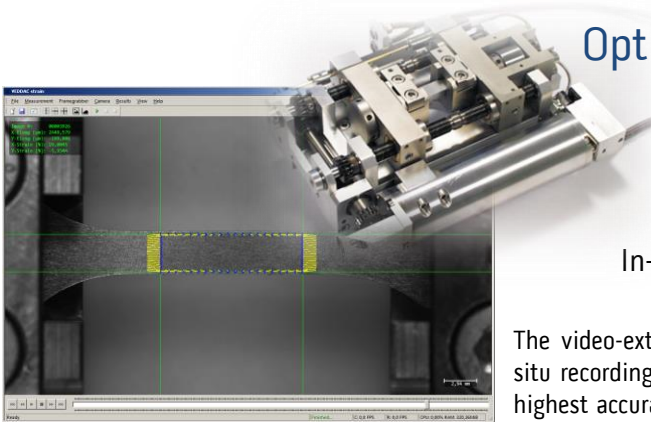


# microDAC<sup>®</sup> strain

Video-Extensometer  
for Tensile Modules made by Kammrath & Weiss



## Optical Measurement System for Elongation Measurement **microDAC<sup>®</sup> strain**

In-situ - contactless – highly precise

The video-extensometer “**microDAC<sup>®</sup> strain**” allows contactless in-situ recording of changes in displacement and extension with the highest accuracy class 0.2, directly on the surface of the specimen under tensile (or compression) load, using the tensile test modules made by Kammrath & Weiss.

This recording works simultaneously during the load measurement carried out in the **K&W tensile module**. It employs high resolution camera technique for the image recording of the materials surfaces .

The center piece of the optical measurement system **microDAC<sup>®</sup> strain** is the software **VEDDAC strain**, that records readings of the elongation changes (elongation in  $\mu\text{m}$ ), and the extension (in %), and transfers them to the MDS (DDS)-software package of the Kammrath & Weiss tensile module.

The camera images taken during the experiment are stored for further analyzing, e.g. for visual characterization in addition to the deformation- and rupture recordings.

Based upon the method of digital image correlation, **VEDDAC strain** works without additional pattern, and it uses the original material's surface as measuring information.

Elongation and transverse strain can be recorded simultaneously. Therefore, the modulus of elasticity and Poisson's ratio in the elastic range, as well as uniform elongation, rupture elongation and anisotropies in the range of permanent deformation can be derived from this.

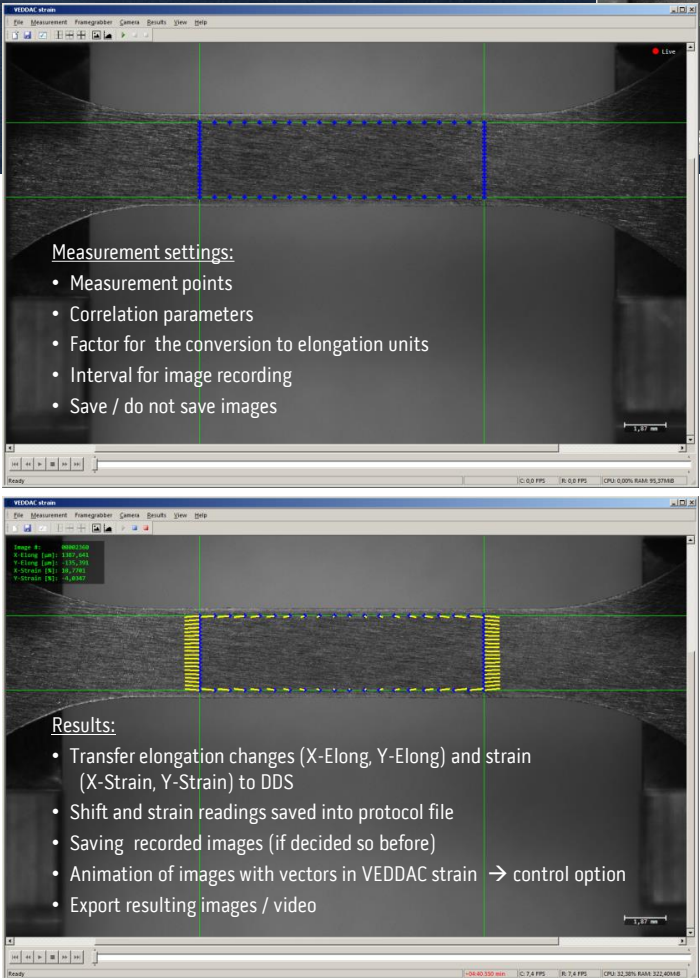
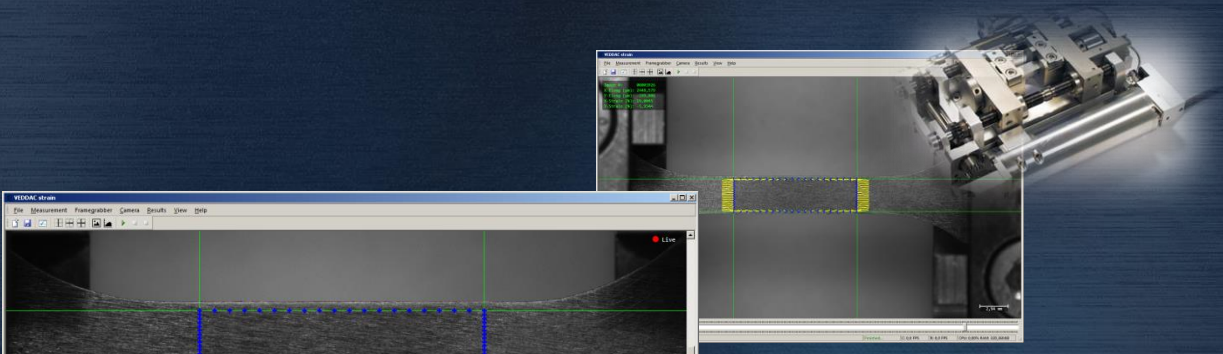
The non-contact and reaction-free measuring method using **microDAC<sup>®</sup> strain** provides advantageous examinations of delicate materials, and also the combination of such measurements with thermal experiments.

**Kammrath  
Weiss GmbH** 

Special Developments for Microscopy



Chemnitzer  
Werkstoffmechanik GmbH



## Software with the Measurement system microDAC® strain VEDDAC strain

The region of interest can be defined using the live image modus of **VEDDAC strain**. For this, utilities are provided to set optimal focus and contrast settings.

Only few parameters are required for experiment setup, such as entering the distances in the measuring point matrix, the correlation parameters, and a conversion factor for the pixel (units of the image processing) into length-units.

Such conversion factors can be determined user-specifically, depending upon the available optical systems.

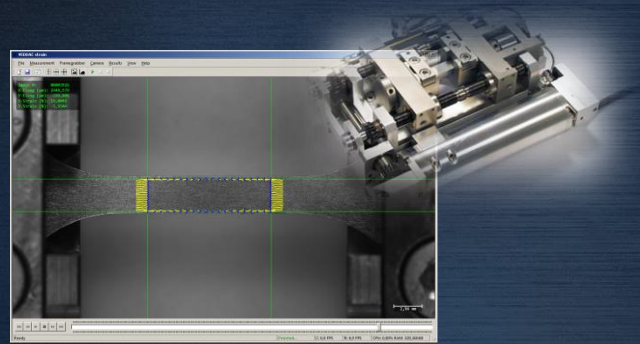
An image recording frequency of 40 images per second is obtainable with the 5 Mpxl-camera that is part of the video-extensometer **microDAC® strain**. If required, the images can be saved during the experiment.

The region of interest where the values for elongation [ $\mu\text{m}$ ] and strain [%] will be taken from, can be defined individually **by positioning the green guidelines** on the main image display, according to the goal of the measurement according to the distances of measuring points determined beforehand, the measuring points will be selected either horizontally (recording the changes in elongation x, x-elongation), or arranged vertically (changes in y, y-elongation), or for both directions simultaneously.

The calculation of elongation or strain changes using **VEDDAC strain** begins at the moment the experiment commences, triggered by the control software of the tensile module (MDS / DDS). It will then return the calculated readings to MDS (DDS). The advancement of the experiment and its calculation progress can be observed in a live image. After completing the experiment, the calculation results can be displayed in images of the result (images with yellow vectors). This allows one to save and check these results for correctness. The recordings may be single images, or video clips.

The determination of the elongation follows the well-known formula  $\epsilon = \Delta l / l_0$ . The only difference here is, that one and the same digital image correlating (**DIC**) method in **microDAC® strain** measuring system is used to determine the change in elongation  $\Delta l$ , taken together with the change in original length  $l_0$ . The errors occurring in mechanical extensometers are circumvented, and the measurement precision is increased significantly. The CCD camera that is part of the system can safely detect elongation changes of down to 0,004%.

# Products



## microDAC® strain

as an Upgrade of your Kammrath & Weiss Tensile Module

### Basic System

contains:

- 5 MPixel – camera
- Image correlation PC
- Software VEDDAC strain
- Interface MDS / DDS (tensile module)

The basic system is a set for users, who already have suitable components (microscopes, tripod hardware with optics, illumination devices, etc.).

Suitable utilities, such as telecentric lenses, ring-light illuminations and tripod hardware components are optionally available upon request. We will take pleasure, assisting you in your choices.

### Software System

contains:

- Software VEDDAC strain
- Software extension to external image sources
- Interface MDS /DDS (tensile module)

The software system is an image evaluation tool for automated strain measurement of images of any camera system and image sources.(e.g. SEM).

### Expert Software VEDDAC 7 (Option)

Suitable for analyzing local elongations, such as studying the deformation properties and defects of inhomogeneous materials, as well as the interface behavior in composite, welded or soldered materials.

