



Designation: F 428 – 01

Standard Test Method for Intensity of Scratches on Aerospace Glass Enclosures¹

This standard is issued under the fixed designation F 428; 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 test method covers the visual inspection of scratches on the glass surface of aerospace transparent enclosures.

1.2 *This standard may involve hazardous materials, operations, and equipment. 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.*

2. Referenced Documents

2.1 Other Standards:

Glass Scratch Visual Comparison Standard²

3. Summary of Test Method

3.1 A visual comparison is made between a set of graded scratch standards and the scratch on the glass aerospace transparency to determine the relative intensity of the scratch.

4. Significance and Use

4.1 Scratches exist on all glass surfaces. Often there are very fine scratches from cleaning operations that are not visible when looking through the glass. Visible scratches may be distracting to the observer looking through the enclosure. Therefore, a procedure to define scratches is useful. A visual standard is used because it is not practical to measure the dimensions of the fine scratches in the scope of this test method.

5. Reference Materials

5.1 *Glass Scratch Visual Comparison Standard* consists of a set of six hermetically sealed glass plates 38 mm (1.5 in.) square with scratches of graded intensity on the inside surface.

The lightest scratch is identified as ASTM F 428-3 and the heaviest as ASTM F 428-8.³

6. Procedure

6.1 Place the part in a suitable inspection position. This may be horizontal on a padded table, vertical against a neutral to dark background, or at an angle simulating the installed position. The scratched surface shall be toward the observer. The light level shall be a minimum of 80 lux. Either natural or artificial light may be used. If possible, move the light until the scratch has the highest contrast against the background. Place the scratch in the visual comparison standard beside and parallel to the scratch in question. Rotate the part or viewing angle to get the best definition of the scratch. Disregarding the length of the scratch on the part and on the standard, select and record the standard that most closely matches the appearance of the scratch on the part. Measure and record the length of the scratch to the nearest 1 mm (or 0.05 in.).

7. Interpretation

7.1 Customer specifications for aerospace glass surfaced transparent enclosures may detail allowable frequency, location, length, and standard number for scratches and they may assign maximum scratch limits for critical and noncritical optical viewing areas.

8. Report

8.1 For each scratch within the scope of the glass scratch standard, report its standard number, length, frequency, and location.

9. Precision and Bias

9.1 An interlaboratory test is being conducted to determine the precision and bias of this procedure. Anyone interested in participating in this process please contact the Chairman of ASTM Subcommittee F07.08 through ASTM headquarters.

10. Keywords

10.1 glass scratches; scratches; windscreen quality; windscreen scratches

¹ This test method is under the jurisdiction of ASTM Committee F07 on Aerospace and Aircraft and is the direct responsibility of Subcommittee F07.08 on Aerospace Transparent Enclosures and Materials.

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² The sole source of supply of the Glass Scratch Visual Comparison Standard known to the committee at this time is Davidson Optonics, Inc., 2223 Ramona Blvd., West Covina, CA 91790. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend.

³ Originally an adjunct that contained seven scratches. The finest scratch (ASTM F 428–2) was determined to be too difficult to use and manufacture. Subsequently, it has been discontinued. Continued use of the older, seven-piece set is acceptable.