



## Heat Strengthened and Fully Tempered Glass Process

WA Wilson's TempRite horizontal heat treating furnace operates on convection assisted radiant electric heat. Each glass thickness, color, coating, and/or pattern has unique heating treating and cooling requirements, both in terms of temperature, time travelling through the furnace, and time in the air cooling quench.

Unless ordered with a finished polished, flat ground, or beveled edge, all glass entering the TempRite furnace receives a seaming on all edges. This seamed edge is to prevent breakage during the heat treating process, and the seamed edge not to be considered a finished edge. We also stamp all heat treated glass with the proper American National for Safety Glazing (ANSI) and the Consumer Products Safety Commission Council (SGCC) logo that is specific to the type and thickness of the glass, unless it is ordered as 'no logo.'

Within our furnace the glass travels along 50 different temperature zones, reaching an average temperature of 1200 degrees Fahrenheit. After exiting the furnace and entering the air quench chamber cooled air blows on the glass, locking about 20% of the depth on all sides of the glass surfaces into a state of compression, while the interior 60% of the glass remains in a state of tension. The glass then exits the air quench at an average temperature of 400 to 600 degrees Fahrenheit.

Heat treating glass improves both its strength and resistance to thermal stress, or uneven changes in heating and cooling once it is glazed into an opening.

There are two different types of heat treated glass- heat strengthened and fully tempered. Both types spend the same amount of time in the furnace. Inside the cool air quench heat treated glass is cooled more slowly than fully tempered, causing a different strength rating and break pattern.

Typically heat treated glass is about twice as strong as regular annealed glass of the same thickness. Depending on the intensity of the load heat strengthened glass will break like annealed glass into relatively large pieces that will tend to stay in the glazing opening. Heat treated glass is not used in areas where safety glazing is required by code or where human contact is a factor. It is commonly used where thermal stress breakage is a concern, such as in tinted Low-E insulated units and Spandrel units.

Fully tempered glass is about 4 to five times as strong as regular annealed glass of the same thickness. Because it is in a higher state of compression, fully tempered glass breaks into small pieces called dice that vacate the framing system under a lateral load. This allows fully tempered glass to be used in areas where safety glazing is required. For the highest assurance of glass retention under a lateral load, fully tempered glass is often laminated with a vinyl interlayer between the lites of glass.

Neither heat treated nor fully tempered glass is considered a fire rated product. Although fully tempered glass can withstand sudden exposures to heat, it carries no UL stamp and is not rated against thermal breakage. After a prolonged exposure to heat fully tempered glass will revert back to heat strengthened, and will exhibit a break pattern similar to annealed glass.