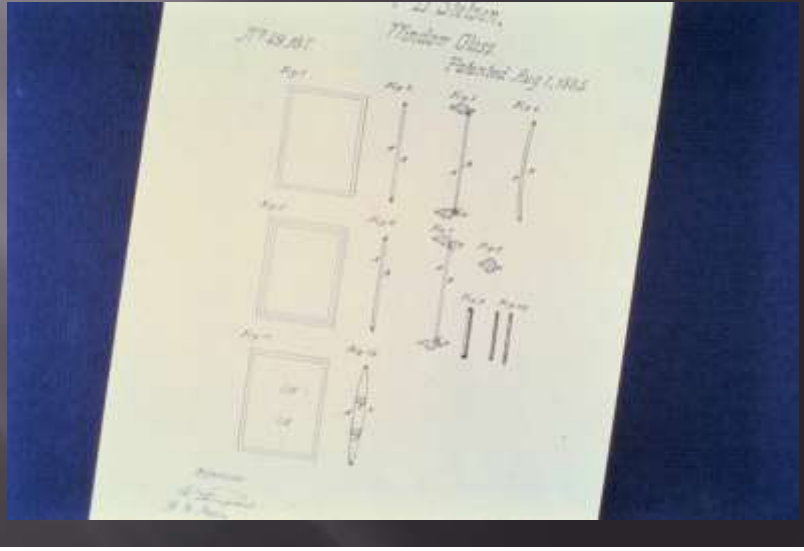
Bridgewater State University
Perkins & Will – Boston

SUPER **INSULATING GLASS & WINDOW OPTIONS**

BRIDGEWATER
STATE UNIVERSITY

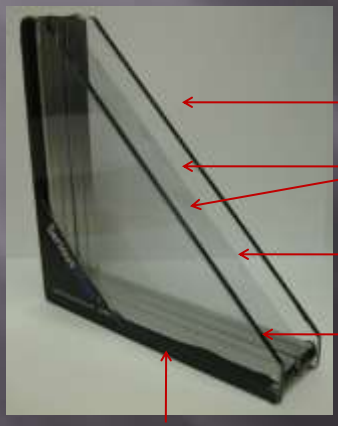
DOUBLE GLASS PATENT
Thomas Stetson – 1865
145 Years Later: R-20 versus R-2 Insulating Value



Proposed Bridgewater SeriousGlass

SCF- IG = Suspended Coated Film - Insulating Glass

Triple Glazing Performance – Double Glazing Weight



Outer Glass Light (N & E: Cardinal 272 Low-e; S & W: Cardinal 366 Low-e On Surface #3)

Two Argon Interspaces

Suspended Coated Film : HM88 (Low-e On #4 Surface)

Inner Light Clear

Perimeter "Dual Seal" – IGCC A-Level Certified

iWINDOW is a framed SeriousGlass interior window that anchors vertically to the present frame

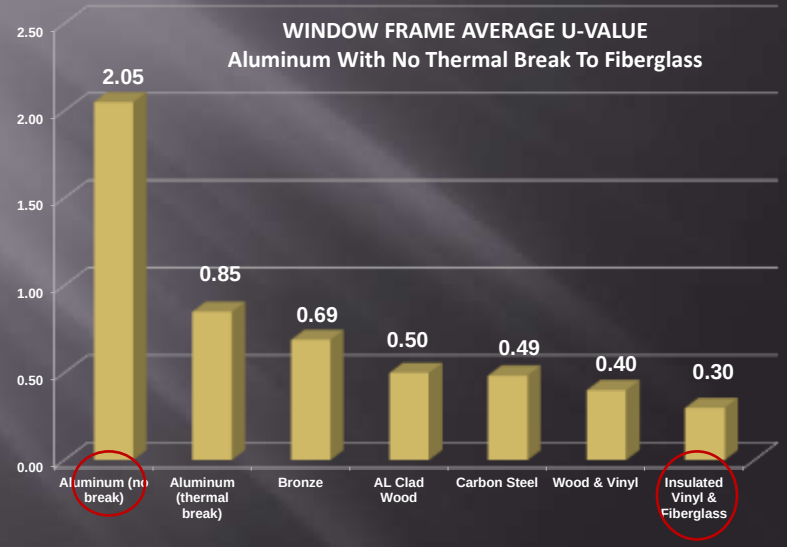
iWINDOW - NEW YORK CITY

Right: "Before" Left: "After"

Directly Analogous To North Attleboro: Double Glass Upgraded To Five Layer *Super* Glazing

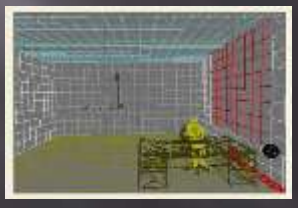
WINDOW FRAME OPTIONS

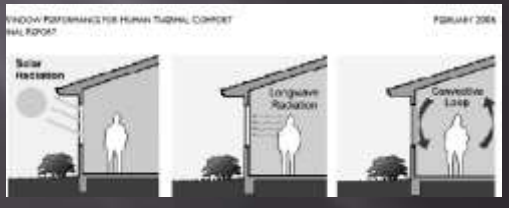
Aluminum (no break – Left Column)
Option: Serious Fiberglass – Right Column)



HUMAN COMFORT & WINDOWS

Five Human Comfort Factors:
•Air Temperature
•Mean Radiant Temperature
•Air Velocity
•Relative Humidity
•Activity Level (*Metabolic Rate*)





North Attleboro Office
Dramatic ally Enhanced Comfort

PROPOSED BRIDGEWATER FIBERGLASS FIXED GLAZING

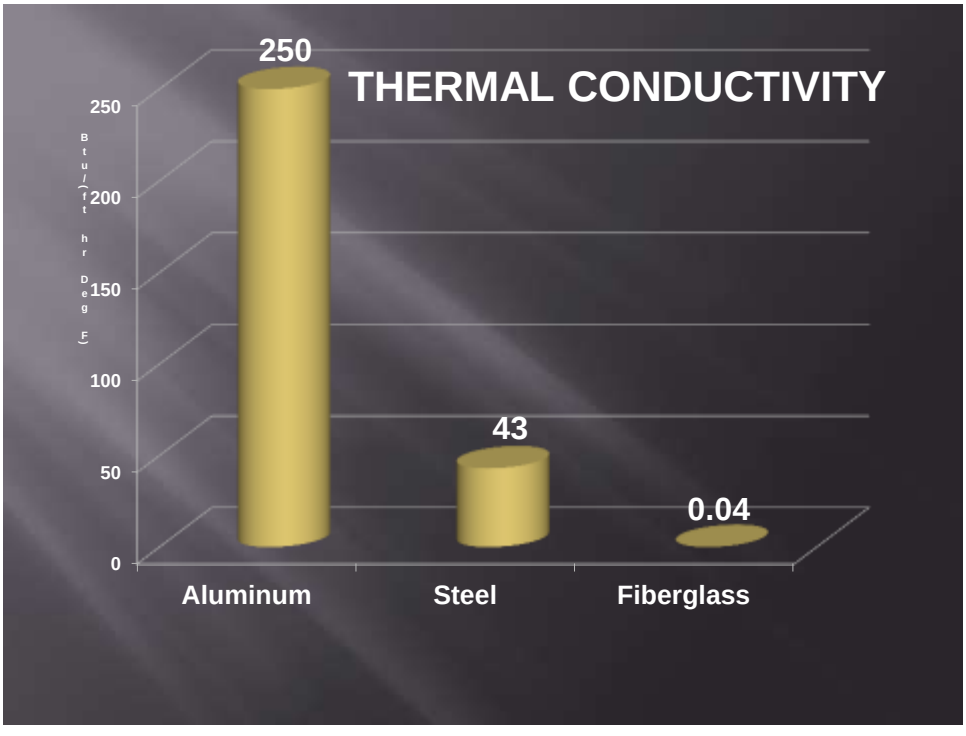
Storefront Aluminum
(Top)
North Attleboro Proposed Fiberglass
(Bottom)

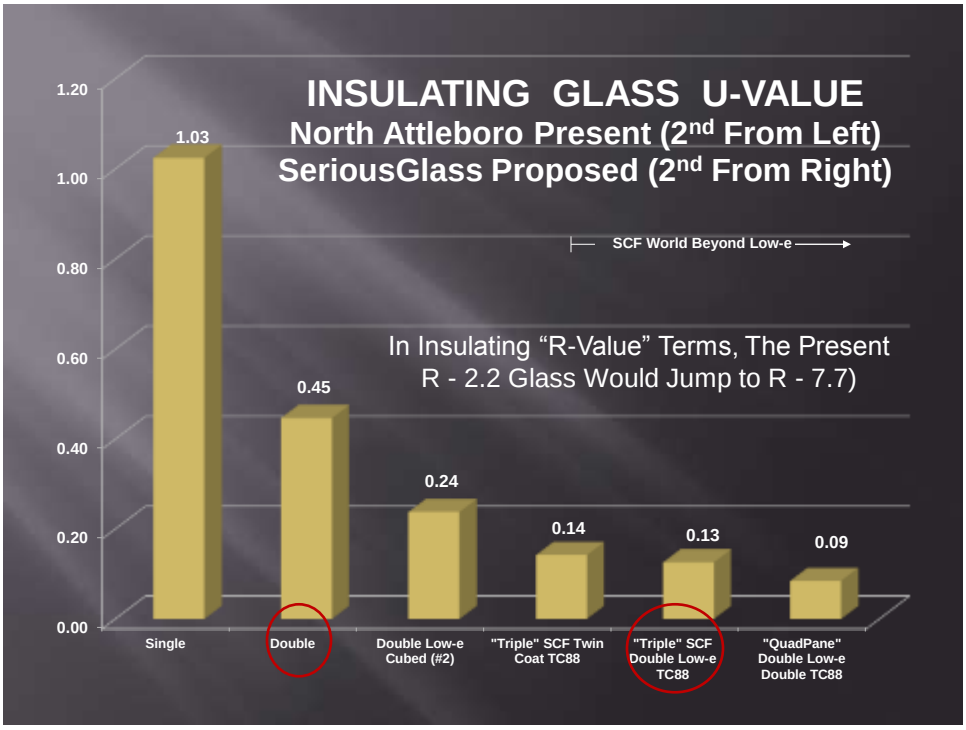
- Strong Walls
- Super Low Conductivity
- "Sustainable" (65% glass)
- Full Spectrum Color Freedom

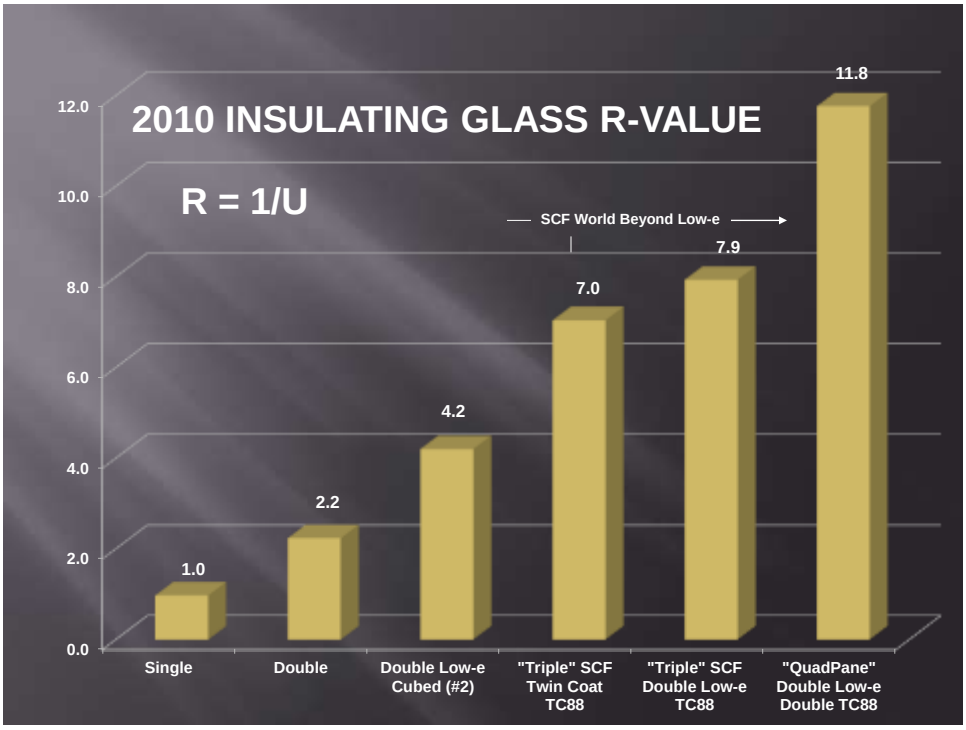
BRIDGEWATER CROSS-SECTION OF PROPOSED SERIOUS FIBERGLASS FRAMING

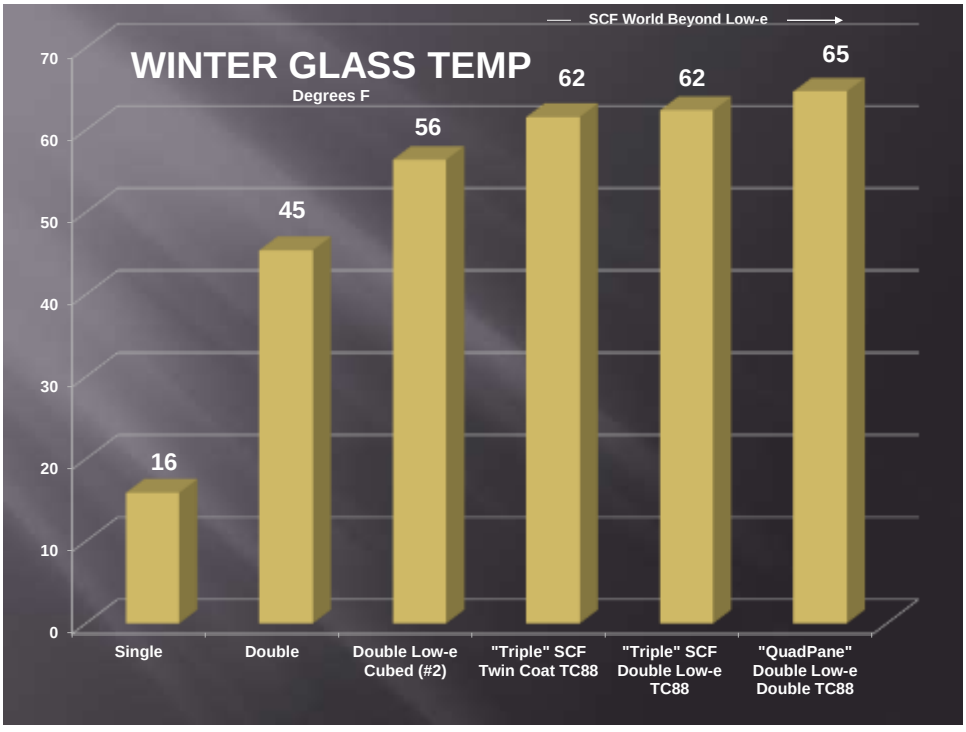
Internal Polycarbonate Anchor Blocks

Winnipeg Church In Blizzard At -17F – Warm To The Touch Window Frames




INSULATING GLASS U-VALUE
North Attleboro Present (2nd From Left)
SeriousGlass Proposed (2nd From Right)
SCF World Beyond Low-e
In Insulating "R-Value" Terms, The Present R - 2.2 Glass Would Jump to R - 7.7)
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1.03
0.45
0.24
0.14
0.13
0.09
Single
Double
Double Low-e Cubed (#2)
"Triple" SCF Twin Coat TC88
"Triple" SCF Double Low-e TC88
"QuadPane" Double Low-e Double TC88


2010 INSULATING GLASS R-VALUE
R = 1/U
SCF World Beyond Low-e
12.0
10.0
8.0
6.0
4.0
2.0
0.0
1.0
2.2
4.2
7.0
7.9
11.8
Single
Double
Double Low-e Cubed (#2)
"Triple" SCF Twin Coat TC88
"Triple" SCF Double Low-e TC88
"QuadPane" Double Low-e Double TC88



ACOUSTICS – NORTH ATTLEBORO I-95 TRAFFIC NOISE SIGNIFICANTLY REDUCED

REPRESENTATIVE STC RATINGS

GLAZING TYPE	SOUND TRANSMISSION CLASS (STC)
Conventional Double Pane (1/8") Glass	29
Solid ½" Gypsum Wall	36
SCF: 1" Overall with ¼" Glass ("Before")	35
SCF: 1 ½" Overall with ¼" Glass ("After)	38
SCF: One Lite Laminated	40
SCF: Two Lites Laminated	43
SCF: Two Dissimilar Laminated Lites	49
SCF: Two "Acoustic" Laminated Lites	52

Overall "Window" STC Value Estimate: 75% of Glass Only figures above

Overall North Attleboro STC Glass Rating Likely To Increase From 35 to 38 – "Noticeably" Quieting I-95 Traffic Noise

NORTH ATTLEBORO SERIOUS GLASS ENHANCEMENT: Low Conductivity Spacers

Proposed: "ThermalEdge" Steel With Polyester "Cap"

THERMAL EDGE
Warm Edge Spacer Bar

SOURCE: HANKBOOK OF PHYSICS		
Material	Conductivity (W/mK)	Ratio To Fiberglass
Fiberglass	0.04	1.0
Wood	0.13	3.3
Vinyl	0.18	4.5
Steel	48	1,200
Aluminum	228	5,688

$63M UNIVERSITY OF COLORADO VISUAL ARTS CENTER

- SCF North-South-East-West "Tuned" Glazing
- Fiberglass Storefront In High Humidity Galleries
- 99.9% UV Blockage
- 62 Degree "Winter" Glass Temp
- Perimeter Baseboard Heating Removal
- Payback Under One Year

CU - BRUCE CURTIS MUSEUM (Broadway & College)

Also "MCOL" Building - Pultrusion Fiberglass Double Hungs – 45% rh Condensation Resistance – 99+% UV Blockage

CU – WOODBURY HALL

1890 – Fourth Oldest Building On Campus

Pultrusion Fiberglass Double Hungs –North: High Light / South Low Solar Heat

"PULTRUSION" FIBERGLASS

"Pultrusion" Makeup: 65% Glass (700 Strands) + 35% Polyester Resin

Three Foot Die With 6 Tons Of Exit Tension

LEED PLATINUM FIBERGLASS WINDOWS & SCF GLASS

Morristown, New Jersey Municipal Building & Dodge Foundation Headquarters

- Pultrusion Fiberglass Casement Frames
- 1 3/8" SCT Glazing Pocket For Thermal & Acoustic Performance
- R-8 SCF Glass
- Warm Winter / Cool Summer

- Directionally "Tuned" SCF Glass
- 99.5% UV Blockage
- Inside/Outside Color Freedom
- 1/500th Aluminum Frame Conductivity
- High Volume Pricing

BOULDER LIBRARY

Directionally "Tuned" SCF Glass (1 ½")

Radiant Comfort – Children's Reading Room

Ideal Daylighting Throughout

Bronze Tint Skylight – SCFGlass HM55

99.5% UV Blockage

Warm/Winter – Cool Summer Glass Temperature

WHEN IG INSULATING VALUE *REALLY* MATTERS

Case Study

- Setting: Boulder Colorado
- Building: Boulder Municipal Library
- Architect: Midyette-Seieroe
- Challenge: Design a comfortable and healthy children's play area directly adjacent to 30 vertical feet of north glass
- Solution: "Super" insulating SCF (Argon), raising glass surface temperature from 16 ºF to 59 ºF on an "ASHRAE Winter" day (0 ºF outside; 15 mph wind; 70 ºF inside). Additional benefits: a) high light transmission into reading area, b) condensation freedom in a humidified library environment through the Colorado winter, and c) 99.5% UV protection for occupants, furnishings and books.

BOULDER LIBRARY

Directionally "Tuned" SCF Glass (1 ½")

Radiant Comfort – Children's Reading Room

Ideal Daylighting Throughout

Bronze Tint Skylight – SCFGlass HM55

99.5% UV Blockage

Warm/Winter – Cool Summer Glass Temperature

WHEN IG INSULATING VALUE *REALLY* MATTERS

Case Study

- Setting: Boulder Colorado
- Building: Boulder Municipal Library
- Architect: Midyette-Seieroe
- Challenge: Design a comfortable and healthy children's play area directly adjacent to 30 vertical feet of north glass
- Solution: "Super" insulating SCF (Argon), raising glass surface temperature from 16 ºF to 59 ºF on an "ASHRAE Winter" day (0 ºF outside; 15 mph wind; 70 ºF inside). Additional benefits: a) high light transmission into reading area, b) condensation freedom in a humidified library environment through the Colorado winter, and c) 99.5% UV protection for occupants, furnishings and books.

POSSIBLE NORTH ATTLEBORO DEMONSTRATION SERIOUS GLASS

Building Integrated PhotoVoltaic + Suspended Coated Films)

Clear Vision Glass Surrounding PV Cells

Partner: Atlantis Solar - Poughkeepsie

ALASKA PIPELINE ENERGY GOES "OUT THE WINDOW"

Amory Lovins: ***All of the energy pumped through the Alaska Pipeline each year goes literally "out America's windows."***