Designation: D8123 – 22

Standard Test Methods for Measuring the Opening Size of Geohazard Nettings[1]

This standard is issued under the fixed designation D8123; 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 These test methods are index tests to measure the opening size of a geohazard netting, or its components, or both, as it has been manufactured. They can be used for estimating the largest size of rock or other object that may pass through an individual opening in the geohazard netting without transferring load to the wire mesh or wire net and may also be used for quality control purposes. These test methods are not used to determine the maximum size rock or other object that the geohazard netting may contain through mobilization of the netting's strength. These test methods do not apply to the measurement of the opening size of a geosynthetic, such as a turf reinforcement mat or geotextile, that may be manufactured as a composite system with the geohazard netting.

1.2 *Units*—The values stated in SI units are to be regarded as standard. The values given in parentheses are provided for information only and are not considered standard. Reporting of test results in units other than SI shall not be regarded as nonconformance with this standard.

1.3 All observed and calculated values shall conform to the guidelines for significant digits and rounding established in Practice D6026.

1.3.1 For purposes of comparing a measured or calculated value(s) with specified limits, the measured or calculated value(s) shall be rounded to the nearest decimal of significant digits in the specified limit.

1.3.2 The procedures used to specify how data are collected/recorded or calculated in the standard are regarded as the industry standard. In addition, they are representative of the significant digits that generally should be retained. The procedures used do not consider material variation, purpose for obtaining the data, special purpose studies, or any considerations for the user's objective; and it is common practice to increase or reduce significant digits of reported data to be commensurate with these considerations. It is beyond the scope of this standard to consider significant digits used in analysis methods for engineering design.

1.4 *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.*

1.5 *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]

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

D6026 Practice for Using Significant Digits and Data Records in Geotechnical Data

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of common technical terms used in this standard, refer to Terminology D653.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *geohazard netting opening, n—in geohazard mitigation*, the minimum clear distance between the wires or wire ropes forming the mesh structure.

3.2.2 *geohazard netting opening size, n—in geohazard mitigation*, the measurement of the minimum clear distance between the wires or wire ropes forming the opposite sides of the wire mesh or net opening.

3.3 *Definitions:*

3.3.1 *geohazard netting, n—in geohazard mitigation*, a material made typically from steel wire, or wire ropes, or both,

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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.

interwoven or connected in such a manner to create a continuous interlaced flexible structure usually used in rockfall, slope stabilization, avalanche and debris flow applications and includes ring nets, wire mesh, wire nets and wire mesh composites.

3.3.2 *ring net, n—in geohazard mitigation*, a geohazard netting consisting of interlocking steel rings connected to multiple adjoining rings.

3.3.3 *selvage, n—in geohazard mitigation*, a secured junction or edge treatment produced on geohazard netting during manufacture.

3.3.4 *wire mesh, n—in geohazard mitigation*, a geohazard netting consisting of single steel wires forming a regular pattern.

3.3.5 *wire mesh composite, n—in geohazard mitigation*, a geohazard netting consisting of a combination of wire mesh, wire nets, or ring nets.

3.3.6 *wire net, n—in geohazard mitigation*, a geohazard netting consisting of multiple steel wire ropes, or wire strands, or both forming a regular pattern.

4. Summary of Test Method

4.1 The geohazard netting opening size is determined by measuring the minimum clear distance between the wires or wire ropes forming the opposite sides of the opening. Test specimens of known dimensions are cut from equally spaced distances over the full width of the laboratory sample. The measured values are then averaged to obtain the mean opening size of the specimen.

5. Significance and Use

5.1 Using a geohazard netting as a medium to retain rock particles necessitates compatibility between it and the adjacent rock. These test methods measure the opening size of a geohazard netting which may be used to estimate the largest size of rocks or other objects that may pass through the geohazard netting without transferring load to the wire mesh or wire net.

5.2 These test methods may be applied to other components of the geohazard netting, such as regularly spaced reinforcement elements or secondary mesh openings.

5.3 These test methods may also be used for quality control during the manufacturing process and quality assurance that materials supplied conform to project or material specifications.

NOTE 1—The quality of the result produced by this standard is dependent on the competence of the personnel performing it, and the suitability of the equipment and facilities used. Agencies that meet the criteria of Practice D3740 are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with Practice D3740 does not in itself assure reliable results. Reliable results depend on many factors; Practice D3740 provides a means of evaluating some of those factors.

6. Apparatus

6.1 *Thermometric Device*—A thermometric device capable of measuring the temperature range within which the test is being performed readable to 0.5 °C or better and having an accuracy of at least ±0.5 °C.

6.2 *Caliper,* shall be calibrated to traceable industry recognized reference standards (for example, NIST), with an accuracy and readability of 1 mm. The caliper range should be commensurate with the opening size of the netting and in accordance with the manufacturer recommendation.

6.3 *Cutter*—Cutting tools shall be able to cut the netting as per manufacturer's recommendation.

7. Sampling and Test Specimens

7.1 The laboratory sample should be free from imperfections or other areas not representative of the material sampled.

7.2 For the laboratory sample, take a full width swatch of sufficient length along the selvage so that the test specimen shall be larger than an area of 1.0 m by 1.0 m (3.28 ft by 3.28 ft) and have a minimum of 25 total mesh or net openings.

7.3 The edge of the test specimen shall be cut in accordance with the manufacturer's recommendations at least one tenth the specimen's width from any selvage.

7.4 If the structure of the geohazard netting is such that the specified test specimen size is not representative of the laboratory sample, a larger size test specimen shall be agreed upon between the laboratory, client, and supplier.

8. Conditioning

8.1 Bring the atmosphere for testing geohazard nettings to a temperature of 21 °C ± 2 °C (70 °F ± 4 °F) for the room or area for testing and acclimating the specimens.

8.2 The specimen shall be conditioned for a minimum of four (4) hours to achieve temperature equilibrium.

9. Procedure

9.1 Care should be taken in handling of the test specimens to avoid altering the material's natural finished state.

9.2 Record and verify the temperature meets the requirements of 8.1.

9.3 The specimen shall be secured and freely hung by gravity in the direction that results in the maximum opening size, as per the manufacturer's recommendations.

9.4 The specimen shall be spread laterally to the maximum extent without tension.

9.5 Record and verify the measurements of each specimen meeting the requirements of 7.2.

9.6 *Option 1*—Applies for uniform, symmetrical mesh openings where the difference between the lengths of the sides of the opening do not exceed 50 %.

9.6.1 Using the caliper, measure the minimum clear distance, L, between the wires or wire ropes forming the opposite sides of the wire mesh or net opening (see Fig. 1).

9.6.2 Record a minimum of five readings of different mesh or net openings in millimeters.

9.7 *Option 2*—Applies for uniform, symmetrical mesh openings where the difference between the lengths of the sides of the opening exceed 50 %.

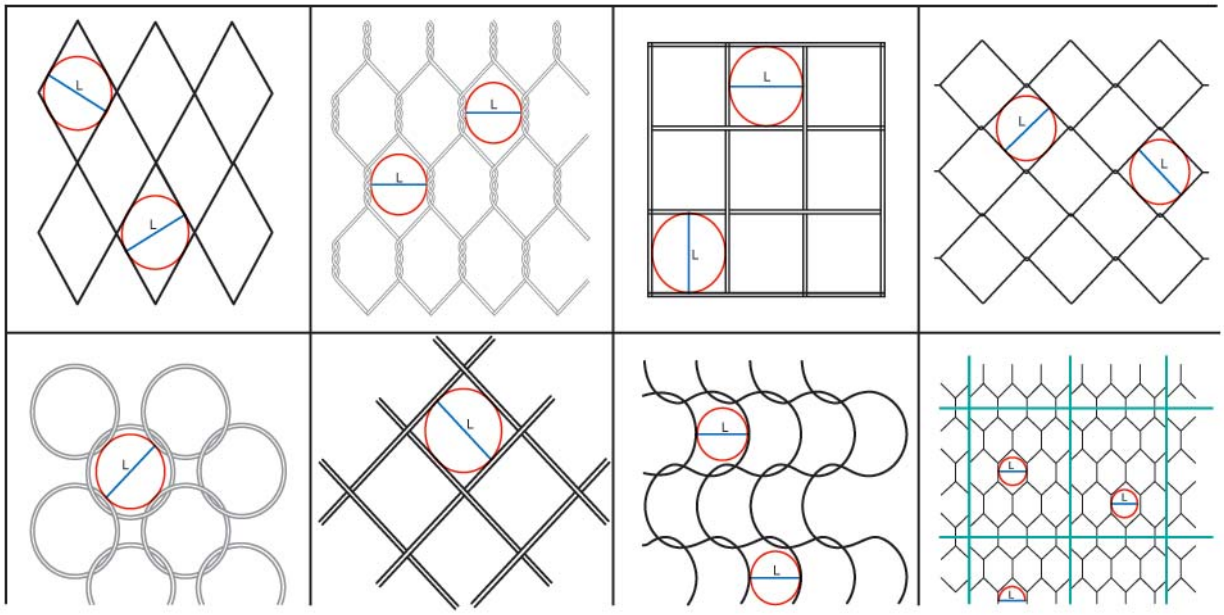

FIG. 1 Examples of the Maximum Diameter Circle That Can Fit Within an Individual Opening

9.7.1 Each dimension shall be recorded separately with measurements taken at perpendicular directions.

9.7.2 Using the caliper, measure the minimum clear distance, L_1 and L_2, between the wires or wire ropes forming the opposite sides of the wire mesh or net opening (see Fig. 2).

9.7.3 L_1 is the average length of an opening of a specimen in one direction, usually taken as a dimension of opposing steel wires or ropes.

9.7.4 L_2 is the average length of an opening of a specimen in one direction, usually taken as the dimension perpendicular to L_1.

9.8 Record a minimum of five readings of different mesh or net openings in millimeters.

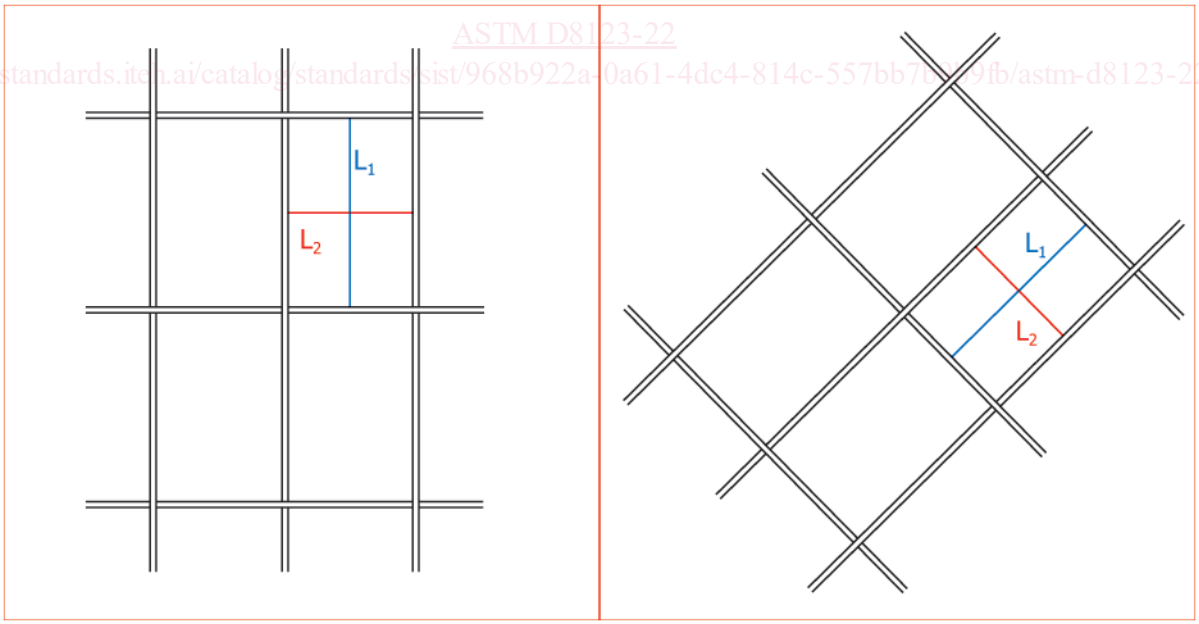

FIG. 2 Examples of the Measurement Between the Wires or Wire Ropes of the Net Opening