



Designation: D1149 – 18

Standard Test Methods for Rubber Deterioration—Cracking in an Ozone Controlled Environment¹

This standard is issued under the fixed designation D1149; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 These test methods are used to estimate the effect of exposure, under surface tensile strain conditions, either dynamic or static, in an atmosphere containing specified levels of ozone concentration, expressed as partial pressure (refer to [Note 1](#)), on vulcanized rubber, rubber compounds, molded or extruded soft rubber, and other specified materials, or as may be determined empirically. The effect of naturally occurring sunlight or light from artificial sources is excluded.

1.2 Previously published ASTM documents Test Method [D518](#) and Test Methods [D3395](#) have been included in these test methods, D1149, in 2007. Please refer to [Note 2](#).

1.2.1 Test Method [D518](#) and Test Methods [D3395](#) have henceforth been withdrawn and superseded by Test Methods D1149. When Test Methods D1149 is cited, or otherwise referenced, a notation shall be included to this effect. Please refer to section [3.2](#) for the appropriate references.

1.3 The specified conditions of exposure to ozone in the controlled environments are accelerated in comparison to outdoor exposure. These accelerated ozone test methods may not give results which correlate with outdoor exposure tests or service performance.

1.4 All materials, instruments, or equipment used for the determination of mass, force, dimension, ozone concentration, partial pressure, temperature, velocity, and gas exchange rate shall have direct traceability to the National Institute for Standards and Technology, or other internationally recognized organization parallel in nature.

1.5 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only. Many of the stated SI units are direct conversions from the U.S. Customary System to accommodate the

instrumentation, practices, and procedures that existed prior to the Metric Conversion Act of 1975.

1.6 *This standard involves hazardous materials, specifically ozone. It may also involve hazardous 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

NOTE 1—A discussion and explanation regarding the measurement of ozone concentrations based upon parts of ozone per unit of air versus partial pressure is provided in Test Methods [D4575](#), specifically Appendices X1 and X2. Test Methods [D4575](#) is also recommended as a source of background information regarding standards involving materials exposed to ozone.

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

[D518 Test Method for Rubber Deterioration—Surface Cracking](#) (Withdrawn 2007)³

[D1171 Test Method for Rubber Deterioration—Surface Ozone Cracking Outdoors \(Triangular Specimens\)](#)

[D1349 Practice for Rubber—Standard Conditions for Testing](#)

[D3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets](#)

[D3395 Test Methods for Rubber Deterioration—Dynamic Ozone Cracking in a Chamber](#) (Withdrawn 2007)³

¹ These test methods are under the jurisdiction of ASTM Committee [D11](#) on Rubber and Rubber-like Materials and are the direct responsibility of Subcommittee [D11.15](#) on Degradation Tests.

Current edition approved June 1, 2018. Published September 2018. Originally approved in 1951. Last previous edition approved in 2016 as D1149 – 16. DOI: 10.1520/D1149-18.

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.