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Habitat for Humanity Goes Green

Copper Fire Sprinkler Systems Installed in Habitat for Humanity Homes

When Habitat for Humanity St. Louis (HFHSL) identified available property just north of downtown, the construction team wanted to build homes that were not only energy efficient but safe for its new home owners.

The nonprofit agency was able to accomplish both by using sustainable materials and installing ecofriendly products, such as tankless water heaters, geo exchange heating and cooling systems, structural insulated panels, white TPO roofs, low (volatile organic compounds) VOC paints and copper fire sprinkler systems.

With model building codes now requiring new single- and two-family dwellings to be outfitted with sprinkler systems, Habitat chose to go with copper systems for all of its new homes, including six that will be constructed in the Spring of 2011.

The 17 single-family homes already built, most already occupied by proud families, are 1,200 square foot homes with three or four bedrooms, and one and a half baths. They were designed to complement the current architecture in the neighborhood. All of the homes are pending LEED Platinum certification.

"We're really proud of these homes," said Kyle Hunsberger, the director of construction for Habitat for Humanity - St. Louis. "They're really well built for the population we serve."

A majority of the materials, services and labor were donated by local companies and contractors. The electrical union IBEW Local 1 installed the electrical service and the members of Sprinkler Fitters Local 268 in St. Louis donated and installed the copper material for the sprinkler systems.

"Of the two materials approved for this type of construction, one is copper the other is steel," said Stan Shiner, president of Fire Protection Systems, the company that installed the sprinkler systems. "We elected to go with copper because it's easier to work with. You can cut and fit copper on the job. You can do this with steel pipe too, but you're threading it — and the accuracy of steel pipe is harder to achieve when hitting walls above."

While some plastic materials are approved for use in residential fire sprinkler systems, they can't be used in exposed locations such as in basements, crawlspaces, attics and garages without being protected behind a fire rated barrier, an additional construction cost. Since copper doesn't burn, doesn't support combustion, and doesn't emit potentially toxic fumes when subjected to fire, it is the safe, smart choice. In addition to being lightweight, durable, easy to install and able to withstand extreme temperatures, it also offers a slimmer profile, which is easier to



Provided by Habitat for Humanity, St. Louis

conceal within the building. And, discharge water from copper systems is typically free of rust or sediment.

Copper systems also offer economic advantages, including lower maintenance costs and long-term performance. Copper's high recycled content and limitless recyclability support green construction practices as well.

"It's a proven system," said Hunsberger, referring to the copper. "When installed properly, it's going to perform for the life of the project."

Once this set of homes is complete, Habitat will continue to build in the JeffVanderLou neighborhood, along with two other neighborhoods, in 2011. **Cu**

Solar Thermal Systems Use Copper to Harness Sun's Energy

From the collector to the tubing, copper is the driving force in solar water heaters

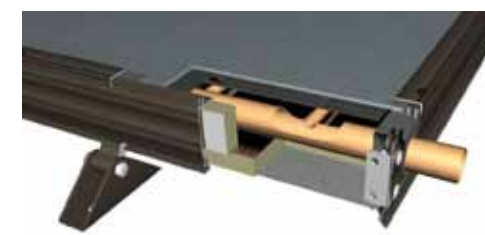
There are about 1.5 million solar water heaters being used in U.S. homes and businesses today. According to the Environmental and Energy Study Institute (EESI), with the availability of solar energy, the U.S. is capable of installing another 29 million solar water heaters with location and climate taken into consideration.

Given the right location, solar water heating systems (SWH, or solar thermal systems) can cut a users energy costs significantly. Besides the energy savings benefit to each user, solar thermal systems and their offset in energy use benefit the community as a whole by reducing the carbon emissions associated with the power production previously used for water heating. Recognizing the benefits of solar water heating, state and federal incentives and rebates exist to promote their installation by households and businesses.

There are several different systems available, which can vary on the type of collectors they use and where they are installed, but copper remains the one material that is a mainstay for all SWH systems.

"The two most common uses for copper in solar systems are the collector itself, specifically the absorber sheet or fin, as well as the tubes that are attached to the sheet or fin," said John Harrison of the Florida Solar Energy Center (FSEC). "Copper is a good fit because of its good heat transfer properties and long-term durability. It's easy to work with and amenable to soldering or brazing."

Copper also plays a key role in the tubing that connects the collector to the water storage and distribution system inside the building. As water temperatures in the collector can become quite high during the heat of the day, many materials, such as some of the common



plastic piping materials, can't handle the high temperatures and pressures in the system. Copper's superior strength at these temperatures make it the ideal choice.

Copper is the driving force for the most important part of a solar water heating system: the collector. While there are many different types of systems, the basics on how a solar system works are fairly simple. As sunshine strikes the collector, the water inside is heated. There is a pump that moves water from the tank through the collector and back to the tank. As the sun's intensity changes throughout the day, the circulating pump also changes its speed accordingly. By the end of the day, the water in the tank has been circulated many times through the collector and has been heated to usable hot water temperatures. For colder weather, heat exchangers are incorporated in the design, which are also copper-intensive.

While the differences in solar water heating systems can change depending on location or system size, copper plays a vital role from the collector to the tubes running through it.

The basic thermal conductivity, longevity, and workability characteristics make copper the perfect metal for solar thermal production. For more about copper's role in renewable energy, visit www.copper.org. **Cu**

Feel the Breeze

Air conditioners can be self-cleaning and energy efficient

How many times have you cranked up your car's air-conditioning on a hot summer day only to be overwhelmed by a gust of musty air? Thanks to the mold and mildew that inhabit the dark, moist environment of your car's AC system, it is an all-too-common occurrence. The same phenomenon occurs on a larger scale in the heating and air conditioning (HVAC) units of buildings. The air conditioner's interior system is dark, moist and hard to clean—ideal breeding grounds for contaminants that are associated with foul odors and decreased efficiency of the unit. But now, there is a way to suppress the growth of these contaminants. The

Environmental Protection Agency (EPA) recently registered copper for use in protecting heating and air conditioner surfaces from bacteria, mold and mildew.

Household items are commonly treated with antimicrobial agents in order to cut down on the growth of bacteria, viruses and fungi found in most homes. These products can be found in almost every room of the house, and include sponges, toothbrushes, toys, and even tissues. Antimicrobial Copper offers a similar solution for heating and air conditioning units in homes, office buildings, schools, cars, airplanes, trains, and other common means of transportation.

Copper has been scientifically shown to suppress the growth of bacteria, mildew and mold in the real world. The EPA registration is complimented by research conducted in the military barracks at Fort Jackson in Columbia, SC. A side-by-side comparison was made between HVAC units outfitted with Antimicrobial Copper components and units using the more common aluminum components. The copper examples inhibited the growth of bacteria, mold and mildew, while the aluminum did not. In

addition to causing odors, the build-up of bacteria, mold and mildew can also compromise the long-term efficiency of the unit, making it more expensive to run.

Charles Feigley, Ph.D., Professor of Environmental Health Sciences at the University of South Carolina explained, "Current building and construction methods focus on energy efficiency, which call for a more controlled environment that, in turn, tends to trap bacteria, leading to odors." Copper components are protected from that build up.

The study at Fort Jackson is being funded by the U.S. Department of Defense in conjunction with clinical trials at Memorial Sloan-Kettering Cancer Center in New York City, the Medical University of South Carolina, and the Ralph H. Johnson VA Medical Center, both in Charleston, SC. These hospital studies have shown that antimicrobial copper is also effective in reducing the bacterial load in intensive care unit patient rooms and on many common touch surfaces in those rooms, including bed rails, over-bed tray tables and nurses' call buttons. **Cu**

Alternative Joining Systems Meet the Challenge

Quick installations and reliable performance are displayed with copper press-connect systems

Easy installation, cost-effectiveness and reliability — these were essentials when Naperville Central High School in Illinois was looking to install 18,000 feet of copper tubing.

Capitol Mechanical, the contractor working with the Naperville School District, was already familiar with copper press connect systems, that's why they chose to incorporate the Advantage Press™ Tube, from Cerro Flow Products. Advantage Press is an alternative joining technology system that takes the proven press-fit, flameless technology further by incorporating a factory formed press-connect end directly on each copper tube length. This is similar to "bell and spigot" type designs used in other types of piping systems, and still utilizes the same tools that contractors already use to install press connect fittings.

Copper press-connect systems have become popular alternatives to traditional soldered joints. They are flameless systems that can save a lot of time and money in installation, while being able to handle pressure and temperature ranges for both commercial and residential building systems. In most cases, the advantages really shine in commercial projects. Case in point like is the Naperville High School, where a quick, easy and reliable installation was a must. Since the Advantage Press Tube means one less joint to be made with each piece of tube, greater savings can be achieved.

"Part of the project was installing new pipe, and the other part was retrofitting the older

system," said Chris LaVoie, project manager of Capitol Mechanical Inc., who installed the system. "Speed of installation was vital so using Advantage Press Tube was a natural extension to copper press fittings, it simply made sense as we have several press tools so we were good to go."

Aside from easy installation, alternative joining systems can offer precise and reliable results, comparable to a brazed or soldered joint.

"As well as providing a system with less connections, Advantage Press Tube addresses the issue of misalignment that can be a big issue with other press connect systems, especially over long runs. Advantage Press Tube always goes on flush," said Forrest Nixon, director of R&D for Cerro Flow Products. "It has been designed to fit into the next piece perfectly and has a built in stop so optimal insertion depth is achieved."

The time savings offered by alternative joining systems are more than just hype. For example, a case study of the Naperville High School project shows that installation time was reduced by 12 to 18 percent over the savings achieved by using press connect fittings alone.

Besides being easier and quicker to install, reliability isn't compromised when using alternative joining systems for copper; as years of testing and in-field performance have proven. Plus, alternative joining systems such as this press connect system, or other alternatives such as push connect, and structural adhesive systems, don't require a flame to install the joint. So hot work permits and fire watches are unnecessary.

"Technology has moved on," Nixon said. "Copper press connect systems are quick, and the tools to install them are getting cheaper and easier to handle."

Alternative joining systems are suitable for



Provided by Cerro Flow Products LLC

most plumbing applications and have proven that you don't have to sacrifice quality. Current systems come in three main types: press connect systems such as Cerro Flow's Advantage Press and the XPress™ fittings manufactured by Elkhart Products Corporation; Push connect systems such as Elkhart's QTite™ and TecTite™ fittings; and structural adhesive systems such as the StreamTech™ system offered by Mueller Industries.

The advantages offered by alternative joining systems, matched with quality copper pipe make it the smart choice for a contractor. For more information about alternative joining systems, visit www.copper.org.

For more information on specific systems mentioned visit: www.cerroflow.com/advantage. For the Naperville case study, visit: www.elkhartproducts.com or www.muellerindustries.com

Cu

Copper Joins the Huddle

Kansas City Chiefs' new training facility showcases a copper football-shaped roof

The Kansas City Chiefs are known for their hard-hitting on the gridiron. Since since 2009, the team has been creating some buzz because of their practice facility's innovative architectural design. The Chiefs' new home in Kansas City, Missouri has an interesting oblong shape that resembles a pigskin, a likeness reinforced by the large copper football that covers the top of the training facility.

The 3,500-square-foot copper covering has six sets of skylights, reminiscent of a football's laces, and sits atop the facility's three story atrium. James Spann, project manager at A2MG, Inc., the company that fabricated and installed the Chiefs' jaw-dropping copper rooftop football, said that the metal's ease of use and durability made it the best choice for the project.

"Copper was easy to work with on a good design like this," said Spann. "It allowed us to easily solder around the skylights to avoid common leaking issues."

The training facility houses the team's offices, meeting rooms, a dining area, and most importantly, locker and equipment rooms. While copper played a major role in the facility's innovative design, had it also been applied to the touch surfaces inside the building it could have aided in killing bacteria*.

Laboratory testing has shown that antimicrobial copper kills greater than 99.9 percent of bacteria* within two hours. Clinical trials being conducted at three U.S. hospitals reveal that ICU rooms that had stainless steel and plastic surfaces replaced with copper harbored significantly less bacteria, including *Methicillin-resistant Staphylococcus aureus*, commonly referred to as MRSA, VRE and E. coli.

The laboratory and clinical trial findings have implications for the sports world, where MRSA infections are not uncommon, particularly in the NFL. Several high-profile athletes including Kellen Winslow Jr., then a Cleveland Brown and now a Tampa Bay Buccaneer, previously contracted a staph infection. In 2003, five St. Louis Rams players fought MRSA infections on eight different occasions.

Locker rooms are notorious breeding grounds for bacteria, but if antimicrobial copper was used for common surfaces — doorknobs, faucets, showerheads, benches and athletic

training tables, the amount of lurking bacteria* would be decreased.

Safety is always a priority when it comes to athletics; both on and off the field. Using copper in the locker room, where athletes change, store their equipment, and often tend to minor wounds, may greatly benefit the athletes. Avoiding infections is critical to the staff and to the owners, who have a financial investment in the team that they run out to the field every Sunday.

In future arenas and stadiums, copper could end up being just as influential behind the scenes as it is in the stunning architecture that greets the Kansas City Chief fans. **Cu**

*Laboratory testing shows that, when cleaned regularly, Antimicrobial Copper alloys kill greater than 99.9% of the following bacteria within 2 hours of exposure: MRSA, Vancomycin-Resistant *Enterococcus faecalis* (VRE), *Staphylococcus aureus*, *Enterobacter aerogenes*, *Pseudomonas aeruginosa*, and *E. coli* O157:H7. Antimicrobial Copper surfaces are a supplement to and not a substitute for standard infection control practices and have been shown to reduce microbial contamination, but do not necessarily prevent cross contamination; users must continue to follow all current infection control practices.



Provided by James Spann, Project Manager, A2MG Inc.