



Designation: G29 – 16

Standard Practice for Determining Algal Resistance of Polymeric Films¹

This standard is issued under the fixed designation G29; 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 This practice covers the determination of the susceptibility of polymeric films to the attachment and proliferation of surface-growing algae.

1.2 The values in SI units are to be regarded as the standard. The inch-pound units 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. Summary of Practice

2.1 In this practice, test strips of polymeric film are suspended in glass jars maintained at room temperature. The test strips are exposed to fluorescent light and in direct contact with a standardized inoculum of the filamentous blue-green alga *Oscillatoria* in culture medium. The sample test jars are re-inoculated with fresh alga every second or third day. A control using untreated polymeric film is used as a basis of comparison. The inoculum is prepared with the help of a propagation apparatus made from a small fish tank. The test is terminated at the end of two weeks, or whenever the untreated control shows dense algal growth.

3. Significance and Use

3.1 Bodies of water, such as swimming pools, artificial ponds, and irrigation ditches often are lined with polymeric films. Algae tend to grow in such bodies of water under the proper atmospheric conditions, and they can produce slimy and unsightly deposits on the film. The method described herein is useful in evaluating the degree and permanency of protection against surface growth of algae afforded by various additives incorporated in the film.

¹ This practice is under the jurisdiction of ASTM Committee G03 on Weathering and Durability and is the direct responsibility of Subcommittee G03.04 on Biological Deterioration.

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4. Apparatus

4.1 Propagation Tank:

4.1.1 A small fish tank (10 gal) is used to contain an algae propagation system where culture medium is recirculated through a polymeric tube with holes punched in the bottom over the top of a polymeric mesh screen inside of the tank. This design was developed in order to provide ideal conditions for propagation of the algae that serve as inocula for each test. The polymeric mesh is supported in such a way that water cascades over the top from a distributor tube above. A small, fully immersed recirculating pump rests on the bottom of the tank and operates continuously to deliver the tank contents to the distributor tube. The light required for algal propagation is provided by a 100-W bulb placed 300 mm (12 in.) away from the polymeric mesh. A timing device turns the light on for the desired light cycle each day.

4.1.2 The propagation tank that is used as the permanent source of inoculum is filled to approximately one-third capacity with the culture medium. Heavy growth of *Oscillatoria* rapidly develops on the polymeric mesh screen and, at different phases, this growth appears light green, dark green, or black.

NOTE 1—Culture medium in the propagation tank is discarded monthly and replaced with fresh media.

4.2 Test Chambers:

4.2.1 One-litre (1-qt) wide-mouth glass jars, 170 mm (6³/₄ in.) high by 76 mm (3 in.) in inside diameter, or equivalent, serve as test chambers wherein water containing an inoculum of the algal organisms and strips of the polymeric film are maintained in contact.

4.2.2 The jars in 4.2.1 are placed in a suitable glass container, such as a 38-L (10-gal) fish tank that is illuminated by four 20-W “cool white” fluorescent bulbs, arranged two on each long side of the tank, at the level of the growing algae in the jars. The lamps are mounted on a bracket that holds the outer surface of the bulbs 25 mm (1 in.) from the wall of the tank. The tank is filled with water to within 25 mm (1 in.) of the top of the exposure jars in order to create uniform temperature conditions for all jars.

4.3 *Homogenizer*—Any suitable commercial homogenizer for preparing the algal inocula.