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X SIGHT

APPLICATION REPORT

UNIAXIAL TENSILE TEST OF POLYMER MATERIAL SPECIMEN

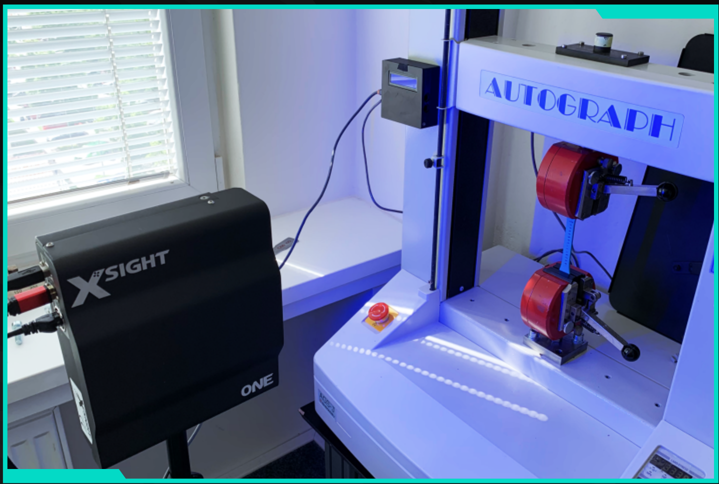
APPLICATION SPECIFICATION

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.



Tensile test set-up

KEYWORDS

- Plastic specimen testing
- Tensile test
- Young's modulus
- Stress-strain curve
- Line strain distribution
- Standard: ISO 527-1:2019

TEST SET-UP

- ONE1-M5 measuring system
- Alpha DIC SW modules: Axial Strain (A)
- Measuring tools:
  - Line probe
  - Extreme line probe
- PA 12 dogbone specimen

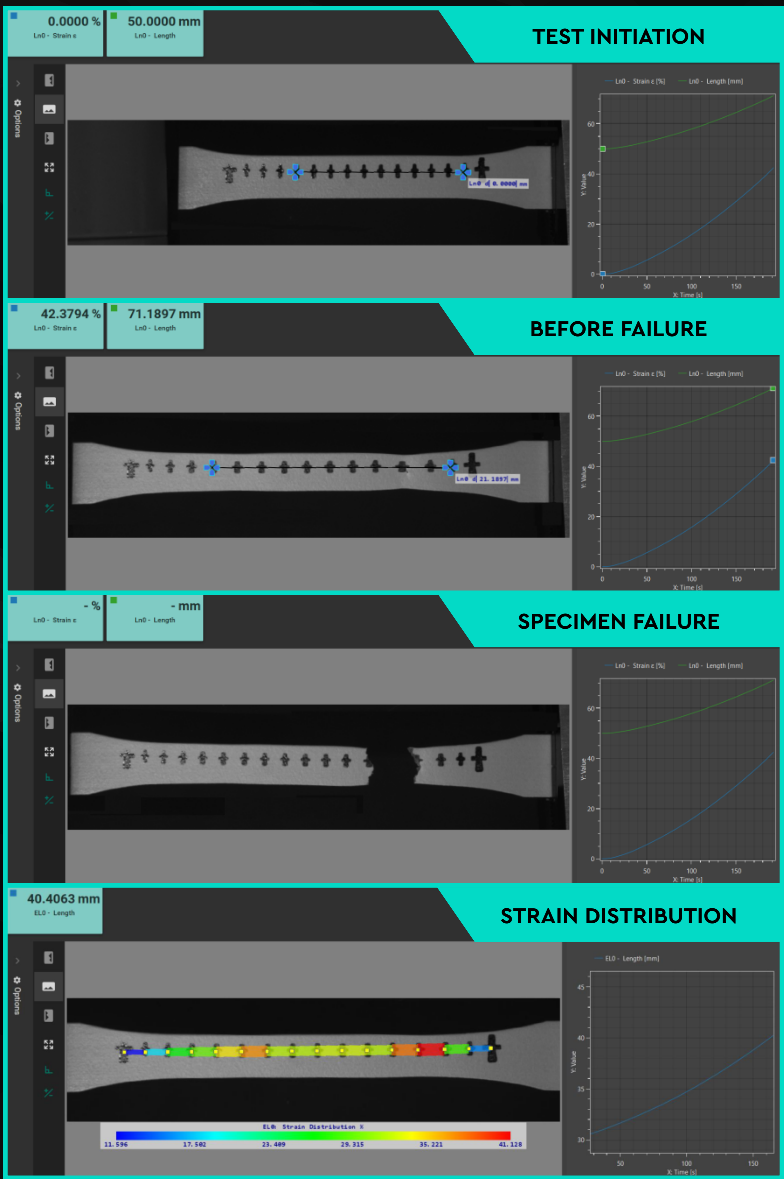
OUTPUT

- Stress-strain curve
- Young's modulus

WHY CHOOSE X-SIGHT?

- Easily manageable calibrations
- A wide range of available outputs
- Real-time and post-process measurements
- Multi-probe measurement
- High sample rate real-time strain distribution
- Easy-to-use and intuitive user interface

MEASUREMENT PROCESS AND TOOLS



LINE PROBE

A basic probe for measuring strain and length.

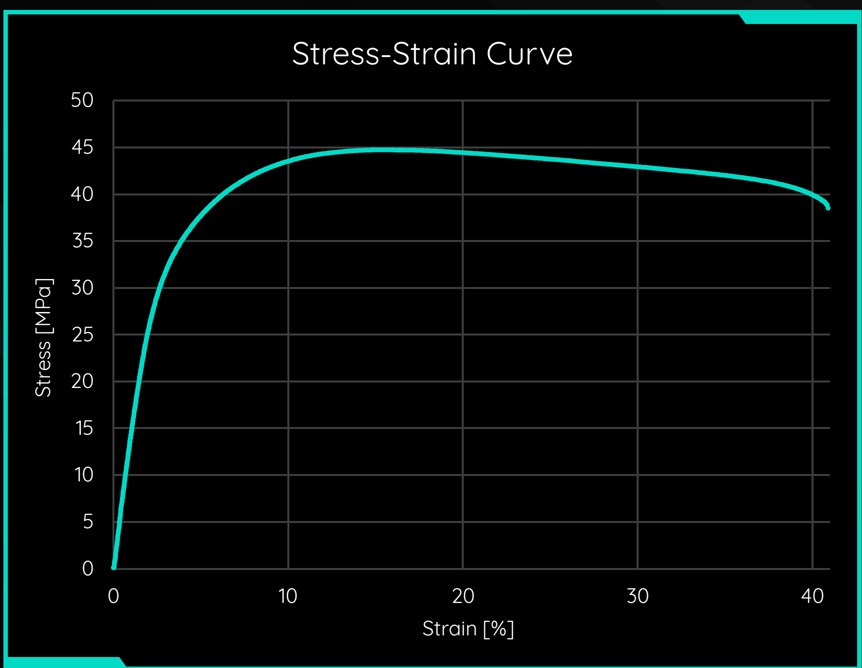
- Measured values:
  - Strain ε – Percent strain change between endpoints
  - Length – Total length between endpoints in selected physical unit
  - Δ Length – Euclidean length change in selected physical unit
  - Δ Length X – X axis directional length change in selected physical unit
  - Δ Length Y – Y axis directional length change in selected physical unit
  - X Axis Angle CCW(+) – angle between X axis and the Line Probe direction, positive in counter clockwise direction
  - Δ Angle CCW(+) – angle change, positive in counter clock wise direction

EXTREME LINE PROBE

An advanced probe for axial neck detection.

The Extreme Line enhances the Line Probe functionality by adding the axial neck detecting feature. The Extreme Line divides the measured specimen into shorter segments and identifies the highest strain gradient. Consequently, strain is always evaluated over the failure area.

MEASUREMENT EVALUATION



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

The resulting value:

E = 1.55 GPa