XSIGHT

APPLICATION REPORT

TRANSVERSAL MEASUREMENT OF POLYMER MATERIAL SPECIMEN

APPLICATION SPECIFICATION

Planar plastic specimens of printed PA 12 with dogbone geometry were measured with X-Sight's standardized ONE1-M5 measuring system.

Initially, the ONE1-M5 system was positioned in front of the sample at the correct distance and calibrated using a corresponding calibration grid.

Because the surface of the specimen lacks a visible natural pattern, markings were necessary to secure optimal measuring conditions.

Data on extension and strain were obtained with detailed information on strain distribution along the designated measurement line. The test was performed according to EN ISO 527-1.

The transversal software module allows to measure transversal strain and other mechanical properties in real-time. It enables to evaluate Poisson's ratio and enhances the measurement process with automatic edge detection.
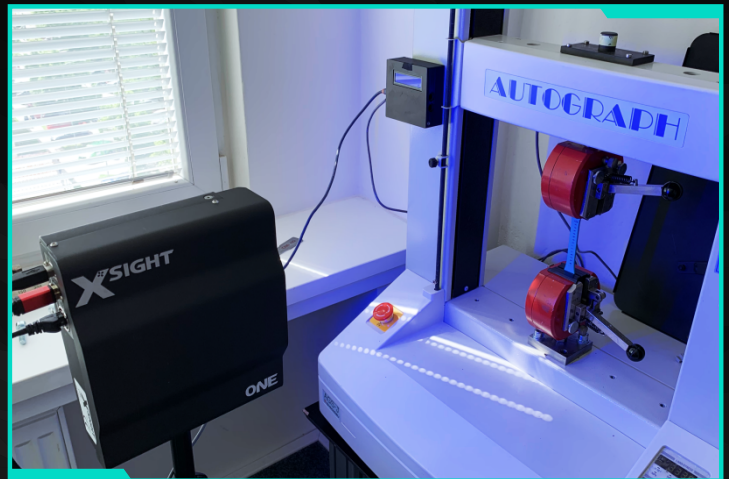
Tensile test set-up

KEYWORDS

▶ Plastic specimen testing

▶ Tensile test

▶ Transversal strain

▶ Stress-strain curve

▶ Line strain distribution

▶ Standard: ISO 527-1:2019

TEST SETUP

▶ ONE-M5 measuring system

▶ Alpha DIC SW Modules: Axial Strain (A), Transversal Strain (T)

▶ Alpha : Axial Strain Module

▶ Measuring tools:
  - Trans Line probe
  - Extreme Line probe
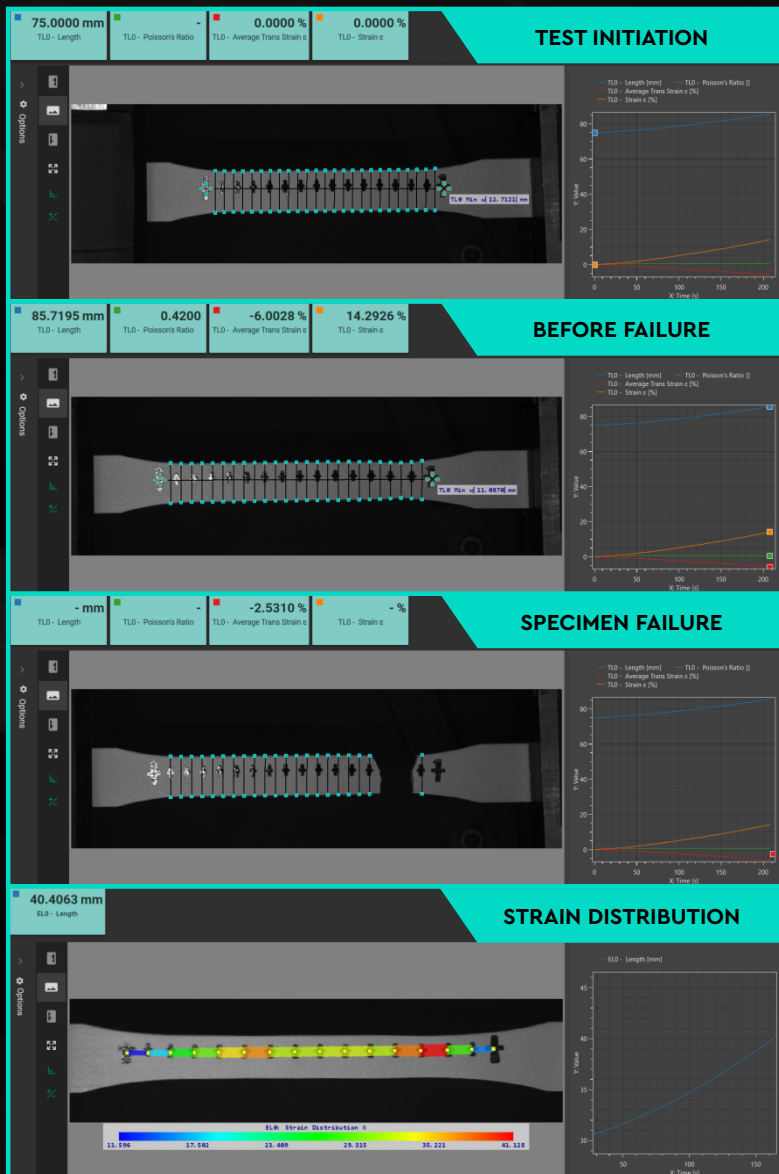
▶ PA 12 dogbone specimen

OUTPUT

▶ Stress-strain curve

▶ Young's modulus

▶ Poisson's ratio

WHY CHOOSE X-SIGHT?

▶ Easily manageable calibrations

▶ A wide range of available outputs

▶ Real-time and post-process measurements

▶ Automatic edge detection

▶ Multi-probe measurement

▶ Professional engineering support

MEASUREMENT PROCESS AND TOOLS

TEST INITIATION

75.0000 mm — TL0 - Length
— TL0 - Poisson's Ratio
0.0000 % — TL0 - Average Trans Strain ε
0.0000 % — TL0 - Strain ε

BEFORE FAILURE

85.7195 mm — TL0 - Length
0.4200 — TL0 - Poisson's Ratio
-6.0028 % — TL0 - Average Trans Strain ε
14.2926 % — TL0 - Strain ε

SPECIMEN FAILURE

- mm — TL0 - Length
— TL0 - Poisson's Ratio
-2.5310 % — TL0 - Average Trans Strain ε
- % — TL0 - Strain ε

STRAIN DISTRIBUTION

40.4063 mm — EL0 - Length

TRANS LINE PROBE

Advanced probe for transversal measurement with automatic neck detection. Axial line is divided into transversal sections (Width Lines). Afterwards, the value with the highest deformation is used for the output evaluation.

- **Detect Edges** – automatic contrast-based edge detection.
- **Auto Detect** – automatically detects the specimen's edge after moving the Trans Line.
- **Detect at Start** – automatically detects the specimen's edge at the start of the test. Useful for frequent switching of specimens.
- **Ambient Detection** - enables to perform edge detection by using only the ambient lighting of the surrounding area instead of the connected lights (if any).
- **Maintain Width** – uses the width of Transversal Lines specified in the textbox as a reference.

EXTREME LINE PROBE

Advanced probe for axial neck detection. Extreme Line divides the specimen into shorter segments and identifies the highest strain gradient, so strain is always evaluated over the failure area.

MEASUREMENT EVALUATION

Stress-Strain Curve
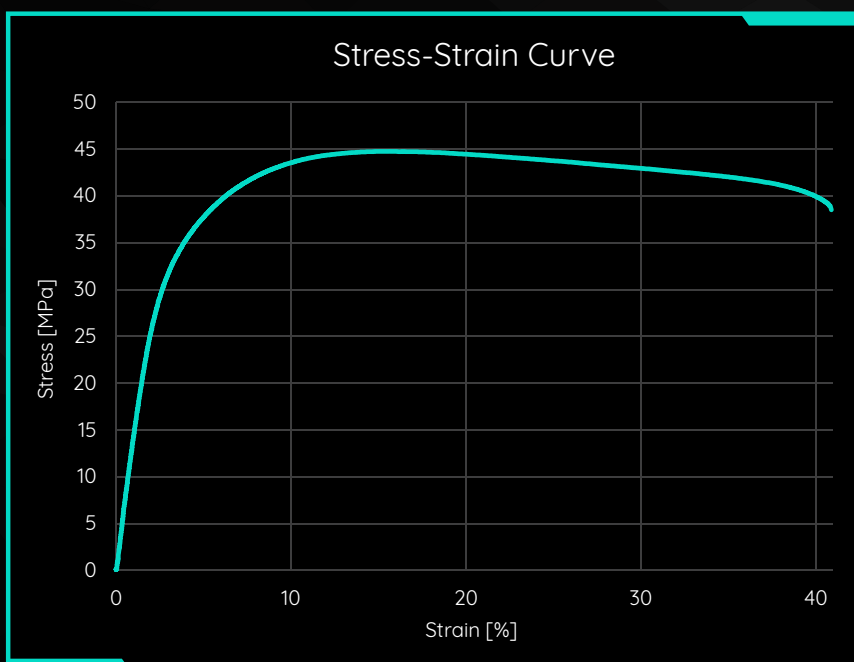
Measured force and calculated strain data were evaluated to obtain the Stress-Strain curve and determine Young's modulus and Poisson's ratio.

The resulting values:

E = 1.55 GPa

μ = 0.4 [-]