



Standard Guide for Addressing Variability in Exposure Testing of Nonmetallic Materials¹

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INTRODUCTION

No experimental procedure is exactly repeatable or reproducible. Exposure testing is susceptible to poor test reproducibility because of many contributing factors. These include the type of material and its homogeneity, the complexity and variability of the outdoor environment, difficulty in precisely controlling the laboratory testing environment, and the variability in the measurement of performance. It is extremely difficult to compare “absolute data,” that is, color shift, gloss, tensile, and elongation, and so forth, from different exposure tests. This is true for natural and accelerated exposures conducted outdoors or for accelerated exposure tests conducted at different times in one laboratory or comparing results between laboratories. The purpose of this guide is to provide the user with background information on test variability and guidance to conduct an exposure test that will provide valid and useful durability information.

1. Scope*

1.1 This guide covers information on sources of variability and strategies for its reduction in exposure testing, and for taking variability into consideration in the design, execution, and data analysis of both exterior and laboratory accelerated exposure tests.

1.2 The values stated in SI units are to be regarded separately as the standard. The inch-pound values given in parentheses are for information only.

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.*

2. Referenced Documents

2.1 ASTM Standards:²

[D4853 Guide for Reducing Test Variability](#) (Withdrawn 2008)³

[D6631 Guide for Committee D01 for Conducting an Interlaboratory Study for the Purpose of Determining the Precision of a Test Method](#)

[E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods](#)

[E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method](#)

[G7 Practice for Atmospheric Environmental Exposure Testing of Nonmetallic Materials](#)

[G24 Practice for Conducting Exposures to Daylight Filtered Through Glass](#)

[G90 Practice for Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight](#)

[G113 Terminology Relating to Natural and Artificial Weathering Tests of Nonmetallic Materials](#)

[G147 Practice for Conditioning and Handling of Nonmetallic Materials for Natural and Artificial Weathering Tests](#)

[G151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources](#)

[G152 Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials](#)

[G153 Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials](#)

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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 The last approved version of this historical standard is referenced on www.astm.org.