Architect Information Binder

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HEAT MIRROR® and OUR SUSTAINABLE FUTURE

Sustainability = Value
Heat Mirror = Comfort &Energy Efficiency

- ***Comfort -***Heat Mirror is without question the most comfortable envelope glazing in the marketplace today. Help your employees, tenants, students, patients benefit from their time indoors
- ***Double the Insulation-***over the best LowE/Argon in the marketplace. Insulation values as high as R-14
- ***Superior Solar Control-*** for those facades subject to the sun's solar heat
- ***Year-round Energy Savings-*** month to month, year by year. For the Life Cycle of the building
- ***Ability to Downsize***-entire HVAC requirements and perimeter heating due to the higher envelope insulation. Equates to significant capital cost savings.
- ***Eliminate Condensation-*** on the glass and check potential health risks associated with mould growth.
- ***Ultimate Daylighting-*** diminishes the need for tinting and shading. Improves the comfort and well being of individuals.
- ***Increased Sound Control-*** via attenuation of sound waves in the Heat Mirror structure. Attraction and retention of tenants.

Any sustainable design should include the use of high-performance glass.

Heat Mirror® ***is endorsed by many as the best, most versatile, high-performance glass solution available today.***

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ECO INSULATING GLASS – COMPANY PROFILE

ECO Insulating Glass Inc. is a manufacturer of insulating glass units specifically suited for sustainable/ energy efficient buildings. Our unique glazing products address the needs and requirements of this burgeoning environmentally conscious marketplace. Today we provide the world's most energy efficient glazing solution. As the call for better buildings intensifies, ECO's products will be recognized as an integral component of building envelopes.

A successful insulating glass manufacturer for over 30 years, ECO was licensed in 1991 as a fabricator of Southwall's Heat Mirror high performance insulating units. We specialize only in insulating glass units, of which the majority is Heat Mirror.
On the outset, our primary focus was the residential marketplace to which we have thousands of satisfied homeowners across Canada. In 2007 ECO's sole proprietorship became a partnership, with a cohesive synthesis between production / quality and marketing. Here our focus changed as we entered the commercial marketplace in North America. Our production processes and procedures were well positioned to allow us acceptance and success in this highly competitive environment.

ECO continues to progress along a parallel path in North America with the uptake and advancements of green sustainable buildings. We actively participate in "green" conferences, trade shows and are part of a growing group of volunteers who work with the Canada Green Building Council and the Ontario Building Envelope Council. ECO is poised and well positioned, both with product offerings and quality standards, to capitalize and satisfy the environmental objectives in this highly dynamic marketplace.

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ECO'S COMMITMENT TO SUSTAINABILITY

The Canada Green Building Council (CaGBC) was established to accelerate the design and construction of Green Buildings across Canada. Its stated objectives are:

1. To promote the design and construction of buildings that are environmentally responsible, profitable and healthy places to live and work;
2. To develop and promote industry standards, educational programs, and design practices related to environmentally responsible buildings;
3. To conduct research and educational activities and to engage in lobbying efforts related to the promotion of green building practices;
4. Other purposes that are not inconsistent with these objectives.

The Council is comprised of a diverse group of businesses and organizations directly and indirectly associated with the building industry. Manufacturers, Utilities, Government, Professional Firms, Educational institutions, Builders, and Contractors to name a few.

ECO Insulating Glass joined the CaGBC in December of 2008 as an active participating member of the Toronto Chapter. Our desire to join the Council were twofold:

- to stay current in the marketplace with sustainable developments and adaptations. To share knowledge with the members.
- to have an opportunity to market and promote our values within this niche group. The strength in numbers and the voice that this council commands will no doubt benefit our organization and those that chose to adopt green building practices.

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The Ontario Building Envelope Council (OBEC) is the largest envelope council in Canada. The aim of OBEC is to 'promote the pursuit of excellence in the design, construction and performance of the building envelope'. OBEC's major objectives are:

1. To create a forum where everyone concerned with building improvement can exchange ideas and information.
2. To accumulate, technical information and make it easily accessible to members.
3. To broadcast information and create educational programs for the benefit of the building community.
4. To promote and guide building research and development to accomplish the aim.
5. To make recommendations regarding improvements to codes and standards.

OBEC bridges the gaps between architecture, building engineering / science, testing and building research by addressing challenges facing building performance. One of OBEC's goals is to actively pursue and promote the most current information on solving key problems in the construction industry.

ECO Insulating Glass became a member of the OBEC in 2007. We felt that this group would be very valuable to our knowledge and understanding of the interaction and association of glass with all components in a buildings envelope. OBEC is a natural fit for our current and future strategies:

- our product can be a significant component of the envelope. OBEC is a natural choice for voicing our issues and interests.
- to stay current with the competitive landscape and remain on the forefront of technological changes and advancements

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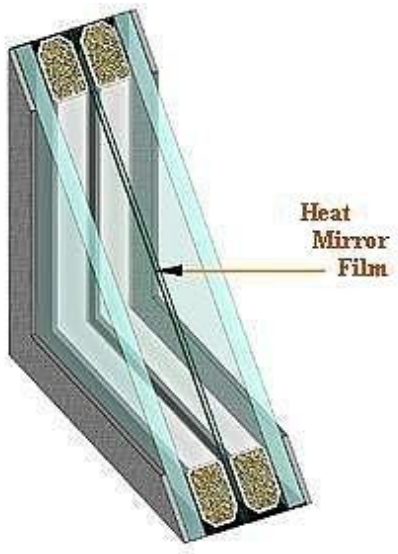
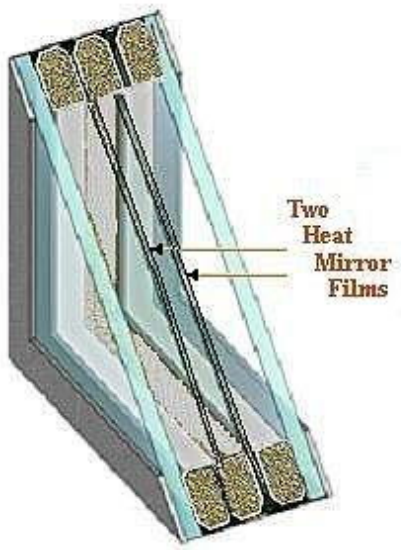
HEAT MIRROR® - PRODUCT DESCRIPTION

Heat Mirror is a clear, Low-Emissivity coated film that is suspended in the air/gas space of an insulating glass unit. Southwall Technologies Inc. of Palo Alto, California developed and patented this process in 1980. They produce an array of film products with different Low-E coatings to match the application.

Heat Mirror films can be used with any type of glass make-up. Fabrication is entirely custom-made to meet the needs and requirements of each individual application. Therefore a wide range of insulation and solar control performance can be achieved to fit the energy and aesthetic demands of any building facade.



Heat Mirror Triple Glazing



Heat Mirror Quad Glazing

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HEAT MIRROR® AND THE BUILDING ENVELOPE

Today, architects have some extremely difficult decisions and choices to make, not the least of which is the right choice of glazing material. The choice of the right glass is one of the most important, critical, and far-reaching decisions that will ever be made for a building, as this decision has more spin-off impacts than virtually any other construction material. ***The glass decision impacts:***

Human Comfort & Productivity
Daylighting & Operable Windows
Energy Efficiency
Mechanical HVAC design and loads
Sound Control
Artificial Lighting
Condensation Control
Humidity Control

In today's architectural design community the concept of ***"Green Buildings", "Sustainable Design", Sustainable Architecture"*** has moved into the forefront in choosing the right materials for the job. The Heat Mirror® family of high performance products enables the architect to actually environmentally "tune" a building by using different wavelength-selective films for different building orientations. For example on South and West facades, one might use Quad SC or HM SC-75, East and North walls could use Quad TC or TC-88 and for overhead, skylight glass HM SC-75, HM-55 or HM-22 are most effective. Tuning allows one to optimize by orientation, the daylight transmittance and solar gain concerns at the same time. This concept of using multiple Heat Mirror types to meet specific design criteria is recognized as one of the most powerful uses of this technology and makes for a truly ***"Green Building",*** and may provide you and your firm with the *"architectural signature"* you have been looking for.

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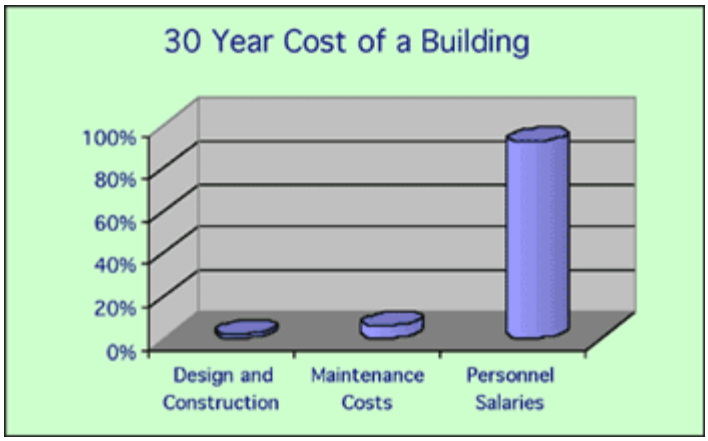
HEAT MIRROR® - PRODUCT BENEFITS

Comfort

The single biggest investment that a business owner makes is not in his building, facility, product, or processes but in his EMPLOYEES!



Few investments generate greater returns than those designed to boost the productivity and health of employees, tenants, students or patients. Heat Mirror glazing offers improved air quality, fresh air, increased daylighting, reduced noise and controlled temperatures. These features make a marked difference in our general well being and performance.

"Using green building strategies can result in increases in occupant performance measures by 6 to 26 percent."
William D. Browning
Founder of Green Development Services
and Senior Associate of
Rocky Mountain Institute

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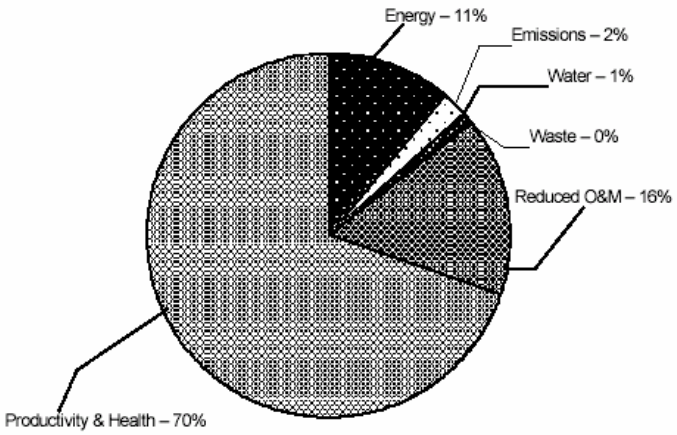
"a 3.7 percent increase in productivity has roughly the same economic impact as the entire cost of a building and its operating and maintenance costs over 30 years"

Joe Van Bellegham
President BuildGreen Developments &
Partner Windmill Developments

The Costs and Financial Benefits of Green Buildings

Figure XI-2. Percentage Breakdown of Green Building Financial Benefits (LEED Certified and Silver Buildings)



Source: Capital E Analysis

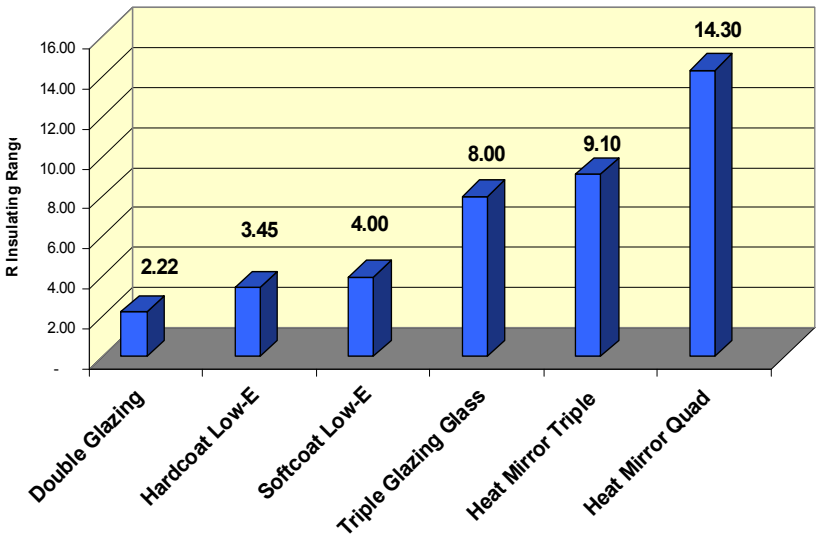
Individuals rarely put a dollar premium on comfort until after they have been uncomfortable. Although the issue of comfort is fairly subjective, one should note that the single biggest investment that any employer makes is **in his people.**

To whatever extent employees can be made more comfortable in their workplace the employer will reap the rewards of **increased productivity.** Conversely, if the workplace is uncomfortable, productivity will suffer dramatically.

Heat Mirror's superior properties and performance enables a comfortable, healthy workplace that can quickly translate into significant bottom-line savings for an employer or building owner.

Insulation

Heat Mirror glazing has DOUBLE the insulation compared to the best LowE/Argon glazing in the marketplace



Data obtained using L.B.L. (Lawrence Berkeley Laboratories) Window 5.2 analysis program (nfrc/ashae)

This Equates to Reduced Operating Costs:

Typically 25-35% of a buildings energy is lost through it windows. We know that the cost of oil and electricity will continue to climb. Heat Mirror's insulation reduces the amount of energy lost and significantly reduces the buildings heating and cooling bills, month over month for the Life Cycle of the building.

And to Reduced Capital Costs:

Heat Mirror's insulating properties allows engineers to downsize the entire HVAC assembly and system. Perimeter heating may be reduced or eliminated because of the increased insulation.

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Heat Mirror Triple Glazing Performance Chart

Description	R-Value			U-Value			U-Value Metric			Shading Coefficient	Solar Heat Gain Coefficient	UV Trans-mission	Visible Light Trans-mission
	Air	Argon	Kr	Air	Argon	Kr	Air	Argon	Kr				
Single Glazing	0.92	n/a	n/a	1.09	n/a	n/a	6.19	n/a	n/a	0.94	0.81	70%	89%
Double Glazing	2.11	2.23	n/a	0.474	0.449	n/a	2.689	2.547	n/a	0.81	0.70	50%	79%
Pyrolytic LowE	3.02	3.44	n/a	0.331	0.291	n/a	1.878	1.650	n/a	0.77	0.67	35%	73%
Softcoat LowE	3.40	4.03	n/a	0.294	0.248	n/a	1.666	1.407	n/a	0.44	0.38	14%	70%
Triple LowE	6.29	8.00	9.26	0.159	0.125	0.108	0.903	0.710	0.613	0.37	0.32	4%	54%
Heat Mirror TC 88	**5.59**	**6.80**	**7.69**	**0.179**	**0.147**	**0.130**	**1.016**	**0.835**	**0.738**	**0.55**	**0.48**	**<0.5%**	**63%**
Heat Mirror TC 88 w LowE	**5.99**	**7.46**	**8.62**	**0.167**	**0.134**	**0.116**	**0.948**	**0.761**	**0.659**	**0.39**	**0.34**	**<0.5%**	**55%**
Heat Mirror SC 75	**4.76**	**5.65**	**6.21**	**0.210**	**0.177**	**0.161**	**1.192**	**1.005**	**0.914**	**0.39**	**0.34**	**<0.5%**	**61%**
Heat Mirror SC 75 w LowE	**6.21**	**7.81**	**9.09**	**0.161**	**0.128**	**0.110**	**0.914**	**0.727**	**0.625**	**0.33**	**0.29**	**<0.5%**	**53%**
Heat Mirror 44	**4.69**	**5.52**	**6.06**	**0.213**	**0.181**	**0.165**	**1.209**	**1.028**	**0.937**	**0.28**	**0.24**	**<0.5%**	**38%**

Data obtained using L.B.L. (Lawrence Berkeley Laboratories) Window 5.2 analysis program (nfrc/ashae)

Assumptions:

All 6mm glass
Air and Argon Gas cavity 1/2”
Krypton Gas cavity 3/8”
Gas Mixture 90% gas/10% air
Maximum Heat Mirror IG size 70” x 120” / 1778mm x 3048mm

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Heat Mirror Quad Glazing Performance Chart

Description	R-Value			U-Value			U-Value Metric			Shading Coefficient	Solar Heat Gain Coefficient	UV Trans-mission	Visible Light Trans-mission
	Air	Argon	Kr	Air	Argon	Kr	Air	Argon	Kr				
Superglass Quad TC	8.26	10.42	12.50	0.121	0.096	0.080	0.687	0.545	0.454	0.45	0.39	<0.5%	50%
SG Quad TC w LowE	8.62	11.11	13.33	0.116	0.090	0.075	0.659	0.511	0.426	0.34	0.29	<0.5%	44%
Superglass Quad SC	7.46	9.26	10.87	0.134	0.108	0.092	0.761	0.613	0.522	0.31	0.27	<0.5%	47%
SG Quad SC w LowE	8.93	11.49	14.29	0.112	0.087	0.070	0.636	0.494	0.397	0.27	0.23	<0.5%	41%

Data obtained using L.B.L. (Lawrence Berkeley Laboratories) Window 5.2 analysis program (nfrc/ashae)

Assumptions:

All 6mm glass
Air and Argon Gas cavity 1/2”
Krypton Gas cavity 3/8”
Gas Mixture 90% gas/10% air
Maximum Heat Mirror IG size 70” x 120” / 1778mm x 3048mm

While the different varieties of Heat Mirror insulting units compared in the above embedded spreadsheet offer a broad range of insulating, Heat Mirror provides a unique package of additional benefits. Heat Mirror goes beyond common "high performance" glazing to provide total performance:

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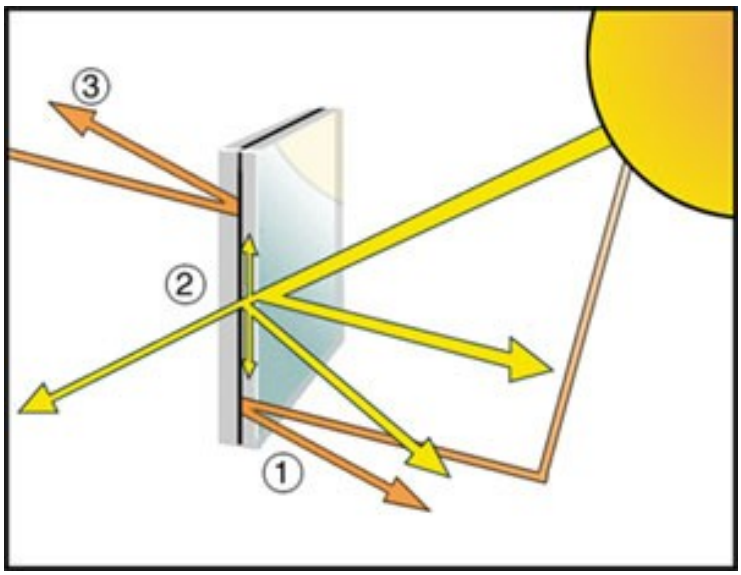
Solar Heat Control



1. External Radiated Heat is Reflected
2. Direct Heat Penetration is Reduced
3. Internal Radiated Heat is Reflected

Heat Mirror's solar heat properties can be customized to meet a buildings needs. From Passive Solar to the best Solar Heat management capabilities in glazing.

This equates to decreased operating costs by reducing the amount of energy required to run our boilers or chillers and lower capital costs by downsizing the capacity of these units.

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Eliminates Condensation on Glass

Heat Mirror makes a significant reduction or total elimination of harmful interior condensation. Since Heat Mirror provides outstanding insulation, a much higher level of humidity can be tolerated within the building before condensation forms. Heat Mirror resists wintertime condensation at exterior temperatures up to 45 ºC colder than conventional insulating glass. Reducing the risk of mould growth is a particularly important benefit for Health environments.

Description	R Value	U Value	Indoor Relative Humidity		
			30% ºC	50% ºC	70% ºC
Monolithic ¼" Glass	0.92	1.09	8	11	14
Double Glazing	2.11	0.474	-28	-10	5
Heat Mirror SC 75	**6.21**	**0.161**	**-96**	**-55**	**-12**
Heat Mirror TC 88	**7.69**	**0.130**	**-109**	**-64**	**-22**
Superglass Quad SC	**10.87**	**0.092**	**-152**	**-92**	**-59**
Superglass Quad TC	**12.50**	**0.080**	**-156**	**-95**	**-62**

Based on LBL Window Center Method with Indoor Temperatures at 21ºC
Outdoor Temperatures (ºC) at which Interior Surface Condensation Occurs

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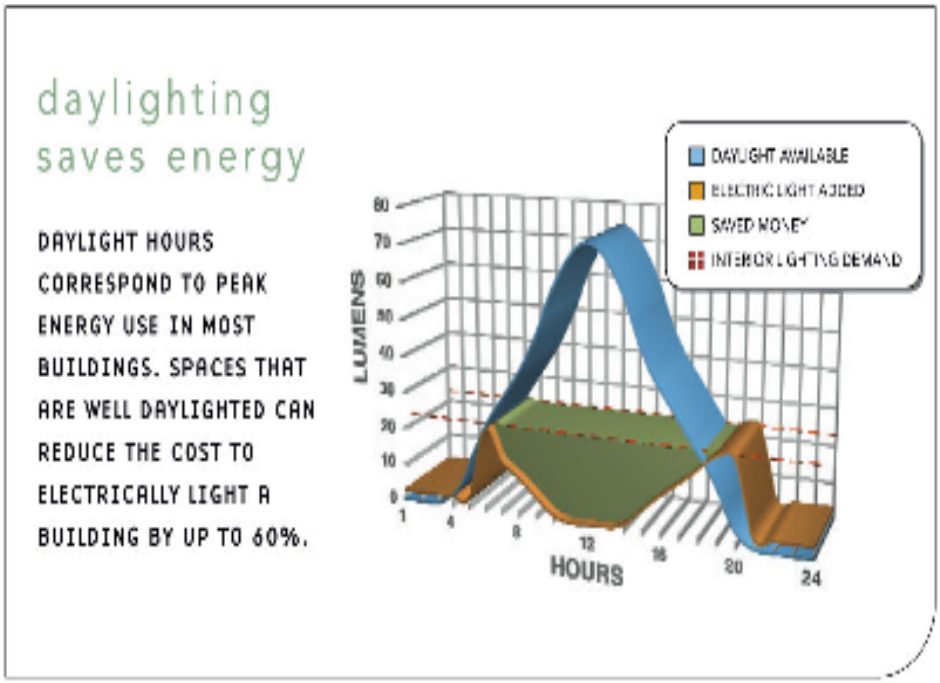
Daylighting

Heat Mirror provides the *Optimum* solution for natural daylighting. Its solar capabilities allow short-wave energy to be transmitted through the glass (natural light), but reflects long wave infrared radiation (solar heat). Daylighting that is comfortable and enjoyable. Tinted glazing is no longer a requisite. The perpetual use of blinds and shading devices is eliminated. In a Heat Mirror glazed building the occupants enjoy the benefits that natural lighting is meant to provide.



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Sound Control

In noisy environments, Heat Mirror's unique construction insulates against unwanted sound transmission better than ordinary double-pane windows. As building technology becomes more sophisticated, improved performance requirements are being placed on building components. The need for acoustical glazing solutions is increasing due to environmental noise caused by aircraft, highway traffic, rail transportation, and the congestion of buildings around areas of high noise levels.

Consumer / Owner demands are requiring building components such as insulating glass meet specified Sound Transmission Loss (STL) levels. STL is a standardized measure of the noise reduction in decibels for specific frequency ranges. Determining sound transmission loss - The American Society for Testing and Materials (ASTM) has developed a Sound Transmission Class, or STC rating, in which a single number rating is used for describing the sound isolation performance of a material. The higher the STC number the better the system is at isolating airborne noise. An STC rating of 45 means that the element reduces the sound passing through it by 45 dB. The higher the STC values, the greater the noise reduction.

Although the STC rating of building elements is generally satisfactory for ranking their reduction of noise from sources such as the human voice, it does not properly rate insulation against sources with strong low frequency content. Because most outdoor noise sources such as aircraft and road traffic are in this category, STC ratings are not sufficient for assessing noise reduction by exterior surfaces. Consequently an alternative rating system called Outdoor – Indoor Transmission Class (OITC) is becoming a more accepted practice for building envelopes. Differences in STC vs. OITC range from 2dB for monolithic glass to 10 dB for an insulating glass unit 2" thick. OITC numbers are always lower for glass or glazing applications, due to the high transmission of certain critical frequencies, such as bus or truck rumble.

Using different thickness' of glass gives greater noise reduction. The resonances for each layer fall at different frequencies thereby reducing noise. Staggering the thickness of the air/gas space has the same effect by altering the resonances.
Heat Mirror® film suspended between 2 lites will increase STC ratings by 1 to 2 points depending on the insulating glass make-up.

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Skylight Applications

The purpose of a skylight is to add natural daylight and enhance the aesthetics of the interior of a building. Heat Mirror provides the highest daylight to solar control ratio of any product on the market. Heat Mirror allows minimum deterioration of insulation value between vertical and sloped applications. When insulating glass is tilted, it becomes a solar collector. The R-value then deteriorates because of increased convection within the air space. Since the Heat Mirror technology creates two small air spaces instead of one large one, this convection loop is short circuited; and the R-value remains close to that of the vertical glass

Description	R-Value			U-Value			U-Value Metric			Shading Coefficient	Solar Heat Gain Coefficient	UV Trans-mission	Visible Light Trans-mission
	Air	Argon	Kr	Air	Argon	Kr	Air	Argon	Kr				
Single Glazing	0.86	n/a	n/a	1.163	n/a	n/a	6.604	n/a	n/a	0.94	0.81	70%	89%
Double Glazing	1.84	1.99	n/a	0.544	0.502	n/a	3.089	2.851	n/a	0.81	0.70	50%	79%
Pyrolytic LowE	2.45	2.81	n/a	0.408	0.356	n/a	2.317	2.021	n/a	0.77	0.67	35%	73%
Softcoat LowE	2.62	3.15	n/a	0.381	0.317	n/a	2.163	1.800	n/a	0.44	0.38	14%	69%
Heat Mirror SC 75	**4.00**	**4.55**	**4.88**	**0.250**	**0.220**	**0.205**	**1.420**	**1.249**	**1.164**	**0.40**	**0.34**	**<0.5%**	**61%**
Heat Mirror SC 75 w LowE	**4.74**	**5.88**	**6.62**	**0.211**	**0.170**	**0.151**	**1.198**	**0.965**	**0.857**	**0.33**	**0.29**	**<0.5%**	**53%**
Heat Mirror 44	**3.69**	**4.20**	**4.61**	**0.271**	**0.238**	**0.217**	**1.539**	**1.351**	**1.232**	**0.28**	**0.24**	**<0.5%**	**38%**
Heat Mirror 22	**3.70**	**4.24**	**4.65**	**0.270**	**0.236**	**0.215**	**1.533**	**1.340**	**1.221**	**0.16**	**0.14**	**<0.5%**	**19%**

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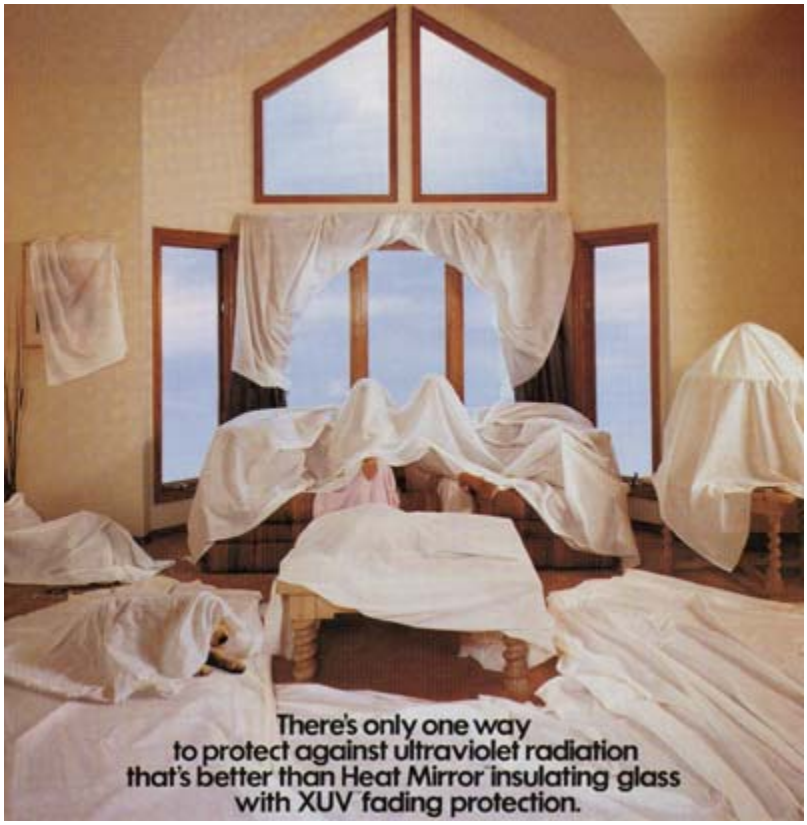
Ultraviolet Fading Reduction



Heat Mirror with XUV transmits less than one half of 1% of UV radiation -50 times less than competitive "Low-E" window products and more than 100 times less than ordinary double-pane glass -while maintaining a clear, colorless appearance

For those institutions where ultra-violet light is detrimental, Heat Mirror is a perfect solution. The optimum in natural light with limited UV penetration.

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SPECIFICATIONS

Project Specific Samples and Submittals

are available from ECO by calling: 905-564-8235 – extension 25 and/or 26

Project Specific Specification Reports

are available from ECO by calling: 905-564-8235 – extension 25 and/or 26

Specification Reports may be produced and emailed using Lawrence Berkeley Laboratories (LBL) Window 5.2 Glazing System Thermal and Optical Properties Software

HEAT MIRROR GLAZING INSTRUCTIONS

The following guidelines must be adhered to:
[Failure to follow these instructions will void the warranty and may cause the unit to fail.]

Heat Mirror must be handled, stored and installed in strict accordance with approved insulating glass procedures as detailed in the GANA[1], and AAMA[3] Glazing Manuals.

1. **Size Limitations:**
Southwall Technologies' wavelength-selective film has a coating width of 72 inches and, as a result, Heat Mirror units must have one dimension that is 70 inches or less. Unit lengths can be as long as 120 inches.

2. **Breather Tube Instructions:**
Some Heat Mirror units (non-gas filled) are equipped with pressure equalizing breather tubes. **DO NOT TWIST, PULL OR CUT** this tube or pull out from unit. This breather tube must be completely closed

upon arrival by crimping twice with pliers. If possible, units should be installed with the breather tube in an upper corner position, pointing downward. Specific instructions are available, and must be followed when using Breather Tubes. Failure to follow the correct process will void any and all product warranties.

3. **Heat-Strengthening or Tempering.**

Heat strengthening or tempering is recommended for the outboard lite of a tinted unit when high thermal stress is likely. High thermal stress situations include circumstances where glass may be subjected to re-radiated solar heat, irregular shadow patterns, and excessive glass coverage.

4. **Flush or structurally glazed Heat Mirror® units must be sealed with approved silicone sealant.**

If Heat Mirror units are to be flush or structurally glazed, this fact **must** be indicated when ordering to insure that the proper Southwall-approved silicone sealant will be used in the fabrication of the units. Polyurethane perimeter edge sealant and spacers must **not** be exposed to sunlight, even during storage. Polyurethane-sealed Heat Mirror installations must provide a full perimeter cap or four-sided capture system to cover the unit sealant edge and spacer assembly with at least 9/16" edge sight-line coverage. Exposed exterior flush or structural glazing joints are not permissible for polyurethane-sealed units and will cause premature sealant failure.

5. **Polyurethane-Sealed Units:**

Standard Heat Mirror units are fabricated with a polyurethane sealant which **must not be exposed to sunlight.** The glass unit edge, spacers, and sealant must be completely covered (captured) by the framing system (9/16" minimum sight line coverage). These organically sealed units **DO NOT** lend themselves to two sided or structurally glazed applications.

6. **Compatible Glazing and Sealant Materials.**

Heat Mirror insulating glass units must be installed with glazing materials and sealants compatible with Courtaulds PRC 4429HM polyurethane sealants, or with Dow Corning 3-0117 silicone insulating glass sealant. For Courtaulds please call 818 549-7530 for compatibility information, and for Dow Corning please call 770 751-7979 or 517 496-7770.

7. **Adequate Water Drainage.**

Adequate perimeter moisture barriers and condensate weepage must be provided by the framing system. Insulating glass unit perimeter edges must not be exposed to water immersion or prolonged moisture exposure. Weep systems must provide for drainage of water at a faster rate that it enters the glazing channel.

8. **Heat Mirror Transparent Film:**

The interior side of each Heat Mirror unit is clearly marked, and must be glazed accordingly to maintain warranty coverage.

9. **Storage Requirements:**

Heat Mirror insulating glass units should be installed promptly. If required, storage facilities **must** be at moderate temperature, dry, and covered. Breather tubes **must** be closed upon arrival. Units **must** be covered or shielded from sunlight exposure.

General Glazing Instructions

(1) ***Glazing Materials:*** Neoprene gaskets or non-hardening, non-corrosive glazing tapes or sealants must be applied in such manner as to effect and maintain a watertight, weatherproof seal for a period of time equal to the Heat Mirror warranty. All glazing materials must be compatible with polyurethane for Heat Mirror units sealed with this material.

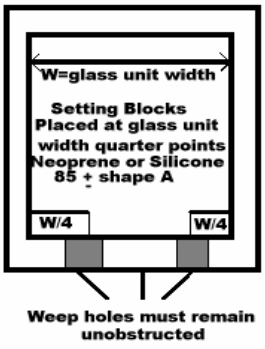
(2) ***Setting Blocks:*** Neoprene or silicone blocks must be placed at unit "quarter points" and equally support insulating glass unit inner and outer lites. Setting blocks should be 4" to 6" long and 1/8" wider than the thickness of the unit as indicated in the GANA Glazing Manual.

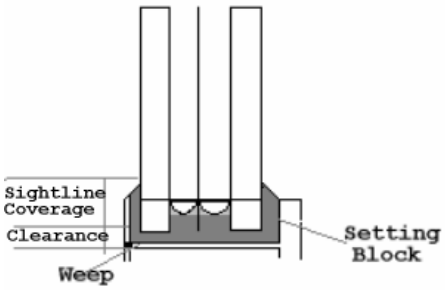
(3) ***Edge Clearance:*** Unit must be centered in the opening so that minimum spacing (1/4") exists between edge of glass and frame (1/8" on small units). No wood or metal shall contact the glass at any point in the frame. Face and edge clearances shall comply with GANA Glazing Manual, Chapter IX minimum recommendations.

(4) ***Weep (Condensate) System:*** Insulating glass units must not be exposed to moisture accumulation or high humidity dew points. The glazing system design and installation must provide a positive weather seal and unobstructed weep drainage.

(5) ***Sight Line Coverage (Bite):*** Frame and gasket materials must provide a least 9/16" sight line coverage (bite). Insulating glass sealants and spacers must be completely covered by the framing system.

(6) ***Framing:*** Openings must be square, in plane, and free of obstructions. Sash and frames must be structurally adequate to support weight of unit and prevent twisting stresses. Frame deflection must not exceed L/175 or less, depending upon size (AAMA).





1. Glass Association of North America, 2945 SW Wanamaker Dr., Suite A, Topeka, KS 66614-5321
2. Insulating Glass Manufacturers Association, 27 Goulburn Avenue, Ottawa, Ontario (613) 233-15103
3. American Architectural Manufacturers Association, 1540 E. Dundee Rd., Ste 310, Palatine, IL 60067, (708) 202 1350.

Guidelines for Skylights

Skylight installations using Heat Mirror® insulating glass units require close adherence to industry (GANA,& AAMA) standard design procedures and Heat Mirror specific installation guidelines. The following skylight installation checklist includes the most important design features.

1. **Skylight and Sloped Glazing Installations.**

Skylight and sloped glazing installations require particularly close attention to glazing design and installation guidelines. Exterior perimeter frame caps should cover the insulating glass unit spacer/sealant assembly plus at least 3/16" of the visible area perimeter. Primary and secondary weepage systems must be provided. Special structural load analysis and laminated safety glass provisions may be required.

2. **Flush or structurally glazed Heat Mirror units must be sealed with approved silicone sealant.**

If Heat Mirror units are to be flush or structurally glazed, this fact **must** be indicated when ordering to insure that the proper Southwall approved silicone sealant will be used in the fabrication of the units. Polyurethane perimeter edge sealant and spacers must **not** be exposed to sunlight, even during storage. Polyurethane-sealed Heat Mirror installations must provide a full perimeter cap or four-sided capture system to cover the unit sealant edge and spacer assembly with at least 3/16" intrusion into sight-line coverage. Exposed exterior flush or structural glazing joints are not permissible for polyurethane-sealed units and will cause premature sealant failure.

3. **Compatible Glazing and Sealant Materials.**

Heat Mirror insulating glass units must be installed with glazing materials and sealants compatible with Courtaulds PRC 4429HM polyurethane sealants, or with Dow Corning 3-0117 silicone insulating glass sealant. For Courtaulds please call 818 549-7530 for compatibility information, and for Dow Corning please call 770 751-7979 or 517 496-7770.

4. **Minimum Slope.**

In order to optimize drainage, Heat Mirror units should be installed in a slope of more than 14º or at least a 3 ft. rise for every 12 lateral ft. pitched roof.

5. **SealGuard Tape.**

It is recommended that SealGuard tape be used in applications where high levels of solar exposure could result in seal deterioration for silicone sealed units. The tape is to be applied to the glass adjacent to the capture or cap system for sloped-glazed applications. For further information and sourcing contact ECO Insulating Glass Mfg. Ltd.

6. **Adequate Water Drainage and Weep Systems.**

Adequate perimeter moisture barriers and condensate weepage must be provided by the framing system. Insulating glass unit perimeter edges must not be exposed to water immersion or prolonged moisture exposure. Weep systems must provide for drainage of water at a faster rate that it enters the glazing channel. Skylights must include weepage systems specifically designed for sloped applications of 14º to 60º. Drainage must be provided for both the unit surface weather seal and internal channels.

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7. **Framing Deflection (AAMA[3])**

Frame unit openings must be square.
Maximum frame deflection at full design load

Dmax = 0.4 (Lg/100)2
where: Lg = Glass edge length (inches)

Example: Unit with a 60" edge span has a maximum deflection of 0.14" (1/8" at 40 psf design load. Framing deflection under passive load (approx. 12 psf) must not exceed 0.05" (3/64").

8. **Glazing Structural Loading (AAMA)**

Maximum unit size for sloped glazing with laminated inboard lite. See AAMA Table 2-7 or Monsanto Loads software program for exact design requirements. Note these are maximums!

up to 12 sq. ft. = 1/4" annealed laminate inboard
up to 18 sq. ft. = 3/8" annealed laminate inboard
up to 24 sq. ft. = 5/16" heat-strengthened laminate inboard
up to 36 sq. ft. = 7/16" heat-strengthened laminate inboard
up to 40 sq. ft. = 9/16" heat-strengthened laminate (run Loads program over 40 sq. ft.)

9. **Perimeter Support Gasket (AAMA)**

Skylight glazing unit inboard surface must be fully supported by a perimeter structural channel gasket capable of evenly distributing load stress during maximum design conditions. Note that glazing tapes applied directly to the metal frame (commonly used in small residential skylights) do not meet guidelines and should not be used on commercial installations or large units.

10. **Setting and Anti-Walk Blocks (GANA[1])**

Setting blocks should be 85 + 5 Shore A durometer neoprene, 4" length, width equal to glass thickness, placed at quarterpoints of the glazing unit base. Anti-walk (edge) blocks should be 55-65 durometer neoprene with at least 1/16" clearance between block and glass.

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GLAZING SPECIFICATION FOR HEAT MIRROR INSULATING GLASS

DIVISION 8 GLASS & GLAZING SECTION 08800

PART 1: GENERAL

1.1 Work of Related Sections (Spec. Sections)

1.2 Submittals

.1 Manufacturer's data: submit manufacturer's specification, product literature and performance data.
.2 Samples: provide one sample 305 x 305 mm of each configuration and type of Heat Mirror insulating glass unit required.

1.3 Quality Assurance

.1 Heat Mirror insulating glass units shall be manufactured by ECO Insulating Glass Inc. a licensee of Southwall Technologies of Palo Alto, CA. ECO is certified with the Insulating Glass Manufacturers Association to manufacture insulating glass with suspended coated film.
.2 Manufacturer shall provide a handling and installation guideline document.

1.4 Site Conditions

.1 Proceed with glazing only when glazing surfaces are accumulating no moisture from rain, mist or condensation.
.2 When temperature of glazing surface is below 4 degrees Celsius, obtain approval of glazing methods and protective measures which will be used during glazing operations.

1.5 Design

.1 Design glass insulating units to CAN/CGSB-12.20-M89
.2 Design glass and glazing to requirements of authorities having jurisdiction.

1.6 Warranty:

Warrant that sealed insulating glass units shall remain free from material obstruction of vision as a result of dust or film formation on the internal surfaces caused by failure of the hermetic seal due to faulty manufacturing for a period of ten (10) years from Date of Substantial Completion. In the event that the products fail to conform to the warranty, ECO will, at its option, furnish the purchaser with another product, FOB ECO factory, or credit the purchase price of the product.

PART 2 – PRODUCTS

2.1 Manufacturer

1416 Bonhill Road
Mississauga, ON L5T 1L3
(905)-564-8235
www.ecoglass.ca

Units shall be Heat Mirror insulating glass as manufactured by ECO Insulating Glass Inc, Mississauga, Ontario 905-564-8235

.1 Unit configuration: Heat Mirror insulating glass shall be configured as follows by type/group.

Type 1.
Outboard Lite: (glass thickness)_____(color/name) _____
Type: (float, laminated, annealed, tempered, heat strengthened) _____
Spacers: (Steel),(Bayform Thermal Edge)
Heat Mirror type: (HM 44, 22, SC-75, TC-88 Quad SC, Quad TC) _____
Inboard Lite: (glass thickness)_____ (color/name) _____
Type: (float, laminated, annealed, tempered, heat strengthened) _____
Space to be filled with: (Air), (Argon), (Krypton)
Overall unit thickness: _____

Type 2. (If any, same format as above)

.2 Performance: All performance data shall be calculated according to ASHRAE standard procedures and verified using the LBL "WINDOW 5.2" program.

Type 1:

.1 Winter nighttime U-value of:	_____	or better
.2 Shading Coefficient of:	_____	or better
.3 Solar Heat Gain Coefficient of:	_____	or better
.4 Daylight transmittance of:	_____%	or better
.7 Ultraviolet blockage shall be	_____%	or better

Type 2: (If any, same format as above)

PART 3 - EXECUTION

3.1 Surface Conditions

.1 Prior to installation carefully inspect installed work of other trades and verify work is completed to the point where work of this section may proceed.
.2 Verify that the glass is installed in accordance with original design and in accordance with all pertinent codes and regulations.

3.2 Installation

.1 Comply with skylight, window, storefront or curtain wall manufacturer guidelines for glazing Heat Mirror in their framing systems.
.2 Setting blocks should be 85 Shore A durometer neoprene, 4" length, width equal to glass thickness and placed at the quarter points of the glazing unit base. Anti-walk (edge) blocks should be 55-65 Shore A durometer neoprene with at least 1/16" clearance between block and glass.
.3 Be sure exterior of the unit is set toward the building exterior.
.4 Skylights must include a weep system specifically designed for sloped applications of 14 to 60 degrees. Drainage must be provided for both the unit surface weather seal and internal channels.

TESTING & QUALIFICATIONS

Heat Mirror Product Testing and Qualification

Southwall Technologies has supplied Heat Mirror insulating glass to 1000+ commercial buildings throughout the world. Installations began in 1981, providing a history of proven reliability. Southwall supplements this experience with accelerated testing using industry standard methods.

TEST	OBJECTIVE	CONDITION	RESULT
Thermal Aging and Ultraviolet Exposure	To determine the long-term adverse effects of accelerated thermal and oxidative aging on Heat Mirror insulating glass units.	UVA-351 fluorescent Bulbs for 5000 hours[1]	Complies. (Test Report available.)
Thermal Stress and Wet Environment	To determine the long-term adverse effects of extreme temperature cycling and moisture on Heat Mirror insulating glass units	Temperature cycling - 20ºF (-30ºC) to 135ºF (+57ºC) plus water spray in six-hour cycles for 1512 hours[2]	Passed CBA level. (Test report available.)
Canadian Ultraviolet Fogging	To determine whether extreme temperatures could cause chemical outgassing to condense inside the insulating glass unit.	Temperature 140ºF (+60ºC) for 164 hours[3]	No chemical Condensation visible. (Test report Available.)

PRODUCT RATINGS: IGCC (Insulating Glass Certification Council) CBA "A" Level Certification;

WARRANTY: ECO Insulating Glass Inc. is a licensed Heat Mirror insulating glass manufacturer and warrants insulating glass units for a minimum of ten (10) years, provided shop drawings have been submitted to and approved by the Heat Mirror manufacturer.

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[1]Per ASTM (American Society for Testing and Material E773-88, #77--88
[2]Per NRCC (National Research Council of Canada) CAN2-12.8-M76
[3]Per ASTM (American Society for Testing and Materials) D-882, G-53

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FENESTRATION TERMS

DAYLIGHT TRANSMITTANCE (Tvis): The percentage of visible light that a glazing transmits through glass.

EFFICACY FACTOR: The ratio of Tvis to SC: K= Tvis SC
A simple ratio of Light to Heat. The higher the number. the more light per amount of heat. A low number means that either it is a dark glass or a lot of heat gets through. A superior, spectrally selective glass will have a K> 1.0 This may also be called Light to Heat Ratio (LHR) or Coolness Factor.

LOW EMISSIVITY COATINGS: Coatings applied which allow short-wave energy to be transmitted through glass, but reflect long wave infrared radiation. The lower the emissivity, the lower the resultant U-value.

PYROLYTIC LOW-E: Glass with a coating, either visually reflective or low emissivity, applied at high temperatures and fired into the glass surface during float glass production.

R-VALUE: Measures the insulation effectiveness of the window. The R-value equals one divided by the Uvalue (R=1/U). The higher the R-value, the better the insulating performance.

RELATIVE HEAT GAIN (RHG): A number which represents the amount of heat entering a building due to both solar radiation and conductive/connective heat gain. The total heat flow through the glass for a specific set of conditions. This value considers indoor/outdoor temperature differences and the effect of solar radiation (Btu's/hr./ft_2).

SHADING COEFFICIENT (SC): Measures the total solar heat gain through the glazing compared to 1/8" clear glass under the same conditions. It includes both the solar energy transmitted directly plus any absorbed solar radiation that is re-radiated as heat into the interior. The number ranges from 0.0 to 1.0. Standard insulating glass has a SC of .81 The lower the shading coefficient, the lower the solar heat gain.

SOFT-COAT LOW-E: Glass with a coating applied in a secondary process at ambient temperature within a vacuum chamber.

SOLAR HEAT GAIN COEFFICIENT(SHGC): The percentage of Solar Energy either directly transmitted or absorbed and then re-radiated into the building.

U-VALUE: Measures the heat loss or gain due to differences between indoor and outdoor air temperatures (Btu's/hr./ft_2). The U-value equals one divided by the R-value (U=1/R). The lower the U-value, the better the insulating performance.

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