



Standard Test Method for Intensity of Scratches on Aerospace Transparent Plastics¹

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1. Scope

1.1 This test method covers the visual inspection of shallow or superficial scratches on the surface of aerospace transparent plastic materials.

1.2 *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. Summary of Test Method

2.1 A visual comparison is made between a set of graded scratch standards and the scratch on the plastic material to determine the relative intensity of the scratch.

3. Significance and Use

3.1 Scratches exist on all transparent plastic surfaces. Usually they are very fine scratches from cleaning operations that are not visible when looking through the plastic. Deeper scratches may result from careless cleaning or handling. While these may not be deep enough to affect the structural integrity of the part, their appearance in certain locations may be distracting to the observer looking through the plastic. Therefore, a procedure to define these scratches is useful.

4. Reference Materials

NOTE 1—The committee is in the process of developing new visual comparison standards. Adjuncts are not currently available.

5. Procedure

5.1 Place the part in a suitable inspection position. This may be horizontal on a padded table, vertical against a neutral background, or at an angle. 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. Place the scratch in the visual comparison standard beside and parallel to the scratch on the plastic material. Rotate the part or viewing angle to get the best definition of the scratch. Disregarding the length of the scratch on the plastic material and on the standard, select and record the highest standard scratch that most clearly matches the appearance of the scratch on the plastic material. Measure and record the length of the scratch to the nearest 1 mm (0.04 in.).

6. Interpretation

6.1 Customer specifications for transparent plastic materials and parts 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.

7. Report

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

8. Precision and Bias

8.1 Precision:

8.1.1 The repeatability of judging the intensity of a scratch within one scratch value, for the same observer, is 92 % or better.

8.1.2 The reproducibility (between observers) of judging the intensity of a scratch within one scratch value is 90 % or better for scratch values 14 and above. The reproducibility of judging the intensity of a scratch within two scratch values is 92 % or better for scratch values below 14. The data reflect that it is more difficult to judge finer scratches.

8.2 *Bias*—The procedure in this test method has no bias because the scratch intensity is defined only in terms of the test method.

9. Keywords

9.1 comparison standard; scratches; transparent plastic

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 Transparent Enclosures and Materials.

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