How to Temper Glass

Tempered glass, or toughened glass, is glass that has been heat-treated to make it stronger, more resistant to heat and break in a way to prevent injury. Tempered glass is used in front doors, shower stalls, fireplace doors and grates, and anywhere strong, safe glass is called for. The process for tempering glass is similar to the process for tempering steel; below are the steps for how to temper glass.

Steps

1. **Cut the glass into the desired shape first.** This has to be done before the glass is tempered, as the tempering process will weaken the glass if it is cut or etched afterward and may increase the likelihood of breakage.

2. **Inspect the glass for imperfections.** Cracks or bubbles may cause the glass to break during tempering; if any are found, the glass cannot be tempered.

3. **Sand the cut edges smooth.** This removes any burrs created during cutting or etching.

4. **Wash the glass.** This removes any tiny grains of glass deposited during sanding, as well as any dirt that may interfere with the tempering process.

5. **Heat the glass in a tempering oven.** Glass may be fed in batches or continuously. The oven reaches temperatures of over 600 degrees Celsius (1,112 degrees Fahrenheit), with the industry standard being 620 degrees Celsius (1,148 degrees Fahrenheit).

6. **Quench the glass to cool it.** The heated glass is subjected to seconds of high-pressure blasts of air at various angles. The rapid cooling causes the outer surfaces of the glass to cool and contract faster than the center, giving the tempered glass its strength.

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Your reply...

Tips

- Properly tempered glass is required to withstand pressures of at least 10,000 pounds per square inch (68,948 kilopascals) before it breaks, but usually it can withstand pressures of at least 24,000 psi (165,475 kilopascals). When broken, tempered glass breaks into small, usually rounded pieces. Annealed glass, which is heat-treated by a different process, breaks at only 6,000 psi (41,369 kilopascals) and may break in large, jagged shards.
Tempered glass can withstand temperatures of up to 243 degrees Celsius (470 degrees Fahrenheit) on a constant basis. Temperatures higher than this will weaken the glass. Exposure to temperatures near those at which it was tempered initially will cause it to shatter.

**Warnings**

- Irregularly shaped pieces of tempered glass can withstand blows to the wide end, but striking the narrow end may cause them to explode into fragments.

**Sources and Citations**

- http://www.scientificamerican.com/article.cfm?id=how-is-tempered-glass-made