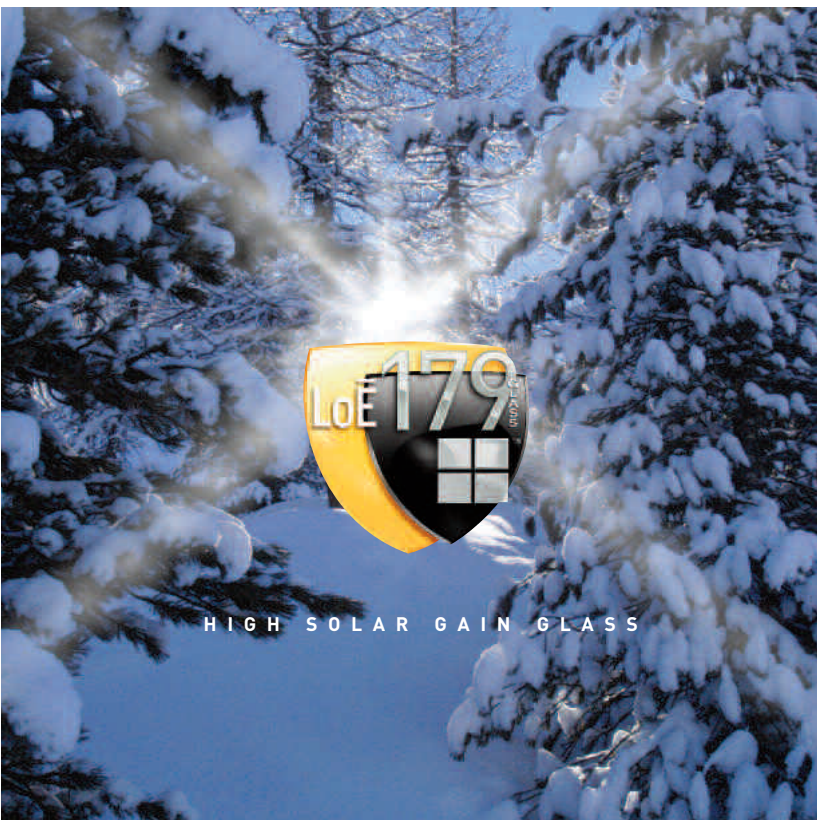



LoE 179



 **Cardinal Coated Glass**
Superior glass products
for residential windows and doors

Minus 20
degrees
outside,

Cardinal comfort inside.

A warm living room scene. In the foreground, an elderly man and a young girl are sitting on a couch, reading a book together. The man is wearing a white cardigan over a light-colored shirt and white pants. The girl is wearing a dark, patterned dress. In the background, a fireplace is lit with a bright fire. Several Christmas stockings are hanging from the mantel. The room is dimly lit, with the primary light source being the fire in the fireplace, creating a cozy atmosphere.

When the weather turns frigid, Cardinal LoE-179™ glass (pronounced low E 179) is the perfect cold remedy. It provides excellent insulating capability, blocking heat loss to the outside and reflecting heat back into the room. What's more, it's the ideal glass for passive solar applications because it allows the winter sun's heat to pass into the home. Regardless of where your home is located, choosing windows that provide you with the highest level of comfort and energy savings year-round is extremely important. And choosing the right glass for your windows is the most important factor in the decision. Go beyond ordinary low-e glass – choose Cardinal LoE-179, the ideal choice for passive solar designs.



When it's frigid here
it's cozy here.

During cold weather, the insulating effect of your windows has a direct impact on how your rooms feel. Typically, 75% of the exposed surface of a window is glass, and the temperature of the room-side of the glass directly affects the air temperature in the room. The better insulated the window glass, the warmer your room will be.

Inside Glass and Outside Temperatures

The table below compares the room-side center of glass temperatures of four different glass types against two different winter conditions.

	-20°F	+20°
Single-pane, clear	0°	31°
Double-pane, clear	37°	51°
Ordinary low-e	47°	58°
LoE-179	50°	59°

The superior insulating capability of Cardinal LoE-179 is a key factor in the construction of comfortable windows for cold climates. The dramatic comfort improvement from windows with warm glass surfaces also means the relative humidity of the indoor air can be controlled and maintained properly. Proper humidity levels (not too much, not too little) will improve comfort and promote a healthier living environment.





Blocks out the cold,
lets in the light.

Count on
LoE-179 to
always meet or
exceed expectations

Cardinal I.Q. -
(Intelligent Quality
Assurance Program) -
ensures the quality of every
piece of glass. Using our
own patented inspection
systems, we thoroughly
examine the glass
from start to
finish.

Cardinal LoE-179 delivers excellent cold weather performance - its insulation value (U-factor) is a low 0.28, and it lets the winter sun's heat pass into the home. It also blocks 76 percent of the sun's harmful UV rays. While blocking out the cold and UV rays, it lets the daylight stream in - more light than ordinary low-e glass.

Visual Light Transmittance

Single-pane, clear	90%
Double-pane, clear	81%
Ordinary low-e	75%
LoE-179	79%

Our unique coating is the key

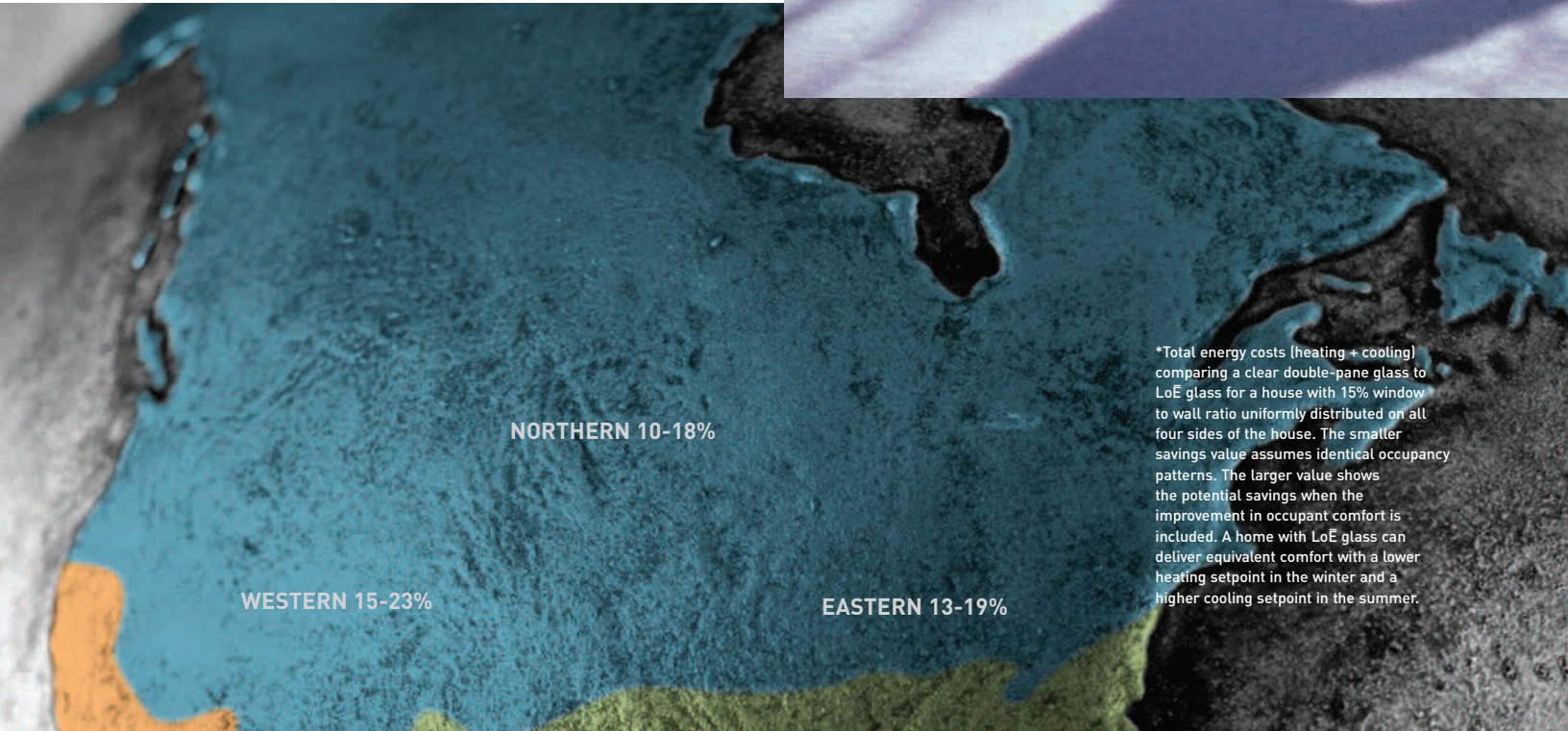
Cardinal employs a state-of-the-art sputter coating process that is unmatched by any other glass manufacturer. The glass is coated with a microscopically thin, optically transparent layer of silver sandwiched between layers of anti-reflective metal oxide coatings. A protective coating is applied to assure durability and long life. The coating is virtually invisible to the eye - it's just like looking through clear glass.

Save energy with glass so smart, it can control your comfort.

Think of LoE-179 glass as invisible insulation. Although windows provide beautiful views and wonderful natural light, they can also account for up to 25% of the annual heating cost for a home. In the winter, LoE-179 helps homes stay warm and cozy by blocking heat loss to the cold weather outside.



LoE-179 can be purchased in a variety of custom shapes and sizes. To learn more about it and other Cardinal glass products, ask your contractor or architect, or visit our web site at www.cardinalcorp.com.



*Total energy costs (heating + cooling) comparing a clear double-pane glass to LoE glass for a house with 15% window to wall ratio uniformly distributed on all four sides of the house. The smaller savings value assumes identical occupancy patterns. The larger value shows the potential savings when the improvement in occupant comfort is included. A home with LoE glass can deliver equivalent comfort with a lower heating setpoint in the winter and a higher cooling setpoint in the summer.

Note: All values calculated using Window 5.2.
 (See <http://windows.lbl.gov/software/window/window.html> and http://windows.lbl.gov/materials/optical_data/default.html for more information on glass optical data and the Windows 5.2 program.) Emittance of ordinary low-e is 0.20.

Solar Heat Gain Coefficient – (SHGC). The amount of solar radiation that enters a building as heat. The lower the number, the better the glazing is at preventing solar gain.

Fading Transmission – The portion of energy transmitted in a spectral region from 300 to 700 nanometers. This region includes all of the ultraviolet energy and most of the visible spectrum, and will give the best representation of relative fading rates. The lower the number, the better the glass is for reducing fading potential of carpets and interior furnishings.

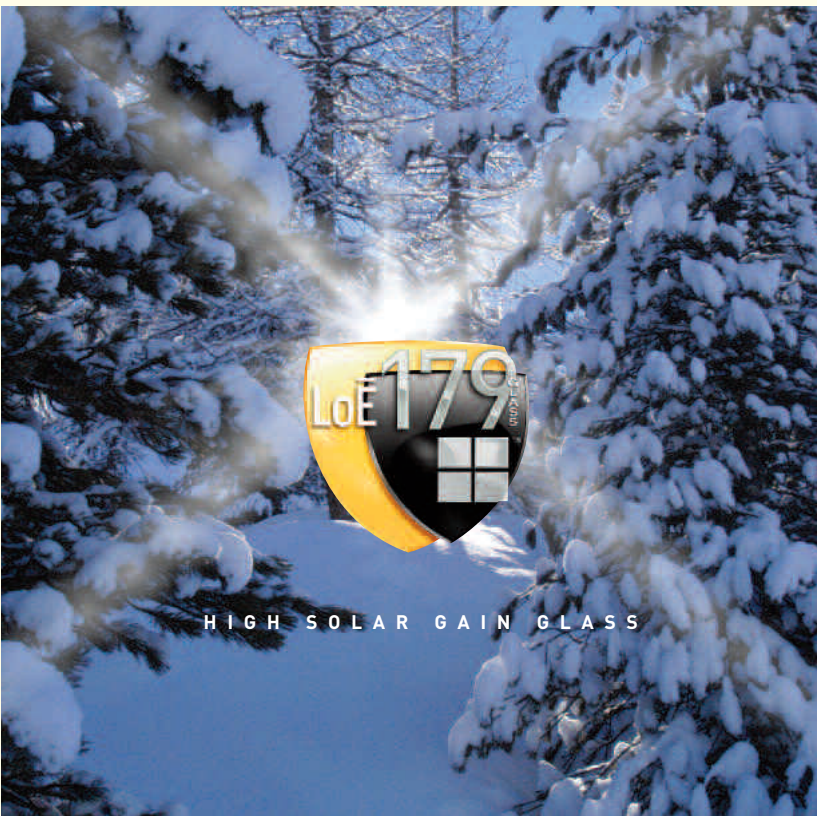
U-Factor – This represents the heat flow rate through a window expressed in BTU/hr/ft²/°F, using winter weather conditions of 0°F outside and 70°F inside. The smaller the number, the better the window system is at reducing heat loss.

Cardinal actively supports and participates in The National Fenestration Rating Council (NFRC). Windows with LoE-179 that are rated and certified by the NFRC can comply with Energy Star™ requirements for all climates in the country.

(See <http://www.energystar.gov/products/windows/> for more information on the Energy Star windows program.)

GLASS PERFORMANCE

PRODUCT	VISIBLE LIGHT TRANSMITTANCE %	SOLAR HEAT GAIN COEFFICIENT	WINTER U-FACTOR (ARGON)	UV	FADING TRANSMISSION
Single-pane, clear	90%	.86	--	.71	.84
Double-pane, clear	81%	.76	--	.56	.74
Ordinary low-e	75%	.72	.31	.44	.63
LoE-179	79%	.70	.28	.24	.61



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