



Introduction to High Performance Fiberglass Windows

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www.fiberglasswindows.com

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Silica Sand is the Key Ingredient in Fiberglass Windows



Fiberglass Windows are:

- Environmentally Friendly
- Sustainable
- Green
- Support LEED base design
- Stable
- Strong
- Non-Conductive
- Non-Corrosive
- Unique glass on glass
- Low Maintenance
- Paintable

Window Frames Comparisons

There are many benefits of Fiberglass material; durability, strength and resistance to weathering, to name a few. These benefits in turn means minimal maintenance for your windows. More common comparisons are boats sailing in salt water for over 50 years and underground chemical storage tanks which must last over 50 years.

Expansion/Contraction Comparison:

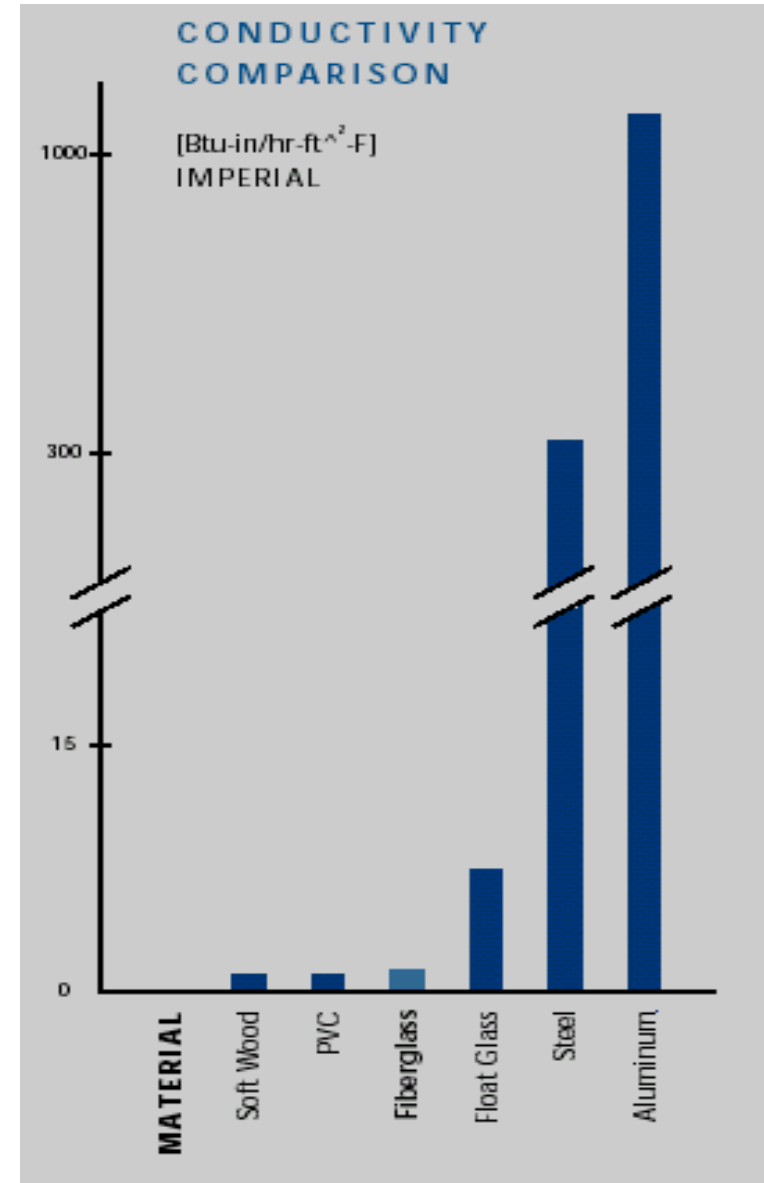
Glass is the main component in fiberglass pultrusion (60%). The expansion and contraction coefficient is therefore virtually the same as that of the adjacent glass sealed unit in the window frame, resulting in a major reduction in thermal breakage (see chart at right).

Qualities	Fiberglass	Vinyl	Wood	Aluminum
THERMAL PERFORMANCE	5	4	4	1
DIMENSIONAL STABILITY	5	2	4	5
COMMERCIAL APPLICATIONS	5	2	4	4
STRUCTURAL STRENGTH	5	2	4	5
CLIMATE DURABILITY (HOT)	5	2	3	4
CLIMATE DURABILITY (COLD)	5	4	4	3
<u>RESISTANCE TO GLASS FAILURE</u>	5	4	4	4
<u>PAINTABILITY</u>	5	1	4	4
<u>RELIABILITY OF DARK COLORS</u>	5	1	4	1
<u>DESIGN FLEXIBILITY</u>	5	3	4	1
<u>LOW MAINTENANCE</u>	5	5	2	4
<u>ENVIRONMENTAL IMPACT</u>	5	4	1	2
<u>RESISTANCE TO ROTTING, SPLITTING, WARPING, TWISTING, CORRODING</u>	5	4	3	4
Total Points (out of 65)	65	38	45	52

<http://www.fiberglasswindows.com/benefits.htm>

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- Fiberglass is 500 times less conductive than aluminum





YOUR GATEWAY TO INFORMATION ON HOW TO CHOOSE ENERGY- EFFICIENT WINDOWS

Collaborative (EWC) members have made a commitment to manufacture and promote energy-efficient windows. This site provides unbiased information on the benefits of energy-efficient windows, descriptions of how they work, and recommendations for their selection and use. Take a look to learn more!

This site is sponsored by the EWC with support from the U.S. Department of Energy's Windows and Glazings Program and the participation of industry members
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<http://www.efficientwindows.org/>

High Performance Glazing with Fiberglass Framing

Window frames can be made of fiber-glass-reinforced polyester, or fiberglass, which is extruded into lineal forms and then assembled into windows. These frames are dimensionally stable and have air cavities (similar to vinyl). When the cavities are filled with insulation, fiberglass frames have thermal performance superior to wood or vinyl (similar to insulated vinyl frames). Because the material is stronger than vinyl, it can have smaller cross-sectional shapes and thus less area. Another polymer-based approach is to use extruded engineered thermoplastics, another family of plastics used extensively in automobiles and appliances. Like fiberglass, they have some structural and other advantages over vinyl.

Usually these high performance frames are used with high performance glazings. The window properties shown below assume fiberglass frames that have cavities filled with insulation.

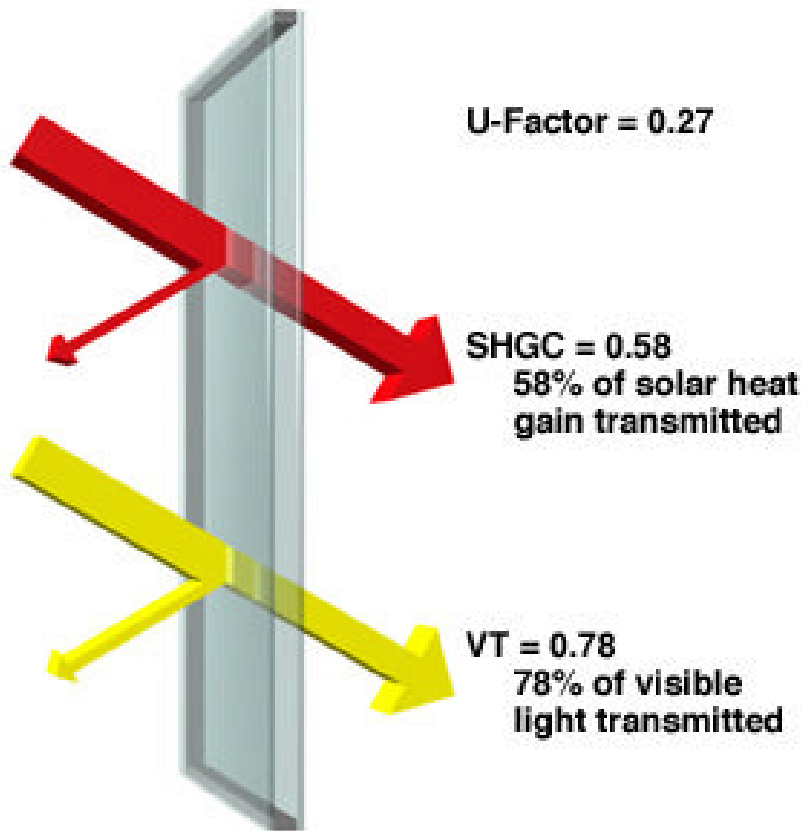
Whole Window Properties - Fiberglass

Glazing	Double-glazed with High-Solar-Gain Low-E, Argon/Krypton Gas	Double-glazed with Moderate-Solar-Gain Low-E, Argon/Krypton Gas	Double-glazed with Low-Solar-Gain Low-E, Argon/Krypton Gas	Triple-glazed with High-Solar-Gain Low-E, Argon/Krypton Gas	Triple-glazed with Low-Solar-Gain Low-E, Argon/Krypton Gas
U-Factor	.29	.27	.26	.18	.18
SHGC	.56	.46	.31	.40	.26
VT	.58	.60	.55	.50	.43
<p>Note: The data presented here is an average of similar (but not identical) products from several manufacturers. Specific products will have performance properties slightly higher or lower. Users are encouraged to check with specific manufacturers for exact performance properties.</p>					

■ Double-Glazed with Moderate-Solar-Gain Low-E Glass, Argon/Krypton Gas

Center of Glass Properties






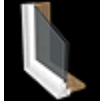


Note: These values are for the center of glass only. They should only be used to compare the effect of different glazing types, not to compare total window products. Frame choice can drastically affect performance.



	<u>Aluminum with Thermal Break</u>	<u>Fiberglass</u>
Frame	<u>Aluminum with Thermal Break</u>	<u>Fiberglass</u>
U-Factor	.48	.27
SHGC	.48	.46
VT	.60	.60

Fiberglass has the best thermal performance

Whole Window Properties - Double-Glazed with Moderate-Solar-Gain Low-E Glass, Argon/Krypton Gas

								
Frame	Aluminum	Aluminum with Thermal Break	Wood	Wood Clad	Vinyl	Hybrid Composite	Insulated Vinyl	Fiberglass
U-Factor	.60	.48	.35	.35	.35	.35	.27	.27
SHGC	.53	.48	.44	.44	.44	.44	.46	.46
VT	.65	.60	.56	.56	.56	.56	.60	.60

Note: The thermal performance properties of specific glazings and frames can vary depending on product design and materials. The results presented here are averages. Consult specific manufacturers for NFRC rated U-factors and SHGCs for products of interest.

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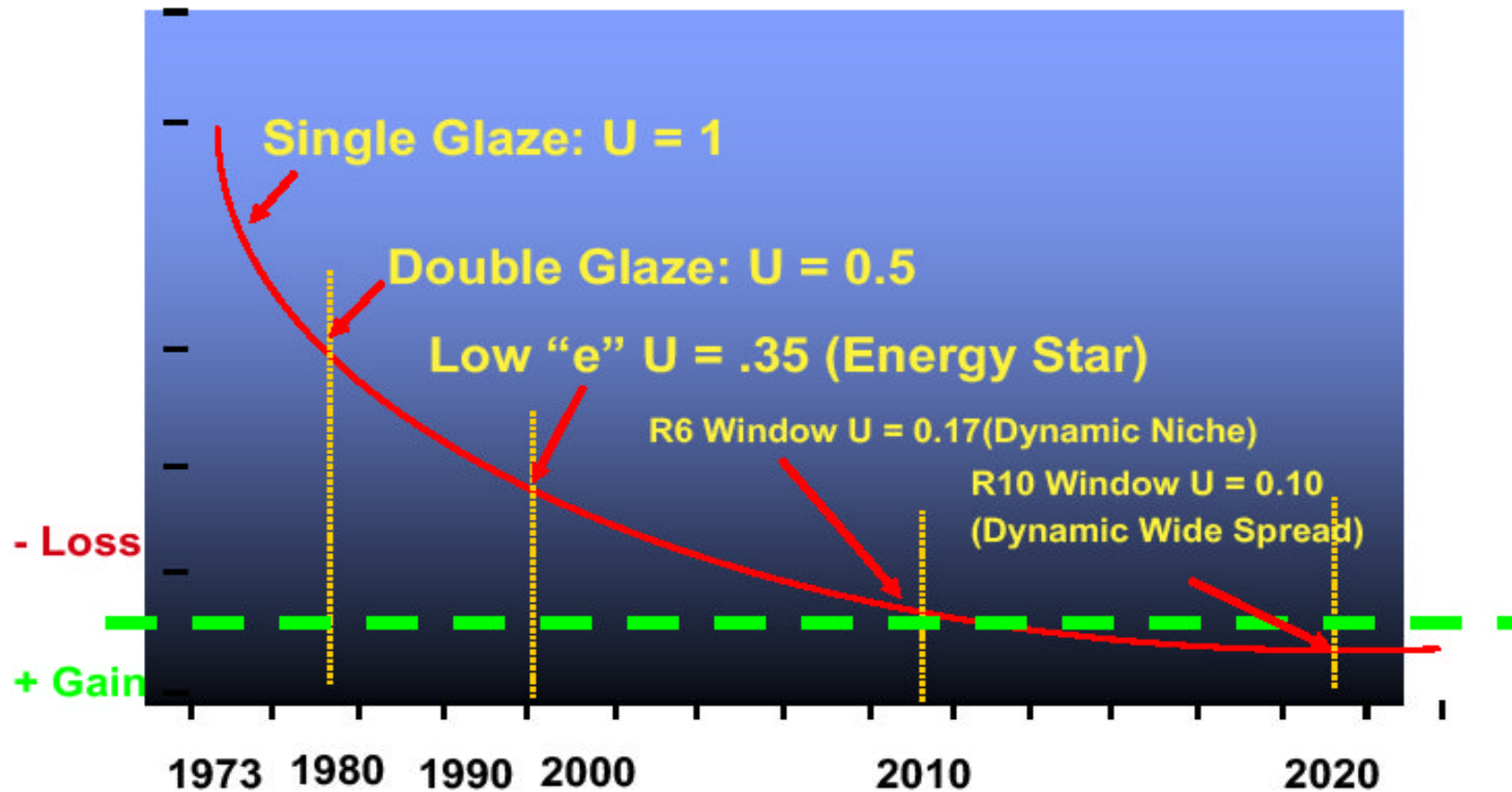
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This site was developed jointly by the University of Minnesota, Alliance to Save Energy, and Lawrence Berkeley National Laboratory.

http://www.efficientwindows.org/glazing_.cfm New England Window Systems, Inc.
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Advanced Windows Can Become Energy Producers



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Thermal Example of Higher Performing Windows

Dual, Clear,
Alum. spacer



Dual, Clear,
Foam spacer



Dual, Low-e,
Foam spacer



Superwindow,
4-lites, low-e, Kr

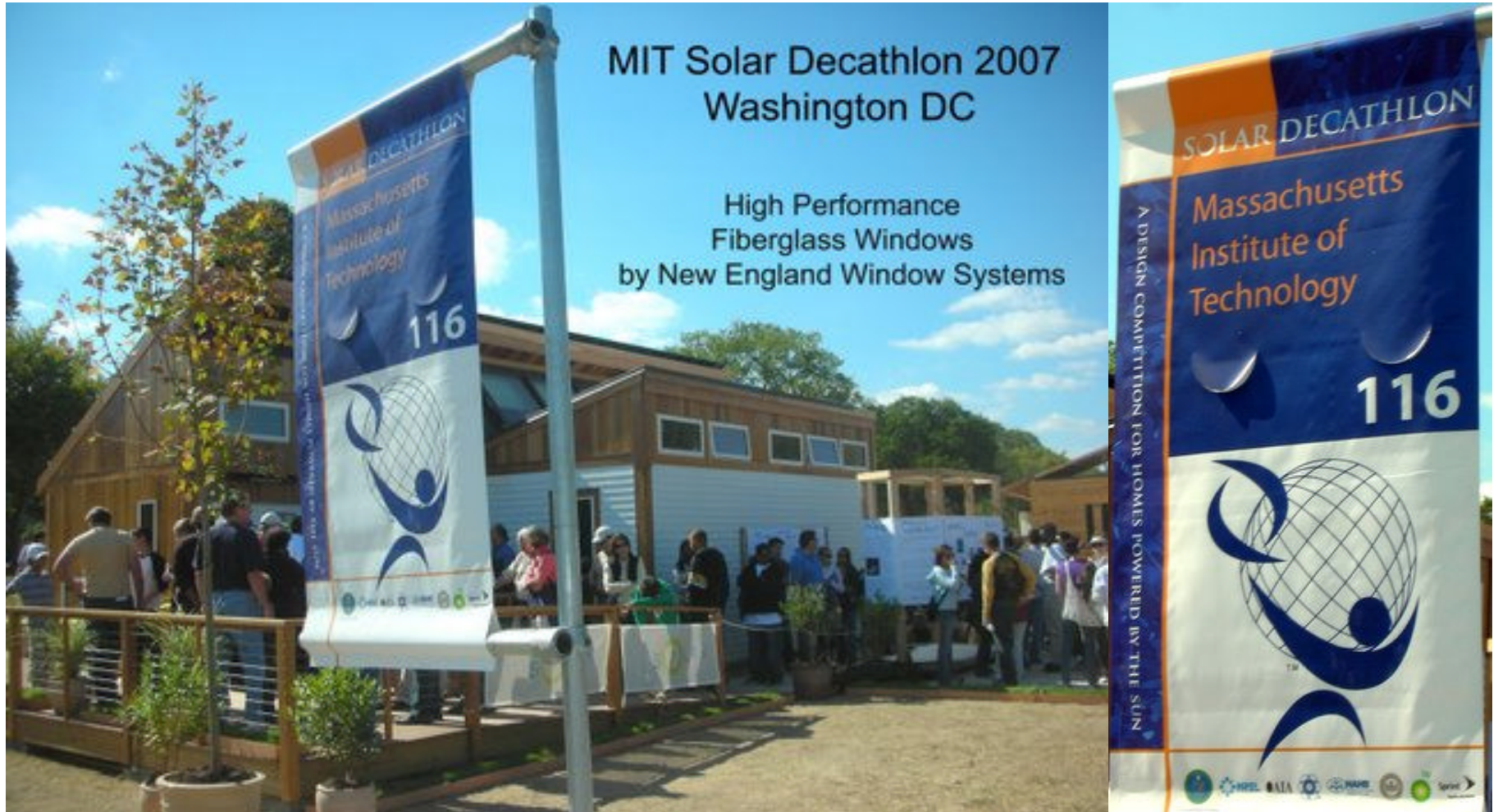


Fiberglass Windows & Doors



- Meet the rigorous LEED Green Building Certification standards
- 15 Year Warranty on frame
- Energy Star Rated
- NFRC Certified
- Tested to AAMA/WDMA/CSA 101/I.S.2/A440-05
- Fiberglass the most energy efficient window framing product available
- Five Standard Colors
 - Dark Colors do not fade
 - Two Tone available, small up charge
 - Custom Colors Full Line of Sherwin Williams Paints

MIT Solar Decathlon entry on the Washington Mall, Washington DC



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MIT Solar Decathlon Team during construction and on the Washington Mall



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Philip Merrill Environmental Center, Annapolis, MD

“The Merrill Center may be the world's "greenest" building. It is the first to receive the U.S. Green Building Council's Platinum rating for [Leadership in Energy and Environmental Design \(LEED\)](#).”

http://www.cbf.org/site/PageServer?pagename=about_merrillcenter_index



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Fiberglass Windows Chosen

**Chesapeake Bay Foundation Building
Annapolis, Maryland**



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**Chesapeake Bay Foundation Building
Annapolis, Maryland**



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Washington Elms Development, Cambridge Housing Authority 2,600 Energy Star Rated Fiberglass Windows replace old aluminum window.

“ While they are more expensive than windows often found in public housing developments, **fiberglass windows typically last twice as long as vinyl or aluminum models.**”

[http://www.cambridge-housing.org/chainfo.nsf/d4a39010ce696ea9852564470065c090/8face39e9bad857d852573320069c7c3/\\$FILE/CHA%20Bulletin%20Summer%202007.pdf](http://www.cambridge-housing.org/chainfo.nsf/d4a39010ce696ea9852564470065c090/8face39e9bad857d852573320069c7c3/$FILE/CHA%20Bulletin%20Summer%202007.pdf)

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Washington Elms Development, Cambridge Housing Authority



Energy Star Rated
NFRC Certified
U Value .32
SHGCc .30
Vt .50

Fiberglass Double Hung Windows
Colonial Aluminum Panning
Child Guard Stainless Steel Screens
Color Ivory

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Solar Energy for Affordable Housing

One megawatt of solar capacity

17% increase in solar capacity in Massachusetts

5,000 solar panels

Over 3,000 residents served



Washington Elms Development, Cambridge Housing Authority

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Washington Elms PV Dedicated –

On November 20th, 2008 Governor Deval Patrick and Mayor Denise Simmons helped dedicate the new 92 kilowatt solar photovoltaic system at the Washington Elms housing development in Area 4.



CHA is deeply committed to reducing its carbon footprint and environmental impact wherever economically feasible. The selection of fiberglass windows for Washington Elms is another example of CHA's commitment to environmental responsibility”

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Cambridge Housing Authority replacing over 2,600 aluminum windows with Energy Star Rated Fiberglass Windows

- “Fiberglass windows were selected for this project for the **overall strength, durability and efficiency.**”
- “**CHA believes the higher up-front cost of the fiberglass windows will more than pay off in the long run.**
- Having much higher insulation ratings, the **new windows will create a better living atmosphere** for Washington Elms residents, most especially in the winter
- “As enticing as this may be, we strongly believe that it is in our residents and **CHA’s best interest to invest in products that will stand the test of time** and, in the case of windows wind up saving money through greater energy efficiency.” said Terry Dumas, Director of Planning and Development.

[http://www.cambridge-housing.org/chainfo.nsf/d4a39010ce696ea9852564470065c090/8face39e9bad857d852573320069c7c3/\\$FILE/CHA%20Bulletin%20Summer%202007.pdf](http://www.cambridge-housing.org/chainfo.nsf/d4a39010ce696ea9852564470065c090/8face39e9bad857d852573320069c7c3/$FILE/CHA%20Bulletin%20Summer%202007.pdf)

River Howard, Cambridge Housing Authority

332 Fiberglass Double Hung Windows with Child Guard Safety Screens



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Columbia West Affordable Housing, Columbia Road, Dorchester
Single, Twins and Triple Single Hung Fiberglass Windows



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229 Columbia Road, Dorchester



Drayton Homes, Affordable Housing, Quincy St. Dorchester
241 Fiberglass Double Hung Windows



New England Window Systems, Inc.
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200 Columbia Road, Dorchester



New England Window Systems, Inc.
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Normandy Street, Dorchester



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Multi-Family Public Housing Hillcrest Village Providence, RI Pocasset Manor Johnston, RI



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Nahanton Woods Condominium, Newton

Triple Single Hung window with Common Jamb



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Single Hung Oriel Window



Walnut Park Condo's, Stoughton

Horizontal Sliders and Large Patio Doors



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Walnut Park Condo's, Stoughton

Oversize Fiberglass Patio Doors 14' 8 3/4"

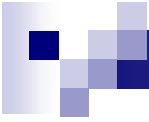


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950 Dorchester Ave, Dorchester Fiberglass Patio Doors



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Multi-Family High Rise Beacon Trust Condominium, Somerville

Fiberglass Horizontal Sliders, Casements & Double Hung---Green Exterior, White Interior



Window Systems, Inc.
glasswindows.com

Sprague House Condominiums, Medford

Casement, Double Hung and Tilt n' Turn Doors



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Kennett High School

North Conway, New Hampshire

Fiberglass Single Hung Windows



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Neighborhood House Charter School, Dorchester Fiberglass Single Hung Windows



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Neighborhood House Charter School, Dorchester



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Neighborhood House Charter School, Dorchester



Saint Peters Elementary School, Cambridge

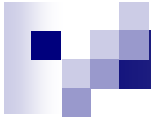
Fiberglass Single Hung, Double Hung, Fixed & Awning Windows



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