



Standard Practice for Determining the Resistance of Single Glazed Annealed Architectural Flat Glass to Thermal Loadings¹

This standard is issued under the fixed designation E2431; 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 reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers a procedure to determine the resistance of annealed architectural flat glass to thermally induced stresses caused by exposure to sun and shadows for a specified probability of breakage (P_b). Proper use of this procedure is intended to reduce the possibility of thermal breakage of annealed glass in buildings.

1.2 This practice applies to vertical or sloped glazing in buildings.

1.3 This practice applies to monolithic and laminated glass of rectangular shape and assumes that all glass edges are simply supported.

1.4 This practice applies only to annealed flat soda-lime silica glass with clean cut, seamed, flat ground, or ground and polished edges that are free from damage. The glass may be clear or tinted as well as coated (not including coatings that reduce emissivity of the glass).

1.5 This practice does not apply to any form of wired, patterned, etched, sandblasted, drilled, notched, or grooved glass or glass with surface and edge treatments, other than those described in 1.4, that alter the glass strength.

1.6 This practice does not address uniform loads such as wind and snow loads, safety requirements, fire, or impact resistance.

1.7 The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to inch-pound units that are provided for information only and are not considered standard. For conversion of quantities in various systems of measurements to SI units refer to [IEEE/ASTM SI-10](#).

1.8 *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 appro-*

priate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Documents:²

[C162 Terminology of Glass and Glass Products](#)

[E631 Terminology of Building Constructions](#)

[IEEE/ASTM SI-10 Use of the International System of Units \(SI\) \(the Modernized Metric System\)](#)

2.2 Other Documents:³

[2005 ASHRAE Handbook Fundamentals](#)

3. Terminology

3.1 Definitions:

3.1.1 For definitions of general terms related to building construction used in this test method refer to Terminology [E631](#), and for general terms related to glass and glass products, refer to Terminology [C162](#).

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *edge bite, n*—the width of the glass edge (measured perpendicular to the cut edge, in the plane of the glass) that is protected from direct exposure to solar irradiance by the window frame edge conditions expressed in mm (in.) [see [Table 1](#)].

3.2.2 *edge thermal stress factor* (TSF_{edge}), *n*—the ratio of induced thermal stress to the solar load, SL , as the result of the edge bite condition expressed in $MPa/(W/m^2)$.

3.2.3 *frame type, n*—the manner in which the edges of the glass are supported in the window frame [see [Table 1](#)].

3.2.4 *glass dimensions, n*—the rectangular dimensions of the glass (not the daylight opening), with the width being the smaller dimension and the length being the larger dimension both expressed in mm.

¹ This practice is under the jurisdiction of ASTM Committee [E06](#) on Performance of Buildings and is the direct responsibility of Subcommittee [E06.51](#) on Performance of Windows, Doors, Skylights and Curtain Walls.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE), 1791 Tullie Circle, NE, Atlanta, GA 30329, <http://www.ashrae.org>.