



# Building & Architecture News

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The GateWay Community College Integrated Education Building in Phoenix, AZ.  
Photo Credit: Bill Timmerman, Liam Frederick

## Builders Turn to Copper for Practical, Visually Stunning Wall Claddings

*Copper Cladding Preferred as Lightweight, Long-Lasting, Efficient Material for Fabricating Wall Panels*

It started on rooftops and is increasingly making its way down the sides of buildings and onto the structures below. Copper wall-cladding options are becoming more popular in North America as builders adopt the style for various architectural purposes.

The preference for copper is not limited to aesthetics. While it's true that builders who gravitate to copper likely see the visual benefits, they also recognize the practical implications of cladding with durable, lightweight and long-lasting materials like copper, brass and bronze. In an era of sustainability and energy efficiency, copper cladding gives architects an ideal avenue for creative, useful design.

Over the last few years, the Copper Development Association (CDA) has seen an increase in the number of copper-cladding systems installed on commercial buildings, evident by those projects selected for a North American Copper in Architecture (NACIA) Award. Projects such as academic facilities,

learning institutes, museums and sports and recreation centers have all been recognized with a NACIA award for incorporating some form of cladding system in the design.

What also makes copper-cladding systems attractive to builders is that it can be field-formed from sheet material or pre-manufactured and transported to the jobsite.

Take screen panels, for example. Building designers are using copper-screen panels as lightweight-finish screens to repel rainwater while allowing in light. The panels can be perforated to allow in the right amount of sunlight, and they are easily cut to include openings that act as decorative designs.

"Architects want options that add to the structural integrity of a building, but that also enhance the interior and exterior features, both performance-wise and aesthetically," said Andy Kireta Jr., Vice President of CDA. "Copper wall cladding can meet both needs.

It's long-lasting, sturdy and requires significantly less in the way of regular maintenance. The end result looks amazing."

Likewise, curtain-wall systems are increasingly made from copper to better control air leaks, moisture and temperature. Copper panels are preferred because they are easy to shape and are the right weight for secure hanging. In modern architecture, this type of innovative thinking is crucial for long-term building life. Consider, for example, the Seagram Building in New York City, which was built in 1957 and comprises bronze and glass components for its curtain-wall system, with mullions running the full height of the building.

In addition to standard sheet copper installations, which provide some natural surface contours, composite panels made with thin copper sheets clad to the exterior of a structural substrate offer designers the ability to create a dead-flat building

surface for a uniform, aesthetic look. These panels are strong, lightweight and can vary by thickness, depending on the project and whether it's for indoor or outdoor use.

Copper's light weight and high formability give designers and building owners unlimited options in creating an exterior building texture to match the design intent of the project: from perforated rain screens, to corrugated folds reflecting the mountain terrain of a building site, to repeating shingle patterns, copper-wall cladding creates building systems that are stunning, long-lasting, low-maintenance and sustainable.

To view outstanding examples of how architects and designers have incorporated copper in today's best building designs, check out the NACIA awards on the CDA website. To learn more about how you can integrate copper into your projects, visit [www.copper.org](http://www.copper.org). **Cu**

## Copper Continues to be a Sustainable, Recyclable Material Widely Used in Various Building Applications

*Copper's High Recyclability Makes It a Resource-Efficient Building Material*

In an era of increased focus on sustainability, copper is king. It's durable, reliable and often outlives its aluminum, plastic and other metal counterparts. Copper has functioned as a staple building construction material for thousands of years, having been used in architecture, plumbing, mechanical, electrical and even healthcare applications throughout the world.

Copper's unlimited recyclability, low maintenance and longevity make it one of the most resource-efficient building materials today. Copper is such a sustainable product that once it has fulfilled its duty in one setting, it can be used again in another.

Building products made from copper — such as plumbing tube, electrical wire, roofing and gutter systems — are all recyclable. This means that the copper itself rarely makes it to the landfill; rather, it's reintroduced and reused to serve a new purpose in another form.

The recyclability of copper is nothing new. In fact, for thousands of years, humans have melted down cannons, church bells, statues and other objects to make tools more suited for the times.

Each year in the U.S., nearly as much copper is recovered from recycled material as is derived from newly mined ore. Excluding wire production, which is mostly made from newly refined copper, more than three-fourths of the copper used by mills, ingot makers, foundries, powder plants and other industries

comes from recycled scrap. Almost half of all recycled copper material is old post-consumer scrap, such as discarded electric cable, junked automobile radiators and air conditioners and cartridge cases from the military. The home is another source for products made from recycled copper. For example, copper architectural and plumbing products typically consist of 60 to 90 percent post-consumer recycled content. Copper tube and sheet products can be recycled over and over without losing their engineering properties.

At present, copper is one of the most used and reused of our "modern" metals.

"Copper is very prevalent in our everyday lives. The high demand has resulted in an industry that relies, in part, on recycling surplus copper and scraps," said Janice Jolly, a copper industry consultant with more than 35 years experience. Jolly recently authored The U.S. Copper-base Scrap Industry and Its By-products report for CDA. "In many cases, it makes more economic sense to use recycled copper — whether it's re-refined for purity or used with 'contaminants' for such purposes as manufacturing feedstock."

Copper is recycled in one of three ways: it can be reused in its existing state, melted and diluted to reduce impurities and returned to its existing composition, or re-refined using conventional techniques in order to gain even higher purity composition.

The most important factor to consider is copper purity. Depending on the purpose, copper can contain trace amounts of other elements without jeopardizing its properties. For example, if copper is used for electrical conductivity, the purity threshold is much higher than it would be for other applications, like plumbing and roofing.

The recycling process is rigorous, but the end result is a highly-functional material. Copper alloys — materials made using a combination of copper and other elements, such as brass or bronze — also can be recycled.

It's no surprise that copper has been around for a long time and continues to be used, reclaimed and reused. Copper's superior engineering properties, such as its thermal and electrical conductivity, demand that it be chosen for use in today's energy- and resource-efficient applications; its durability and longevity ensure that use will be long-lasting, maximizing and leveraging those efficiencies; and its unlimited recyclability guarantees those efficiencies will be realized in many future uses. This makes copper and its alloys truly green materials perfect for building a sustainable world.

For more information about copper's use, recycling copper or to download the CDA report, visit [www.copper.org](http://www.copper.org). **Cu**



Copper scrap before it's recycled and reused.  
Photo Credit: Copper Development Association

## Copper Electrical Wiring Keeps Building Occupants More Safe

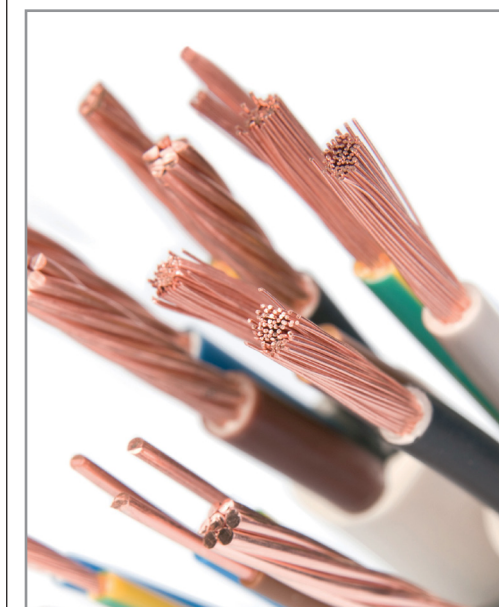
*Electricians Trust Copper to Protect Against Power Outages, Personal Injuries and Fires*

No modern building material is more time-tested than copper electrical wiring. From generators and motors to electric lights, copper is recognized as the industry standard and is the only wiring material to be approved by all electrical codes nationwide. It's resilient, reliable, and most importantly, safe.

With National Electrical Safety Month in May, reviewing your electrical system is as important as understanding the safety benefits of copper wiring. Copper electrical wiring is used commercially and residentially because it's easy to work with and can be easily, securely and safely connected to outlets and other electrical equipment. It requires less maintenance and its connections are much less likely to loosen and corrode over time. It's these advantages, not to mention copper's superior conductivity, that make this metal the preferred choice among professional contractors working on building wire systems.

"Electrical wiring is everywhere, nestled just behind every wall of your home or office. It's just not worth the risk to rely on non-copper wiring materials that can corrode or give under pressure," said David Brender, program manager for the Copper Development Association, CDA. "It's hard to find a material better suited than copper to prevent electrical fires and keep building occupants safe."

Copper wiring is known for withstanding an overload better than other materials because of its significantly higher melting point (1,984 degrees Fahrenheit, compared with aluminum's melting point of 1,221 degrees Fahrenheit). Additionally, repeated cycling is less likely to loosen a copper joint.



Copper wiring  
Photo Credit: Copper Development Association

Corrosion is another major risk of using other metals and alloys in wiring. Commonly called a "noble metal," copper is not susceptible to galvanic corrosion when connected to non-copper metals. It effectively resists moisture- and humidity-driven corrosion that can destroy other wiring systems, reducing the risk of power outages, system failures and fires. Copper wiring typically does not require the use of conductive greases at its connections, and torque is not critical. It does not loosen over time; connections remain tight.

Because copper is regarded as a timeless building material, it's well-known. Electrical contractors and electricians alike require little special training, reducing the risk of a dangerous mishap. For that same reason, copper wiring is very common, meaning electricians making repairs rarely encounter compatibility issues.

The unique combination of strength and ductility allows copper electrical wiring to be bent further, twisted tighter and pulled harder, all without stretching, creeping, nicking or breaking. Such exceptional strength ensures that copper is the safest and most preferred wiring material available to electricians.

To learn more about the safety benefits of copper electrical wiring, visit [www.copper.org](http://www.copper.org). **Cu**

## Copper Proves to Be Safer and More Reliable Option for Medical Facilities

*Natural Properties of Copper Reduce Fire and Smoke Risks, Prevent Corrosion: Essential for Carrying Drinking Water and Medical Gas*



Copper tubing used for a medical gas installation at a hospital.  
Photo credit: CCBDA

Copper's role in medical facilities goes far beyond the standard piping and plumbing systems that are tucked behind walls and above ceilings of a

building. In fact, copper is also an essential tool for respiratory care systems, delivering on a daily basis the gases needed by patients undergoing life-saving medical treatment.

The healthcare industry routinely uses copper tubing to dispense compressed medical air, oxygen and nitrous oxide critical for patient treatment and care; nitrogen and compressed air to operate life-saving tools, surgical and treatment equipment; and to operate the medical vacuum system, which removes gases and fluids from patient-treatment areas and surgery. Whether in surgery at a hospital, care at a dentist's office, or treatment at an out-patient facility, copper tubing plays an integral part in the medical procedure.

Copper tube has long been the preferred choice as a result of its internal cleanliness, durability, longevity, and low-maintenance requirements. Additionally, its comparatively high-melting point is much less likely to spread flames or smoke throughout the building. "One of the advantages of copper over plastic is that copper doesn't burn, and it doesn't add smoke

in the event there is a fire," said Dale Powell, CDA project manager.

Copper's non-flammable capabilities are especially significant where an emergency may occur and the people are less mobile or elderly, Powell said. Copper's melting point is 1,984 degrees Fahrenheit, far higher than that of plastic, which will soften at about 300 degrees and emit smoke when exposed to flames. Plastic tubing also expands and contracts up to 10 times more than copper when exposed to intense heat, making it less likely that the system can be put back in service following an event.

These characteristics make copper an essential material for plumbing and medical gas applications, therefore making it widely favored inside and outside medical facilities. While alternative materials might be considered to control construction costs, medical facility contractors consistently trust copper because of the long-term payback guaranteed by its versatility, reliability and dependable performance.

While the copper piping used to supply critical medical gases is the same material as the piping that is likely found behind the walls of a house, it is

specially prepared to ensure that the interior surface is of the highest cleanliness. The piping is also supplied using special precautions, coming capped with sealed ends, to ensure that cleanliness is maintained throughout installation.

But like the piping in the home, at a very basic level — water distribution — copper's performance far outweighs most other materials. It doesn't corrode or rust as easily because of a protective coating known as patina. What's more, studies have shown that copper can kill bacteria and limit the growth of potentially deadly microbes.

By comparison, plastic plumbing carries the risk of contamination, as the material can foster bacterial growth if not properly maintained. When exposed to high heat or fires, plastic has the potential to release toxins due to its composition. The semi-permeable membrane of plastic plumbing also has the potential to allow contaminants to enter the water stream.

When it comes to plumbing and tubing, copper's main properties have made it indispensable in medical settings. For comprehensive resource materials and more information about copper plumbing and tubing, please visit [www.copper.org](http://www.copper.org). **Cu**

## Copper Roofing Systems Prove Cool, Energy-Efficient and Sustainable

*Roof Assembly and Life Cycle Become Increasingly More Important in Sustainable Design*

Building designers today are striving to incorporate longer-lasting materials, more energy-efficient assemblies and environmentally-conscious technologies in order to reduce environmental footprints and improve overall building sustainability.

The roof assembly has come under particular scrutiny as it is the first line of defense against the elements and, often times, the building envelope's largest exterior surface area. Copper, arguably the most sustainable metal known to man because of its long-life cycle, low life-cycle costs and recyclability, is not only proving to be a valuable roofing material for its durability and ease of maintenance, but energy-efficiency and cost-effectiveness as well.

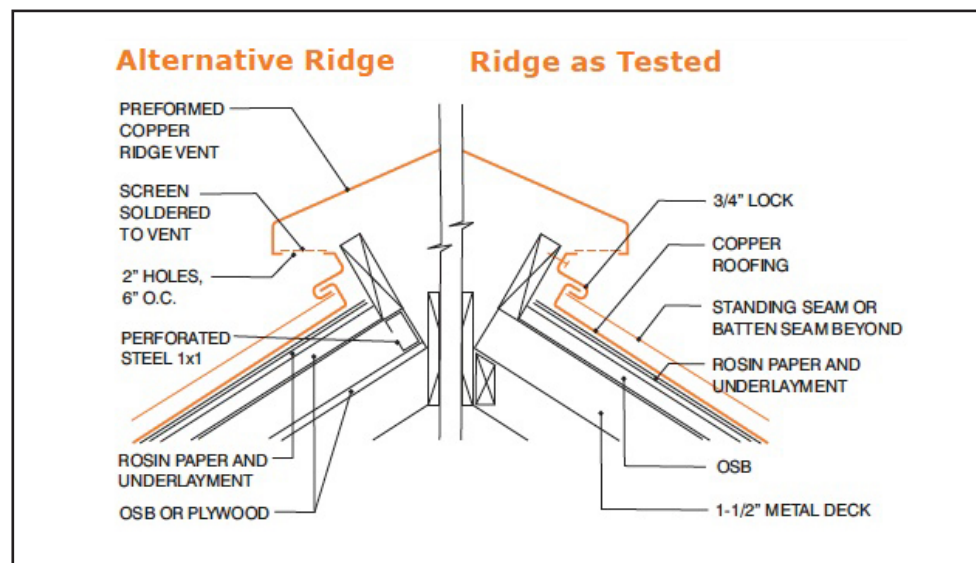
When "cool" roofing is discussed, two main factors usually define the effectiveness of a particular material: reflectance (the ability to reflect solar energy) and emittance (the infrared radiation energy that is released from the roof). These are typically achieved through paint pigments and reflective coatings in asphalt and other metals. The roof system, however, goes beyond the surface material. To achieve the highest potential building energy efficiency, a correctly assembled, properly ventilated copper roof can prove just as

effective as a highly-reflective or emissive-surfaced roof.

In a recent study conducted by the Copper Development Association (CDA) at the Oak Ridge National Laboratory, two different vented copper assemblies were compared to two steel roof assemblies and one asphalt system. The ventilated copper systems take advantage of convective heating/cooling by properly venting the system at the eaves and ridge. As air moves in through the eaves, it heats, rises and is expelled through the ventilation at the roof ridge, controlling heat gain and yielding lower attic temperatures, keeping the building cooler and more energy efficient.

With this particular roof assembly, surface reflectance and emittance no longer holds as much influence on the interior building temperature and energy performance of the building. Copper emerges as the better choice. The result is lower cooling costs for the building owner and reduced electrical energy usage.

"Bottom line, copper has been providing property owners with a sustainable roofing system design for hundreds of years," said Andy Kireta Jr., Vice President of CDA. "The recyclability, long life span, beauty and maintenance-free durability of a



A diagram of a roof using copper. Photo credit: Copper Development Association

properly designed copper roof can meet or exceed the typical installations of other comparable materials and be one of the most environmentally sound assets of your green building."

Based on performance and overall goal, a copper roof is cool where it matters most: energy savings. This is just one more reason why copper remains

a design element of choice. Not only does copper's versatility provide various ways to address today's energy concerns, its durability and longevity are essential to long-term cost effectiveness. To learn more about copper and cool roofing, visit [www.copper.org](http://www.copper.org). **Cu**