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Copper Alternative Joining Systems: A+

"Solderless" copper systems offer longevity, quick and easy installations

In today's economy, educational districts and facilities are facing tough choices in providing programs and facilities that offer better educational opportunities at lower costs. When it comes to facilities construction and maintenance, that decision doesn't have to come at the sacrifice of quality. Lower overall construction materials costs and new technologies can deliver reliable, long lasting facilities to serve them long into the future.

Do you remember standing on your tiptoes for a drink from that water fountain in the hallway? Copper has long been the preferred piping material chosen to deliver safe, potable water for that and many other uses within a school building. For new construction or repairs, copper is still the benchmark for plumbing and heating systems due to its reliability, long life, and overall value. With today's new joining methods, copper can continue to offer school districts a lifetime of safety and value while cutting down on installation, labor and future repair costs.

Alternative "solderless" joining systems rely on push-connect or press-connect mechanical fittings, or similar fittings that utilize a structural adhesive joining system, all of which are suitable for most plumbing applications and are capable of withstanding the pressure and temperature ranges common to both residential and commercial building systems. Another advantage of solderless joining systems is the ability for "wet-repairs," which can be done immediately, without draining the system.

"When it's time to install a copper system, it's not just soldering and brazing anymore," said Andy Kireta Jr., vice president of the Copper Development Association (CDA)."Between the quality of copper, and the advantages that these alternative joining systems offer, it's hard not to choose copper for any construction project, especially for facilities as valuable to our communities as schools. We want these facilities to last a lifetime, or more' and we need to use quality materials like copper piping to insure that they do."

Robert Hall is the national technical consultant for Viega, which specializes in plumbing and heating technology, and acknowledges the role of copper in commercial buildings, including educational facilities. "Copper has the track record, and it's still a mainstay in construction in the U.S.," Hall said. "Copper has always been known for its performance."

The principal advantage of solderless joining for many commercial projects, especially educational facilities, is faster installation. When you have a scheduled project that has a deadline quickly approaching, copper can offer the quick high-quality fix.

"[Alternative joining systems] bring projects in on time and there are very few callbacks after the installation," Hall said. "Contractors learn pretty quickly that callbacks hurt the bottom line. It's attractive to them and the engineers when they are looking for value that will reduce the overall costs."

Glen Urquhart Private Elementary School, in Beverly, MA, broke ground in November 2006 and had problems completing the plumbing and heating portion of the project by October 2007 — the scheduled deadline. They turned to an alternative press-connect joining system for speed of installation, while feeling assured that the overall copper system was a product they can rely on for decades to come.

"When you have a flameless system, there is no need for burn permits, especially in renovation and repair applications," Hall said. "It's fast, clean and green. These are highly-engineered systems, but at the same time, very simple. It revolutionizes joining technology."

And the longevity, sustainability and workability of copper remain unmatched when talking about alternative joining systems.

"When designers want a building to last 100 years," Hall said. "Copper will be their product of choice."

To learn more about alternative joining systems, please visit www.copper.org. **HPN**

Copper system installation, courtesy of Viega, LLC

New Metal on Campus

Willamette University turns to copper for exterior walls and solar PV panels

Sustainability, "going green" and environmental conservation are a few hot button topics everyone in new construction has been hearing or talking about over the past few years. For many, this is only talk, or the incorporation of new "gadgets," for others it is a call to rebuilding their design process from the ground up to make smart, sustainable choices throughout the building project.

Willamette University's newest academic building, Ford Hall, is one such project that exemplifies sustainability throughout.

The $19.6 million architectural marvel opened in the fall of 2009. This new structure houses the departments of rhetoric and media studies, computer science, mathematics, digital art, film studies and music technology. It encompasses 42,000 square feet of highly efficient building space complimented by the beauty of copper wall cladding.

This new addition to the Willamette campus, located in the heart of Salem, OR, is the university's second project to earn LEED Gold status. Ford Hall attained this designation in part through the integration of copper in the overall design.

"There are so many aspects of copper that can fit the sustainable mold when designing buildings like these," said Andy Kireta Jr., vice president of building construction for the Copper Development Association (CDA). "It allows architects and designers to think about sustainable design, without sacrificing the look they might be trying to achieve."

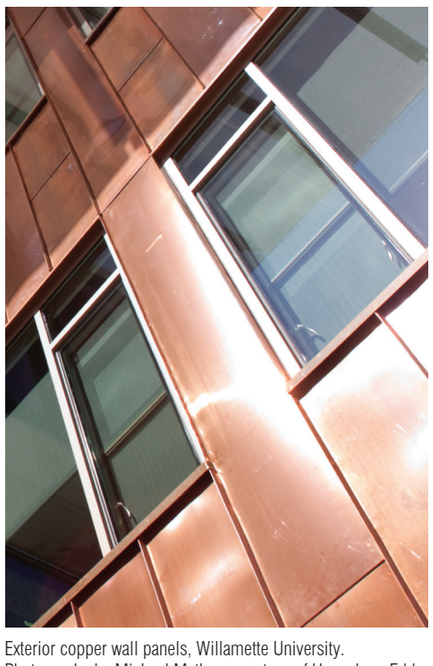
In the case of Ford Hall, copper sheeting of high recycled content was attached to the exterior wall panels, bringing a natural beauty to the building that will slowly and gracefully age through the life of the building. But unlike the saying, in this building the beauty of copper is more than skin deep. More than 4,000 square feet of photovoltaic solar panels, all interconnected with safe, efficient and reliable copper wiring are installed on the building's roof, which provide 26.8 kilowatts to the campus grid. In addition, long lasting copper piping delivers safe drinking water throughout the building, and is integral in the motors and heat exchangers of the Hall's highly efficient heating and cooling systems.

Designed by Hennebery Eddy Architects and built by Hoffman Construction Company, both of Portland, OR, the construction of Ford Hall was accomplished in just 14 months.

"The most sustainable building is one that does not get torn down," said Doug P. Reimer, project manager for Henneberry Eddy Architects. "The building was designed to last 100 years and offers flexibility for future renovations, so we selected materials such as copper that endure the test of time."

Reimer also went on to say that copper is used in several other buildings on campus. From a design perspective, the architects used natural materials (brick, limestone and copper) that develop patina or have a natural range of color that work well together.

To learn more about copper and using it in building applications, please visit www.copper.org. **HPN**



Exterior copper wall panels, Willamette University. Photographs by Michael Mathers courtesy of Hennebery Eddy Architects, Inc.

Power Quality on Campus:

Electrical Infrastructure is a Top Priority at Renowned Computing Center

Computers and networks are woven into the fabric of university life. Today, they are essential to the educational experience, whether training students for satisfying work in an increasingly digital world or connecting them to vast storehouses of knowledge pertaining to their specialized fields of study.

Networks are everywhere on campus, including dormitories, computer labs, media centers, libraries and research labs. Many business schools today have installed realistic securities "trading floors" complete with ticker boards, where students can learn how to execute real-time transactions in global markets based on up-to-the-minute financial data.

A computer-intensive educational facility requires the utmost in reliable, stable and clean electrical power, or what's known as high power quality. An excellent example of power quality on campus is the electrical infrastructure at the Ray and Maria Stata Center on the campus of the Massachusetts Institute of Technology.

The 720,000-sq ft "Stata" is arguably one of the most eye-catching structures to be found on any American college campus. Regardless of its unusual appearance, the Stata has an enviable electrical infrastructure that ensures the highest level of power quality, with copper being the focal point in the workings.

The installation includes a 500-kcmil bare copper ring ground and multiple "triangulated" copper-clad electrodes to ensure less than 5 ohms resistance to ground. A well-designed copper-based grounding system is essential for any electrical wiring project, especially one this complex. It helps stabilize an electrical wiring system, and provide a path to the Earth for transient conditions such as over voltages and lightning.

Several copper-wound, K-rated transformers help to accommodate harmonic currents and improve energy efficiency. Moreover, full-sized grounding conductors in all circuits ensure low ground resistance to the points-of-use.

The dedication and separation of "sensitive" branch circuits from branch circuits serving non-sensitive equipment helps to shield sensitive equipment from electrical noise. The number of outlets on sensitive branch circuits is limited to six or less, to reduce the magnitude of harmonic currents; isolated grounds (IGs) in all sensitive circuits provide additional protection against RF noise and other voltage irregularities. Finally, the electrical infrastructure includes the installation of transit voltage surge suppression (TVSS) equipment at substations and at points of use. Layered protection of this type assures maximum protection from voltage surges, while requiring a low-resistance ground path to work properly.

The Stata's electrical infrastructure not only benefits from a robust wiring and grounding system now, but also provides sufficient size and flexibility to accommodate the future needs of the Institute.

For more information about the electrical infrastructure of the Stata Center and the optimization of power quality at educational institutions, visit the power quality applications section of www.copper.org. **HPN**

Antimicrobial Copper at the Head of the Class

Bacteria can be kept at bay with copper in the classroom

Walk through any of our nation's schools and what do you see? Smiling faces and skinned knees. Runny noses and high fives. Friends chatting around the lunch table, or working hard over a lab table. Kids being kids, healthy, sick or somewhere in between. Schools are laboratories for growing young minds, but are also laboratories for growing and transmitting all sorts of infections illnesses.

That's why we just can't be too careful when it comes to germs in schools. Eighty percent of illnesses are spread by contact, which means that when someone touches a door handle, handrail or faucet, they are leaving behind bacteria to be picked up by the next person who touches that surface. Frequent hand washing is the best way to prevent spreading bacteria, but it is not a common practice among children—or many adults—with great regularity.

The U.S. Center for Disease Control and Prevention (CDC) lists five factors that are conducive to the spread of disease-causing bacteria: crowding, contact, contaminated surfaces, compromised skin (i.e. cuts and scratches) and lack of cleanliness. All five of these elements are present in almost every school on a daily basis.

Frequently touched surfaces in schools can be breeding grounds for bacteria. One way to combat this is to make those touch surfaces inherently antimicrobial. This can be achieved easily with copper. The U.S. Environmental Protection Agency has registered more than 280 copper alloys as antimicrobial, recognizing that they begin decreasing contamination immediately, and kill 99.9 percent of bacteria within two hours.*

Clinical trials in three U.S. hospitals, where frequently touched objects, such as bed rails, IV poles, and nurse call buttons, are made of copper rather than stainless steel, aluminum or plastic, are now entering the next phase where they will try to identify the impact of this change on reducing infection rates.

In schools, surfaces that are commonly touched by everyone, such as door handles, push plates, handrails and faucets, can be made from antimicrobial copper, brass and bronze. The natural tones of the EPA-registered alloys range from red to yellow to silvery gray and the choice of textures and finishes are almost limitless. When using antimicrobial copper, design and aesthetics do not have to be compromised.

"Copper is the perfect antidote for any public facility, particularly for schools where germs can thrive," said Andy Kireta Jr., vice president of building construction for the Copper Development Association (CDA). "We see a lot of copper used for a building's exterior and piping and mechanical systems where beauty, durability and reliability are important. Add to that copper's antimicrobial action and it makes it a no brainer for application on interior surfaces and products."

With antimicrobial copper touch surfaces, no action other than standard cleaning is required of the custodial staff, and nothing other than good hygiene practice is required of the students. For more information, please contact www.antimicrobialcopper.com. **HPN**

*Laboratory testing shows that, when cleaned regularly antimicrobial copper kills greater than 99.9% of the following bacteria within two hours of exposure: vancomycin-resistant *enterococci* (VRE), methicillin-resistant *Staphylococcus aureus* (MRSA), *Staphylococcus aureus*, *Enterobacter aerogenes*, *Pseudomonas aeruginosa*, and *E. coli* O157:H7

An Education in Copper

Stuckeman Family Building for the School of Landscape Architecture (SALA). Photo courtesy of WTW Architects.

Copper makes the grade on college and university campuses

Many iconic and historic buildings are famous for their copper details. Architectural copper is a popular choice because of its beauty, durability and sustainable qualities. Churches, museums, libraries government buildings and skyscrapers worldwide use it for roofing, exterior cladding and flashing, water piping and, of course, electrical wiring.

Because copper is one of the most efficient materials to work with, it is no surprise that the world's oldest metal is also prominent in the architectural design of some of the most prestigious educational institutions in the country.

College campuses across the U.S., including Penn State University, University of Minnesota, Florida State University and Dartmouth College —just to name a few—have used copper because of its distinctive features, ease of installation, recyclability, availability, low or nonexistent maintenance costs and its durability.

"Copper is a traditional metal that is proven to be long lasting when used in its purest, unalloyed form," said Andy Kireta Jr., vice president of building and construction for the Copper Development Association (CDA). "Historically, some of the greatest architectural masterpieces of our time have used copper because of its aesthetic beauty and sustainable characteristics."

For instance, the Stuckeman Family Building for the School of Architecture and Landscape Architecture (SALA) on the Penn State campus used more than 30 tons of recycled prepatinated copper cladding to cover the majority of the building's exterior. Adding copper not only contributed to the building's financial and environmental performance, it helped the university achieve its LEED certification.

When constructing a new academic center for biological research on the Dartmouth campus, the college decided that the new building should feature the "traditional" architecture of the rest of the buildings in Hanover, New Hampshire.

A pale-green copper roof was installed on The Class of 1978 Life Sciences Center building. Because it can take years for copper to achieve a green patina—a natural barrier that protects the metal and contributes to its legendary lifespan—the new building's roof was prepatinated before installation, a process that accelerates the color change.

Other notable projects include the University of Minnesota's Weber Music Hall in Duluth, MN, and the Florida State University College of Medicine in Tallahassee, FL. The Weber Music Hall called for 12,000-square-feet of copper-clad metal roofing for its angular dome, and the medical building used more than 32,000-square-feet of unpainted copper roofing panels and 10,000-square-feet of copper flat stock in its design.

"Copper is and will continue to be the metal of choice for architects and contractors who want to highlight a building's beauty and preserve its longevity," Kireta added.

To learn more about architectural benefits and opportunities for using copper in building and construction, please visit www.copper.org. **HPN**

For more information on the technical uses of copper in building construction, please contact the Copper Development Association at 212-251-7200 or visit the website at www.copper.org.