



## CASE STUDY

### **TECHNOFORM BAUTEC COLLABORATES WITH YKK AP<sup>®</sup> AMERICA INC. ON YOW 350 XT DESIGN**

#### ***CUSTOM-SHAPED BAUTEC STRUCTURAL INSULATING STRIP HELPS WINDOW UNIT DELIVER HISTORICALLY LOW U-VALUES AND BEST-IN-CLASS THERMAL PERFORMANCE***

### EXECUTIVE SUMMARY

When global architectural products manufacturer YKK AP<sup>®</sup> America Inc. set out to develop a radically new energy-efficient aluminum window, they turned to Technoform Bautec for a thermal break solution that could help this product reach its unprecedented performance targets.

Technoform Bautec's engineers responded with a series of custom-designed structural insulating strip prototypes – AND the consultative expertise needed to simulate and integrate them into the finished window unit. This collaboration between Technoform Bautec and YKK AP yielded a product solution that met the customer's stringent design criteria, time frames and budget parameters.

### SITUATION ANALYSIS

New product development can be a costly and time-intensive proposition for fenestration manufacturers. Yet the need for it is clear, given shifting occupancy demands and ever-tightening thermal codes and standards. As this landscape continues to evolve, manufacturers must keep pace by delivering new products that are marketable well beyond the next sales cycle.

**YKK AP America Inc.** ("YKK AP") is a Georgia-based company that takes this challenge seriously. YKK AP manufactures a variety of high-performance fenestration products for office buildings, residential high-rises, schools, stadiums, shopping centers and institutional structures. These products include entrances, storefronts, curtain walls, window walls, sun controls, windows and sliding doors.



Today's architects are designing ever-more efficient structures, and YKK AP's product development team has kept pace with high-performance window products that help them meet their growing efficiency targets. In 2009, YKK AP sought to expand its enerGfacade<sup>®</sup> product line with a new aluminum window unit, the YOW 350 XT, that would deliver unprecedented energy performance using standard one-inch insulating glass. Specifically, the team was charged with delivering a two-finish window unit that was up to 30 percent more efficient than a standard, thermally broken window unit and offered narrow sightlines for aesthetic appeal.

Two-finish window systems like the YOW 350 XT are increasingly popular among architects, as they provide increased design flexibility in finishing and manufacturing processes, and are cost competitive as well. Additionally, two-finish systems allow for Kynar<sup>®</sup> fluoropolymer-based finishes on the outside of a building, with more economical finishes on the inside of a building. This satisfies both weathering and aesthetic goals of architects at a significant savings.



In order to satisfy the demanding objectives of this project, YKK AP needed to incorporate a unique thermal break system into the window unit – one that provided exceptional thermal and structural performance and could be built to YKK AP's exact specifications. Given YKK AP's performance and aesthetic targets, therefore, it was apparent from the outset that standard profiles would not be sufficient to accomplish the design objectives. Instead, the YOW 350 XT necessitated a custom-designed thermal break system.

## TECHNOFORM BAUTEC UNIQUELY SUITED TO MEET YKK CHALLENGE

With its North American headquarters in Twinsburg, Ohio, **Technoform Bautech** is a global leader in the design, production and distribution of high-performance structural insulating strips. Founded in 1969, Technoform Bautech holds 120 national and international patent registrations and maintains manufacturing and distribution facilities throughout Europe, Asia and North America.

Technoform Bautech's sales engineers, technical support staff and customer service representatives understand the challenges that manufacturers face to complete projects on time and on budget. They are knowledgeable, responsive, customer-focused and committed to providing fast turnaround. State-of-the-art manufacturing processes at the company's Twinsburg facility comply with Technoform's worldwide production quality and ensure product quality, order accuracy and on-time completion.

Equally important, Technoform Bautech Engineers work closely during the initial phases of a project to help create strategies around the customer's product development process that effectively integrate Structural Insulating Strips into their designs. Technoform Bautech also offers customers a systems design approach that can reduce a company's inventory of aluminum extrusions, lower production/fabrication tooling costs, and even cut total system production costs by optimizing production flow.

Richard Braunstein, YKK AP's Manager of Product Development, had called on Technoform Bautech's Structural Insulating Strip for use in other YKK AP products through the years. So by the time YKK AP was ready to embark

***"[Technoform Bautech's] ability to service us on small quantity needs has been extremely helpful – they're clearly a very service-driven company, and that helps us meet our schedules. Technoform Bautech has never let us down."***

Richard Braunstein, YKK AP America Inc.

on the YOW 350 XT project, he was familiar with the company, and several of its people. "Technoform Bautech has been our supplier for these types of materials in Japan, and several years ago, we expanded that relationship here in North America," he said. "We already value their technology, and clearly Technoform Bautech shines in terms of their support. So for product development people like us, that adds significant value."

### **KNOW-HOW...AT NO CHARGE:**

#### **CONSULTATIVE EXPERTISE AND CUSTOMER SUPPORT FROM TECHNOFORM BAUTEC**

As the leading global supplier of structural insulating strips, Technoform Bautech offers a comprehensive global network of industry specialists who can help evaluate your system design needs and convert your systems to the Bautech Structural Insulating Strip – all at no additional cost to you.

- Product concept and design
- Thermal simulation and testing support
- Rapid prototyping of custom insulating strip profiles
- Product layout and equipment specification
- Start-up assistance
- Quality control



Technoform Bautech's Dave Hendrickson expanded on that notion. "We had worked with them on past projects, so they knew that we offered more than just a product – they knew we could help them achieve their system performance goals with the YOW 350 XT."

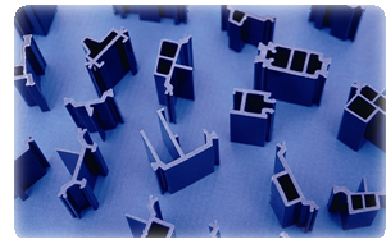
Hendrickson, a Technoform Bautech Market Team Engineer, expanded on the consultative value that Technoform Bautech provided for this project: "Our job was to help get YKK AP where they needed to be performance-wise with the YOW 350 XT," he said. "Experienced, unbiased advice provided by an outside company like Technoform Bautech, combined with assistance in simulating product designs, is really a tremendous benefit for a window manufacturer. In fact, we think it's nothing short of research and development counsel – at no cost to the customer."

## YKK AP CALLS ON THE BAUTEC STRUCTURAL INSULATING STRIP

Constructed of sturdy polyamide 6.6 with 25% glass fiber content, the Bautech Structural Insulating Strip enables aluminum window, door and curtain wall manufacturers to provide the highest degree of thermal performance and structural integrity available today. It features an expansion/contraction rate nearly equal to that of aluminum, thermal conductivity rates 700 times lower than aluminum, and structural properties that exceed those of virtually every other thermoplastic available. It can serve as a primary seal, and it also proves an effective means to fasten gaskets, and flexibly utilize them to further enhance system performance.

The Bautech Structural Insulating Strip is the preferred method worldwide for achieving the lowest U-values in aluminum fenestration. It is installed in millions of windows annually throughout the world and is backed by more than 25 years of success.

Given YKK AP's substantial investment of time and resources in this project, it was critical that the structural insulating strip used in the YOW 350 XT would help this window unit achieve its performance benchmarks – and do so cost-effectively. Therefore, Technoform Bautech collaborated with YKK AP at the outset of this process to provide custom prototype strip designs, run simulations of those designs, and offer assistance and feedback during YKK AP's own product simulation and testing.



As Hendrickson recalled, "They would send us a concept drawing of the window unit integrated with the strip, then our engineering team would review it, discuss it, analyze it and refine it. We also ran thermal simulations and worked collaboratively with YKK AP to refine the design based on those results. In turn, they would take our ideas and run their own thermal simulations and tests to determine how the window's thermal performance was affected by the strip."

"The team at Technoform Bautech proved to be an invaluable design asset," said Braunstein. "As we worked through our internal design process, they completely understood our design goals and shared our excitement about where this project was headed. They really helped us steer the ship by making sure that our process generated the most economical design solution."

Once YKK AP arrived at a preliminary design for the YOW 350 XT, prototype development began. Technoform Bautech assisted by supplying several small quantity requirements. "Our designers would get Dave on the phone and explain what we needed, and they would accommodate us every time. Their ability to serve our small quantity needs was extremely helpful – they're a very service-driven company, and that helps us meet our schedules. Technoform Bautech has never let us down."



Technoform Bautec's commitment didn't end with design consultation. Once shape designs were finalized, the company worked closely with YKK AP personnel on the shop floor to train them on ways to properly crimp those shapes and integrate them into the finished window YOW 350 XT design. As Braunstein explained, "When we develop new ideas like the YOW 350 XT, we discover new ways to look at cross-sectional properties of our aluminum shapes. But in doing so, there's a manufacturing challenge to make sure that those shapes can be properly assembled. For this project, we were in some ways surpassing the normal constraints of this equipment. So Technoform Bautec became directly involved in supporting our guys on the floor in making these shapes feasible.

"The Bautec team was right there, teaching and training us on how to use our own equipment to meet the design solution," Braunstein added. "That alone was invaluable. Had that part of the process not taken place, we may not have been able to achieve our goals."

## THE RESULT: THE YOW 350 XT... BEST-IN-CLASS PERFORMANCE, MADE POSSIBLE WITH THE BAUTEC STRUCTURAL INSULATING STRIP

The collaboration between YKK AP and Technoform Bautec's engineering team resulted in a final approved design that included two custom Bautec Structural Insulating Strip shapes produced specially for use in the YOW 350 XT.

Work on the YOW 350 XT was completed in time for its unveiling at the 2009 Greenbuild International Conference and Expo. Now commercially available throughout North America, the YOW 350 XT features an overall depth of 3-1/2" and is thermally broken by a combination of the Bautec Structural Insulating Strip and YKK AP gasketing to insulate multiple air chambers. Improved occupant comfort is achieved by interior surfaces that are significantly warmer than traditional window systems in cold climates.



A key component of the YOW 350 XT is the Bautec Insulating Strip, which separates exterior metal from interior metal, providing a continuous thermal barrier to reduce condensation and save energy. In fact, when using industry standard Low-E glazing, *the YOW 350 XT achieves an aggressive U-value of 0.34 in a fixed window configuration. With the same glass type, casement and projected configurations, the YOW 350 XT achieves a U-value of 0.35.*

Hendrickson reflected on the successful collaboration between Technoform Bautec and YKK AP: "We really fostered a team approach with both applications and sales engineers working closely together," he said. "We never tried to push a solution on them; instead, we offered them our ideas and our expertise, and we let them decide if that met their needs. Also, we didn't just consider the design of the product – we looked at its intended application, and what it would take to assemble it. So in the end, we provided a thermal break solution, but we also helped them integrate it into their manufacturing process."

Said Braunstein: "We have interfaced with several people at Technoform Bautec through the years, and they're a pleasure to work with. Their collaborative energy emanates from the company's President down: He understands the architectural market; he knows he has a material that architects can use; and he's empowered his people to work closely with customers to help them meet their goals. Collaboration was the key to making this project a success, and Technoform Bautec has made this process easy. I admire the company, and I really enjoy working with them."



## ***SUMMARIZING THE BENEFITS OF THE BAUTEC STRUCTURAL INSULATING STRIP:***

**NEW DEPTHS IN THERMAL PERFORMANCE** – Available in depths of up to two inches, or more for special applications

**MATERIAL QUALITY** for consistently superior structural performance

**MORE THAN 400 EXTRUDED PROFILES AND DESIGN POSSIBILITIES** – including C shapes, T shapes, gasket holders, screw bosses, multiple hollows and parting stops

**HIGH MELTING TEMPERATURE** – Offers superior resistance to heat that may cause lesser materials to lose structural integrity

**CHEMICAL RESISTANCE** – Resists corrosive effects of window cleaning and other chemicals used in construction applications

**DIMENSIONAL STABILITY / TIGHT TOLERANCES / SOUND INSULATION / TWO-TONE FINISHES**

**ALLOWS FOR EASY PRODUCTION OF TWO-FINISH PRODUCTS**

**TESTING AND CERTIFICATION** – Even at similar depths, it provides thermal performance that is consistently better than other thermal break systems

## **FOR MORE INFORMATION**

Call (330) 487-6600, visit [www.technoform.us](http://www.technoform.us) or contact [sales@technoform.us](mailto:sales@technoform.us).

\* *AAMA Specifications:* AAMA 2603 = 1 year South Florida exposure (inside) / AAMA 2605 = 10 year South Florida exposure (exterior)