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Air/Water-Resistive Barrier Scores High Marks at Fort Bliss

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Air / water-resistive barrier is SIX TIMES more effective than the allowable standard

Performance cited for repeatability on 24 buildings at Fort Bliss

In November 2010 BASF Wall Systems announced the results of third party documented real life performance testing of its air and water-resistive barriers. It’s fluid-applied barrier demonstrated outstanding air tightness performance during fan pressurization/ depressurization testing conducted on new barracks buildings recently constructed at the Fort Bliss, Texas, U.S. Army base.

The project, which began in August 2009, consists of 24 Infantry Brigade Combat Team (IBCT) unaccompanied personnel housing barracks for the Army’s 4th and 5th brigades. Construction of this project was among the very first to fall under the new U.S. Army Corps of Engineer requirement mandating a maximum allowable envelope leakage of 0.25 cfm/ft² (not at 75-Pa) so as to reduce energy consumed by buildings as bases.

The Air Tightness Directive

On Oct. 30, 2009, the United States Army Corps of Engineers (USACE) issued Engineering and Construction Bulletin No. 2009-20, a Directive defining building air tightness requirements for new constructions and for the renovation of existing structures greater than or equal to 25 percent of the total replacement cost of the building beginning in 2010. This Directive references a number of applicable ASTM references, as well as the U.S. Army Corps of Engineers Air Leakage Test Protocol for Measuring Air Leakage in Buildings.

Building Description

Each of the Ft. Bliss UEPH barracks is a two-story building with a “U” shaped housing unit split face wainscot. The floors are poured concrete slabs over the sheathed walls. The design also specified a mixed exterior cladding consisting of BASF Wall Systems Senerflex Channeled Adhesive Design EIFS with a concrete masonry unit split face wainscot. The floors are poured concrete slabs and the roof assemblies are a fully-adherent thermoplastic-olefin (TPO) single ply membrane.

“Even experienced crews benefit from reviewing critical application details with the manufacturer’s technical representative – especially when air leakage tests could mean a huge loss of time and money if application were done improperly.”

Blake Anderson
Project Manager for Diversified Interiors

No Room for Error

This subcontractor for the Senerflex-R and Senerflex EIFS was Diversified Interiors of El Paso. They were already familiar with Senerflex-R and had installed many Senerflex wall systems in the past. However, Fort Bliss was an unusually large and complex project. According to Blake Anderson, project manager for Diversified Interiors, “the production schedule was tight and required us to complete more than two buildings each month. Completion of the Senerflex-R air barriers was on the critical path to get the buildings tight and enclosed. With the Oct. 30, 2009, the United States Army Corps of Engineers requirement for fan pressurization testing on each building, we could not afford any surprises, mistakes or delays.”

To address these concerns, he worked with a BASF Wall Systems team who augmented internet video application demonstrations with additional on-site application training for his crews. Anderson explained, “Even experienced crews benefit from reviewing critical application details with the manufacturer’s technical representative – especially when air leakage tests could mean a huge loss of time and money if application were done improperly.”

Although they spray-applied Senerflex-R on other projects, Diversified Interiors chose to apply a material based upon project layout and site conditions. Large mock ups showing all critical details were prepared on site with the guidance of a BASF representative.

In addition to training and mock ups, the general contractor, Sundt Construction, arranged for a pre-construction conference involving their air barrier consultant and testing firm, Pie Forensic Consultants along with Diversified Interiors, other subcontractors and a representative of the Army Corps of Engineers. Blake Anderson said, “These meetings provided an opportunity to expand the mock-ups, and review details, sequencing and jobsite safety issues.”

Eric Amhaus, a Principal with Pie Forensic Consultants stated, “Not only have all of the buildings passed with flying colors, but the repeatability of the performance testing results on this project were outstanding. The fact that the test results for all 24 UEPHs have been so close, indicates that similar results can be achieved on other buildings with like construction, materials and attention to detail in both the design and construction phases. This data can be used by the U.S. Army and/or others when evaluating design parameters & defining expected levels of performance for future buildings.”

Amhaus further added, “It should also not be overlooked that the 0.25 cfm/ft² USACE requirement is approximately 38 percent tighter or more demanding than ASHRAE-161, which is to be adopted in the 2012 International Energy Conservation Code and sets approximately 38 percent tighter or more demanding than ASHRAE-161, which is to be adopted in the 2012 International Energy Conservation Code and sets the maximum allowable whole building leakage for commercial buildings at 0.45 cfm/ft². Sundt Construction and all of the parties involved on this project should be proud of what they have achieved.”

Performance testing showed that the incorporation of Senerflex-R as the primary vertical wall air barrier on this project contributed to the client achieving average air leakage ratios that were 71 percent better than the U.S. Army Corps of Engineers’ minimum allowable requirement of 0.25 cfm/ft² at 75-Pa.

According to Richard Manthe, Nonresidential Market Manager for BASF Wall Systems, the growth in the use of air barriers is increasing rapidly. “Air barriers are an EEC requirement for all new construction. Repeatable results like those we achieved in the Fort Bliss tests support the effectiveness of our final applied air barriers in cutting energy robbing air leakage.”

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Each of the 24 barracks are two-story buildings with a “U” shaped housing a living sleeping area of 73,312 ft² the surface area of the defined air barrier. The exterior envelope walls consist of plywood sheathing over wood framing. Senershield-R fluid air/water-resistive barrier and accessory flashing tapes were applied for protection over the sheathed walls. The design also specified a mixed exterior cladding consisting of BASF Wall Systems Senershield Channelled Adhesive Design EFS with a concrete masonry unit until site conditions. Large mock ups showing all critical details were prepared on site with the guidance of a BASF representative.

No Room for Error

Despite the high expected levels of performance for future buildings.

Eric Amhaus, a Principal with Pie Forensic Consultants stated; “Not only have all of the buildings passed with flying colors, but the repeatability of the performance testing results on this project were outstanding. The fact that the test results for all 24 UEPHs have been so close, indicates that similar results can be achieved on other buildings with like construction, materials and attention to detail in both the design and construction phases. These data can be used by the U.S. Army and/or others when evaluating design parameters & defining expected levels of performance for future buildings.”

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According to Richard Mantova, Nonresidential Market Manager for BASF Wall Systems, the growth in the use of air barriers is increasing rapidly. “Air barriers are an essential component of the IECC requirement for all new construction. Repeatable results like those we achieved in the Fort Bliss tests support the effectiveness of our fluid-applied barriers in cutting energy robbing air leakage.”

**Air leakage diagnostics were accomplished as a part of each test by the Forensic Consultants’ certified infrared thermographers.**

**“Even experienced crews benefit from reviewing critical application details with the manufacturer’s technical representative – especially when air leakage tests could mean a huge loss of time and money if application were done improperly.”**

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Project manager for Diversified Interiors

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Success Stories

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