years due to regular maintenance needed to supress corrosion. Stainless Steels and Aluminium emissions do not increase as their passive films prevent the need for regular maintenance.

The CO2 emissions data and associated included recycling credits are industry supplied figures. The Aluminium data has been adjusted downwards to reflect the fact that the density of Aluminium is about one third that of carbon steel and stainless steels.

Example: The Life Cycle of Water Bottles



It is possible to illustrate how stainless steels can in the long term be the material offering the lowest CO2 emissions. The life cycle emissions of two reusable water bottles are shown below. The Stainless Steel water bottle has higher CO2 production emissions, but because this bottle will last at least 20 years and a PET* bottle will need to be replaced at least 10 times in these 20 years, the stainless steel water bottle will ultimately be the lowest emitter of CO2.

Summary

It is fair to say that considering the production emissions for stainless steels are only partly informative. There are two high-level production systems at play both of which are necessary to support the global demand for stainless steels. Over the coming years the production emissions associated with Nickel Pig Iron (NPI) will progressively fall as greener technologies for the production of NPI become widely adopted.

Furthermore, the life cycle emissions associated with using stainless steels offer a different and more compelling perspective for the benefits of using sustainable and resilient materials. Selecting materials that do not degrade and equally do not require significant maintenance and/or partial replacement presents a different and much lower emissions profile.

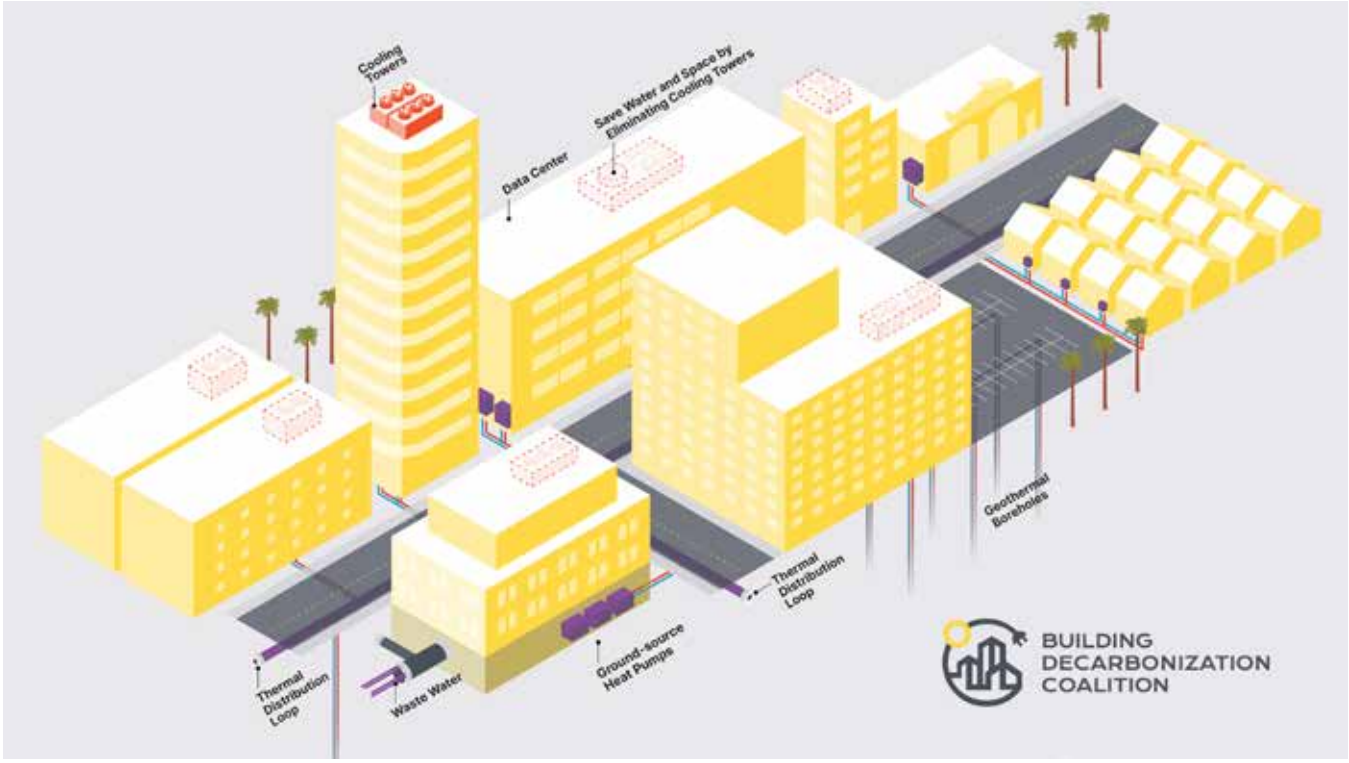
More information on application-aligned comparative materials sustainability modelling can be found via info@worldstainless.org or on the worldstainless website: https://www.worldstainless.org/about-stainless/environment/stainless-steels-and-co2-industry-emissions-and-related-data/



Tim Collins, MBA, BMet (Hons), Dip P&IM
Secretary-General world stainless association
Tim was born and grew up in the home of UK stainless steelmaking, Sheffield. Whilst at school he worked part-time for his father making steelworks thermocouples and laboratory furnaces. After leaving school he studied metallurgy at university and joined British Steel Stainless immediately after graduating. A succession of industry mergers saw Tim undertaking senior stainless technical, operations and supply chain roles in the Netherlands, Sweden, and the UK before joining the ISSF (now worldstainless) in August 2019. During his career Tim also found time to study Goldratt's teaching on lean flow and operations, gain a post-graduate diploma in operations and inventory management and a masters degree in business administration.
Away from work Tim still supports his boyhood football club, Sheffield Wednesday and enjoys rock music, cycling, fine wines and craft ales.

Multi-Solving for Sustainability:

Optimizing Building Cooling and Water Conservation



The HVAC industry is at the forefront of innovation in building energy efficiency and sustainability. Original Equipment Manufacturers (OEMs) play a pivotal role in developing cutting-edge technologies and systems to solve the urgent problem of building emissions. OEM design engineers have answered the call for more efficient decarbonized systems, with air-source heat pumps now outselling gas furnaces. But building decarbonization is not the only challenge facing this industry. Two interrelated problems, rarely considered at the same time, are building decarbonization and water conservation.

Traditional commercial and industrial HVAC systems, particularly water-cooled chillers and evaporative cooling towers, are notorious for their substantial water consumption. These systems rely on evaporation to remove heat. Large buildings in the U.S.—an estimated 81 billion square feet—consume millions of gallons of water annually to cool indoor spaces through evaporative cooling. In an era of water scarcity, this poses a serious sustainability challenge for OEM design engineers, as they are tasked with improving system performance in a changing climate while minimizing environmental impact.

Geothermal (or ground-source) heat pumps have been shown to reduce or eliminate the need for evaporative cooling while maintaining efficient temperature control. And when geothermal heat pumps are linked in systems known as thermal energy networks (TENs), they can share and balance thermal energy across multiple buildings, further enhancing efficiency, reducing costs, and supporting large-scale water conservation efforts.

TENs use a network of underground, water-filled pipes to link multiple buildings and thermal energy sources. Those sources include the earth, bodies of water, or buildings' own waste heat. The water in the pipes acts as a heat transfer medium without evaporative losses. In every building, geothermal heat pumps facilitate heat exchange.

Real-World Water Savings Data

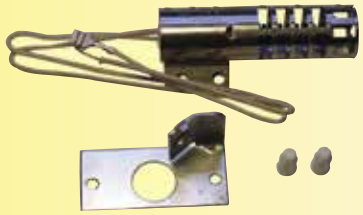
We at the Building Decarbonization Coalition compiled a first-of-its-kind analysis of water savings in TENs. Across eight installations that reported water savings, we found that these systems saved approximately 337 million gallons

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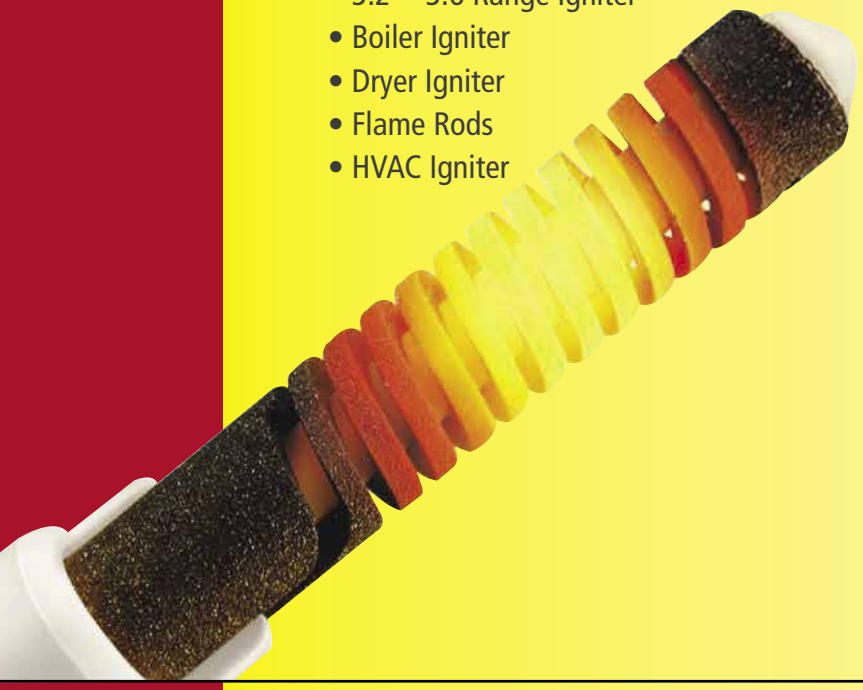
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of water annually, equivalent to the average yearly water use of 3,000 U.S. households.

While water savings varied depending on system design and the number of connected buildings, the surveyed sites show annual savings between 18% to 46%, or 3,000 and 18,000 gallons per cooling or heating ton.

OEM design engineers and the broader HVAC industry should take note of TENs' water-saving potential for a number of reasons.

Sustainable Cooling: Data from 50 U.S. cities shows that the heat wave season is now 46 days longer than it was in the 1960s, and occurrences have tripled from two per year in the 1960s to six per year in the 2010s and 2020s. TENs provide reliable and efficient cooling across diverse climate zones that may experience drought or scarcity in addition to rising temperatures.

System Scalability: TENs can be expanded to serve multiple buildings, making them ideal for district cooling applications in campuses or commercial districts. Colorado Mesa University and Miami University have both added to their campus thermal energy networks over time.

Saving Water, Saving Money: TENs reduce the maintenance costs associated with evaporative cooling towers, including frequent water replenishment and chemical treatment of water in cooling towers. TENs eliminate or reduce reliance on these maintenance-intensive pieces of equipment.

Using distributed heat pumps within TENs also offers substantial operational savings by reducing energy costs. Heat pumps use ground-source or ambient energy, which lowers electricity consumption, particularly during peak cooling and heating seasons. Networked heat pumps can redistribute excess heat between buildings, balancing energy loads and further reducing operational costs by optimizing thermal management. Colorado Mesa's TEN, which was included in our report, has achieved an impressive yearly average Coefficient of Performance (COP) of 5.7; this efficiency has translated directly to consistent utility bill savings.

The Future of TENs: What OEM Design Engineers Need to Know

TENs are poised for growth. Federal funding has unlocked millions of dollars for community TENs, while eight states have passed legislation allowing or mandating gas utilities to pilot TENs.

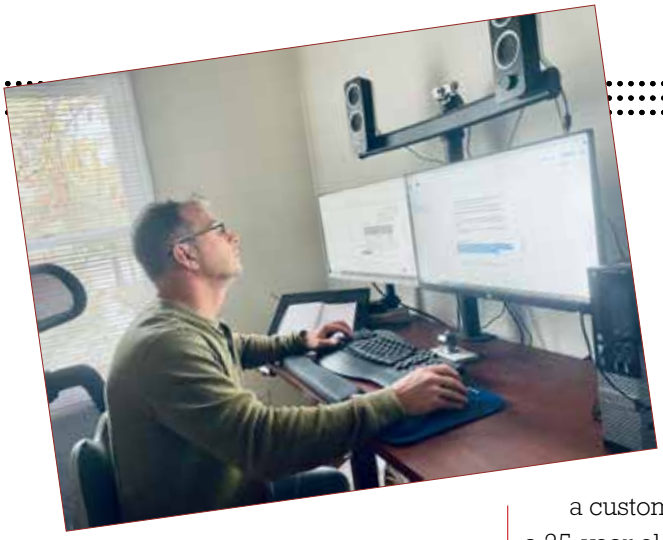
Meanwhile, local water conservation ordinances can affect building cooling system specifications: for example, in 2023, the Southern Nevada Water Authority Board of Directors voted to support a moratorium on installing evaporative cooling towers in new buildings in the Las Vegas Valley.

The convergence of water conservation requirements and decarbonization goals invite design engineers to roll up their sleeves in designing future-proof systems. Engineers should prepare for increased demand in TENs-related equipment and expertise. By focusing R&D efforts on TENs-compatible equipment now, OEM design engineers can develop, innovate, and improve products for a more resilient and sustainable built environment, while establishing their companies as leaders in this growing market.

As more regions implement water conservation mandates and building owners seek smart, sustainable solutions, OEM engineers who develop TENs-compatible products will be positioned to lead the industry transition to water-wise cooling solutions, define technical standards for the next generation of building systems, and drive innovation in thermal energy components and infrastructure. TENs offer OEM design engineers the opportunity to reshape building infrastructure for a water-constrained and climate-resilient future.



By Ashley Besic, Senior Associate, Thermal Energy Networks Building Decarbonization Coalition



How a Side Gig Answering Online Appliance Repair Questions Turned into a Lucrative Full-time Remote Career

If you would have asked me back when I was a ground equipment mechanic in the Air Force or later as an appliance technician with Sears and GE whether I could have pictured making a living without ever getting my hands dirty, from the comfort of my own home, I would have laughed and called you crazy. But that's pretty much exactly my life today – and the income is much more lucrative than I could have ever imagined. That's because for the past three years my full-time job has been as an Appliance Repair Expert on JustAnswer, a global platform connecting verified and vetted experts with people seeking immediate, professional help via online consultations and phone calls.

Gone are the days when I hop in a van for a home visit to check out someone's leaky dishwasher or malfunctioning dryer. Today, instead, I help diagnose problems, troubleshoot and then coach people through DIY appliance repairs if possible through the phone or online chat – and get paid to do so. Another bonus? I get to help people save money and solve everyday household problems so they can get on with their lives.

For example, recently I helped a customer successfully repair a 25-year-old Whirlpool washing machine with a bad speed sensor. Other times, I've helped the customer remove the child lock from the control panel by pressing the correct sequence of buttons. There was even the time that I helped someone diagnose and replace a bad diode on a microwave oven.

It all started about three years ago. Having been involved in maintenance (homes/apartment, appliance repair) for more than 20 years, I was interested immediately when I started to notice ads for more and more opportunities for online and remote work in my field. Finally, I saw an Instagram promotion for JustAnswer that seemed like a good fit – work-at-home opportunities for an appliance technician like myself.

Originally, I started working on the platform only part-time because I didn't have the trust or confidence that this would truly be a financially viable option. At first, I was going onto the computer for an hour or two per night to check it out for a couple of nights a week. After I did that for a month and saw that I had made a couple grand, I thought "wow." Slowly, I started spending more and more time on JustAnswer– and made $90K in the first year doing it only part-time.

Organization, Discipline and Prioritization = Keys to Online Success

If it seems like trading actual tools for a keyboard and phone are an easy ticket to big bucks in this line of work, that's not an accurate picture of what it really takes to make it as an online appliance expert.

For me, transitioning to online work was a fairly natural fit because working in the field involved honing my people skills and developing a sense of self discipline and organization from years of running a route and maintenance requests.

The people skills really are paramount in this job. That's because you're really dealing with the full



spectrum of customers who come in through the platform, from people with some skills to those who should not be holding a tool ever. Sometimes you need to decide when someone is just not going to 'get it' and you need to move on. For example, I'll ask ''do you have a multimeter?'' If they have no idea what I'm talking about and/or don't have the basic tools, I know what level of skill set I will be working with. For example, a dryer might be just a matter of checking the power first, number-one. If you don't have a multimeter, you won't be able to even test whether you have the correct voltage. And then, let's face it, there are times when people write or call in with extremely strange questions like the time a customer believed their microwave was recording their conversations as part of a government surveillance operation.

At the same time, while you're interacting with many different types of people by phone and online, you do have to be comfortable working from home, in front of a computer for hours on end. Lots of people truthfully want to get out of the house or might not have a dedicated home office space. But being successful means being online and available when the opportunities arrive.

Over the years, I've developed a few systems for being more efficient at the job. For example,

I have two large computer screen monitors open at all times – on one I have a giant Word doc always open with common Q&A scripts for the most common queries. Drafting scripted responses to the most frequently asked questions and troubleshooting issues helps save time and enables me to process more questions per hour. I'm also subscribing to forums that provide detailed technical data I can access for especially challenging customer problems.

Another key to success in this job is knowing which questions to skip and what topics to focus on that you're most confident about. For example, I tend to avoid queries involving Subzero, Viking or Bosch appliances, since it's very difficult to access all the information and parts that people might need to do DIY repairs. However, there is one specific type of question about a Bosch error code that I can explain in my sleep. The customer sees a large H with two numbers behind it and fears it is an error or fault code but it's only a time delay that was selected. H01 means in one hour the wash cycle would start , typically pressing and holding the start button will reset the unit.

Finally, this is not the job for someone who is not used to tracking their own earnings and making the right preparations for taxes as a 1099 worker. That can take some adjustment for someone who has always collected a regular paycheck. You will also need to plan on healthcare for you and your family.

Overall, I'm a big believer in the service that I provide and the reason this kind of a platform makes so much sense. Just about every single traditionally blue collar field will be incurring a charge for an in-person visit, even just for the initial consultation - so this kind of service can save someone hundreds of dollars. It's great to help empower people to find answers to their problems and make DIY repairs when possible – and help them know when they really do need to call in someone for that expensive house call.



Author Bio: Matthew Rankin - JustAnswer Appliance Repair Expert
Greenville, South Carolina-based Matthew Rankin has been an appliance repair specialist on JustAnswer since March 2022. Prior to joining JustAnswer, for the last 6 years, he was involved with apartment property management as a maintenance supervisor, and prior to that was an appliance technician with Sears and GE factory service for almost 20 years. He was also a ground equipment mechanic in the Air Force.



What's Happening

Vitrek Adds New 16-Bit Resolution, 4 Channel A/D Card to GaGe Product Line

Sabre Express Product Designed for Customers Needing High-Resolution & Mid-level Speeds

Vitrek, a US-based manufacturer of high-end test equipment and signal recording systems, has added the Sabre Express, a 4-channel analog-to-digital converter card to its GaGe line of digitizer cards.

Featuring 250 MS/s, the Sabre Express card provides a 4-channel alternative to the GaGe line of 16-channel digitizer cards currently available offering 500 MS/s or 1 GS/s.

The Sabre Express features a 6GB/s PCIe x8 interface that can deliver real-time streaming to the host over sustained periods of time.

The 4-channel Sabre Express card can be combined with various PC solutions to serve as the heart of a wideband, multi-channel, RF/Microwave signal analysis and recording system. The card supports both Windows 10/11 and Linux operating systems and is offered with the GaGeScope PC Oscilloscope software, including development kits for C/C#, Python, LabVIEW, and MATLAB systems.

''Customers have been coming to Vitrek looking for a pared-down high-resolution digitizer system for the wide range of applications that do not require the added speed and flexibility of our high-end systems,'' said Gary Schafer, Vitrek President, adding that the card offers the same outstanding signal-to-noise ratio that has made GaGe cards popular worldwide.

Click here or visit the Vitrek website for details on the Sabre Express and Vitrek's full line of digitizer cards.

About Vitrek and GaGe

The GaGe digitizer cards are recognized worldwide for combining high-speeds with high-resolution and application flexibility. Their outstanding signal-to-noise ratio distinguishes them in the marketplace for enabling users to achieve the highest effective number of bits at any speed. Vitrek's Sabre Express Digitizer follows a long line of GaGe card products that have helped researchers and scientists solve hundreds of ground-breaking discoveries. Read overviews of how GaGe cards assisted these breakthroughs in the summaries of published white papers available on Vitrek.com.

Vitrek, the umbrella brand for all our test and measurement products, is also the world-recognized brand name for our high-voltage testing equipment, multi-point high-voltage switches, and graphical power analyzers.

Vitrek's MTI Instruments includes various precision engine rotor measurement/balancing tools and non-contact measurement equipment used by industry leaders worldwide. For applications from jet engine balancing to semi-conductors and film measurement.

Pfeiffer Vacuum Becomes Pfeiffer Vacuum+Fab Solutions



Pfeiffer Vacuum, a member of the global Busch Group, is proud to announce the introduction of its new name and refreshed logo, marking the evolution of the company into Pfeiffer Vacuum+Fab Solutions. This rebranding reflects the comprehensive portfolio of Pfeiffer as a one-stop supplier for both vacuum solutions and semiconductor fab solutions.

The updated logo incorporates a stylistic representation of a turbopump's rotor blade and stator blade, reflecting the spirit of innovation that has always defined the company and will continue to shape the vacuum industry.

The introduction of the new name and logo marks the seventieth anniversary of the company's first major innovation. In 1954 and 1955, the turbomolecular vacuum pump was developed at Pfeiffer – a technology that revolutionized the world of vacuum. Today, within the Busch Group, Pfeiffer is a world-leading provider of solutions for high and ultra-high vacuum technology with a comprehensive product portfolio also including leak detectors, measurement and analysis devices, components as well as vacuum chambers and systems.

''Our new logo is more than just a trademark. It tells our story, which began with the invention of the turbopump and became a global success. Our teams design and manufacture products that are used in the world's most high-tech applications and future megatrends, exploring the frontiers of knowledge'', explains Wolfgang Ehrk, CEO of Pfeiffer.

Menlo Micro Announces Global Distribution Agreement with DigiKey to Promote and Deliver Ideal Switch® Products

Partnership Will Enhance Company's Worldwide Distribution Network to Better Support Customer's Diverse Business and Technical Need

Menlo Microsystems, the company responsible for bringing to market the greatest electronic component innovation since the transistor with its Ideal Switch® technology, announced a new global distribution agreement with DigiKey, a leading global commerce distributor. Under the terms of the agreement, DigiKey becomes a franchised distributor for worldwide marketing and sales of Menlo Micro's innovative Ideal Switch® products.

''This partnership focuses on expanding Menlo Micro's Ideal Switch technology to an even wider group of power and RF designers by leveraging DigiKey's world-class distribution expertise,'' said Yalcin Bulut, COO at Menlo Micro. ''The addition of DigiKey as a global distribution partner will not only empower engineers and designers to leverage our breakthrough technology for a wide range of applications, but it will also strengthen our worldwide distribution network to better support the expanding business and technical needs of our customers.''

Menlo Micro's Ideal Switch technology revolutionizes the way switches operate, offering unmatched performance, reliability, and efficiency with no compromises. Unlike traditional electromechanical switches, the Ideal Switch leverages a unique combination of semiconductor technology and cutting-edge design, resulting in higher efficiency, reduced size, and a longer lifespan — benefiting a wide range of products in Smart Energy, Home Automation, Industrial IoT, Test and Measurement, Aerospace and Defense, Telecommunications, Consumer Electronics and Medical.

''DigiKey is excited to add Menlo Micro's Ideal Switch technology to our line card,'' said Ken Paxton, Director, Advanced Semiconductor at DigiKey. ''This partnership allows us to connect engineers and designers around the world with advanced switch solutions to enhance their products and designs and support their efforts to create cutting-edge technology.''

Through this agreement, DigiKey will provide customers with immediate access to Menlo Micro's Ideal Switch products, facilitating rapid design cycles and enabling engineers to implement advanced solutions to their applications. The collaboration aligns with both companies' commitment to innovation and customer satisfaction in the ever-evolving electronics market.

Polymer Resources Advances Corporate Sustainability Strategy with Launch of New Materials Featuring Reduced Carbon Footprint





Polymer Resources Ltd., a leading U.S. compounder of high-quality engineering resins, today announced the commercialization of its new and growing sustainable materials portfolio. Currently comprising four general-purpose resin grades, by mid-2024 this portfolio will expand to include several flame-retardant products listed by Underwriters Laboratories (UL). All grades in the portfolio contain at least 50 percent recycled content, helping to reduce their carbon footprint and meet customer demands for products containing recycled materials. This initiative is one aspect of the company's robust sustainability strategy, which also includes reducing fossil-based energy consumption, emissions and landfill waste, and promoting safety and wellness internally and in the community.

''Sustainability is an integral part of our business, and we are passionate about supporting sustainable practices and principles within the plastics compounding industry,'' said Scott Anderson, president and chief operating officer, Polymer Resources. ''Developing new products containing a significant percentage of recycled content is one important way we can help the industry and our customers reduce carbon emissions and increase circularity – without compromising on performance or quality. We look forward to expanding our sustainable portfolio with new materials in the near future.''

Starting Strong with General-purpose Resins

To meet the needs of many customers, Polymer Resources initiated its sustainable materials portfolio with the development of four general-purpose grades, each containing a minimum of 50 percent recycled content. The four commercially available products consist of a low-flow polycarbonate (PC) resin (PC-GP1S), a medium-flow PC resin (PC-GP2S), a high-flow PC resin (PC-GP3S), and a PC/acrylonitrile-butadiene-styrene blend (PC/ABS-GP1S). All are opaque and available in natural, black or custom colors. The properties and processing parameters of these grades are very similar to those of their virgin counterparts, making it possible, in many cases, to use these sustainable resins as drop-in replacements for existing fossil-based resins.

PHOTO: Power tools, components for small appliances and switch plates are examples of applications that could be made with Polymer Resources' expanding portfolio of sustainable materials with UL listings.

Polymer Resources' new and growing sustainable materials portfolio of four general purpose grades will soon expand to include several flame-retardant products listed by Underwriters Laboratories (UL). All grades in the portfolio contain at least 50 percent recycled content, helping to reduce their carbon footprint and meet customer demands for products containing recycled materials.



S&P USA Ventilation Systems Names Jeff Ledsinger National Director of Sales

S&P USA Ventilation Systems Names Jeff Ledsinger National Director of Sales.jpg

S&P USA Ventilation Systems LLC , a leader in the sales and distribution of HVAC air movement products throughout North America, has named 32-year HVAC industry veteran Jeff Ledsinger as its National Director of Sales.

Ledsinger will direct S&P USA's domestic sales team; manage all national accounts and buying groups; and liaise with S&P USA's North American sister companies S&P Canada Ventilation Products, Mississauga, Ont., RenewAire, Waunakee, WI, and S&P Air Control, Chattanooga, TN.

His promotion follows three years as S&P USA's Central Regional Manager, where he oversaw 15 states. Previously, Ledsinger was Director of Sales at Bartos Industries, Dallas, TX; Sales Manager at Gunder Associates, Carrollton, TX; and served as North Texas Territory Manager at Nu-Calgon, St. Louis, MO. He holds a BA degree from Southwest Texas State University.

To accentuate S&P USA's corporate mission, ''Enabling the World to Breathe Better Air,'' Ledsinger will expand many current programs and strategies, including ''Quickship,'' sales team communication, sales leader development and customer/technical support. He plans to continue new product development to accommodate standard HVAC applications and niche markets that will further strengthen S&P USA's single-source ventilation reputation.

''We're looking for Jeff to grow the sales of S&P USA and its North American sister companies to new levels,'' said Walter (Buddy) Doll, CEO and President, North American Division (Jacksonville)—Soler & Palau Ventilation Group, Barcelona, Spain.

Ledsinger will also serve as a liaison between S&P USA and Soler & Palau Ventilation Group's recent acquisition of four North American HVAC companies. United Enertech Corp, Air Performance LLC, Air Conditioning Products LLC, and Metal Form Manufacturing LLC are now grouped under the S&P Air Control brand. The additions of grilles, registers, diffusers, air terminal units, and specialty HVAC sheet metal products further expands the company's already comprehensive mechanical ventilation portfolio.

Aspen Founder Remembered as a Dedicated Leader James Piccione



Funeral services were held last month for James ''Jim'' Piccione, the founder of Aspen Manufacturing, who died in August at age 92.

Piccione's leadership, unwavering passion, and relentless dedication were the driving forces behind Aspen's growth and the delivery of exceptional customer satisfaction, a press release from the company said. He was a devoted family man, decorated veteran, and visionary entrepreneur, the company said.

Born in Jamaica, New York, he served with distinction in the U.S. Marine Corps during the Korean War, earning both a Purple Heart and a Bronze Star. His passion for life extended beyond business — he was an avid fisherman, tennis player, skier, and golfer, and found joy in sharing those activities with family and friends.

Piccione founded Aspen Manufacturing in 1975, and the company is now one of the largest independent manufacturers of evaporator coils and air handlers for the residential and light commercial HVAC markets in the U.S. and Canada.

Piccione's spirit will live on in the hearts of his children, grandchildren, great-grandchildren, nieces, nephews, fellow parishioners at St. Anthony of Padua Catholic Church in The Woodlands, Texas, and all who knew him. He was a volunteer for many causes that served the less fortunate and had a special connection to Martha's Kitchen, a community food kitchen at St. Martha Catholic Church in Kingwood, Texas, an online obituary said.

Survivors, according to the obituary, include two sons,

James (Glynnis) and David (Laura); three daughters, Christine Walker (John), Linda Piccione, and Carol Biondi (Joe); and 15 grandchildren. Piccione was preceded in death by his wife of 60 years, Myrna.

David Piccione is chairman of the board at Aspen, and James Piccione's grandsons Trevor and Coltan are regional sales managers there.

Carrier Drives Transformative Impact of Electrification on HVAC Solutions



Carrier is partnering with Rewiring America, a leading national electrification nonprofit, in an effort to transform the marketplace for clean electric home upgrades for communities at all income levels, providing significant health, economic, and resilience benefits. Carrier is a part of Carrier Global Corporation, a global leader in intelligent climate and energy solutions.

Rewiring America's initiative kicked off this summer with electrification retrofits for 100 households across four states including: Oregon, Wisconsin, Oklahoma, and Georgia. The "demonstration projects" are bolstering electrification awareness, and the corresponding benefits, for low income and disadvantaged communities (LIDAC) ahead of the Inflation Reduction Act federal rebate programs launching in most states. The program aims to demonstrate heat pump applicability in diverse regions, garner trust with homeowners in underserved communities who may not have functioning or efficient home heating and cooling, and to scale significantly in the future as federal rebates become available.

"With temperatures climbing in recent years, having a safe, cool, conditioned space is no longer optional," said Nick Arch, vice president and general manager, Residential HVAC Solutions, Carrier. "Partnering with Rewiring America to prove heat pumps are the leading HVAC solution for decarbonization in most climates is a phenomenal opportunity to electrify the country while supporting low-income communities. By adding or upgrading to more modern and efficient HVAC technologies, homeowners will experience increased comfort, cost savings through energy efficiency, and system resiliency."

"Partnering with Carrier is a monumental step towards equitable electrification," said Rewiring America CEO Ari Matusiak. "By bringing advanced HVAC solutions to underserved communities, we not only reduce carbon emissions but also provide tangible health and economic benefits. Together, we can ensure that all households, regardless of income level, can enjoy the comfort and savings of modern, efficient energy solutions."

Of the demonstration projects, Carrier will be providing air source heat pumps in Gresham, OR where many households do not have air conditioning and heat can be life threatening, and Tulsa, OK, a historically pro fossil-fuel city. Carrier's commitment to global heat pump innovation and access includes its prior commitment to investing $4 billion by the end of 2030 in the innovation and development of sustainable solutions; completing the Department of Energy's Cold Climate Heat Pump Challenge; and the recent designation of its Collierville, Tennessee facility as its Center of Excellence for high-efficiency heat pump production.

Copeland Unveils Unified Brand Identity Across Product Portfolio

Industry leader focused on delivering seamless customer experiences while providing next-gen climate solutions

Copeland Unveils Unified Brand Identity Across Product Portfolio

Copeland, a global leader in sustainable climate solutions, announced today that it has transitioned its extensive product portfolio to align with the Copeland brand. This rebranding initiative represents a significant milestone in Copeland's journey as a stand-alone company, further solidifying its commitment to delivering innovative climate solutions across global commercial, industrial, refrigeration and residential market sectors. Backed by more than 100 years of innovation, Copeland's vision is to create sustainable solutions that improve lives and protect the planet today and for future generations.

"Our brand transition is a natural step forward in Copeland's transformation. With a more consolidated and connected portfolio of brands, we will make it easier for our customers and end-users to navigate our extensive product range," said Paul Mottershead, vice president of global marketing and communications at Copeland. "This strategic move allows us to meet the evolving needs of our customers, while unifying the next-generation climate solutions that address the HVACR industry's most pressing challenges."

Copeland's product portfolio was previously offered under various brand names. This strategic rebranding aims to provide customers with a more consistent

and recognizable brand experience while reinforcing Copeland's core values of sustainability, reliability and innovation.

In addition to Copeland's line of compressors, variable speed drives, and refrigeration condensing units, the company is migrating its controls portfolio (i.e., rack, system, facility, environmental and flow controls), enterprise management software and services, leak detection, cargo monitoring, transport solutions and other system components to the Copeland brand. The brands transitioning to the Copeland name include:

- Dixell electronics.
- Emerson and Alco flow controls, valves and system components.
- Emerson rack system facility controls and case controllers.
- Emerson leak detection.
- Emerson cargo monitoring solutions.
- ProAct services and software.
- ProAct Transport.

Additionally, the following brands, which are now part of the Copeland brand suite, will remain and play pivotal roles in Copeland's portfolio:

- Sensi – Smart thermostats that enable demand-response capabilities and energy savings in residential and light commercial buildings.
- Verdant – Energy management solutions designed to reduce energy consumption in the hospitality and multi-dwelling unit markets.
- Vilter – Industrial and commercial compression and controls, specialized for refrigeration, cold storage, heat pump and renewable natural gas (RNG) applications.
- White-Rodgers – Traditional thermostats, universal heating controls and gas valves for enhanced comfort and efficiency in residential and commercial spaces.
- Cooper-Atkins – Temperature and environmental measurement devices, compliance solutions and wireless monitoring systems for food service and industrial markets.

Under the Copeland umbrella, the product brands above will retain their existing names with an updated look and feel. This approach retains the highly recognized brand names that customers and end-users know and value.

Product packaging and labeling updates to reflect the brand changes are being implemented over the next 6-12 months, ensuring a seamless and recognizable experience across all touchpoints by mid-2025.

Congratulations to the 2024 CSA Group Member Award Recipients!

Each year, CSA Group recognizes individuals who have made outstanding contributions to the world of standards through the presentation of the John Jenkins Award, the Award of Merit, and, for the fifth year, the Young Professional Award. Past winners hold these awards in high regard as they were nominated by their fellow members and peers.

John Jenkins Award

The John Jenkins Award is the most prestigious of the CSA Group Awards. It recognizes individuals who, through their leadership, have fostered the development and advancement of standards, both nationally and internationally. We are pleased to announce the 2024 John Jenkins Award recipient is Kevin Ernst. Congratulations, Kevin!

Kevin Ernst
Oakville Stamping & Bending Limited
Oakville, Ont.
Standards for construction and civil infrastructure

Young Professional Award

The Young Professional Award was launched in 2019 for the 100th anniversary of CSA Group to recognize a young professional who has made outstanding contributions to developing and advancing voluntary standards. We are pleased to announce the 2024 Young Professional Award recipient is Benoit Cusson. Congratulations, Benoit!

Benoit Cusson
WSP Canada
Brossard, Que.
Standards for the design of Canadian bridges

Award of Merit

The Award of Merit is bestowed upon individual members for outstanding contributions and leadership in developing and advancing voluntary standards. We are pleased to announce the following recipients of the 2024 Award of Merit:

Dr. F. Michael Bartlett
Western University
London, Ont.
Standards for structural safety and reliability, highway bridges, and concrete structures

Dr. Denis Beaulieu
University of Laval
Laval, Que.
Standards for the design of steel and aluminum structures, buildings, and bridges

Jeffrey A. Fournell
Qai Quality Assurance Inc.
Edmonton, Alta.

Standards for oil and gas pipeline systems and materials

Murray Gallant
Department of National Defence (retired)
Ottawa, Ont.
Standards for accessibility and inclusive design

Kristina Gillin
Vysus Group
Stockholm, Sweden
Standards for radioactive waste management in the nuclear secto

r**Jeff Hammond**
International Ground Source Heat Pump Association
Standards for ground and water source heat pumps

Douglas Hird
Technical Safety Authority of Saskatchewan
Regina, Sask.
Standards for fuels and transportation

Richard Lord
Carrier Corporation
Monteagle, Tenn.
Standards for heating, ventilation, air conditioning and refrigeration, and building energy systems

Alex Reed
Keyera Corporation
Calgary, Alta.
Standards for the storage of hydrocarbons in underground formations

Robin Snell
Parkin Architects
Toronto, Ont.
Standards for health care facility design

Valerie Vanderwyk
Aboriginal Apprenticeship Board
The standard CSA Z301, Equity, diversity and inclusion, and accessibility in apprenticeship programs

Catherine Williamson
Alberta Health Services
Standards for medical device reprocessing

Sheila Woodcock
QSE Consulting Inc.
Lunenburg, N.S.
Standards for medical laboratory quality systems
We are proud to recognize the extraordinary efforts and expertise of all our award recipients.

Vacuum Interrupters Introduces RVI-WL-35925A Replacement Vacuum Interrupter



Vacuum Interrupters, a leading manufacturer of replacement vacuum interrupters, pole assemblies, parts, and components for medium-voltage vacuum circuit breakers and contactors, introduces the RVI-WL-35925A replacement vacuum interrupter.

This direct fit-and-function replacement unit for the Powell WL-35925A vacuum interrupter meets original equipment ratings and is intended for use in Powell PowlVac 05PV50 vacuum circuit breakers. The RVI-WL-35925A is built to provide excellent high-voltage insulation, high cumulative and breaking capacity, exclusive internal torsion control, and an excellent vacuum seal thanks to its fine alumina ceramic.

The replacement vacuum interrupter offers 2000 A RMS-rated current, 5 kV RMS maximum voltage, 60 kV peak impulse withstand, and 50 KA RMS-rated short-circuit breaking current.

No modification is required for proper installation and operation in the existing Powell PowlVac 05PV50 vacuum circuit breakers. Vacuum Interrupters can also provide assembly components and mounting hardware to aid in installation and shorten downtime.

Honeywell and Qualcomm Work to Revolutionize Energy Sector With 5G, Low Power Wireless and AI-enabled Solutions

Honeywell and Qualcomm Technologies, Inc. today announced an expanded collaboration to develop new artificial intelligence (AI)-enabled solutions for the energy sector. The design and development of these solutions with Qualcomm Technologies supports Honeywell's alignment of its portfolio to three compelling megatrends, including automation.

Through the collaboration, Honeywell intends to incorporate Qualcomm Technologies' connectivity and AI capabilities into Its existing AI-powered applications, such as the Honeywell Field Process Knowledge System (PKS). By integrating these capabilities, Honeywell's Field PKS will better be able to help provide connectivity to remote corners of plant and manufacturing facilities and enable greater data capture and analytics at the edge.

Qualcomm Technologies' portfolio of low power AI-enabled processors with native wireless connectivity, software, and computer vision combined with Honeywell's extensive portfolio of sensing technologies

will enable the development of a family of industrial sensors used for monitoring process parameters, asset parameters or environmental conditions. These new capabilities will help deliver more information to field and service technicians, enabling faster delivery of answers that can result in time savings, greater accuracy, and interactive results.

"We are committed to developing on-device generative AI solutions that will propel the expansion of the connected intelligent edge to help drive digital transformation," said Nakul Duggal, group general manager, automotive, industrial and embedded IoT, and cloud computing, Qualcomm Technologies, Inc. "This collaboration with Honeywell enhances how industries and businesses interact with their environments through intelligent and responsive technology. Our recent acquisition of Sequans' 4G IoT technology adds to Qualcomm Technologies' broad portfolio, further strengthening our technology offerings for Industrial IoT applications."

"The combination of Qualcomm Technologies' industry-leading on-device AI processors with Honeywell's AI- enabled technology will enable field workers to work smarter, help make assets more efficient and improve the overall performance of the process industry," said Pramesh Maheshwari, President of Honeywell Process Solutions. "With the introduction of AI-enabled solutions such as Honeywell's Field PKS, Multi-Modal Intelligent Agent and sensor technologies, we are advancing what's possible for the process industry with mobile field technicians and autonomous operations."

In 2024 Honeywell and Qualcomm Technologies began developing an AI-enabled Multi-Modal Intelligent Agent designed to allow workers in distribution centers and retail industries to interact naturally with handheld devices through voice, pictures, and video. In 2025, Honeywell intends to add the computer vision capabilities in the Multi-Modal Intelligent Agent to Honeywell's Field PKS. To learn more about how Honeywell is leveraging AI across process industries, visit: https://process.honeywell.com/us/en/solutions/industrial-autonomous-solutions

PPG Board of Directors announces quarterly dividend of 68 cents per share

The Board of Directors of PPG (NYSE:PPG) today declared a regular quarterly dividend of 68 cents per share, payable Dec.12 to shareholders of record Nov. 12.

This payment will mark 53 consecutive years of annual increases in the company's dividend and is the 505th consecutive dividend payment. Through the ongoing dedication and engagement of its workforce, the company has paid uninterrupted annual dividends since 1899.



Another appliance efficiency crackdown is coming. Here's what you need to know

The debate surrounding energy-efficient appliances in homes is heating up again.

The U.S. Department of Energy is tightening standards for dishwashers, washing machines and clothes dryers after coming to an agreement with manufacturers. The standards, which should be finalized by mid-2024, will go into effect within the next three to six years, lighting a fire under appliance companies to update their products. The Wall Street Journal's John Keilman writes that the new regulations will cut the average home's utility bill by $120 and lower carbon dioxide emissions by 270 million metric tons over the next 30 years.

This report comes on the heels of the news that the Energy Department is also increasing regulations for gas and electric stoves and ovens. As detailed by Maxine Joselow in The Washington Post, future models of electric stoves will be required to use 30 percent less energy than the current lowest-performing model, while gas stoves and electric ovens will need to use 7 percent less energy and gas ovens 4 percent less energy.

The new standards will apply to appliances manufactured in 2028 or later, not those currently on the market or already installed in homes. They will only affect 3 percent of gas stoves and 23 percent of electric stoves on the market, according to the Post. The regulations will not be telling Americans "how to cook their dinner," as Sen. Joe Manchin wrote on X last year—nor will there be a complete ban on new gas stoves, which the Consumer Product Safety Commission previously suggested as a possibility before backtracking.

Energy-efficiency standards are updated every six years to keep the guidelines abreast of the latest technological capabilities. Keilman points out that when these regulations hit the market, appliance companies adapt with upgrades like new compressors that help refrigerators maintain a consistent temperature, advanced sensors that stop clothes dryers when the job is done instead of completing a preprogrammed cycle, and motors and pumps that allow dishwashers to use less water per load.

On January 8, 2024 marketing strategist Ericka Saurit

shared five essential strategies to keep your project pipeline full in 2025. Click here to learn more and remember, workshops are free for BOH Insiders.

Chicago-based designer Dijana Savic-Jambert of Maredi Design, which specializes in sustainable and regenerative design practices, sees the new regulations as another step in the right direction for the home sector. ''Ultimately, it means that the consumer is going to save money on their utility bills, from water to electricity,'' she says. ''Especially with induction cooktops, you are ensuring the option that will give you the best indoor air quality because they do not emit harmful pollutants like gas cooktops do, which we now know is scientifically proven.'' Consumer resistance, she finds, often comes from discomfort with the unfamiliar. ''With any new type of technology, [there's a] learning curve,'' she explains. ''[While] cooking with induction is different from cooking with gas, it is also much more precise in terms of temperature control, and it even shortens cook time.''

New York–based designer Laurence Carr has long advocated for her clients to use energy-efficient appliances. ''It's an investment in their wallet, the environment and the future,'' she says. For those who seek her out for her sustainability bona fides, that investment is a no-brainer.

Yet some in the appliance industry question how much further the quest for energy efficiency can go. Whirlpool's head of sustainability, Pamela Klyn, told The Wall Street Journal that appliances are approaching their efficiency limits. For example, for the electric footprint of a modern microwave to be any lower, it would have to run without a clock. The increased prices of new-and-improved appliances are another concern. In the same WSJ article, Paul Storch, who runs the Bronx-based appliance retailer Felix Storch, says that the new compressors needed for the small refrigerators he sells could raise the prices by almost 10 percent, which translates to $50 to $100 per fridge. According to the Energy Department's calculations, though, the money consumers spend upfront on more expensive appliances will be offset by lower energy bills down the line.

Despite naysayers' critiques, the bulk of the evidence driving these new regulations seems to point to a cleaner and healthier environment, along with financial savings for consumers. The world is moving in a more environmentally conscious direction, and sooner than later your clients may want to as well.

''These are constantly evolving conversations that [are important] to have with clients because the education component is so significant,'' says Savic-Jambert. ''Even if they are not replacing appliances right away, [we want them to be] aware of the best choices for the future.''

The Fourth Annual Tools Competition Awards More Than $8 Million to 50 EdTech Developers and Organizations | 2024 Tools Competition

Winning edtech tools expect to improve education and student engagement for over 24 million worldwide

The Tools Competition—the world's largest edtech competition—has announced more than $8 million in awards to teams developing or expanding learning tools and platforms that promise to transform education and enhance student engagement worldwide.

The Tools Competition is a multi-million dollar funding opportunity for edtech innovation that leverages digital technology, big data, and learning science to meet the urgent needs of learners worldwide. In all, 50 winners from 18 countries will receive more than $8 million in funding to reach an estimated 24 million learners around the globe.

Winning ideas range from AI-powered simulators for teachers-in-training to support chatbots that help prevent student dropouts to expanded data sets for researchers studying what works in education. Notable ideas receiving awards today include:

- **Yiya AirScience** (Uganda), an edtech solution that promotes problem-solving and creativity skills in under-resourced Ugandan youth by leveraging keypad phones to teach STEM content.
- **Handwritten Math Benchmark for LLMs** (Massachusetts, USA), a dataset that will use multimodal visual LLMs to diagnose and provide feedback on handwritten student math work, ultimately improving the capabilities of multimodal models.
- **Bookbot: Reading Coach for Early Grades** (Australia), a reading instructional platform that uses real-time conversational features to nurture children's critical thinking, social, emotional, and communication skills.
- **Wingspans: Experience Translator** (Rhode Island, USA), an inclusive, AI-powered career navigation platform that leverages storytelling to empower adult learners to succeed in work that is better paid and more highly valued.
- **FIND-C** (California, USA), a video coaching platform that supports educators by reinforcing responsive interactions with their students, thereby improving children's outcomes in language development, social emotional development, and literacy.
- **HVAC Hero** (California, USA), an adaptive, simulation-based platform aimed at widening access to high-quality skilled trades by training and expanding pathways into the HVAC workforce.

Additionally, the Tools Competition partnered with OpenAI to offer the OpenAI Learning Impact Prize for teams using the power of AI to accelerate educational progress, particularly in underserved communities. The KOBI team (Slovenia) was named the winner of this prize and will receive an additional $100,000 in funds to enhance reading skills for children with dyslexia, as well as API credits and technical guidance from the OpenAI team. Yiya Airscience, Learning Equality, and The Portal by New Visions were named as runners-up for the Prize, receiving $25,000 in API credits to help advance their work.

According to a recent survey, more than 70 percent of teachers have used ChatGPT—up 23% since last year—to plan lessons, provide feedback, and differentiate for student needs. Among students, Black and Hispanic learners use chatbots at the highest rates, turning to them to help with concepts they struggle with and to help them study for tests and quizzes.

"Winning tools stand out in their potential to both transform educational outcomes and build the field of learning engineering," said Kumar Garg, President at Renaissance Philanthropy and a founding sponsor of the Tools Competition. "They are demonstrating the power of advanced technology to accelerate learning and are working with researchers to scale their impact for the benefit of the field at large."

"By supporting exceptional teams and innovative technology, the Tools Competition is opening new doors for learners around the world," said Julia Quinn, Director of Philanthropy at Citadel and Griffin Catalyst. "These winners are helping unlock the transformative power of education and enabling current and future generations to achieve their potential. We're proud to recognize their incredible work."

The 2023-24 competition included awards in six tracks:

- Accelerating & Assessing Learning
- Building an Adaptive and Competitive Workforce
- Engaging Adult Learners in Higher Education
- Facilitating Learning Science Research
- Instructional Coaching for Early Childhood Education
- Preparing for the 21st Century World

The 2024 competition generated nearly 2,000 submissions from 92 countries, with the winners hailing from institutions and organizations across all continents. This is the fourth cycle of the Tools Competition. To date, the competition has awarded $17.5 million to 130 edtech innovators.

Background

The Tools Competition is the largest edtech competition in the world. It spurs edtech innovation leveraging digital technology, big data, and learning science to meet the urgent needs of learners worldwide.

The 2023-24 Tools Competition was run with support from: Renaissance Philanthropy, Griffin Catalyst, Walton Family Foundation, Bill & Melinda Gates Foundation, Siegel Family Endowment, the Defense Advanced Research Projects Agency (DARPA), Ballmer Group, Calbright College, Axim Collaborative, Jacobs Foundation, Endless Network, and OpenAI.

The competition is administered by The Learning Agency and Georgia State University.

Winning sustainability start-ups earn chance to pilot their innovations with the Amazon Sustainability Accelerator



Eleven innovative businesses receive funding to tackle complex environmental challenges.

Start-ups tackling some of the world's biggest sustainability challenges will trial technology with Amazon across Europe after winning funding in this year's Amazon Sustainability Accelerator (ASA). Eleven start-ups from across Europe (as well as from the US and Canada) have been awarded the opportunity to test their pioneering innovations within Amazon operations, with a potential investment of up to €2 million.

The start-ups will work with Amazon in the UK, Denmark, France, Germany, and Spain to test new ways to recycle electronic waste, innovative packaging methods, ground-breaking building materials, and using artificial intelligence (AI) to improve energy efficiency. The pilots will vary in both duration and scope depending on the challenge that is being addressed, with the opportunity for wider partnerships on completion.

Representation of Cheesecake Energy's pilot, which will help Amazon optimise its solar energy utilisation at specific locations.

Cheesecake Energy from the UK will deploy its compressed air and thermal technology to provide safe, reliable energy storage within Amazon's European operations, reducing emissions from electricity usage.

Cheesecake Energy was founded at the University of Nottingham and uses energy storage systems to capture electricity generated by solar power during the day to provide additional energy during peak hours, or at night when the sun doesn't shine. The technology will be used in selected Amazon fulfilment centres (FC) in Europe.

''Storing energy for longer periods is vital as we accelerate towards net zero,'' said Michael Simpson, Chief Commercial Officer at Cheesecake Energy. ''We are excited to test our innovative technology with Amazon. This will help the company store excess solar energy and use it when needed. It's great that Amazon shares our belief in the potential of the Cheesecake Energy technology, to reduce the cost of energy storage as well as ensuring renewable energy is used efficiently.''

Re-Zip

To support our packaging reduction efforts, start-ups Re-Zip and Hipli will launch pilots to ship close to 100,000 orders across France, Germany, Netherlands, Belgium, Luxembourg and Austria using unique, reusable packaging.

''We are delighted with the opportunity to test our model on a large scale with Amazon and thus contribute to a more sustainable future for e-commerce,'' said Anne-Sophie Raoult, co-founder of Hipli. ''Collaborating with a player of the size of Amazon gives us the unique opportunity to demonstrate the full potential of our approach to drastically reduce the use of disposable packaging at the industry level.''

Hipli: ''I am a reusable packaging''

Circu Li-Ion from Luxembourg will help extend the life of Amazon's batteries, using robots to disassemble and support batteries upcycling, giving them a second life, reducing lithium-ion waste, and decreasing carbon-intensive material extraction.

Throughout the pilots, Amazon's subject matter experts will work closely with the start-ups, offering feedback, troubleshooting assistance, and opportunities to refine their technologies to ensure they work smoothly in their respective placements. Upon completion, we will assess the environmental impact, financial viability, and overall effectiveness of the pilots to determine whether any can be scaled across other Amazon sites as part of a long-term partnership.

''This trailblazing programme is a testament to Amazon's commitment to supporting innovation and driving positive change,'' said Amazon's Sustainability Director Justine Mahler. ''By providing a real-world testing ground for unique and cutting-edge technologies, we're not only reducing our environmental impact but also creating a blueprint for more sustainable practices across industry.''

Since launching in 2022, the Amazon Sustainability Accelerator has supported more than 40 start-ups across the UK and Europe, provided more than €1 million in grants and credits, and helped those businesses on average increase sales by 700% and raise over €18.7 million to date.

The eleven start-ups selected for the Amazon Sustainability Accelerator Climate Tech Pilot:

1. BrainBox AI (Canada) – BrainBox AI has developed an AI-driven solution that optimises the efficiency of heating, cooling, and ventilation (HVAC) systems in commercial buildings. This technology enables reductions of up to 25% in associated HVAC energy costs, as well as reduce heating and cooling-related carbon emissions by up to 40%. TIME Magazine recognized BrainBox AI's solution as one of the Top 100 inventions of the year in 2020.
2. Cheesecake Energy (UK) – Cheesecake Energy develops sustainable energy storage that lasts 2-3 times longer than lithium-ion batteries. Its system uses compressed air and thermal energy storage to achieve low cost, long lifetime and lower environmental impact. This solution tackles the challenge of limited solar energy utilization for 24/7 operations, like at Amazon, and will accelerate a transition to on-site renewable energy. The pilot location and launch timeframe is currently being scoped.
3. Circu Li-Ion (Luxembourg/Germany) – Circu Li-Ion's technology allows for an automated disassembly process of battery packs ensuring scalability, efficiency, and safety. Over the next six months Circu Li-ion and members of the Amazon Battery Collaborative team will process selected battery packs from Amazon's EVs using Circu Li-ion's technology. This will allow for greater waste avoidance and reuse, with recycling taking place at a more granular level. Ultimately, by reusing EV batteries more effectively, Amazon aims to reduce the demand for new replacements and lower the associated carbon footprint.
4. Hipli (France) – Hipli plans to fulfil 50,000 orders from Amazon's fulfilment centre in Montélimar using its reusable packaging design during the month of September. Each package can be re-used up multiple times, decreasing the reliance on single-use packaging. Hipli was selected for its scale, maintaining a million packages in circulation, and for their innovative approach.
5. HT Materials Science (Republic of Ireland) –

From September, HT Materials Science will help Amazon save on its cooling and heating energy requirements by up to 14% at fulfilment centres in Coventry, Daventry and Doncaster. HTMS has developed a 'nanofluid additive', which increases the cooling and heating capacity of typical HVAC systems without additional energy input, offering a lifespan of more than 10 years with minimal maintenance.

6. Phaidra (USA) – From early 2025, Phaidra will use its AI tool with the heating and cooling system at one of Amazon's UK fulfilment centres, which is expected to lower carbon emissions by up to 40% and reduce energy costs by up to 25%. When connected, Phaidra's software will use algorithms to optimise energy usage in real-time based on factors such as the weather and the number of occupants in the building.
7. Pirta (UK & USA) Pirta's innovative passive cooling paint is being planned for deployment at Amazon's fulfilment centre in Seville in 2025, delivering heating and cooling related savings on energy and carbon emissions across the site. Pirta's water-based solution is both highly reflective and emissive allowing sub ambient surface temperatures to be achieved.
8. Raicoon (Austria) – Raicoon's AI-powered technology can significantly increase solar power performance while reducing operational expenditure. It's pilot with Amazon aims to increase the performance of their solar panels by up to 15%. With its AI-powered Autonomous Operations Centre, Raicoon can detect 100% of system anomalies with unprecedented speed, precision and accuracy. This ensures prevention of issues such as falling debris and thermal events.
9. Re-Zip (Denmark) – Re-Zip will supply Amazon with 45,000 reusable cardboard boxes to fulfil customer orders across five European countries. Dispatched from Amazon's fulfilment centre in Lauwin-Planque between September and October, the pilot will test both the reusability of the boxes and the cross-border collection capabilities with partners in France, Germany, Belgium, Netherlands, Luxembourg and Austria. All returned packaging from customers will be collected, cleaned and sent back to Lauwin-Planque to be reused for future fulfilment.
10. SolCold (Israel) - SolCold's leading nanotechnology coating is being planned for deployment in 2025 on Amazon's warehouse rooftop in Seville. Thanks to its ability to cool down up to 5°C below shade temperature while under sunlight, the aim will be to significantly decrease the cooling systems' use, thereby contributing to the reduction of Amazon's overall energy consumption, capital expenditure and carbon footprint, supporting its goal to reach net-zero carbon emissions by 2040.
11. Unbound Potential (Switzerland) – Unbound Potential's membraneless redox flow batteries enhance longevity and efficiency over conventional options, offering a cost-effective energy storage solution. Their energy storage solution addresses Amazon's challenge of limited solar energy utilization due to 24/7 operations, enabling the transition to off-grid fulfilment centres powered entirely by renewable sources. The pilot location and launch timeframe is currently being scoped.

ETCO Introduces Flame-Retardant Insulated Terminals that Accommodate the Appliance Design & Assembly Process



Produced to UL and NEMA specifications and supplied in strip form, these insulated terminals come in right angle and straight styles to accommodate appliance design and assembly requirements.

Flame-retardant, fully insulated electric terminals that come in right angle (flag) and straight styles featuring high integrity "F" crimp connections have been introduced by ETCO, Incorporated.

ETCO, Incorporated has introduced new flame-retardant, fully insulated electric terminals that come in right angle (flag) and straight styles featuring high integrity "F" crimp connections.

ETCO Flame-Retardant Insulated Disconnects are constructed from a high temperature alloy and flame-retardant nylon insulator and feature an open barrel "F" crimp connector to withstand the appliance assembly process. Produced to UL and NEMA specifications and supplied in strip form, they come in right angle and straight styles to accommodate design requirements.

ETCO Flame-Retardant Insulated Disconnects are constructed from a high temperature alloy and flame-retardant nylon insulator and feature an open barrel "F" crimp connector to withstand the appliance assembly process.

Available in 10-22 ga wire sizes to mate with .110"

x .020'', .187'' x .020'', and .250'' x .032'' NEMA male tabs, ETCO Flame-Retardant Insulated Disconnects are designed for automated wire processing equipment. Housings are rated to 150°C and if there is a malfunction the nylon insulator collapses on itself and safely holds until the appliance completes an automatic shutdown.

ETCO Flame-Retardant Insulated Disconnects are priced according to style and quantity in white or black; custom colors are available depending upon volume. They are V-O rated per

Change in leadership at Bosch in North America



Mike Mansuetti to retire after 12 years as president of Bosch in North America, 36 years with the company

Paul Thomas to assume role of president of Bosch in North America in addition to existing position as president of Bosch Mobility in the Americas

Bosch in North America poised for continued growth

Farmington Hills, Mich. – Today Bosch announced that Mike Mansuetti, president of Bosch in North America, will retire on Oct. 1, 2024, after transitioning to an advisory role on Sept. 1, 2024. On Sept. 1, Paul Thomas will assume the role of president of Bosch in North America in addition to his existing position as president for Bosch Mobility in the Americas.

''In his 12 years at the helm of the North American region, Mike Mansuetti established a dynamic culture that focused on high-performance and cooperation across all business areas,'' said Stefan Hartung, chairman of the board of Robert Bosch GmbH. ''We are confident that Paul Thomas will continue to build on this foundation as Bosch seeks to further accelerate profitable, sustainable growth in North America.''

During Mike Mansuetti's tenure as president, Bosch in North America third-party sales increased more than 55%, from $10.6 billion in 2012 to $16.5 billion in 2023. He prioritized regional growth around four success factors: innovation, customer satisfaction, high-performance culture and digital enablement. He represented Bosch in many industry associations over the years, including the Board of Directors for MEMA, The Vehicle Suppliers Association, and the Consumer Technology Association Executive Board and Board of Industry Leaders.

In his current role, Paul Thomas oversees technology, strategy and sales activities for Bosch Mobility in the Americas region, a $12.4 billion business. He has more than 25 years of mobility experience and has held executive leadership positions in the areas of sales, production control, logistics, manufacturing and business unit management.

An Executive Committee will support Paul Thomas in his role as president of Bosch in North America. The committee members will serve in an advisory capacity and further enable regional growth, operations, advocacy, cross-domain coordination, talent sustainability and functional excellence:

- Mohammed Abraham, executive vice president, Bosch Mobility
- Christine Zimmerman, senior vice president, Bosch Global Business Services
- Alissa Cleland, vice president, Corporate Communications and Government Affairs, Bosch

Across the Globe, Only 35% of Workers Describe Their Workplace Air as Very Clean, According to Fellowes' 2024 Annual International Day of Clean Air Survey

Fellowes, a global leader and trusted partner that provides product solutions to fulfill a broad range of WorkLife needs, announces the results of its third annual 2024 Annual International Day of Clean Air Survey. Fellowes conducts this proprietary survey each year as part of its commitment to understanding workers' needs and concerns to better help building owners and employers meet those needs.

''Indoor air quality (IAQ) literally impacts people's every breath,'' commented Arti Lyde, Global General Manager, Air Quality Management at Fellowes. ''Our

yearly survey allows us to understand global pain points related to IAQ, follow developing trends in worker IAQ knowledge and concern levels, and contribute these insights to ongoing IAQ improvement discussions.''

This year's comprehensive survey canvassed 1,994 adults across the U.S., Canada, France, UK, Italy, and Germany who work indoors at least one full day per week. The survey's findings reveal a stark contrast between real-time perceptions and expectations of IAQ, underscoring the critical need for continued focus on workplace indoor air quality.

Here are some key takeaways from this year's survey and some trend comparisons to previous years:

1. Global Perception of Clean Air: Only 35% of all respondents across the surveyed countries described the indoor air quality at their workplace as ''very clean.'' Even in the U.S., where this sentiment was the highest at 52%, a large swath of the respondents still did not find the IAQ where they work up to their standards.

2. Demand for Air Purification: Among respondents who did not rate their workplace air as ''very clean,'' the majority indicated that providing air purification units would increase their confidence in workplace air quality. This sentiment was strongest in Italy (72%) and the UK (67%), followed closely by Germany (67%) and the U.S. (60%).

3. Confidence-Boosting Measures in the U.S.: A majority of U.S. respondents who felt their workplace air was ''very clean'' attributed this primarily to 1) access to real-time IAQ data and status (71%), 2) building certifications like LEED, Fitwel, WELL (57%), and 3) visible air purification units (57%).

4. Impact on Performance: A resounding 90% of all respondents affirmed that clean indoor air is essential for performing their best work. Specifically, 90% of U.S. respondents agreed, an increase in sentiment over last year's 87%. Additionally, this belief was particularly strong among Canadian respondents, with 93% asserting the importance of clean air on their ability to deliver their best performance at work.

5. Universal Right to Clean Air: An overwhelming 92% of all respondents agreed that clean indoor air should be a right for all employees. This view was most prevalent among Canadian workers, with 94% supporting this notion, up from 91% in the previous year.

6. Employee Retention Concerns in the U.S.: Alarmingly, 64% of U.S. workers indicated they would consider leaving their current employer due to poor indoor air quality, nearly doubling last year's 34%. About one-third of respondents from other countries would also consider leaving their employer due to poor indoor air quality, a concerningly large percentage for employers.

7. Hybrid Workers' Preferences: In the U.S., 67% of hybrid workers stated that seeing increased evidence of air quality considerations, such as visible purification units, access to IAQ data, and healthy building certifications, would make them more likely to work in-office more frequently.

8. Importance of Indoor Air Quality Transparency: 82% of all respondents expressed that it is important for employers to share information about the quality of air in the workplace. This sentiment was strongest among Canadian workers (87%), followed closely by those in the U.S. (84%).

9. Workplace Priorities: 36% of U.S. and Canadian respondents ranked a clean indoor workspace, including indoor air quality, as the most important factor when choosing a new job. This preference surpassed other popular perks, such as health allowances/stipends (25%) and free coffee/snacks (12%).





Bending and Rolling in Home Construction

One can't walk too far in, through or around a home without finding the results of plate rolling or angle bending. Once you're aware, it's clear how broad reaching and vital the technology has become to everyday life.

From essential components and equipment that are integrated into house's form and function to structural and architectural features, if metal plate requires rolling or bar, tube or pipe needs to be bent, plate rolls and angle bending machines were involved.

Equipment/appliances

The easiest place to spot rolling and bending technology is among essential home appliances. Every house needs a water heater, for example, and the rolled and bent shells that hold the hot water are in high demand as the home construction industry works to increase housing inventory. Plate rolling machine manufacturer Davi has 58 years of expertise in all manner of rolling and bending technology. Its MCA 4-roll plate rolling machine is the result of decades of research, development and refinement that make it uniquely capable of rolling the 0.06'' – 0.08'' (1.5 – 2 mm) steel plates used for water heater shells. The MCA 4-roll machine maintains perfect control over plate position by clamping it with a bottom roll, and Davi's patented Servo-Tronic parallelism control system always keeps machine rolls in perfect parallel alignment. The machine is also fully CNC control enabled for automated production with limited operator input required during the bending process.

Additionally, a variety of heating, ventilation and air conditioning (HVAC) equipment along with plumbing components, housings, shrouds -virtually any shape that is curved or cylindrical – was rolled on a plate rolling machine. Davi plate rolls provide an ideal solution to the HVAC sector with high automation for precision, efficiency and safety.

Structural components

Angle roll machines are essential when forming steel structure components. Angle joists, door jams and frames, foundational columns

and beams and bending rebar all require some form of angle bending or rolling. Davi provides the builders with a wide selection of angle rolling technology and accessories to meet the industry's broad range of design and engineering requirements.

Architectural features

Apart from function, form plays a significant role in residential construction. Archways, circular staircases, oven hoods and ornamental features are in many cases shaped by rolling and bending machines.

Exterior features

There are also a significant number of exterior features that use plate and angle bending. Propane, fuel oil and other storage tanks all require plate rolling. Retaining walls and other buttresses to support landscaping, earth and water retention may also leverage plate rolling technology for proper form and fit.

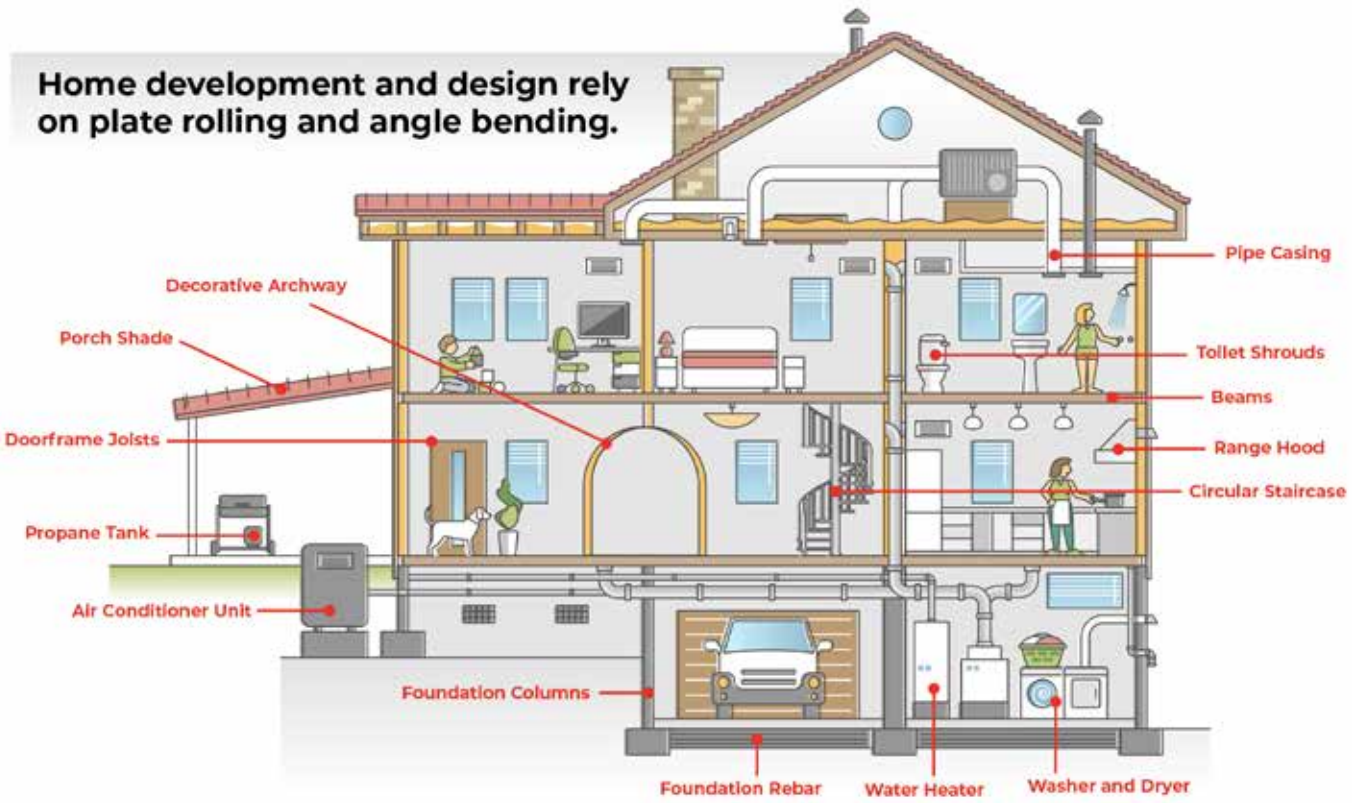
Sunshade structures, in particular, with their unique shapes and designs rely on the use of angle rolls to streamline production time and provide the versatility needed for the vast number of configurations that are possible.

Commercial and multi-family residential

As the project grows in size and scope to larger multi-family and commercial building structures, steel and metal frameworks play a larger role. Angle joists, side and end wall girts, bracings and purlins that run the length of a building to support the roof must be bent and formed to precise angles. Angle bending machines are instrumental in that process along with the efficient bending of large-scale plumbing and conduit fixtures that run throughout multiple floors and/or units in the building.

If it's curved or angled metal, it's probably been formed with a plate roll or angle bending machine. The home construction sector has come to rely on this technology to manufacture everything from water heaters to support structures. As the world's largest manufacturer of plate rolls, angle rolls and customized rolling machines with almost six decades of experience and expertise, Davi continues to provide the industry with metal rolling and bending solutions that turn blueprints into houses and houses into homes.

Ettore Giambetti, General Manager at Davi Inc.



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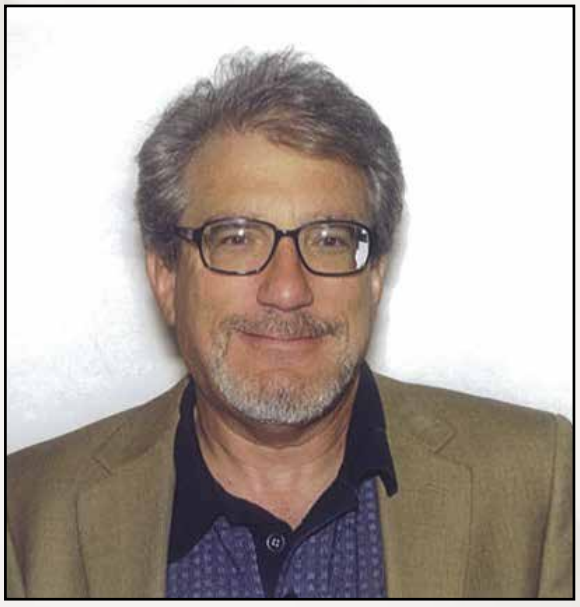
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