



Designation: D 5937 – 96

AMERICAN SOCIETY FOR TESTING AND MATERIALS
100 Barr Harbor Dr., West Conshohocken, PA 19428
Reprinted from the Annual Book of ASTM Standards. Copyright ASTM

Standard Test Method for Determination of Tensile Properties of Moulding and Extrusion Plastics¹

This standard is issued under the fixed designation D 5937; 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 This test method specifies the test conditions for determining the tensile properties of moulding and extrusion plastics.

1.2 This test method is selectively suitable for use with the following range of materials:

1.2.1 Rigid and semirigid thermoplastics moulding, extrusion and cast materials, including compounds filled and reinforced by, for example, short fibers, small rods, plates, or granules, but excluding textile fibers, in addition to unfilled types,

1.2.2 Rigid and semirigid thermosetting moulding and cast materials, including filled and reinforced compounds, but excluding textile fibers as reinforcement, and

1.2.3 Thermotropic liquid crystal polymers.

1.3 This test method is not suitable for use with materials reinforced by textile fibers with rigid cellular materials or sandwich structures containing cellular material.

1.4 This test method is applied using specimens that may be either moulded to the chosen dimensions or machined, cut, or punched from injection- or compression-moulded plates. The multipurpose test specimen is preferred (see ISO 3167:1993 (Specification D 5936)).

1.5 This test method is identical to ISO 527-2. This standard is comparable to Test Method D 638 but neither standard should be substituted for the other. The two standards may differ with respect to test specimen dimensions, test specimen conditioning, test equipment, testing conditions, etc. The two methods may not give the same results.

1.6 *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. Referenced Documents

2.1 *ASTM Standards:*

D 638 Test Method for Tensile Properties of Plastics²

D 5936 Specification for Multipurpose Test Specimens

¹ This test method is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D20.61 on USA Technical Advisory Group for ISO/TC 61 on Plastics.

Current edition approved June 10, 1996. Published August 1996.

² *Annual Book of ASTM Standards*, Vol 08.01.

Used for Testing Plastics³

D 5938 Guide Describing the General Principles for Determination of Tensile Properties of Plastics³

D 5939 Practice for Preparing Multipurpose Test Specimens and Bars of Thermoplastics by Injection Moulding³

D 5940 Practice for Preparing Small Plate Test Specimens of Thermoplastics by Injection Moulding³

2.2 *ISO Standards:*⁴

ISO 37:1977 Rubber, Vulcanized—Determination of Tensile Stress-Strain Properties

ISO 293:1986 Plastics—Compression Moulding Test Specimens of Thermoplastic Materials

ISO 294 Plastics—Injection Moulding of Test Specimens of Thermoplastic Materials

ISO 295:1991 Plastics—Compression Moulding of Test Specimens of Thermosetting Materials

ISO 527-1:1993 Plastics—Determination of Tensile Properties—Part 1: General Principles

ISO 527-2 Determination of Tensile Properties—Part 2: Test Conditions for Moulding and Extrusion Plastics

ISO 1926:1979 Cellular Plastics—Determination of Tensile Properties of Rigid Materials

ISO 2818 Plastics—Preparation of Test Specimens by Machining

ISO 3167:1993 Plastics—Multipurpose Test Specimens

3. **Terminology**—See Guide D 5938, Section 3.

4. **Principle**—See Guide D 5938, Section 4.

5.

6. **Apparatus**—See Guide D 5938.

7. Test Specimens

7.1 *Shape and Dimensions*—Wherever possible, ensure that the test specimens are dumb bell-shaped, Types 1A and 1B as shown in Fig. 1. Type 1A is preferred for directly-moulded multipurpose test specimens, and Type 1B is preferred for machined specimens.

NOTE 1—Types 1A and 1B test specimens having 4-mm thickness are identical to the multipurpose test specimens according to ISO 3167

³ *Annual Book of ASTM Standards*, Vol 08.03.

⁴ Available from ANSI, 11 West 42nd Street, 13th Floor, New York, NY 10036.

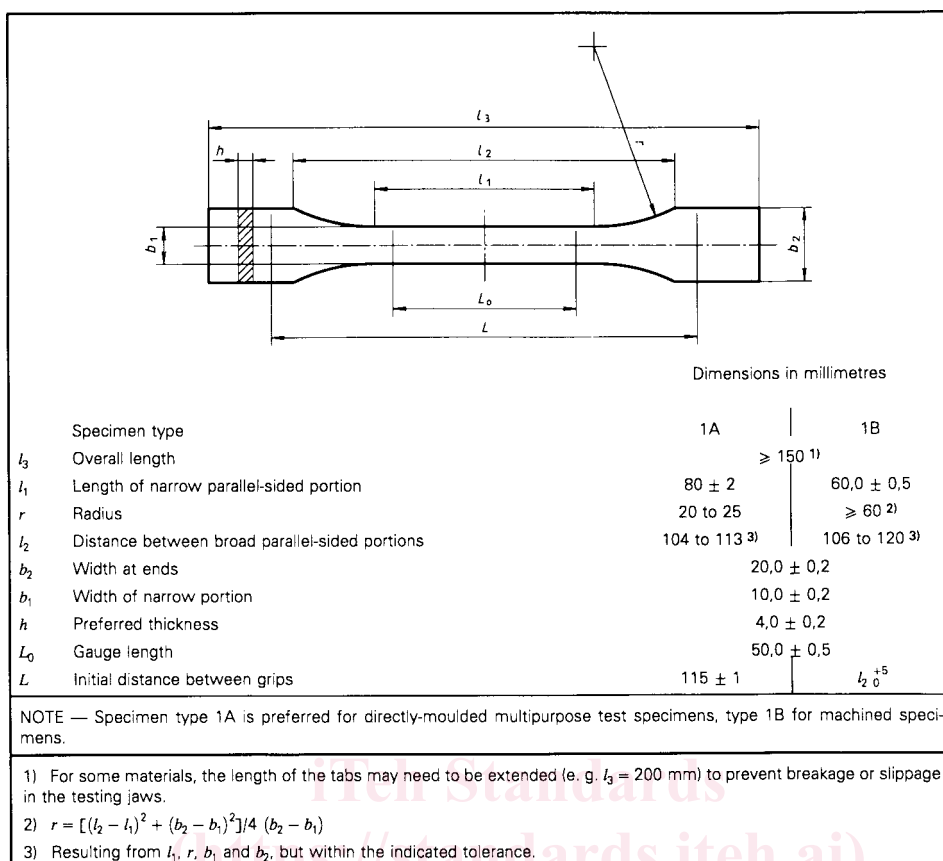


FIG. 1 Test Specimen Types 1A and 1B

(Specification D 5936), Types A and B, respectively.

7.1.1 For the use of small specimens, see Annex A1.

7.2 Preparation of Test Specimens:

7.2.1 Prepare test specimens in accordance with the relevant material specification. When none exists, or unless otherwise specified, ensure that specimens are either directly compression- or injection-moulded from the material in accordance with ISO 293, ISO 294 (Practices D 5939 and D 5940), or ISO 295, as appropriate, or machined in accordance with ISO 2818 from plates that have been compression- or injection-moulded from the compound.

7.2.2 Ensure that all surfaces of the test specimens are free from visible flaws, scratches, or other imperfections. From moulded specimens remove all flash, if present, taking care not to damage the moulded surface.

7.2.3 Take test specimens from finished goods from flat areas or zones having minimum curvature. For reinforced plastics, test specimens should not be machined to reduce their thickness unless absolutely necessary. Test specimens with machined surfaces will not give results comparable to specimens having non-machined surfaces.

7.3 Gauge Marks—See Guide D 5938.

7.4 Checking the Test Specimens—See Guide D 5938.

8. Number of Test Specimens—See Guide D 5938.

9. Conditioning—See Guide D 5938.

10. Procedure

10.1 See Guide D 5938.

10.2 For the measurement of the modulus of elasticity, the speed of testing is 1 mm/min for specimen Types 1A and 1B (see Fig. 1). For small specimens see Annex A1.

11. Calculation and Expression of Results—See Guide D 5938.

12. Test Report

12.1 Report the following information:

12.1.1 A reference to the report as stated in Guide D 5938, including the type of specimen and the testing speed according to:

	Tensile Test	
Type of Specimen (see Fig. 1)		ISO 527-2 (Test Method D 5937)/1A/50
Testing Speed, in millimetres/minute		ISO 527-2 (Test Method D 5937)/1A/50
		(see ISO 527-1:1992 (Guide D 5938), Table 1)

For additional items to be included in this report, see Guide D 5938.

13. Precision

13.1 The precision of this test method is not known because interlaboratory data are not available. When interlaboratory data are obtained, a precision statement will be added with the next revision.

14.

15. Keywords

15.1 plastics; tensile properties; test conditions