



High-Rise Building The “Green” Way

“You’re Hired!” Aluminum Extrusions Get The Call



ALuminum Extrusion

S H O W C A S E

I N N O V A T I O N S T A K I N G S H A P E

HIGH-RISE BUILDING THE “GREEN” WAY IS TRANSFORMING CHICAGO’S SKYLINE



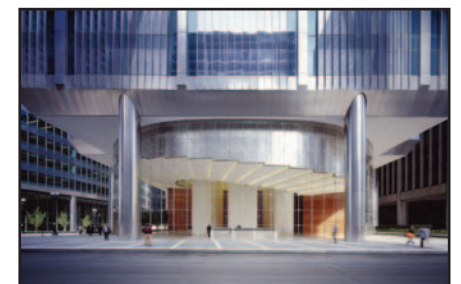
The 111 S. Wacker building incorporates aluminum extrusions into every aspect of its green design.

The worldwide Green Building Movement is influencing architects to rethink and reshape the urban landscape, especially in Chicago’s fast-paced downtown Loop business district. The newest skyscrapers on the Chicago horizon are a proving ground for sustainable green design, incorporating key environmental and quality-of-life aspects into their design and construction. Aluminum extrusions play a vital role in taking these architectural marvels from the drawing board to the building site.

111 S. Wacker Drive

Designing buildings that extensively use extruded aluminum in unitized curtainwall panels, elevator cabs, and ceiling lighting systems makes perfect sense to Steven Nilles, AIA, principal and executive V.P. at Lohan Caprile Goettsch Architects in Chicago. His firm’s recently completed speculative high-rise office building project at 111 S. Wacker Drive spans 53 stories and 1,457,000 square feet of energy-efficient, cost-effective green design. The project’s general contractor was Bovis Lend Lease Chicago and was developed by the John Buck Company of Chicago.

More than one million pounds of aluminum were used in the tower’s construction. A striking curved structural glass cylinder encloses the 50-foot-high lobby, forming the visual signature of this office high-rise. Profiled marble covers the 60-by-60-foot concrete center core support structure. An aboveground parking garage on levels three through eight accommodates 390 vehicles, with one million rentable square feet of office space above.



A west street view of the building’s lobby shows off its curvilinear design.

MORE ▼



High-Rise Building The “Green” Way



On the façade, columns transfer from 40-foot spacing to an 80-foot spacing, shown by the inverted triangles on the exterior's base.

© Photo courtesy of David Seide, Defined Space.



(left) From 40 feet above, the extruded aluminum framing grid has a pendant-mounted up-lighting system, complementing the lobby's curved design.

(right) Pretensioned cables suspend the lobby's wall of nonreflective glass.



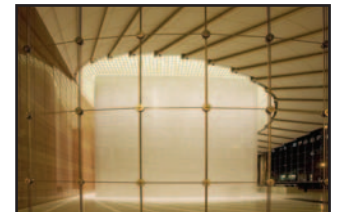
Buildings such as 111 S. Wacker demonstrate how energy-efficient sustainable design is now the preferred choice of investors.

“You’re Hired!” Aluminum Extrusions Get The Call

The tower's curtainwall enclosure system on the exterior façade is extruded aluminum, with extruded mullions in all the framing. “The extruded profiles are thermally improved, so heat doesn't transmit through the curtainwall system,” Nilles said. Ceramic pattern glass and linen-finish stainless steel column enclosures are formed over the extruded aluminum framework.

An extruded aluminum grid in the lobby's ceiling core houses the main lighting element suspended from 40 feet above, providing an up-lighting system. The extruded framing grid has pendant-mounted housing high-output indirect lighting, which reflects light back into the ceiling. The lobby's outer wall system uses cables pretensioned up to 60,000 pounds to form an elegant-looking cable wall system of nonreflective monolithic white glass. The wall system was engineered to allow movement of 11 inches during maximum wind pressure loading.

All 24 elevators' cabs are built with extruded aluminum framing. The cylindrical cab enclosures are constructed with curved laminated ceramic frit-patterned glass panels, glazed with structural silicone on the aluminum framing. According to Nilles, “These high-capacity elevators use a special high-speed motor designed to support only a specific amount of weight to run at peak efficiency. Extruded aluminum framing weighs less than other materials yet has the structural strength to support required loads. Structural integrity is crucial to high-speed, high-performance elevators that are used day-in and day-out.”



The lobby's Carrara marble-clad elevator core houses cylindrical, high-capacity elevator cabs framed with aluminum extrusions.

Green Building Design Makes Business Sense

“Sustainable green design is a holistic approach to environmentally sensitive buildings, which includes energy savings, recyclable materials, site selection, natural light, indoor air quality, and plumbing and water quality,” explains Nilles. “Green design reduces heating and cooling costs as thermal efficiency is designed into the building enclosure. Even a 50-cent-per-square-foot savings in operating expenses adds up. Sustainability is now the investment of choice, and green building products give an exceptionally good return on investment.”



MORE ▼

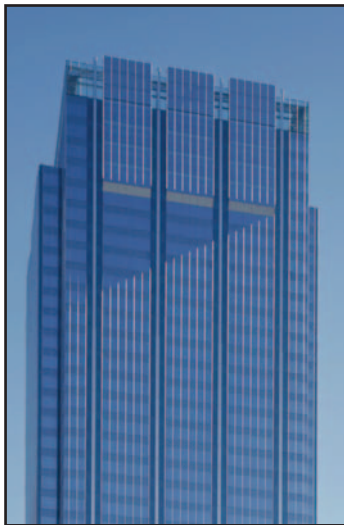


High-Rise Building The “Green” Way

“You’re Hired!” Aluminum Extrusions Get The Call



Natural sunlight and other “green” amenities improve quality of life for those who live and work in downtown Chicago.



The 111 S. Wacker tower exemplifies the new-era architecture of urban green design.

Green design data indicates increased employee productivity, which Nilles says is huge to the financial bottom line: “Healthier, happier employees have less absenteeism because the built environment vastly improves air quality and provides better thermal and solar comfort. Even a modest worker productivity increase amounts to a significant savings when deducted from lease rent and operation expenses. Building owners and developers must attract tenants and offer a competitive value—a challenging process for a value-driven design!”

LEEDing The Way

The 111 S. Wacker building is designed to be the first speculative high-rise in the United States to achieve Gold Core and Shell LEED® (Leadership in Energy and Environmental Design) certification, and was one of the first buildings under Chicago’s new energy code to receive a permit. Chicago’s green building initiative encourages green design by offering market incentives, taking all aspects of green design into account. “Mayor Daley embraces the green movement,” says Nilles. “Chicago’s buildings represent a force in architecture. The Mayor has taken a leadership role in facilitating green building design, and is leading this trend by example.”

The U.S. Green Building Council’s (USGBC) LEED Green Building Rating System™ recently garnered the National Building Museum’s prestigious Henry C. Turner Prize for Innovation in Construction Technology. LEED is a voluntary national standard for developing high-performance sustainable buildings, awarding Certified, Silver, Gold, and Platinum certification levels based on points earned.

“The way we think about buildings is changing,” said Rick Fedrizzi, USGBC president and CEO. “LEED gives the industry a way to verify and benchmark green building performance and sustainability standards. These integrated whole building design practices promote environmentally responsible buildings that are profitable and healthy places to live and work.”



The 111 S. Wacker high-rise is designed to be the first in the nation to be awarded Gold LEED certification by the U.S. Green Building Council.





High-Rise Building The “Green” Way

“You’re Hired!” Aluminum Extrusions Get The Call



The award-winning UBS Tower, completed in just 24 months, uses extruded aluminum in curtainwall, panels, and elevator cabs.

UBS Tower

Architects James Goettsch and Steven Nilles also designed the UBS Tower project at 1 N. Wacker Drive. Key components of the 1.6 million square foot office building are aluminum including extrusions, cladding, panels, and elevator cabs. The elevator cab shells are constructed of aluminum, and are clad with multicolored ceramic frit-patterned laminated glass. The tower features aluminum extruded framing, aluminum panels, stainless steel with glass spandrel areas, and a concrete core with stone cladding.

The building’s exterior façade is stepped into three dramatic levels, with decreasing size floor plates on the footprint ascending to its 50-story peak. The protruding center bay on the east elevation’s façade artfully bows out overlooking Wacker Drive—an attractive value-added feature for tenants of this premier Loop business address. The high-rise’s second floor fitness center and expansive conference facility are popular amenities accessed from the large enclosed lobby.

The imposing 50-story tower’s stepped façade features a protruding center bay for magnificent views from every floor.



Left to right: Nonreflective water-white glass joins the outside plaza to the stone & granite lobby interior. In evening lighting, the elegant lobby is seen through the net wall. Two-way cables make the nearly invisible look of the lobby walls possible.



The tower’s lobby design incorporates natural stone, granite, and marble, blending traditional elements with the modern glass and metal façade. The 40-foot-wide space with its core wall set 60 feet back from the street seemingly brings the outside in. As natural lighting changes throughout the day, the nonreflective water-white monolithic glass retains its transparency and does not turn dark as viewed from the outside. The net wall system uses two-way cables to support the nonreflective glass, forming a strong visual connection to the plaza outside where thousands of businesspeople walk past each day, commuting to and from the train station.



MORE ▼



High-Rise Building The “Green” Way

“You’re Hired!” Aluminum Extrusions Get The Call



Site selection near mass transit further impacts energy savings of green buildings.

Green Design’s Legacy

“Green design is responsible design,” Nilles says. “It is part of our corporate mission, goal, and philosophy when designing these buildings. Sustainable design ultimately affects the global environment because green buildings conserve energy. Building location also impacts energy used. Buildings in suburban areas require workers to commute longer distances by car, using more gasoline and causing more pollution. Chicago’s UBS and 111 S. Wacker towers are both adjacent to major transit hubs, which factored into the site selection.”

Nilles notes the green building trend’s impact: “We’re seeing dramatic examples of integrated sustainable design incorporating structural, mechanical, and botanic factors, combined with air quality, lighting, plumbing, water use, and re-use. Progressive companies are requiring, and tenants are now asking for, sustainable design elements, and the market must support these innovations. Sustainable design is fast becoming part of mainstream culture with environment, energy conservation, and worker productivity the biggest issues. Green architecture is the new wave of building, heading in directions never seen before.”



Green architecture is now in great demand, marrying structural design with botanic elements into totally integrated environments.



Antamex International, Inc., of Toronto Canada designed, engineered, and tested extruded aluminum components, dies, and assemblies for the two Wacker Drive towers. Antamex designers worked with project architects, combining technical requirements with the architect’s aesthetic vision into a cladding solution. Aluminum profiles and sections address structural, energy, weathering, acoustic, seismic, fire separation, and bomb blast resistance requirements. Partnered with extruders and die designers, Antamex created a suite of 50 to 60 die profiles for each project. Each profile underwent quality testing, and engineers continually honed structural design factors.

Extrusion Design Is A Collaborative Effort



Extruded aluminum components for the tower’s curtainwall were custom-designed in partnership between design engineers, extruders, and die makers.

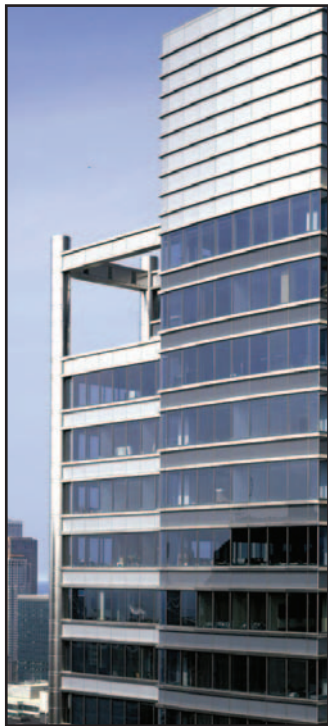


MORE ▼



High-Rise Building The “Green” Way

“You’re Hired!” Aluminum Extrusions Get The Call



Aluminum curtainwall sections, including the tower’s uppermost floors, must withstand lateral buckling forces and high winds.

For the UBS Tower, custom 13-foot-high by 5-foot-wide enclosure sections built as three-floor mock-ups were tested under structural loads for air and water infiltration and thermally tested in an enclosed pressurized chamber to simulate high winds. Antamex then glazed and fabricated the building’s façade sections, providing just-in-time delivery to install two floors per week of extruded aluminum curtainwall during construction.

Antamex president Elio Toffoli notes that the greatest design challenge was to create thin-walled extruded aluminum sections that resist the forces of lateral buckling. “Both projects had high wind load criteria with ‘hot spots’ exceeding 180 miles per hour. One big advantage of working with aluminum extrusions is that we are able to place material where it is most structurally effective, yet still maintain the aesthetic intent,” says Toffoli.

Aluminum curtainwall may be thermally tuned using a variety of thermal break depths and materials in conjunction with infill options to achieve specified wall thermal transmittance. Toffoli adds, “This curtainwall system delivers reduced heat loss/gains and interior condensation resistance, increasing thermal comfort for building occupants while conserving energy. Another important advantage is aluminum’s ability to accept a high grade paint finish, which addresses both aesthetic and structural concerns.”



UBS Tower delivers energy efficiency and streetscape beauty to Wacker Drive.



For more information on aluminum extruders, request your free copy of the AEC Buyers’ Guide at mail@aec.org.

MORE ▼



ALuminum Extrusion

S H O W C A S E

I N N O V A T I O N S T A K I N G S H A P E

ALUMINUM EXTRUSIONS GET THE CALL FROM **DONALD TRUMP** TO BUILD BEHEMOTH CHICAGO TOWER

Aluminum extrusions play a pivotal role in all design aspects of the new Trump International Hotel & Tower Chicago—a 2.6 million-square-foot, 92-story complex that is creating a new icon in the Windy City's skyline.

Ever since Anwar Hakim, architect, associate partner, and senior technical coordinator for Skidmore, Owings & Merrill LLP (SOM), got the "you're hired" telephone call from Donald Trump, Hakim and his colleagues have been busy designing the "green-friendly" building.

Not only is it the tallest building currently being built in the United States since the 110-story Sears Tower was built in 1974, but the boss is "The Donald." In Donald Trump's own words, the mandate is "to enhance the culture, the beauty, and the sophistication of Chicago in a way that is completely unique."

The green plan ensures that the new Trump Tower does not dwarf the existing skyline by reaching for the stars and blocking its neighbors. It also is critical that the building pays homage to the Art Deco-era skyscrapers that make Chicago a living architectural museum.

In the Trump Tower's design, architects are choosing aluminum extrusions for their structural strength, flexibility,

Trump International Hotel & Tower Chicago will be a uniquely designed architectural jewel on the last major riverfront building site in Chicago.

ALUMINUM EXTRUDERS COUNCIL

1000 N. Rand Road, Suite 214 • Wauconda, IL 60084
USA • Tel. 847/526-2010 • www.aec.org

Photo: © Skidmore, Owings & Merrill LLP. Used with permission.

"You're Hired!"



and for their visual impact. The extruded aluminum elements combine with glass and stainless steel to create a framed and textured curtainwall, which is rigid enough to support every floor's 10-foot-high floor-to-ceiling glass windows. The silver-colored façade adds greater visual depth and dimension to the exterior impression, and creates a compatible transition between its nearby neighbors, the stark white Wrigley Building and the bold black IBM Building.

Using aluminum extrusion in the curtainwall is critical, Hakim says. The lighter weight materials chosen for Chicago's Trump Tower design reflect and refract sunlight, displaying a silver array of clear anodized aluminum and stainless steel. If steel were used, its heavy and bulkier presence would block the views from inside and out, changing the visual dynamics and the building's architectural lines.

The façade's outset stainless steel tubing patterns also provide a harmonious visual signature in this high-profile neighborhood. Tubes raised apart from the glass surface provide visible density and thickness, and a metallic element to the otherwise flush glass exterior walls. This mullion system weaves aluminum extrusions in vertical and horizontal directions, creating an intricate latticework design on the façade.

Setbacks in the structure's massing complement the surrounding buildings while integrating the tower's 472 residential condos, 286 five-star hotel suites, and nearly 100,000 square feet of retail space into its riverfront setting. The Trump Tower's first setback is at the same height as the cornice on the Wrigley Building, the second is the same height as Marina City, and the third setback parallels the top of the IBM Building across the street.

"Using aluminum extrusion in such a significant way enables us to have much more flexibility in our design and total look," says Hakim. "It also plays a major role in the economics of the project, because it is a lot less expensive."

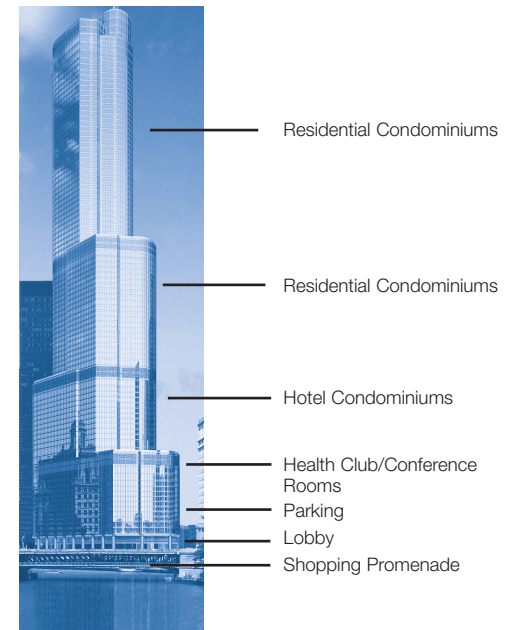
In an effort to support Chicago's dedication to the "Green" movement, the building's massing is raised up forty feet, opening an extensive three-level promenade of landscaped terrace steps leading gently down to meet the Chicago River. The walkway performs double duty, conveniently bridging Michigan Avenue and State Street for pedestrians, while providing access to the tower's nearly 100,000 square feet of world-class shopping space along the river's edge.

Other environmentally sensitive features of the project include wild grasses on the roof and a cooling system that utilizes water from the Chicago River.

Anthony Scacco, Project Manager with Bovis Lend Lease, the general contractor for the Chicago Trump Tower, comments, "The attention received by this project and the unique aspects of the architecture make it a challenging endeavor." Construction is scheduled to be completed in January 2009.

For more information on aluminum extruders, request your free copy of the AEC Buyers' Guide at mail@aec.org.

Watch for more extruded aluminum application stories in future issues! Contact mail@aec.org to share an application story, provide feedback, or request a free subscription to Showcase. We encourage you to share this Showcase issue with anyone you feel will be interested.



View past issues in the Extrusion Applications section at www.aec.org.