e(g)p engineered glass products™


# Appliance Applications White Paper

*by Peter Gerhardinger, Vice President of Technology, Engineered Glass Products*



## Thermique™ Hot Glass Technology™ Applied to Appliances

Radiant heating can be inefficient and unsightly because of the imprecise technology of heating coils. These coils, by design, provide heat only along narrow bands. This creates uneven heating and thus warm and cool spots throughout the object or area to be heated. The heat radiates off the coils in all directions, leading to a significant amount of wasted energy. Also, these coils are aesthetically unappealing if exposed. Therefore, they are generally covered up with extra material, which in turn adds size, weight, and cost to the heating apparatus.

Thermique™ Hot Glass Technology™ by Engineered Glass Products is the remedy to all of these shortcomings.

Thermique™ glass is, by design, a near perfectly uniform heating source. It maintains a steady and consistent temperature across the entire surface, and heat radiates off the glass in only one direction: towards the object or area to be heated. This unique technology has all the beauty and elegance of glass. Plus, it can be colored or etched with designs in order to complement the appearance of any room.

## Thermique™ Technology

Thermique™ technology creates a uniform heating surface across an entire pane of glass through the use of a transparent thin film conductor and interconnects designed by EGP engineers. All components are UL® recognized. Coupled with an electronic control circuit that regulates power (and thus glass temperature), this proprietary design is efficient, safe, and environmentally responsible.

Figure 1 demonstrates the superior uniformity of heated glass over traditional coil heating. The Thermique™ heater plate—which includes the thin film conductor, bus bars, and interconnects—is applied to one surface of the glass during fabrication. This process leaves a 12mm perimeter around the Thermique™ components where the glass can be installed into ordinary framing materials.

The appearance of heated glass is a vast improvement over coils. There are no visible wires or anything to minimize the beauty of the glass. The technology is invisible, silent, and undetectable except for the heat radiating off the glass.

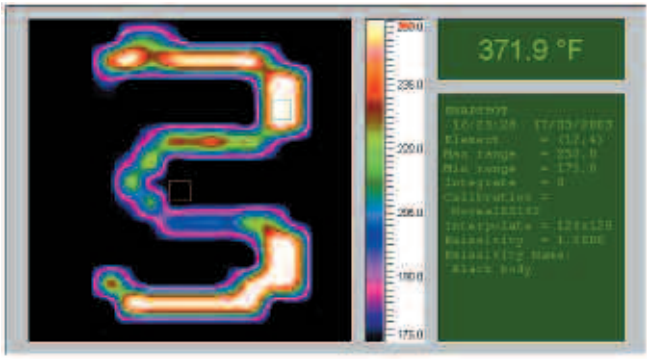
Thermique™ technology is designed for use with an electronic controller. This controller utilizes switching technology to efficiently regulate the power level of the glass. The controller is UL® recognized and can be controlled manually, preprogrammed to a specified power level, or automated by timer. It can respond to external commands, or it can be built with any type of switching or user interface.

An important feature of the controller is its automatic fault or breakage detection capability. The controller will automatically shut down the system if there is a problem with the wiring or in the event of glass breakage. In addition, the appliance should include a GFCI breaker to guard against ground faults and leakage currents.

The electronic controller provides instantaneous response and very accurate control, even at very low power levels, which is critical particularly in food preparation and storage applications.

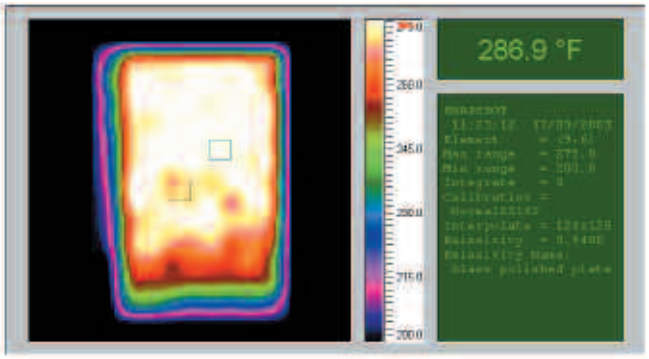
thermique™ by e(g)p

**Standard Heating Element**
Warmer Drawer, Front View



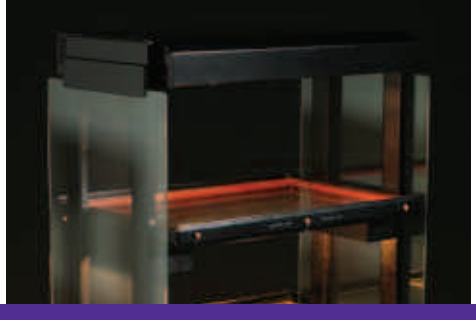

Vertical, Open Mount – 6 minutes of power

**Thermique™ Hot Glass Technology™**
Warmer Drawer, Front View




Vertical, Open Mount – 6 minutes of power

***Figure 1***



## Applications

Thermique™ is a new technology, and its full potential remains unexplored as of yet. However, numerous applications are now ready for manufacture. These range from architectural windows to heater panels in office furniture. Cooking and food warming appliances can be improved by this technology as well.

EGP engineers are now pioneering new applications for Thermique™ glass in the kitchen and bathroom. The technology is elegant as well as sanitary, making it ideal for use with food in a public setting. It is also excellent for warming plates, utensils, and more. In the bathroom, it can be used to keep towels and linens luxuriously warm.

All Thermique™ products are UL® recognized for approved and meet all Safety Glazing Code requirements. This is critical for electrical devices, especially those designed for use near water, such as in the bathroom.

## Towel Warmers

EGP is already working with some of the finest hotels and custom home developers worldwide to commercialize a revolutionary new line of heated glass products for the bathroom. Glass towel warmers with Thermique™ technology are the ideal addition to any upscale home or luxury hotel suite.

Stylish and sophisticated, these towel warmers are comprised almost entirely of glass. The exterior surface of the glass can be customized, colored, or etched with a company logo. The invisible Thermique™ thin film conductor is even more efficient than traditional radiator-type towel warmers.

Thermique™ glass provides a transparent heated surface where the towels are stored. The temperature of the glass is only hot enough to warm a towel. It is never too hot to touch, and it does not contribute uncomfortable amounts of heat to the room.

Thermique™ glass towel warmers can be installed in new construction or remodeling, but the need to run wiring does necessitate getting inside the walls.

A similar design allows for Thermique™ technology to be incorporated into a bathroom drawer where towels and other linens can be stored. The results are the same: the linens are kept warm for luxurious comfort during use. A “Warmer Drawer” is often more practical for residential use than a wall-mounted towel warmer because of limited wall space and ease of installation. The Warmer Drawers designed by EGP can be engineered into traditional bathroom fixtures. The EGP design requires minimal changeover from existing coil technology if such a component is already in place to perform the same function.

## Food Service

Although Thermique™ technology is not suited to cooking food, it is ideal for reheating, food storage, and display of foods that need to remain hot between preparation and serving time. EGP’s exclusive technology has a number of advantages over coil heating or gas flames.

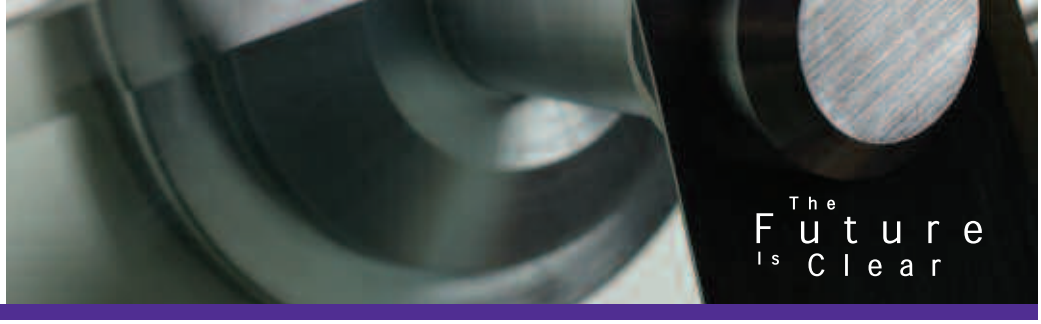
First, Thermique™ glass allows for precise power control. With a simple twist of the dial, the glass can assume any temperature from approximately 70° F to 350° F. The user is allowed full modulation of temperature. This differs from gas flames, which are either lit or unlit when used for reheating or food display.

Even in appliances that allow for gas flow to be regulated in order to control the size of the flame, temperature control is a product of imprecise guesswork on the part of the operator. Thermique™ technology allows for precise numeric readings of the energy input to the glass heating element. Furthermore, with gas flames the minimum temperature may be undesirably high, resulting in decreased efficiency as the operator attempts to keep the food at an appropriate distance from the flame (often by guessing) in order to dissipate some of the heat. This is not a problem with Thermique™ glass. Since the glass temperature is precisely regulated and the glass is sanitary, the food items can always be placed directly on the heat source.

This leads to another important benefit of Thermique™ technology when used for food preparation or display. The radiant heat from the glass is almost perfectly uniform across the entire surface. No part of the food is ever too far or too close to the heat source. Flames provide high heat in isolated spots while coils create a snake-like pattern of heating. Both technologies leave cool spots around the edges and elsewhere. EGP engineers have solved this problem through Thermique™ glass.

A similar drawback of flames or coil technology is created by size. An increase in the size of the heated area can result in an increase in cool spots with these traditional heat sources. The size of the glass in an appliance does not affect the temperature or uniformity of the Thermique™ heating element. The square footage of the heating surface simply does not factor into the quality of the design.

Another benefit of Thermique™ technology is the glass itself. Glass is smooth and easy to clean. The same cannot be




said of heating apparatuses that use gas flames or coils. Also, glass is visually appealing, unlike the crude and mechanical appearance of previous technologies. Plus, glass is naturally transparent, so it does not limit the visibility of food items in storage or on display.

## Food Applications

These features have led EGP engineers to develop a number of practical applications for the kitchen, restaurants, delis, caterers, etc. These include elegant glass shelves that can keep food warm until served or sold. This is not only because food tastes better warm but also for health issues. Heated shelves help prevent spoilage and retard bacteria growth.

An entire display case can be made of Thermique™ glass to keep warm foods visible to customers in a shop or restaurant. The electrically heated glass would not be subject to condensation from steam, so the transparency would not be diminished and water would not drip back down into the food.

Thermique™ glass can also be incorporated into the smooth surface of a stovetop as a high-quality burner. It provides uniform heat—unlike an unsightly, hard-to-clean coil burner—with minimal engineering changes. With temperatures reaching 350° F, these burners are easily capable of boiling water and other common stovetop heating and warming applications.

Thermique™ technology can take the place of steam tables or flame-heated serving platters at a banquet or party. A stylish warming station with Thermique™ glass is just as effective and far more attractive. Plus, it is easier to transport and set up. Similarly, Thermique™ glass can also be used to warm plates and utensils.

## About Engineered Glass Products

Combining more than 50 years of experience with cutting-edge expertise, Engineered Glass Products is today's premier developer of heated glass technology. EGP is headquartered in Chicago, Ill., with a technology center located in Toledo, Ohio.

EGP has been providing Thermique™ glass for food service and industrial applications since 2001 and has thousands of successful applications in the field. EGP's experience with the design and fabrication of heated glass and electronic controllers forms the basis of its appliance-related applications. EGP has completed UL® testing and certification.

EGP's staff of engineering professionals has more than 50 years of experience with architectural glass, electronics, fabrication, and technical support. For more information on heated glass technologies, e-mail info@egpglass.com or visit the Web site at www.egpglass.com.

*Hot Glass Technology.*™

*Reflect on the possibilities.*

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