How do I find the right extensometer for my application?

Katja Müller
Zwick Roell GmbH & Co. KG
Agenda

How do I find the right extensometer for my application?

Choosing the suitable extensometer: selection criteria

6 examples for a good choice
Choosing the suitable extensometer: selection criteria

Application & environment requirements

Material / specimen, material properties

Test method / Standard: Gauge length, accuracy, test sequence, required values

Budget / costs of purchasing, handling and maintenance

Functionality, options

Handling

Environmental influences: dust, vibrations, lighting, temperature…

Selection according to must and should criteria
Agenda

How do I find the right extensometer for my application?

Choosing the suitable extensometer: selection criteria

6 examples for a good choice
Example 1

Clip-on extensometer: simple & effective solution for standard metal / plastic tests.

Convenient one-handed operation allows fast, easy attachment and removal.

Reproducible test results by accurate, lockable setting of initial gauge length (low user influence).

Precise measurement system, high measurement travel.

Automatic alignment at round specimens: prismatic counter-rollers.

High precision in temperature chamber by compensation of accuracy deviations.
Example 2

makroXtens II – a universal extensometer

- Standard extensometer in metals, plastics and automotive industries – more than 6,500 systems installed
- Highly flexible:
  - Tensile, compression and flexure tests
  - Tests in temperature chamber
  - Mechanical and optical transverse strain extensometers / fine-strain extensometers (options)
- User independent: automatic gage-length adjustment and automatic attachment/ removal (optional)
- Robust extensometer, can be used up to specimen failure (Integrated safety mechanism and tilting knife-edges)
Example 3

Automatic determination of breaking position with optical extensometers

- Testing metals acc. ISO6892: specimen often breaks outside gage length Le → High costs because of wasted time and specimen material

➢ Optical extensometer with option strain distribution = automatic determination of breaking position
Example 3

Testing metals with automatic determination of specimens breaking position

- up to 16 virtual measurement marks, (in-between automatically identical distances)
- during the test: simultaneous recording of up to 15 local strains
- Le is centered automatically around the sector of highest strain → automatic determination of specimens breaking position
- automatic balancing of the virtual Le around the constriction acc. to ISO 6892-1 annex I

- reliable determination of strain at break
- "no" specimen to reject
Example 4

Changing applications with high accuracy at a testing house: Allrounder multiXtens II HP

- Only one extensometer that can do small and high strains combined with high measurement accuracy. Class 0.5 combined with large measurement range (700 mm – L0)
- Highly modular and flexible: Tensile, compression, flexure tests, tests in temperature chamber, transverse strain,…
- Fully automatic system, no influence of user

- Automatic test area measurement
Example 5

Efficient but highly precise testing of composites: 
Clip-on biax 2501-2

- Biaxial testing: determination of axial and transverse strain of composites
- Determination of the shear modulus (IPS) and Poissons ratio
- Extreme high accuracy in temperature chamber
- One-hand operation, lockable setting of L0
- Device for withdrawing the clip-on in temperature chamber from outside and safety restraint
Example 6

One system for typical composite applications & for comparable test results also under temperature: videoXtens biax 2-150 HP & ZwickRoell temperature chamber

Applications

- Tensile test on composites acc. to ISO 527-4/-5, ASTM D 3039, ASTM D 4018
- Determination of tensile modulus acc. to ISO 527-1
- Determination of Poisson's ratio acc. to ISO 527-1
- Determination of shear strain and/or shear modulus (IPS-test) to ASTM D 5318 & ISO 14129
- 3-/4-point flexure test to DIN EN ISO 14125
- All tests under temperature
- Fulfills exacting requirements for determination of tensile modulus and Poisson ratio acc. to ISO 527-1 (annex B and C)
- Accuracy of 1 µm for tests under temperature in Zwick Roell temperature chamber
- Marking-free measurement
- Testing up to break

How do I find the right extensometer for my application?
ZwickRoell has the right extensometer system for every application

Feeler arm extensometers
Optical extensometers
Clip-on extensometers
Special transducers

Thank you for your attention!