At BASF, we believe that for a business to be successful in the long term, it must act responsibly toward the environment and society. For this reason, sustainability is an integral part of our strategy. For the building and construction industry, it means helping to create products that meet a whole new set of challenges.

To address rising energy costs, buildings must achieve a new level of energy efficiency. They need to be strong in order to withstand the damaging effects of severe weather. From production through disposal, construction products must have a minimal impact on the environment. Finally, construction projects must achieve other practical benefits such as durability, affordability, speed of construction and ease of maintenance. These are the challenges that BASF solutions meet head on.

BASF’s more than 600 chemical innovations help to move construction projects closer towards sustainability. Our broad portfolio of solutions and products are used directly on construction sites, or as ingredients that enhance the performance of others’ construction products. Our contributions to the industry span 75 different construction categories including wall systems, building systems, expansion management, insulation, sealants, adhesives and window components to name a few. For commercial, school, residential, infrastructure and many more project areas, BASF products and solutions have increased energy efficiency, durability and strength, construction speed and design flexibility.

Read on to learn about some of the many ways in which we are leading the building and construction industry down a more sustainable path.

For more stories and more products: www.basf.com/construction
The new football stadium in Arlington, Texas will be 2.7 million square feet (250,838 square meters) when it is completed in 2009, making it the world’s largest column-free room. It will have the capacity to hold over 80,000 people and the ability to increase the total to 100,000 for special events.

Contractor Manhattan Construction Company needed a high-performance product for the foundations which support the steel arches spanning the entire stadium. BASF Construction Chemicals—Admixture Systems worked with Dallas-based, ready-mix concrete producer, TXI, to supply 225,000 cubic yards (172,000 cubic meters) of cast-in-place concrete. Each concrete foundation is made of 250 yards of concrete—meeting a very high-strength measure of 8,000 psi (55 MPa)—in just 28 days. To help TXI solve previous slump retention problems and achieve the desired strength and durability, BASF provided PS 1466 high-range, water-reducing admixture.

BASF Construction Chemicals—Building Systems created a waterproofing and abrasion resistance plan for the 800,000 square foot waterproof seating bowl—first addressing the non-mechanical expansion joints of the structure. The joints, which are 0.5 - 0.75-inches wide, were double caulked with Sonneborn® sealants. Joints were first caulked with Sonolastic® nP2—recessed approximately two inches. Just prior to the deck coating application, each joint was water tested to ensure no leaks would be present after nine to 12 months. Once this test was performed, Sonolastic Ultra caulk, which has a high Shore A hardness of 50, was installed.
A seamless polyurethane deck coating system was then applied to the entire seating bowl area. The system included a Sonogaurd® basecoat followed by a Sonogaurd topcoat. Finally, the area was sealed with a Conipur 295 topcoat. A seamless polyurethane deck coating system was then applied to the entire seating bowl area. The system included a Sonogaurd® basecoat followed by a Sonogaurd topcoat. Finally, the area was sealed with a Conipur 295 topcoat. A seamless polyurethane deck coating system was then applied to the entire seating bowl area. The system included a Sonogaurd® basecoat followed by a Sonogaurd topcoat. Finally, the area was sealed with a Conipur 295 topcoat. A seamless polyurethane deck coating system was then applied to the entire seating bowl area. The system included a Sonogaurd® basecoat followed by a Sonogaurd topcoat. Finally, the area was sealed with a Conipur 295 topcoat. A seamless polyurethane deck coating system was then applied to the entire seating bowl area. The system included a Sonogaurd® basecoat followed by a Sonogaurd topcoat. Finally, the area was sealed with a Conipur 295 topcoat. A seamless polyurethane deck coating system was then applied to the entire seating bowl area. The system included a Sonogaurd® basecoat followed by a Sonogaurd topcoat. Finally, the area was sealed with a Conipur 295 topcoat. A seamless polyurethane deck coating system was then applied to the entire seating bowl area. The system included a Sonogaurd® basecoat followed by a Sonogaurd topcoat. Finally, the area was sealed with a Conipur 295 topcoat. A seamless polyurethane deck coating system was then applied to the entire seating bowl area. The system included a Sonogaurd® basecoat followed by a Sonogaurd topcoat. Finally, the area was sealed with a Conipur 295 topcoat. A seamless polyurethane deck coating system was then applied to the entire seating bowl area. The system included a Sonogaurd® basecoat followed by a Sonogaurd topcoat. Finally, the area was sealed with a Conipur 295 topcoat. A seamless polyurethane deck coating system was then applied to the entire seating bowl area. The system included a Sonogaurd® basecoat followed by a Sonogaurd topcoat. Finally, the area was sealed with a Conipur 295 topcoat. A seamless polyurethane deck coating system was then applied to the entire seating bowl area. The system included a Sonogaurd® basecoat followed by a Sonogaurd topcoat. Finally, the area was sealed with a Conipur 295 topcoat.
The Cooper River Bridge in Charleston, SC, is the longest cable stay bridge in North America. Design engineers needed to create a road that could flex as needed, hold to heavy traffic loads and deliver many years of trouble-free service.

BASF worked with Latex Systems Inc., a distributor, and Cleco Corporation, the bridge deck overlay contractor, to create a recipe for the latex-modified concrete that included BASF Styrofan 1186. The recipe provides flexural strength and durability, keeps the roadway structure strong for an extended period of time and gives the bridge authority a low-maintenance road surface.

“The beauty of the latex modified concrete overlay is that it compensates for those dimensional variances. More importantly, it adds a great deal of extra strength and flexibility to the road surface that keeps it in good condition for a long time and helps the deck last much longer.”

“Styrofan 1186 helps to create a strong, yet flexible, bridge deck surface that will last for up to 20 years,” said John J. Sweeney of Latex Systems. “The latex reduces water requirements and creates a concrete with higher flexural strength and tremendous adhesion. It also helps resist penetration of oil, water and salt, protecting against erosion—especially important where road salt and freeze-thaw cycles cause extensive damage to concrete decking.”

Cooper River Bridge
Charleston, SC

The Cooper River Bridge in Charleston, SC, is the longest cable stay bridge in North America. Design engineers needed to create a road that could flex as needed, hold to heavy traffic loads and deliver many years of trouble-free service.

BASF worked with Latex Systems Inc., a distributor, and Cleco Corporation, the bridge deck overlay contractor, to create a recipe for the latex-modified concrete that included BASF Styrofan 1186. The recipe provides flexural strength and durability, keeps the roadway structure strong for an extended period of time and gives the bridge authority a low-maintenance road surface.

“The beauty of the latex modified concrete overlay is that it compensates for those dimensional variances. More importantly, it adds a great deal of extra strength and flexibility to the road surface that keeps it in good condition for a long time and helps the deck last much longer.”

“Styrofan 1186 helps to create a strong, yet flexible, bridge deck surface that will last for up to 20 years,” said John J. Sweeney of Latex Systems. “The latex reduces water requirements and creates a concrete with higher flexural strength and tremendous adhesion. It also helps resist penetration of oil, water and salt, protecting against erosion—especially important where road salt and freeze-thaw cycles cause extensive damage to concrete decking.”
Lester B. Pearson International Airport
Toronto, ON

Construction of Toronto’s Lester B. Pearson International Airport provided some interesting and unique expansion control challenges to the engineers at BASF Watson Bowman Acme.

Volume through the central area and Pier F Hammerhead required an expansion control system that could withstand not only high-volume pedestrian traffic but also traffic from airport transportation vehicles and maintenance equipment.

The depth needed to accommodate the structural slab and complement the terminal’s terrazzo flooring surface. It also had to be fire rated, control water intrusion through the expansion opening and meet potential for seismic movements.

The load-bearing plate was designed using proprietary Finite Element Analysis (FEA) software. This determined appropriate manufacturing materials to accommodate the live load requirement and the fatigue that would occur during the course of repetitive loading and unloading.

The system meets ADA criteria and incorporated a gutter system used in conjunction with a UL and ULC listed fire barrier system.

Interstates I-77/I-64
Beckley, WV

Replacing concrete pavement where traffic is as heavy as it is at this major interstate intersection demands the fastest solution. When several stretches of the I-77/I-64 West Virginia turnpike were deteriorating, the commissioners called for a fast-track replacement with minimum inconvenience to motorists. BASF worked with Boxley Materials, a local ready-mix concrete producer, to develop a mixture that would achieve required compressive strength even in the cool ambient spring temperatures.

The answer was use of a high-early compressive strength mixture using the 4X4™ Concrete System, which attains at least 400 psi flexural strength within four hours of placement. Included were MB-VR™ air-entraining mixture, DELVO® extended set-controlling admixture, Glenium® 3030 NS high-range water-reducing admixture, PolyHeed® 997 mid-range water-reducing admixture and Pozzolith® NC 534 accelerating admixture.

West Virginia Paving, Inc. began to remove deteriorated pavement sections at 7 p.m. and prepared the subgrade for fresh concrete that was delivered, installed and cured by 1:30 a.m. The target of 2,000 psi compressive strength was achieved and the lane re-opened in time for early morning rush hour traffic.

Challenge: Design a custom expansion control system for a high-traffic international airport
Solution: BASF Watson Bowman Acme
Benefit: Durability

Challenge: Repave a major interstate intersection and reopen it to traffic in 12 hours
Solution: BASF Admixtures
Benefit: Speed of construction
Texas A & M University
College Station, TX

In 1974, the Physical Plant Department at Texas A&M began looking for alternatives to the tar and gravel built-up roofing systems (BURs) that were leaking constantly after an average of five years of service. Spot repairs were difficult because isolating the sources of the leaks was next to impossible.

The university selected BASF ELASTOSPRAY® Spray Polyurethane Foam (SPF) because it is seamless, monolithic and fully adhered. Since it was lightweight, a complete tear-off of the existing BUR could be avoided. “We sprayed over the failing BUR for a number of years, mainly due to budgetary constraints,” said Sam Cohen, Construction Project Manager, Engineering Design Services at Texas A&M. “That’s one of the advantages to SPF. Environmentally, it means all that material doesn’t end up in the landfill.”

Eleven years later, Gerald Scott, P.E., then in charge of roofing and energy conservation within the Physical Plant Department, announced another benefit the university had been receiving from the SPF roofs: significant energy savings. Scott monitored energy costs on 27 buildings on campus that had received an SPF roof from 1980 to 1984. The results showed the university had been able to recover the complete cost of the roof application through energy savings in an average of 4.5 years.

The oldest over-BUR SPF roofs on the campus are now more than 30 years old. According to Cohen, they have received little-to-no maintenance, yet remain leak free and retain their energy-efficient performance.

Amherst College
Amherst, MA

Amherst College looks exactly how you might imagine a traditional New England campus that has its roots in the nineteenth century. That’s why, when it came time to rebuild, the college and its architectural firm, Shepley Bulfinch Richardson and Abbott of Boston (SBRA), needed an exterior design that would be compatible with the existing architecture and would provide a modern building envelope.

To accomplish these goals they chose the WALLTITE® insulating air barrier system from BASF Polyurethane Foam Enterprises LLC in combination with foam sealants. According to Project Manager, Shaun Landon, the WALLTITE insulation and air barrier system “provided a tight, efficient, high-performance building envelope in a shorter timeline.”

Challenge: Re-roof campus buildings with a material that would have a longer life expectancy than a traditional tar and gravel built-up roofing (BUR) system
Solution: BASF ELASTOSPRAY® Spray Polyurethane Foam (SPF) from BASF Polyurethane Enterprises LLC
Benefit: Energy efficiency

Challenge: Construct two new energy-efficient buildings while maintaining the traditional architectural style of the existing campus
Solution: The WALLTITE® insulating air barrier system from BASF Polyurethane Foam Enterprises LLC
Benefit: Speed of construction

The two buildings compose the east side of Amherst’s historic quadrangle, each approximately 36,000 square-feet. The buildings are steel-frame construction with concrete block back-up and a brick veneer. The architect’s original plan for the Massachusetts-mandated air barrier system was a liquid-applied vapor barrier with rigid insulation on top. But SBRA is one of an increasing number of New England firms who are focused on creating air barrier systems that exceed state mandates to meet the highest expectations of in-field quality control. And the WALLTITE system meets those standards.
The role of BASF Chemistry in Residential Buildings

100 Homes
Lubbock, TX

When the City of Lubbock was awarded money from the Federal Community Development Block Grant to demolish and reconstruct homes in certain neighborhoods, Brad Reed, Senior Housing Inspector for the Community Development Department, recognized his once-in-a-lifetime opportunity to rebuild homes the right way, making them more energy efficient and safer under increased incidents of extreme weather.

After studying different construction methods, Reed attended a training seminar on American PolySteel’s insulating concrete form (ICF) products using BASF Styropor® Expandable Polystyrene (EPS) foam. He was so impressed that he returned to Lubbock and piloted the construction of the first ICF home under a new construction program called “Home Investment Partnership.” After gathering and analyzing cost data over three years, the City realized the operational cost savings were so great in the ICF homes they no longer offered owners a choice—every new home would now use ICF construction. The 100th ICF home was poured on September 12, 2007. Reed estimates the additional costs of ICFs over traditional wood framing ranges from $3,000 to $4,000 per house. That would add less than $24 per month to a 30-year mortgage at six percent interest. Since monthly energy costs for the ICF homes range from $50 to $75, compared to the $150 to $200 commonly found in non-ICF construction of similar homes, the net result is reduced operational costs.

Challenge: Create high-performance windows that are durable, energy efficient, and offer flexible design options
Solution: Thermoplastic Spacer (TPS) technology using BASF Oppanol® polyisobutylene
Benefit: Energy efficiency

TRACO®
Cranberry Township, PA

TRACO®, manufacturers of high-quality windows for more than 60 years, wanted to create a line of windows that addressed market demands for increased energy efficiency. The experts at TRACO realized that replacing the traditional metal spacer with a plastic version would make a significant difference. That’s why for their NEXGEN™ Energy Windows they chose spacers produced by ADCO Global Inc., which are enhanced with BASF Oppanol® polyisobutylene (PIB).

ADCO uses BASF Oppanol® PIB as the primary sealant for its TPS system because it is flexible, reduces moisture infiltration and is resistant to UV radiation. The BASF-enhanced TPS spacers help increase energy efficiency up to 10 percent. They also provide design flexibility and long-term performance.
Near-Zero Energy Home, Paterson, NJ

The BASF Near-Zero Energy Home in Paterson, NJ, was built to the highest standards of sustainable building practices. The house incorporates Zero-Energy Housing (ZEH) concepts from Oak Ridge National Laboratory, the building science principles of PATH/Build America expert Steven Winter, AIA and the Whole Building Approach from Sustainable Buildings Industry Council.

It achieved Platinum Certification in the Leadership in Energy and Environmental Design for Homes (LEED®-H) rating system. The home has also achieved ENERGY STAR® certification and, with the inclusion of solar panels, supports New Jersey’s Solar Initiative Program.

Many BASF products were used to help achieve this success. Detailed descriptions of all the major systems: building envelope, HVAC and solar, are available at www.betterhomebetterplanet.com

**Challenge:** Build a model energy-efficient and environmentally compatible home that is both durable and fast to construct

**Solution:** BASF advanced building envelope innovations

**Benefit:** Energy efficiency

---

Habben Home, Sierra Nevadas

Nestled in the foothills of the Sierra Nevada mountains, where summer days often reach 110 degrees Fahrenheit and winter lows are often in the teens, builder Eric Habben set out to prove that his new home could be an oasis from energy concerns. He knew that structural insulated panels (SIPs) could achieve superior energy efficiency and set out to find the best in class.

Habben chose Thermocore Panel Systems, Inc. of Mooresville, IN. For this home, Thermocore supplied SIPs with four inches of BASF Autothrot® polyurethane foam.

Polyurethane in the panels provides insulation value of R-6 to R-7 per inch, higher than any other standard insulation material. Window and door openings in the panels are precut at the factory using precision machinery to insure excellent fit at the job site.

This enabled Habben to erect the entire shell of his 3,200-square-foot home in less than four days. “We used 10 gallons of propane to heat last year. And my highest electricity bill for cooling was $77 a month,” said Habben.

**Challenge:** Quickly construct an energy-efficient home using the best available technology

**Solution:** Thermocore Structural Insulated Panels (SIPs) manufactured with BASF Autothrot® polyurethane foam

**Benefit:** Energy efficiency

---

TRACO® and NEXGEN™ are trademarks of TRACO Intellectual Inc. LEED® is a trademark of the United States Green Building Council. ENERGY STAR® is a trademark of the United States Department of Energy. Sonolastic®, 4X4® Concrete System, DELVO®, MB-VR®, Glenium®, PolyHeed®, Pozzolith®, ELASTOSPRAY®, Styrofoam®, Oppanol®, and Autothrot® are trademarks of BASF Corporation. Squashbusters Fitness Center, Atlantis Paradise Island Hotel, Cooper River Bridge, Lester B. Pearson International Airport, Texas A&M University, Amherst College, Habben Home and all other structures and their trademarks are the property of their respective owners. The BASF Near-Zero Energy Home-Paterson, NJ was donated to St. Michael’s Housing Corporation.

© 2008 BASF Corporation.

www.basf.com/construction

Printed on Mohawk Via 30% PCW, which is made with 30% post-consumer recycled fiber and manufactured with 100% Green-e Certified renewable wind power.