



Designation: D3851 – 17 (2022)

# Standard Specification for Microcellular Polyurethane Shoe Soling Materials<sup>1</sup>

This standard is issued under the fixed designation D3851; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This specification covers microcellular polyurethane materials for shoe soling applications. It provides physical property requirements and identifies test methods for determining those specific properties.

1.2 SI units are to be regarded as the preferred units of measurements for values. The inch-pound values in parentheses can be used if there is an agreement between the contractual parties.

NOTE 1—There is no known ISO equivalent to this standard.

1.3 *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:*<sup>2</sup>

[D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension](#)

[D624 Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers](#)

[D792 Test Methods for Density and Specific Gravity \(Relative Density\) of Plastics by Displacement](#)

[D883 Terminology Relating to Plastics](#)

[D1052 Test Method for Measuring Rubber Deterioration—Cut Growth Using Ross Flexing Apparatus](#)

[D1622 Test Method for Apparent Density of Rigid Cellular Plastics](#)

[D1938 Test Method for Tear-Propagation Resistance \(Trouser Tear\) of Plastic Film and Thin Sheeting by a Single-Tear Method](#)

[D2240 Test Method for Rubber Property—Durometer Hardness](#)

[D3489 Test Methods for Microcellular Urethane Materials](#)

## 3. Terminology

3.1 For definitions of terms used in this test method and associated with plastics issues refer to the terminology contained in standard [D883](#).

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *microcellular polyurethane, n*—an elastomeric material made by the interaction of a polyol and an organic isocyanate, having very small cell diameters. Microcellular polyurethane shoe sole materials typically have cell diameters in the range of 0.1 to 200  $\mu\text{m}$ .

## 4. Classification

4.1 This specification covers three grades of microcellular polyurethane materials for selection according to abrasion resistance, cut-growth resistance, and other physical properties. The grades are classified as Grade 1, Grade 2, and Grade 3.

## 5. Ordering Information

5.1 Any product represented as complying with this specification shall meet all the requirements listed herein for its particular classification.

## 6. Physical Requirements

6.1 The material shall conform to requirements for physical properties prescribed in [Table 1](#).

## 7. Test Methods

7.1 The physical tests shall be in accordance with Test Method [D3489](#).

## 8. Inspection

8.1 Inspection of the material shall be agreed upon in writing between the purchaser and the supplier as part of the purchase contract.

8.2 Testing for conformance to requirements shall be done in accordance with this specification and Test Methods [D3489](#).

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee [D20](#) on Plastics and is the direct responsibility of Subcommittee [D20.22](#) on Cellular Materials - Plastics and Elastomers.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

\*A Summary of Changes section appears at the end of this standard