



Use case for 2D VEX Tensile Testing

Understanding the material's behaviour is essential for efficient product design, which enables the manufacturers to produce reliable products and strictly define their limits. One of the most common ways of material testing is **uniaxial tensile testing**, which provides insight in material strength, yield strength and ductility. In this test, a specimen is elongated in one axis until it breaks. The measured values are the force the testing machine has to output and the elongation/strain corresponding to this force.

There are **several methods** used **to measure strain** during a tensile test. In some cases, it may be acceptable to calculate the strain by observing the **crosshead displacement** on the testing machine and comparing it to the initial specimen length. This method, however, is not very accurate and does not comply to a standard.

Strain gauges, which are bonded with the specimen's surface, are commonly used to measure strain in various materials. They are accurate and comply to a standard, however, they require a considerable preparation and skill to use them correctly.

Extensometers are multi-purpose devices, complying to common standards, which can be divided into two categories: **contact** and **non-contact** extensometers. Contact extensometers are clipped onto the specimen surface. They are not suitable for thin or fragile specimens due to danger of damage to the specimen caused by the clipping mechanism.

Non-contact extensometers measure strain **optically** without the need to touch the specimen. They are also ideal for measuring strain of specimens at high temperature inside a testing chamber. Thanks to the development at optical methods in the last years, these methods are as precise as its predecessors (or even more) while keeping their advantages, namely the **post-processing** ability, **full-field** displacement and strain distribution results and the ability to obtain **different results** from the **same measurement** (Principal Strain, Poisson's ratio etc.).





Our AMEE 2D VEX is a fully non-contact **Video Extensometer** designed to deliver precise measurements while the setup is as easy as connecting two cables and running a test. It is a compact sized, lightweight design device that can be mounted on a tripod or directly to the testing machine. Passive cooling ensures reliable operation during extended testing.

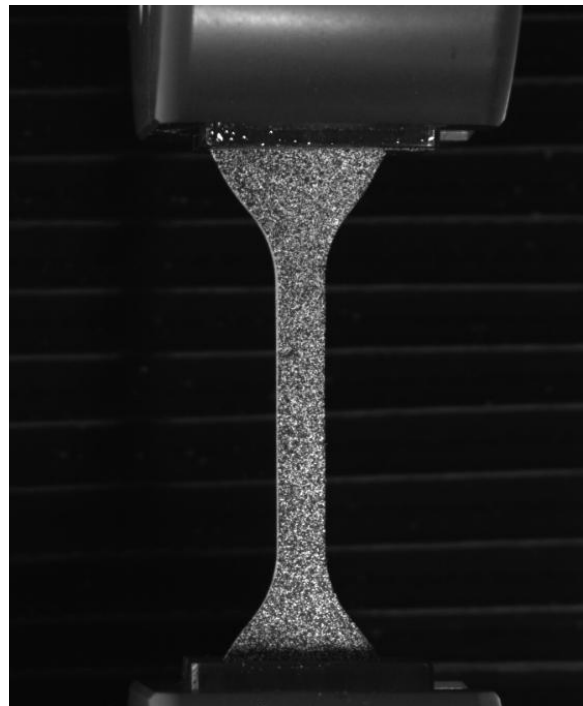


Fig. 1: Specimen fixed in UTM



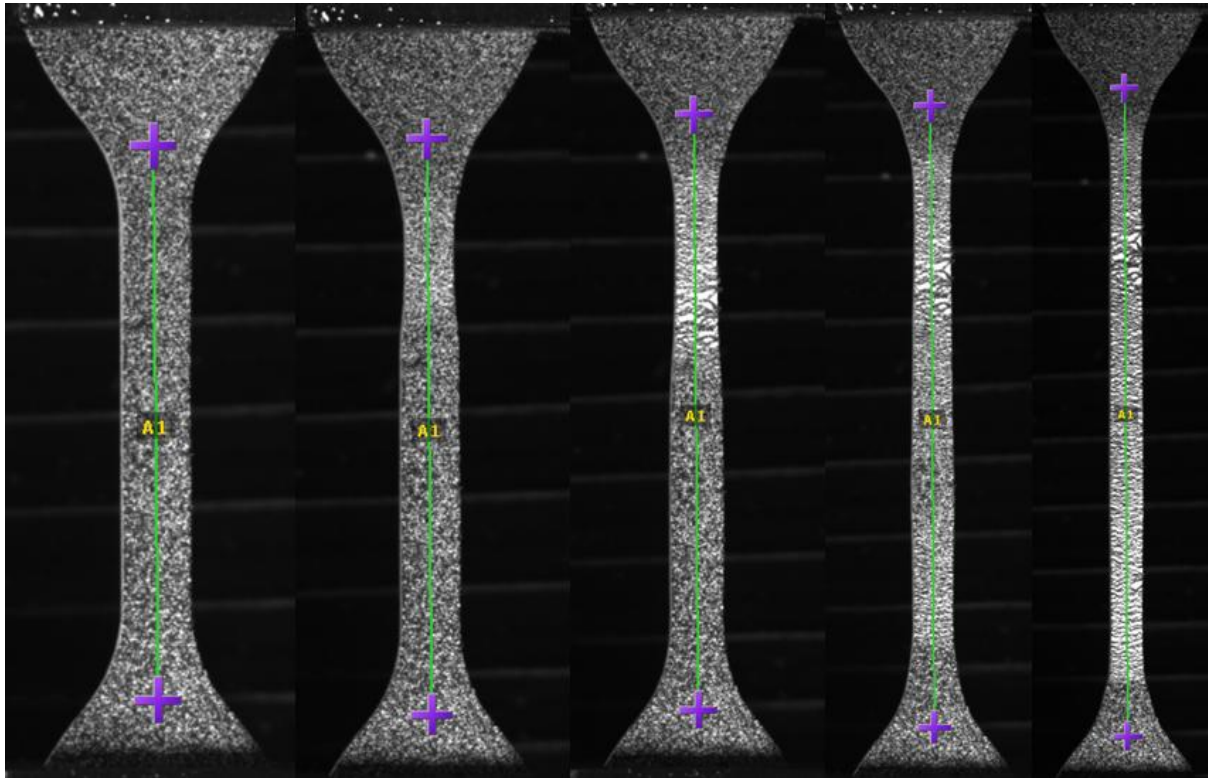


Fig. 2: Displacement tracking

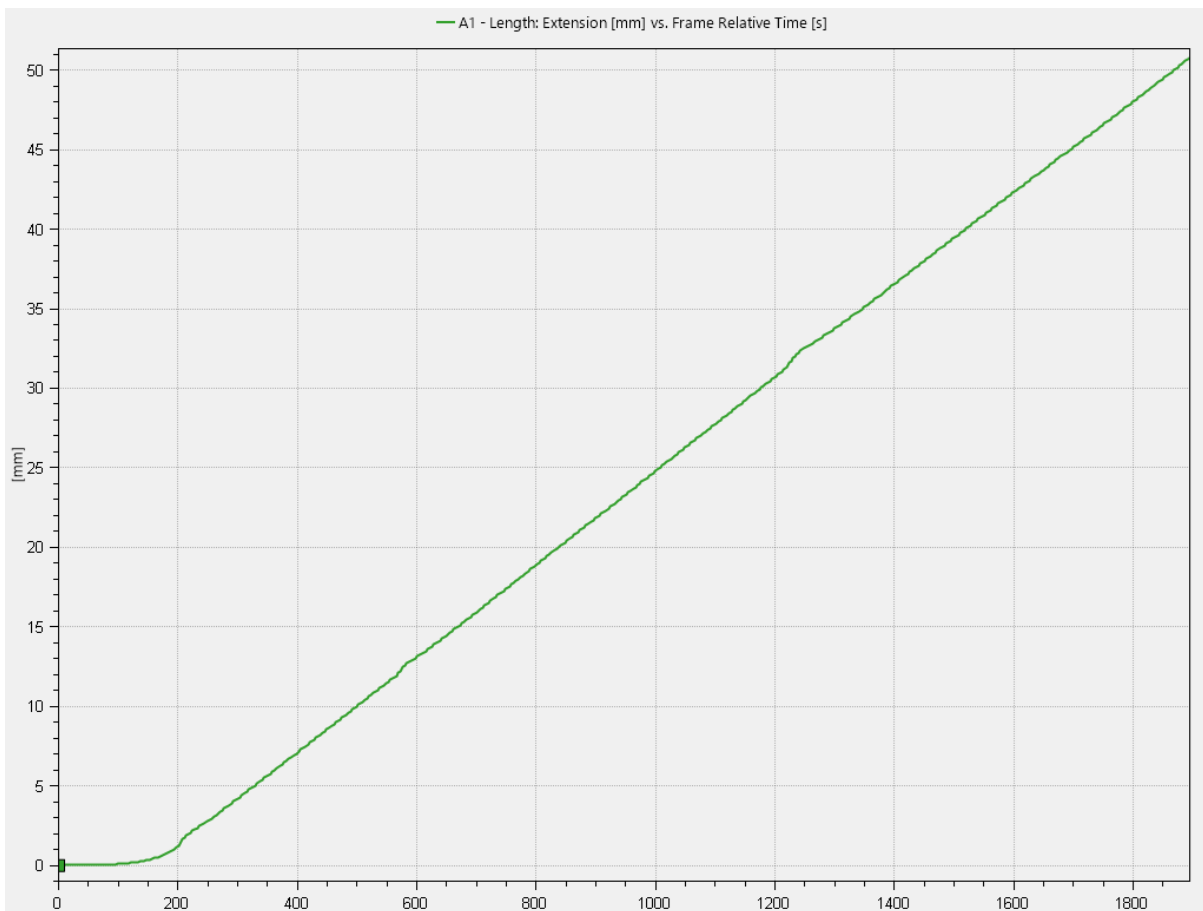


Fig. 3: Specimen elongation



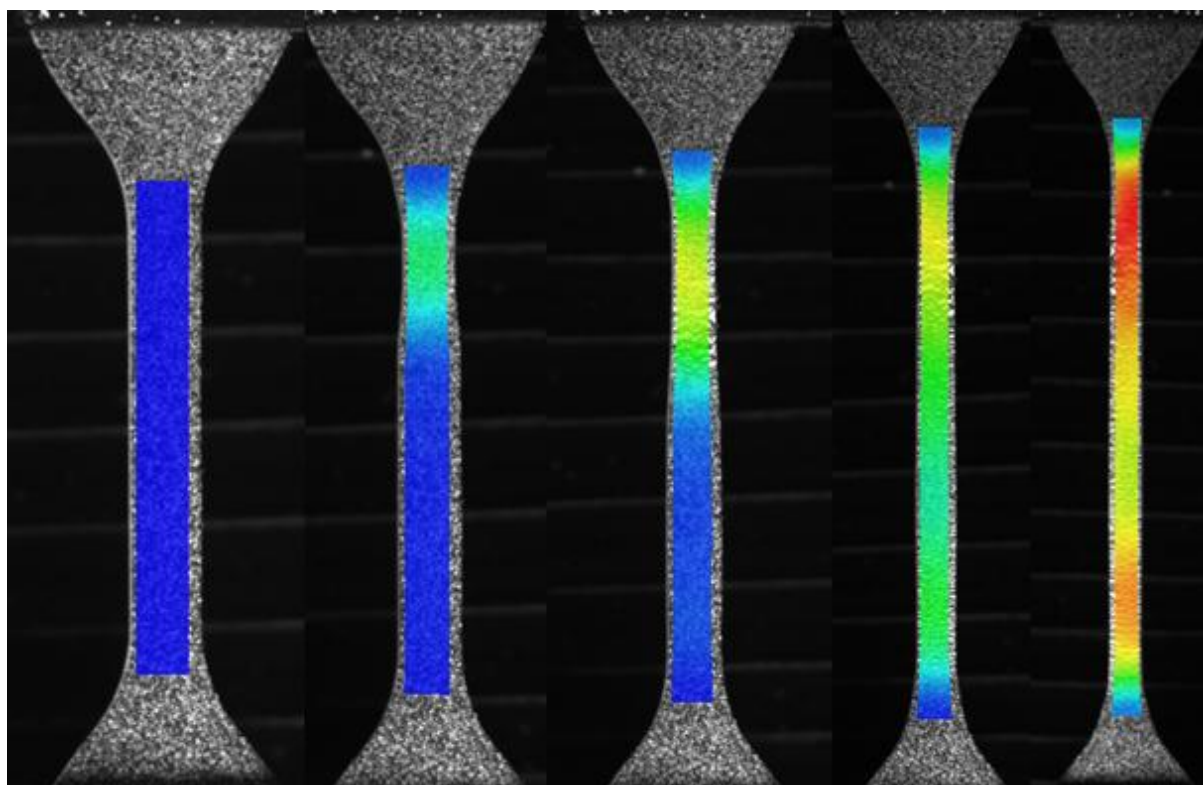


Fig. 4: Strain field during a tensile test

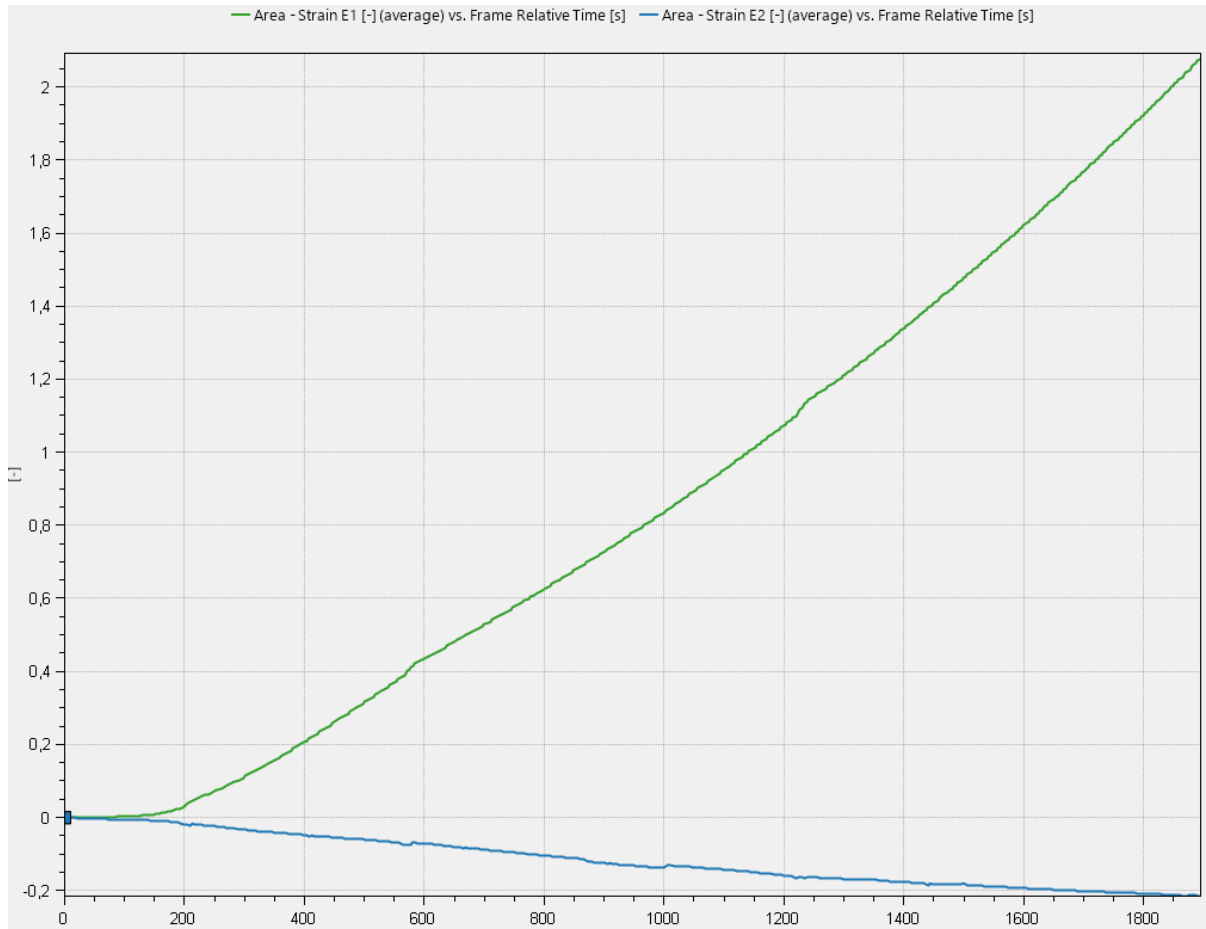


Fig. 5: Average E1 and E2 strain

