

# New Exterior Substrate Wall System Offers Superior Cost and Performance Benefits

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US. Gypsum Company Claims DUROCK Exterior Wall System Combines Benefits of Gypsum Sheathing With Traditional Cement Substrates

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**T**here's a new exterior substrate wall system now available which provides a cost effective, high performance alternative to gypsum sheathing, cement block and poured concrete substrates.

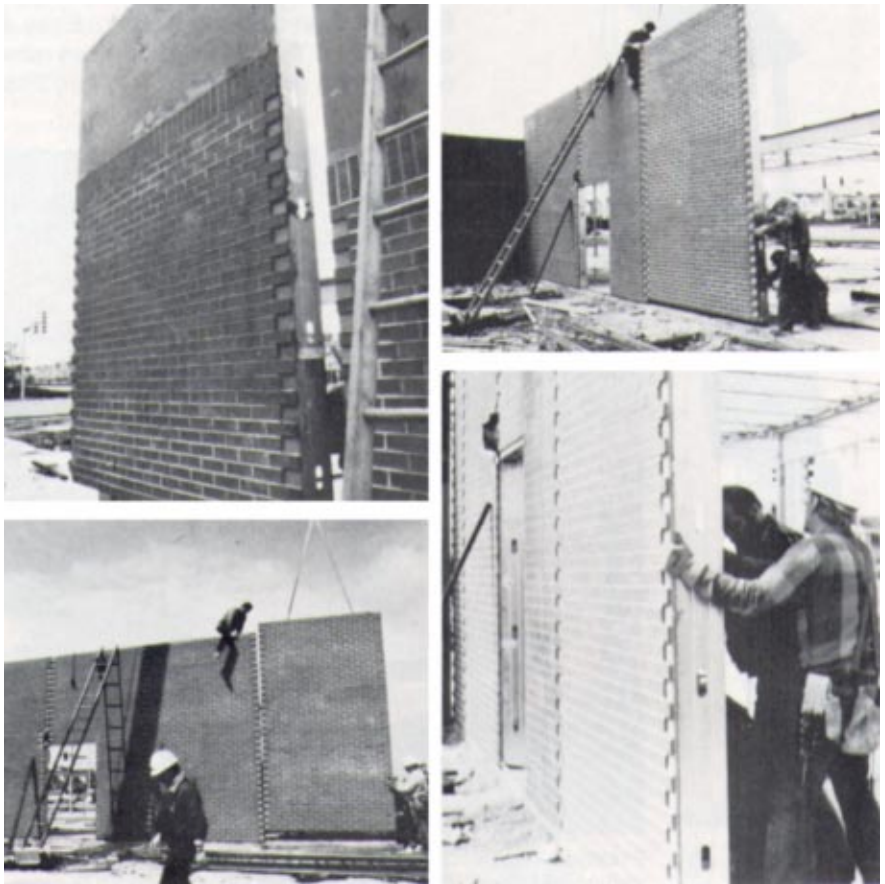
The manufacturer, United States Gypsum Company, claims its new DUROCK® Exterior Wall System combines the benefits of gypsum sheathing with the advantages of the traditional cement substrates.

The systems are specifically made for use with ceramic tile, stone aggregate and thin brick exteriors and can be used in commercial, industrial and residential construction. They are unique in the fact that the main substrate wall component, Exterior Cement Board, provides a density and hardness comparable to cement. Yet, the board can be handled and installed with much the same ease as gypsum sheathing . . . including panelization!

The board has a one or two hour fire rating and effectively withstands high temperature, humidity, water, wind and repeated freeze-thaw cycles.

It is made from aggregated portland cement, reinforced with special glass-fiber mesh. It is available 4x8-ft. x ½-in. thick. The ends are square cut and edges reinforced and finished smooth.

The DUROCK Exterior Wall System is an integrated system with its own screws, exterior tape, latex-



On-site assembly in sequence of panelized walls with DUROCK Exterior Wall System substrate and thin brick finish for Hungry Fox restaurant in Wheeling, IL. According to the panelized contractor, Architectural Enclosure Systems, Grand Rapids, Mich., the DUROCK Exterior Wall Systems provided a 7-10% cost savings in comparison to other panelized substrate systems.

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<b>DUROCK Exterior Cement Board Tested Performance</b>		
<i>Property</i>	<i>ASTM Test Ref.</i>	<i>Value</i>
<b>Flexural Strength — psi</b>	<b>C947-81</b>	<b>1000</b>
<b>Water Absorption % by wt. 24 hours</b>	<b>C948-81</b>	<b>10</b>
<b>Nail Pull Resistance lb., 0.4" head diameter wet or dry</b>	<b>C473-84</b>	<b>125</b>
<b>Weight lb/sq. ft.</b>	<b>C473-84</b>	<b>3</b>
<b>Freeze/Thaw Resistance Procedure A — number of cycles with no deterioration</b>	<b>C666-84</b>	<b>100</b>
<b>Surface Burning Characteristics</b>	<b>E84-84</b>	<b>5.0</b>

(Figure 1)

fortified mortar and latex-fortified grout.

### **Tested Performance . . .**

The UL-approved systems underwent extensive research and testing before being introduced to the market for use with load-bearing wood framed and non-load-bearing steel framed walls.

Performance evaluations, conducted by Construction Technology Laboratories, a division of the Portland Cement Association, revealed that the systems adequately withstand deformation under compressive and flexural loads, water permeance, cyclic freezing and thawing and wetting and drying. (See Fig. 1)

Freeze/thaw stability tests show that no deterioration of the board occurs after 100 freeze/thaw cycles.

Another notable component of the system is the specially developed DUROCK Screws. They were designed specifically for use with the system's

Exterior Cement Board. Two types are available: one for application onto 14 to 20 gauge steel stud framing; and another for use on 20 to 25 gauge steel studs and wood framing. They feature a Climaseal corrosion resistant finish and provide maximum holding power.

### **System Benefits . . .**

Cost-effectiveness is one of the primary advantages offered by the system. A United States Gypsum Company cost analysis report concluded that the total installed cost of the DUROCK Exterior Wall System is approximately:

- 18% less than the installed cost for a typical ceramic tile curtain wall;
- 33% less than the installed cost for a typical epoxy matrix/stone aggregate curtain wall;
- 7% less than the installed cost for a typical brick veneer wall.

Design freedom is another important benefit. By minimizing many of the cost, weight and performance

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restrictions associated with other types of substrate walls, the system allows greater versatility and design flexibility.

Part of the beauty of the system is that the same substrate is used for the three different exterior finishes. This gives specifiers the ability to combine two or more finishes on the same building without having to deal with multiple application and specification procedures. This benefit holds true for the contractor as well. The application procedures are basically the same for each of the three systems. Once a crew has the basics down, they can easily handle any of the exterior finishes.

The system components are usually available from a single source. Most suppliers carry all components included in the system, so there is no need to hunt down various materials from multiple suppliers.



Completed Hungry Fox restaurant. The 20 DUROCK Exterior Wall System panels were assembled in-factory in approximately 40 man hours. The panels were erected on-site in about four hours.

One example of the system's design flexibility is the Diagnostic Imaging Center, a recently completed medical building, located in Kansas City, MO. Designed by prominent Kansas City architectural firm, HNTB Architects, the split-level building features a combination brick and ceramic tile exterior.

"We designed a lightweight structure which would not have been practical for tile application if we had to rely on a conventional support wall system," notes Larry Ralph, project architect. "The light weight and quick installation of the DUROCK system combined to make the tile application practical and economically feasible."

Design flexibility was also specified as a key benefit by John Harris, president of Orlando, Fla.-based Continental Walls and Ceiling Company. Continental was subcontractor on the construction of a 30,000 sq. ft. stone aggregate addition on the American Pioneer Plaza bank building in Winter Park, Fla. The addition, completed in early 1987, utilized the DUROCK Exterior Wall System as a substrate under the stone aggregate.

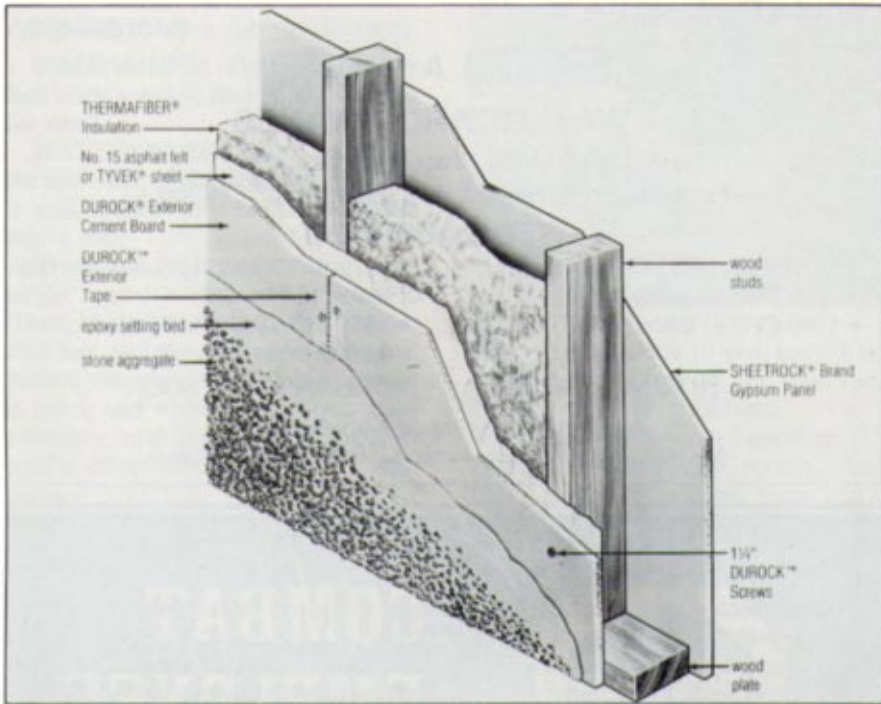
The project was actually bid and specified a year and a half before construction started. During that interim period, the substrate originally specified proved to be impractical for the job . . . and that left Harris looking for a viable alternative.

"We considered cement block," Harris explains, "but we ran into a problem with that around the windows. Above each window there's a parapet wall which turns back into the glass at a 90 degree angle. Then below each window there is a 45 degree sloping sill which extends about three feet. Cement block just wouldn't have worked in these areas. There was no way we could use it."

The system proved to be the answer to the problem. The board was easily cut to fit around the parapet walls and sloped sills.

"I wish this system had been available when we originally spec'd the project," Harris noted upon completion of the job. "We would have gone with it right from the start."

Walt McCully, vice president of McCully Construction Company, general contractor for the Pioneer Plaza building, agrees with Harris' assessment. "We'd much rather work



Cut-away views showing components of the stone aggregate option from among the three DUROCK Exterior Wall Systems.

with the DUROCK system than virtually anything else on these types of applications," he maintains. "It provides a very stable support wall, it's easy to handle and it would seem to have excellent durability and longevity properties."

## Panelized Construction . . .

A recently completed project—the Hungry Fox restaurant in Wheeling, Ill., developed by Lexington Development Corporation—demonstrates the advantages this system provides in panelized construction.

Featuring a thin brick exterior finish, panels were prefabricated in-factory by Architectural Enclosure Systems, a Grand Rapids, Mich.-based panelized manufacturer.

Fred Gebauer, president of Architectural Enclosure Systems, maintains that the DUROCK Exterior Wall System provided a 7-10% cost savings in comparison to other thin brick panelized construction techniques he has used in the past.

The savings, according to Gebauer, are realized in both material and labor costs.

"The in-factory assembly cost for the panels, including the thin brick finish, was approximately \$10 per square foot," he says. "Other thin brick systems we've used usually come to about \$11 per square foot."

"The concept of incorporating the cement board into an exterior wall system makes a lot of sense to us," Gebauer adds. "We really think this is exactly what's needed in our market."

A total of 20 panels (3,400 sq. ft.) were fabricated in-factory and shipped to the Wheeling construction site, where they were in place within four hours.

Evert Orndahl, Commercial Production Manager for Lexington Development, estimated that the panelized system provided a cost savings of approximately \$10,000 in comparison to conventional brick masonry construction.

"It was a good choice," Orndahl maintains. "It worked out well for us."

