

Web Exclusive: Retractable Screens and Natural Cooling

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Natural cooling principles integral to energy efficient design and construction deserve some renewed attention. At issue is whether windows and doors used in a home design can be or will be opened and how this impacts homeowners' ability to use cooling breezes to naturally cool the house.

Using ventilation and cooling breezes as a way to keep the AC off is a first step in any plan for natural cooling. One wants to be able to take advantage of prevailing winds to ventilate a house. Convective cooling takes this general idea one step further by making optimal use of hot air rising and creating potential for moving air currents through the house to cool it. Cooling night air is generally let into the house via low open doors, windows, or vents that take advantage of the prevailing winds (windward side). Warmer air near the ceiling or attic is let out via openings that are away from the prevailing breeze (leeward). To get the best cooling rates, leeward openings should have substantially larger total area (50 percent to 100 percent larger) than those on the windward side of the house.

Sounds simple enough until you drill down into some practical and aesthetic considerations that often make homeowners unwilling to open their doors and windows. Concerns about West Nile disease and other insect-borne diseases, or just the sheer nuisance of having insects and animals wandering into a house are such that many are not willing to open windows and doors that are not screened. However, French Doors and other in-swing and out-swing window and door designs can be difficult or impossible to screen with traditional fixed screens. Fixed screens, also commonly present aesthetic problems of clunky hardware that undermines the view-enhancing aspect of these windows and doors and the overall feel of a house design.



Retractable screens make all of these practical limitations with in-swing and out-swing window and door designs into non-issues. For those not familiar with retractable screens, they are insect screens that disappear into a compact housing that doesn't interfere with window or door functioning. The screen is extended from the housing and kept in place by a magnetic latch that easily retracts with the aid of a spring-loaded roller tube inside the unit housing. Homeowners often prefer this type of screen, even with more traditional slider doors and windows, because they interfere the least with views of the landscaping details or vistas through windows and doors.

From the vantage point of natural cooling concerns, retractable screens are a very low-cost way to boost cross-ventilation potential in a house construction. Even entranceway doors that might otherwise remain closed at all times can readily become part of the cross-ventilation scheme. When one can open all windows and doors it is far easier to capture those advantages of prevailing winds. It is not just energy efficiency concerns that make them attractive. The comfort factor that retractable screens afford is probably the biggest driver in the fast-growing market for retractable screens for both home improvements and new construction.

In higher end homes motorized retractable screen systems with solar screen meshes (exterior woven fiberglass screens) and automated controls take natural cooling considerations to the next level. Exterior woven fiberglass screens have been shown to reduce infrared emissions into home interiors up to 90 percent . That significantly blocks interior solar gain and delivers a corresponding decrease in the need for AC. (Note: This shouldn't be confused with interior solar screens that have negligible effect on interior solar gain but instead are handy to protect furnishings from discoloration caused by constant sun exposure.)



These motorized systems are not inexpensive, however, and usually start at \$1500 each. That's why they have mainly taken hold in the luxury home market where there are many house features that rely on electronics. The best solar screen solutions will utilize either sun sensing or programmable timer controls that are integrated into programmable AC thermostats.

What's the optimal natural cooling solution? When natural cooling is a top design concern and when house construction costs are less of an issue, the best-in-class construction would combine use of exterior motorized solar screens with interior retractable screens (motorized or manual) for use in the evening hours when one wants to let hot air out of the house and let cooling night breezes into the house.



Architects and builders who want to better acquaint themselves with the various retractable screen products available are well advised to seek out product options in home shows or other opportunities where one can do a side-by-side comparison. There ARE distinct differences in various brands that will be apparent. The short list of features to consider includes:

component engineering; powder coating quality and color choices; durability of screen meshes to retain shape after pet or child collisions; ability to control tension and closing speed; and corrosion resistance warranted by the manufacturer.

Reputable retractable screen manufacturers have installer specialists on hand who can assist in designing trim and other design details that best integrate retractable screens into the window and door designs. For photos showing a range of door and window types with retractable screens see

www.miragescreensystems.com/retractable/photoGallery_BeforeAndAfter.aspx.

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