



Designation: C 1422 – 99

Standard Specification for Chemically Strengthened Flat Glass¹

This standard is issued under the fixed designation C 1422; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last approval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers the requirements for chemically strengthened glass products that originate from flat glass and are used in general building construction, transportation, and other specialty applications, such as copy machine scanners, computer disks, and flat glass screens for television monitors. Techniques such as ion implantation, dealcalization, etch-strengthening, and glaze coatings are specifically excluded.

1.2 Classification of chemically strengthened glass products is based on the laboratory measurements of surface compression and case depth and not on the modulus of rupture (MOR). This specification does not purport to address end-use performance.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

1.4 Dimensional values are stated in SI units, the standard units for this specification. Inch-pound units, given in parentheses, are for information only.

2. Referenced Documents

2.1 ASTM Standards:

C 162 Terminology of Glass and Glass Products²

C 978 Test Method for Photoelastic Determination of Residual Stress in a Transparent Glass Matrix Using a Polarizing Microscope and Optical Retardation Compensation Procedures²

C 1036 Specification for Flat Glass³

C 1279 Test Method for Nondestructive Photoelastic Measurement of Edge and Surface Stresses in Annealed, Heat-Strengthened, and Fully Tempered Flat Glass²

¹ This specification is under the jurisdiction of ASTM Committee C-14 on Glass and Glass Products and is the direct responsibility of Subcommittee C14.08 on Flat Glass.

Current edition approved May 10, 1999. Published August 1999.

² *Annual Book of ASTM Standards*, Vol 15.02.

³ The recommended range is from 0.5 to 1.5 mm (0.02 to 0.06 in.). Specimen thicknesses at the lower end of this range yield better results.

3. Terminology

3.1 Definitions—Refer to Terminology C 162, as appropriate.

3.1.1 *blemishes*—Refer to Specification C 1036 for flat glass.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *case depth*—depth of compression below the surface to the nearest zero stress plane.

3.2.2 *chemically strengthened glass*—glass which has been strengthened by ion-exchange to produce a compressive stress layer at the treated surface.

3.2.3 *ion-exchange process*—the exchange of constituent ions in the glass with externally supplied ions (generally at temperatures near the strain point of the glass). This may be accomplished by immersing glass in a molten salt bath or solution with or without electric field assistance, exposing glass to plasma, applying a paste on the glass surface, or surface crystallization with or without electric field assistance.

3.2.4 *surface compression*—an in-plane stress which tends to compact the atoms in the surface.

4. Significance and Use

4.1 Chemically strengthened glass is significantly stronger than annealed glass, depending upon the glass composition, strengthening process, level of abrasion, and the application environment. The strengthening process does not contribute significantly to optical distortion.

4.2 The chemical strengthening process can effectively strengthen glass of all sizes and shapes and can be useful in cases in which glass is too thin, small, or complex-shaped for thermal tempering.

4.3 Monolithic chemically strengthened glass is not a safety glazing product because its break pattern is similar to that of annealed glass. When safety glazing is required, chemically strengthened glass shall be laminated.

4.4 The very nature of the chemical strengthening process alters the glass surface chemistry. Therefore, the procedures for and the performance of postprocessing steps, such as laminating and coating, can be different from that of nonchemically strengthened glass.