An Educational Experience

DOW™-KNIGHT CI-System at Kishwaukee College

PROJECT SNAPSHOT

Kishwaukee College Student Center
Malta, Illinois
80,000 ft² New Construction

Scheduled Completion
October 2012

Architect
Demonica Kemper Architects,
Chicago, Illinois

Construction Manager
Shales McNutt, Elgin, Illinois

Insulation and Façade Contractor
Stuckey Construction,
Waukegan, Illinois

Dow/Partner Products Used
DOW™-KNIGHT CI-System
Knight CI-PanelTek Rain Screen
THERMAX™ (ci) Exterior Insulation
WEATHERMATE™ Flashing
STYROFOAM™ Brand SPF CM 2045

Destined to be a hub for bustling campus life when it opens in the fall of 2012, the new Student Center at Kishwaukee College in Malta, Illinois, will be more than a student hangout. As one component of a campus-wide master plan to serve the needs of the community for the next 20 years, this single building may also have an historic place in the building community due to an exciting new wall construction method.

Since its development in 2009, the innovative, three-in-one THERMAX™ Wall System has been helping raise thermal efficiency and lower energy costs at educational and recreational facilities across the United States. Kishwaukee College has the distinction of being the first application of the DOW™-KNIGHT CI-System, a complete continuous insulation rain screen solution that can be customized for a multitude of façades and cladding systems.

The innovative DOW™-KNIGHT CI-System combines Dow's three-in-one continuous insulation, moisture and air barrier system with patented rain screen infrastructure and cladding attachments from Knight Wall Systems. The result is a smart and beautiful system that helps create energy-efficient, moisture-managed walls with fewer materials and installation steps – and unmatched design versatility.

Integrity by Design

Dow and Knight Wall Systems joined forces to develop the DOW™-KNIGHT CI-System in response to one of the biggest challenges architects face today: Designing a way to attach exterior cladding that doesn't disrupt the integrity of the continuous insulation and air barrier assembly.

"One of the challenges with modern wall systems is maintaining a continuous thermal barrier through all the details of the construction process," said Tony Holub, Demonica Kemper Architects (DKA). On the Kishwaukee project, continuous insulation was a part of the building envelope design from the very beginning. But the Z-furring detailed for the cladding attachment threatened to create significant potential for thermal bridging.

Holub learned about the DOW™-KNIGHT CI-System through his Dow architectural seller, Norah Prombo. "After an architect specifies the THERMAX™ Wall System, I check in periodically as the design and construction details come together," said Prombo. "In this case, my goal was to help Tony find a cladding attachment solution that would still allow the building to fully realize our system's thermal, air and moisture benefits. So I recommended Knight Wall's excellent rain screen options for hanging heavier cladding over continuous insulation."

At this point, construction planning was well underway, leaving a narrow window of opportunity to change details.

Prombo invited representatives from DKA and construction management firm Shales McNutt to a hands-on training to give them a chance to get a closer look at the DOW™-KNIGHT CI-System. Holub brought the construction plans for the Kishwaukee College project to the training, where he was able to meet with representatives from Knight Wall who were instrumental in helping to engineer an attachment system for the natural wood veneer panels, a cladding not previously used with the patented system.

"Successfully addressing thermal envelope challenges and accommodating a non-traditional cladding was a great way to help illustrate how well our two systems work together," said Prombo.

According to DKA principal Dominick Demonica, the firm believes in an integrated design process. "From the outset, we focus on what we can do to reduce building load from an envelope standpoint, but also from the standpoint of building massing – that is, aligning various architectural and building elements to optimize energy usage," he said. "It's all about thinking critically and creatively to build a more efficient and aesthetically appealing building."

> "This is the first system I've seen that allows us to accomplish the truest nature of continuous insulation."
>
> – TONY HOLUB
> DEMONICA KEMPER ARCHITECTS

True Continuous Insulation

Offering new levels of design flexibility for cladding over continuous insulation, the DOW™-KNIGHT CI-System eliminates the need for any furring that penetrates the thermal barrier and disrupts the drainage plane, significantly minimizing thermal shorts. The system provides excellent thermal performance, moisture management and air barrier properties, while simplifying the wall assembly and meeting or exceeding today's energy standards.

The performance of insulation placed between steel studs is compromised by the studs due to thermal bridging. Z-furring and other continuous metal attachment methods also affect the thermal integrity of the insulation. The effect this thermal short-circuiting has on the energy performance of a wall assembly is directly proportionate to the amount of metal that penetrates the insulation.

> "With the faster installation process, our production rates increased at least 25 percent."
>
> – ED STUCKEY
> STUCKEY CONSTRUCTION

The CI-System, an all-in-one cladding attachment, support and rain screen cavity system, helps significantly reduce thermal bridging through the wall assembly. Its unique design acts as a brace, working with the rigid insulation and fasteners for wind and cladding load resistance without sacrificing thermal efficiency.

"At the detail level, the DOW™-KNIGHT CI-System helped solve thermal bridging issues," said Holub. "The single-source system allowed us to seamlessly transition between materials, maintaining a continuous weather barrier despite various material intersections. Thermal bridging is reduced to isolated fasteners and service openings. This is the first system I've seen that allows us to accomplish the truest nature of continuous insulation."

Ahead of the Learning Curve

The learning curve associated with new and possibly unfamiliar design details often poses challenges during the construction process.

"It is never convenient to change details mid-stream, but we knew this was the right thing to do," said Demonica. "Changing to the DOW™-KNIGHT CI-System enabled us to give our client a better system."

In the end, there were two deciding factors in making the last-minute switch to the DOW™-KNIGHT CI-System: the hands-on training and visiting another college project using the THERMAX™ Wall System in its building envelope design.

"The on-site visit coupled with hands-on training really helped drive home how easy our three-in-one system is to install," Prombo said. "It was written into the plans just in the nick of time."

Passing the Test – with Flying Colors

Once the system components were in place, the insulation and façade contractor engaged an outside testing firm to conduct rigorous ASTM air leakage and water penetration tests (ASTM E783 and E1105) to simulate the extremes the weather barrier would be exposed to under real-world conditions. Air infiltration tests (glazing only), conducted at an inward pressure of 1.57 psf, resulted in negligible air infiltration. Water penetration was tested at a 4.18 psf pressure differential, while water was sprayed simultaneously on the exterior face of the assembly at 5 gal/ft^2/hr for 15 minutes. No water leakage was found on the assembly interior, glazing or perimeter during the testing.

Reliable Performance

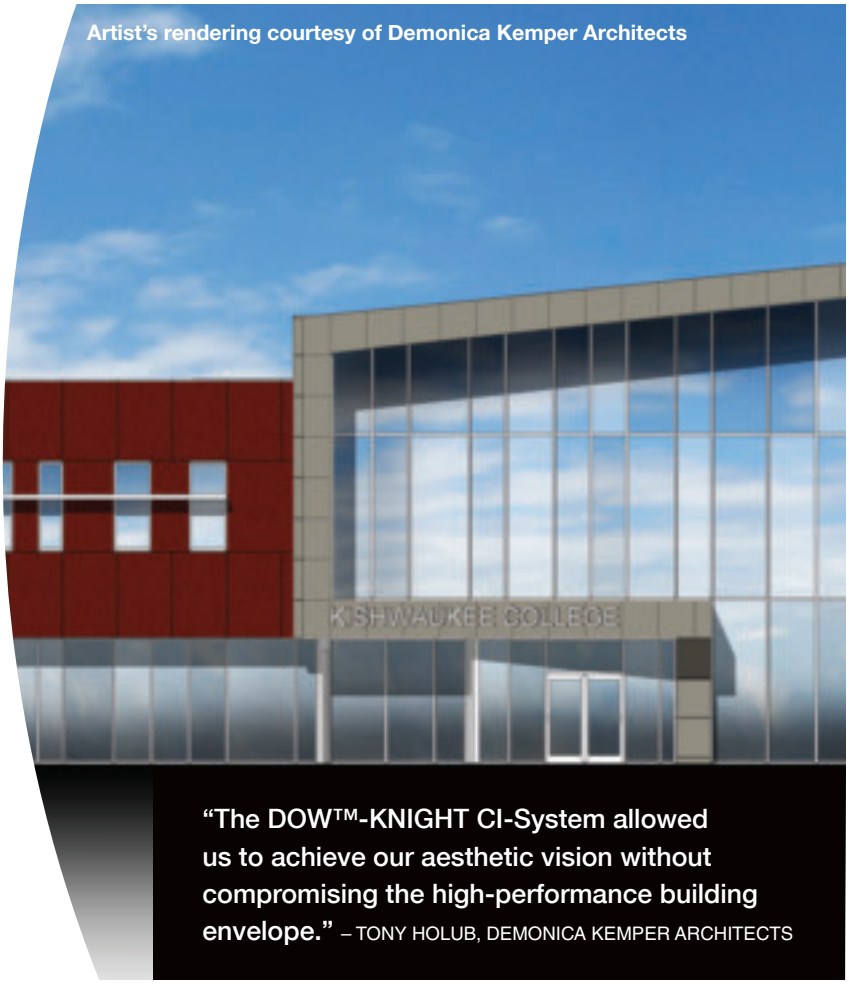
"We conduct these tests on every exterior rain screen project when working with an exterior air and moisture barrier," said Ed Stuckey, president of Stuckey Construction. "These results were far better than most other systems I have seen."

Why Simpler Is Better

Stuckey credited the system's simple design for contributing to significantly reduced opportunities for failure. "I've found that the simpler the details, the better," he said. "The thermoset-coated aluminum facers on the insulation replace the requirements for a separate moisture barrier. Plus there are fewer joints and the self-sealing butyl tape really simplified the flashing details around the windows. The DOW™-KNIGHT CI-System is the best I've seen to hang insulation and cladding on the outside of a wall. It takes a couple of steps out of the installation process and it's a great value."

Faster Installation

In addition to the system's air and moisture performance, Stuckey was impressed with the speed of the framing process. "With the faster installation process, our production rates increased at least 25 percent," he said. "Our three-man crew was able to hang the surface-mounted framing at a rate of about 1,300 ft^2 per day. It's really a slick system. Hanging the cladding went very quickly, too – we completed the entire east elevation, about 70 panels, in about two days."



Artist's rendering courtesy of Demonica Kemper Architects

"The DOW™-KNIGHT CI-System allowed us to achieve our aesthetic vision without compromising the high-performance building envelope." – TONY HOLUB, DEMONICA KEMPER ARCHITECTS

LEEDing the Class

The Kishwaukee College Student Center is designed to accommodate increased student demand for financial aid, registration and counseling services, as well as an expanded bookstore, dining facilities and space for student activities.

"Our vision was to create an inviting space for students and the community," said Holub. "The wood veneer façade provides the warmth and natural beauty we wanted to have reflected in our exterior design, and the DOW™-KNIGHT CI-System allowed us to achieve our aesthetic vision without compromising the high-performance building envelope."

The Student Center is targeting a LEED Gold rating from the U.S. Green Building Council. Holub attributes this in large part to doing all the right things on this project – including achieving a high-performance building envelope.

"It's exciting to be a part of this innovative approach that will become the standard for how we put an integrated building envelope together," said Holub. "I see this as the direction the architectural community is heading, detailing buildings for the next 5 to 10 years."

www.dowknightsolutions.com

THE DOW CHEMICAL COMPANY
Dow Building Solutions . 200 Larkin . Midland, MI 48674
1-866-583-BLUE (2583)

KNIGHT WALL SYSTEMS
28308 N. Cedar Road . Deer Park, WA 99006
1-855-KWS-WALL (597-9255)

THERMAX™ Polyisocyanurate Insulation
CAUTION: This product is combustible and shall only be used as specified by the local building code with respect to flame spread classification and to the use of a suitable thermal barrier. For more information, consult MSDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989-636-4400.

WARNING: Rigid foam insulation does not constitute a working walkable surface or qualify as a fall protection product.

Dow Polyurethane Foam Insulation and Sealants
CAUTION: When cured, these products are combustible and will burn if exposed to open flame or sparks from high-energy sources. Do not expose to temperatures above 240ºF. For more information, consult MSDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989-636-4400.

STYROFOAM™ Brand Spray Polyurethane Foam contains isocyanate, hydrofluorocarbon blowing agent and polyol. Read the instructions and Material Safety Data Sheets carefully before use. Wear protective clothing (including long sleeves), gloves, goggles and proper respiratory protection. Supplied air or an approved air-purifying respirator equipped with an organic vapor sorbent and a P100 particulate filter is required to maintain exposure levels below ACGIH, OSHA, WEEL or other applicable limits. Provide adequate ventilation. Contents under pressure. STYROFOAM™ Brand SPF should be installed by a trained SPF applicator.

Building and/or construction practices unrelated to building materials could greatly affect moisture and the potential for mold formation. No material supplier including Dow can give assurance that mold will not develop in any specific system.

Printed in U.S.A.

Form No. 179-04603-0212BBI
McKAY212784