

EDS

Engineering,
GM DAEWOO Auto & Technology
Standards

THE TEST METHOD FOR TENSILE PROPERTY OF PLASTICS

EDS-T-7511

ISSUED DATE: 1993. 09. 27

REVISED DATE: 2006. 06. 19

VERSION: 5

1. PURPOSE

This standard is used to determine the tensile characteristics of plastics by applying the specified load on the plastic test piece.

2. SCOPE

2.1. This test method applies to determining tensile characteristics of plastics by applying a load on the specified test piece under the constant conditions (conditioning, temperature/humidity, test speed).

2.2. Characteristics of plastics measured by this test method are as follows.

2.2.1. Tensile strength

2.2.2. Tensile stress at break

2.2.3. Yield stress or off-set yield stress

2.2.4. Tensile stress at given elongation

2.2.5. Strain at maximum load

2.2.6. Strain at break

2.2.7. Strain at yield stress

3. DEFINITION

3.1. Strain : ϵ

The length which is momentarily extended during the test at the extended length (ΔL) on the basis of the initial length (L_0) of the marking line of the test piece.

ϵ_B : Strain at maximum load

ϵ_R : Strain at break

ϵ_S : Strain at yield stress

ϵ_{SX} : Strain at off set yield stress

3.2. Tensile stress : σ

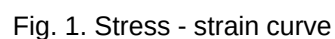
A momentary tensile strength based on the minimum sectional area of the test piece during the test.

3.2.1. Tensile strength (σ_B): Tensile stress at maximum load

3.2.2. Stress at break (σ_R): Tensile stress at break

3.2.3. Yield stress(or yield point) (σ_S): In case of such material that has not tensile and yield stress when the inclination of the stress-elongation curve reaches zero point for the first time, offset yield stress can be replaced with yield stress.

3.2.5. Tensile stress at given elongation(σ_1): The tensile stress when strain reaches 1%.



4. APPARATUS

4.1. Tensile test machine

The one which can apply a speed and force freely and has a measuring device capable of expressing them. In this case, the test value shall meet the expressed value in the measuring device if possible.

4.2. Extension indicator (extensometer)

Low-Extension Measurements : For making measurements at elongations nominally 20% or less, measuring techniques with error no greater than $\pm 1\%$ of the measured value are acceptable.

High-Extension Measurements : For making measurements at elongations greater than 20%, measuring techniques with error no greater than $\pm 10\%$ of the measured value are acceptable.

4.3. Clamp

When tightening a test piece, the following shall be fulfilled.

4.3.1. It shall be capable of adjusting the longitudinal axle(vertical direction) of the test piece not to get load in the direction of extension.

4.3.2. Free from failures caused by grips.

4.3.3. Care shall be taken that the test piece does not slide in the grips.

4.4. Micrometer

The one which can measure the thickness of a test piece to the nearest ± 0.025 mm.

Note : A micrometer and a width measuring device shall apply a pressure of 25 ± 2.5 KPa on the test piece.

5. TEST PIECES

5.1. Preparation of test pieces

Preparation of test pieces varies depending on the products to be tested and is specified on the relevant standard. Test pieces shall be prepared by compression or injection molding, or machining. All surfaces and edges shall be free from damage and failure in order that notch effects are avoided. In case that flash marks appear during preparation of test pieces, they shall be removed without damage on the surface. This machining process shall be conducted in longitudinal direction of the test sample. If aeolotropic material is to be expected, test pieces shall be prepared respectively parallel and vertical to the expectant direction.

5.2. Shape and dimensions of test pieces

5.2.1. Shape and dimensions of possible test pieces shall be shown in Table 1 and Fig. 2. Selection of test pieces is dependent on the products to be tested. As far as the shape of test pieces is not specified in the respective