



Designation: D8212 – 24^{ε1}

Standard Practice for Determination of the Radial Tensile Properties of Geogrids Under Low Radial Strain¹

This standard is issued under the fixed designation D8212; 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.

^{ε1} NOTE—The title of [Appendix X1](#) was editorially corrected in March 2024.

1. Scope

1.1 This practice presents a method for determining in-air index values (see [Note 1](#)) of the radial load and radial stiffness at low strain in each symmetric direction of a balanced geogrid (see [Note 2](#)) subjected to 360° radial strain. This determination is based on tensile test results from testing in accordance with Test Method [D6637/D6637M](#) and an analysis of the radial force balance in each symmetric direction across a circle of geogrid that is assumed to be strained uniformly in all radial directions to a low strain level.

1.2 Symmetric directions relative to the machine direction:

1.2.1 For geogrids with square or rectangular apertures: 0°, 45°, 90°, 135°.

1.2.2 For geogrids with triangular apertures: 0°, 30°, 60°, 90°, 120°, 150°.

NOTE 1—These index properties are not to be used for design or performance purposes.

NOTE 2—A balanced geogrid is one in which the manufacturer's specification indicates that variation of tensile properties between different sets of parallel ribs is 20 % or less.

1.3 This practice will facilitate comparisons of the radial tensile properties of different balanced geogrids and judgment of conformity of product manufactured and acceptance of commercial shipments of geogrids by standardizing the data used and the method by which the calculations are performed.

1.4 This standard practice is restricted in application to geogrids with two sets of parallel ribs arranged at nominally 90° to each other or three sets of parallel ribs arranged at nominally 60° to each other with one set lying in the cross-machine direction.

1.5 Further, this practice is restricted to 20 % variation in the specified unit tensile properties of the different sets of ribs

in a geogrid in order to enable the development of the mathematics that use these properties of each set of ribs in the geogrid. This generates index values for the unit tensile properties in the nominal directions as outlined in [1.2.1](#) and [1.2.2](#) of a geogrid that is under 360° radial strain at any designated strain level. A 2 % strain level is set as the default strain of choice as it has been found that this is the lowest strain level at which most test laboratories can achieve consistent low-strain tensile test results on geogrids.

1.6 Calculations in accordance with this practice determine the radial component of the unit tensions generated in the geogrid. Differences in the unit tensions of different rib sets will also give tangential components of force. With a difference in tension between rib sets restricted to 20 % or less, it has been found that these tangential components will be approximately 10 % or less of the values of the radial components. Therefore, the resultant of the radial and tangential component in any symmetric direction will be less than 0.5 % greater than the radial component. As this is less than the variation normally found in tensile testing of a set of rib or wide-width specimens, it does not detract from the calculated radial tensions being valid index properties of the geogrid.

1.7 This practice is not applicable to uniaxial geogrids.

1.8 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.9 *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.*

1.10 *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.*

¹ This practice is under the jurisdiction of ASTM Committee [D35](#) on Geosynthetics and is the direct responsibility of Subcommittee [D35.01](#) on Mechanical Properties.

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