



## Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings<sup>1</sup>

This standard is issued under the fixed designation F 1642; 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.

### INTRODUCTION

Historical records show that fragments from glazing that has failed as the result of intentional or accidental explosions present a serious threat of personal injury. Glazing failure also allows blast pressure to enter the interior of buildings thus resulting in additional threat of personal injury and facility damage. These risks increase in direct proportion to the amount of glazing used on the building facade. This test method addresses only glazing and glazing systems. It assumes that the designer has verified that other structural elements have been adequately designed to resist the anticipated airblast pressures.

### 1. Scope

1.1 This test method sets forth procedures for the evaluation of hazards of glazing or glazing systems against airblast loadings. The specifying authority shall provide the airblast loading parameters.

1.2 This test method allows for glazing to be tested and rated with or without framing systems.

1.3 This test method is designed to test and rate all glazing, glazing systems, and glazing retrofit systems including, but not limited to, those fabricated from glass, plastic, glass-clad plastics, laminated glass, glass/plastic glazing materials, and film-backed glass.

1.4 The values stated in SI units are to be regarded as the standard. Values given in parentheses are for information only. For conversion of quantities in various systems of measurements to SI units, see SI 10.

1.5 *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.* See Section 9 for specific hazards statements.

### 2. Referenced Documents

#### 2.1 ASTM Standards:<sup>2</sup>

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee F12 on Security Systems and Equipment and is the direct responsibility of Subcommittee F12.10 on Systems Products and Services.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

E 997 Test Method for Structural Performance of Glass in Exterior Windows, Curtain Walls, and Doors Under the Influence of Uniform Static Loads by Destructive Methods  
SI 10 American National Standard for Use of the International System of Units (SI): The Modern Metric System<sup>2</sup>

### 3. Terminology

#### 3.1 Definitions:

3.1.1 *ambient temperature*— $24 \pm 11^{\circ}\text{C}$  ( $75 \pm 20^{\circ}\text{F}$ ).

3.1.2 *blast mat*—a steel or concrete pad upon which high explosive may be detonated to reduce the incidence of ejecta.

3.1.3 *effective positive phase duration (T)*—the duration of an idealized triangular positive phase reflected airblast pressure history, having an instantaneous rise to the measured  $P$ , with a linear decay to ambient, such that the impulse of the idealized pressure history equals  $i$  of the measured positive phase reflected airblast history.

3.1.3.1 *Discussion*—The idealized triangular airblast wave is considered to provide a reliable standard measure of the positive phase airblast intensity.

3.1.4 *glazing*—transparent materials used for windows, doors, or other panels.

3.1.5 *glazing system*—the assembly comprised of the glazing, its framing system, and anchorage devices.

3.1.6 *peak positive pressure (P)*—the maximum measured positive phase airblast pressure, kPa.

3.1.7 *positive phase impulse (i)*—the integral of the measured positive phase reflected airblast pressure history, kPa-ms (psi-ms) (more correctly called the *specific positive phase impulse*).

3.1.8 *reflected airblast pressure*—the pressure increase that a surface, oriented other than parallel to the line from the detonation point to the surface, experiences due to the detonation of a high explosive charge.

