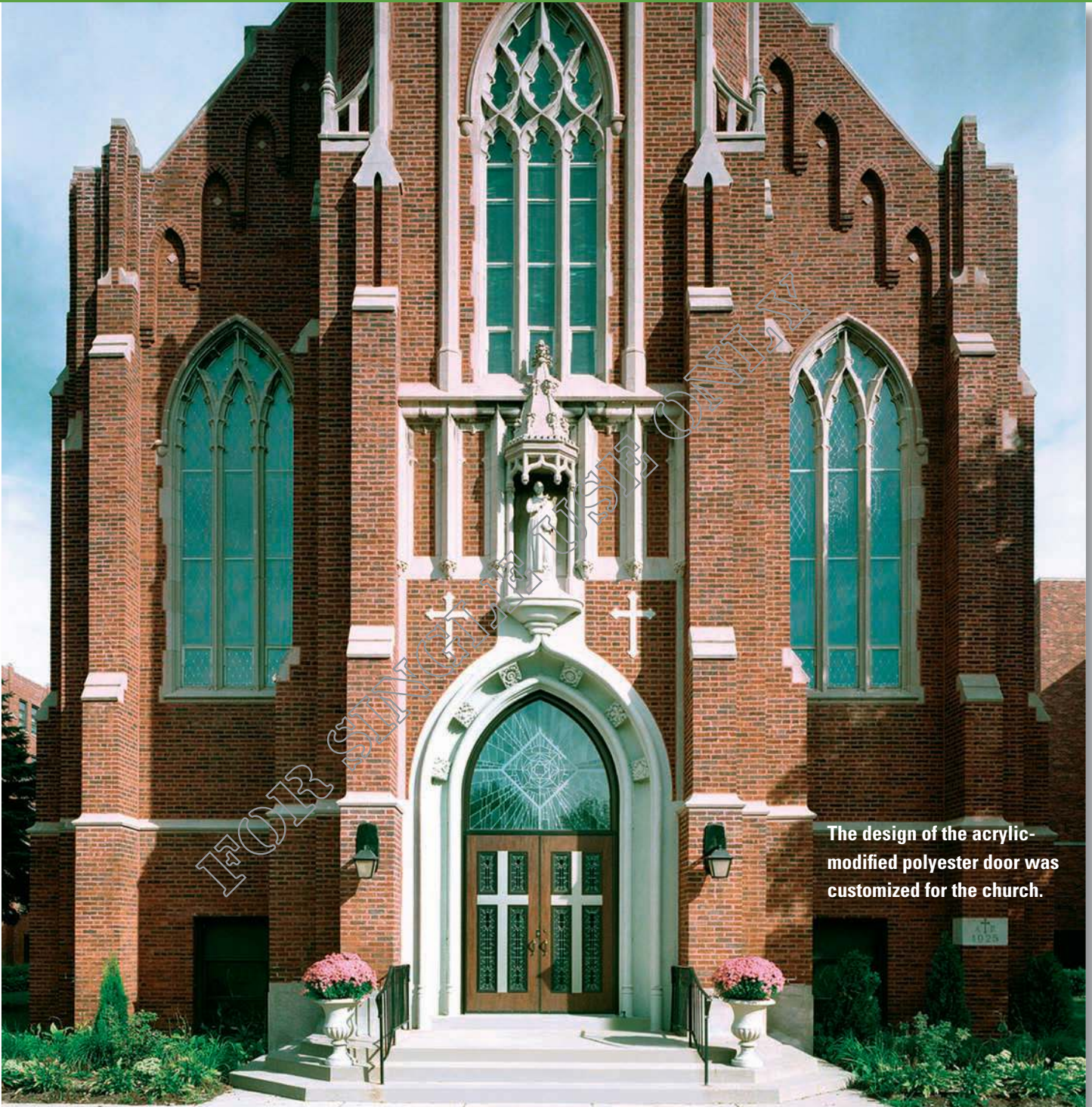


Commercial BUILDING PRODUCTS

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cbp doors
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The design of the acrylic-modified polyester door was customized for the church.

Choosing A Sustainable Door

Dan Depta, Special-Lite Inc.

If you are constantly replacing an exterior door, how green can it be? Consider these specifying tips.

Often overlooked in green-building discussions, entrance systems have been shown to incur a disproportionate cost in regard to operations and facility management, compared with the initial cost of the product and its installation. If a facility is to achieve the best return on investment for its green practices, its management must have an appreciation for the role exterior doors play in achieving the sustainability goals of a structure. Owners also have to understand how the considerations and priorities for a green exterior door do not precisely align with standard green building practices and philosophies.

For the most part, architects, builders, and building owners have taken their cues from the U.S. Green Building Council, Washington, and its Leadership in Energy and Environmental Design (LEED) green-building rating system.

The credit-based system has no explicit specifications for entrances, but its larger, general recommendations for building materials do provide some guidance for specifying green doors. In the most general terms, LEED prefers architectural products that are salvaged or reused, made from recycled or rapidly renewable materials, are locally sourced, and made from materials that will not emit harmful volatile organic compounds or other environmental pollutants. The rating system does not explicitly address whether a building product should be recyclable, how it is to be eventually disposed of, or even how long it should last.

The current LEED standard can inadvertently influence the specification of architectural products not appropriate to institutional and high-traffic commercial environments. The most important characteristic of a sustainable component is a factor only assumed in the language of the LEED system: that the product is engineered and employed in a manner that



Hollow metal doors suffer from rust, dents, and peeling paint.

prevents premature failure and unplanned maintenance and replacement.

Above all other considerations, a green door has to be built to last.

Choosing a door for sustainability

Take schools as an example. The main entry door is subject to constant and sometimes creative abuse—several thousand openings a day and regular impacts from kicking or shoving the door. Put the door next to the football locker room and that damage increases substantially. Add environmental factors (humidity, harsh winters, extreme heat, and direct exposure to sunlight) and the life expectancy of the door will decrease even further.

This creates a cycle of repair and replacement that is the opposite of sustainability. But exterior doors need not be the ink cartridges of architectural products. With some proper foresight and product knowledge, it is possible to identify an exterior door that is as sustainable as the building itself.

A door must be durable enough to withstand kicks, shoves, and occasional blunt-force collisions from human (a runaway cart or a batted baseball) and natural (high-velocity winds or hail) sources. It must be able to withstand malicious attempts to damage or breach the door.

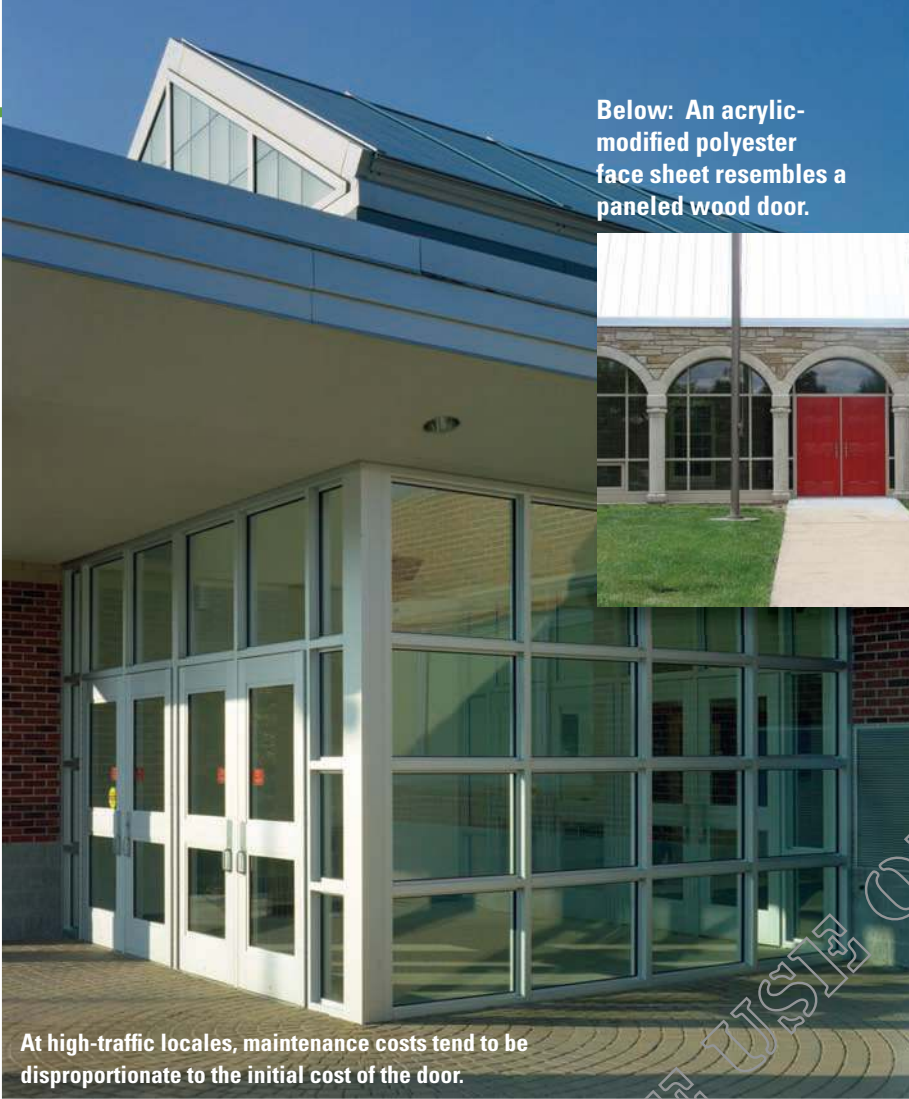
Not as obvious is that the door must be strong enough to withstand literally thousands of small impacts/day. The inertia created by opening and closing a door subjects it to physical forces that stress the door itself and the hardware that moves it.



Restaurants see high-traffic. This aluminum door was built for function and style.



This badly faded door has begun to rust along its edges and at the hinges.



At high-traffic locales, maintenance costs tend to be disproportionate to the initial cost of the door.

Below: An acrylic-modified polyester face sheet resembles a paneled wood door.



An entrance is actually a system consisting of the door, hardware, and the door frame. A deficiency in any one component will affect the entire system. The ideal door properly distributes the stressful forces of motion. It should not be heavy and rigid, but lightweight and flexible. A door only needs to be rigid enough to keep out the elements and secure the building. Any more than that is counterproductive and will increase the wear and tear on the door hardware. As the hardware and framing components wear out, the door may go out of adjustment and fail to latch properly, creating leaks that will affect weather resistance and thermal integrity.

Resisting chemicals and the effects of weather

Non-corroding materials, lifetime factory finishes, and easy-cleaning surfaces provide protection against graffiti and abrasive cleaning agents that can stain or corrode a door's surface. Humidity, proximity to the ocean or industrial facilities, wind-

driven rain or snow, and even sidewalk salt can take a heavy toll on a door.

A door with components that are glued together might not hold up to the weather, even on a good day. Door skin temperatures can reach 200 F in direct sun. In a temperature-controlled building, that can mean a difference of more than 100 F between the two sides of the door. This variance will cause the opposite faces of the door to expand or contract at different rates, introducing unseen forces that pull the sides of the door in opposite directions, stressing the glued bonds of the door, and conceivably tearing it apart.

It is critical that the door be properly sealed and protected against condensation. An unsealed door can collect rainwater, condensation, and dirt. Not only is this known to cause rust, there is the potential for mold growth within an unsealed door.

Although they account for a small portion of a structure's surface area, exterior doors play an important role in the overall energy efficiency of a building. As with windows or walls, designers must

take care to specify components that limit thermal exchange (the transfer of heat from one side of the door to the other).

Some sacrifices might be required to achieve the best thermal performance. Glass is a particular concern. The best way to keep the heat in during winter and out during summer is to use the minimum amount of glass necessary to ensure safety and security.

Glass provides a direct thermal-transfer point, so full-face doors and insulated side panels are the most efficient

choice. This can have an effect on daylight and views, a priority in green building, and may not be aesthetically appropriate for some entrances. The glass used in the door should be insulated and at least 1 in. thick.

When examining a product, be sure that any claims are for tests on the door itself and not the base material of the door. Some building products are manufactured with materials that will emit noxious fumes, pollutants, or volatile organic compounds. This can come from paint, adhesives, and certain plastic. These can be introduced during maintenance and cleaning, too. Specify a door that will require little regular maintenance and seek out products that have earned indoor air-quality accreditations from a third-party verifier such as GREENGUARD or Scientific Certification Systems.

The most important point to understand is that not every door is designed and manufactured for sustainability. Truth be told, most are not. Like any sustainable component, an exterior door should be engineered and employed in a manner that prevents premature failure and unplanned maintenance and replacement.

Likewise, the entrance must adhere to the same principles of performance, efficiency, and air quality common to all green buildings.

The exterior door is usually the first and last component an occupant will encounter in any building. It is representative of the structure itself and much more than an aesthetic detail. When designing a structure for sustainability, it is imperative that an exterior door meet the same standards as the building itself. ☐

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