

REFERENCE : EX151

Non contractual photo

**SERVICE : BENDING TRACTION BENCH
REF. EX150 TEST TUBES WITH STRAIN
GAUGES REF. EX152, EX154, EX158
EXTENSOMETRY BRIDGE REF. EI616**

The DELTALAB EX150 tensile-deflection bench is the basis for a series of material resistance experiments. In its standard configuration, this bench allows the study of traction and simple bending with conventional measuring instruments: comparators. Two comparators are used for lengthening and deformation measurements of the specimens; a third to the determination of the force applied to the test pieces during the tests. To complete these global observations, tensile and flexural specimens equipped with strain gauges are proposed to check the distribution of deformations according to the section and the length of these simple structures. The experiments are directly feasible and exploitable with the DELTALAB EI616 6-channel extensometric bridge. The use of these instrumented specimens led us to the design and development of displacement sensors with strain gauges to replace the comparators. These elements have enabled the realization of a computerized data acquisition and processing system EX151 which, beyond the purpose of these experiments designed to give students the physical sense of elasticity of materials and resistance mechanical structures, introduces the use of computers in the experiment. This tool brings flexibility and speed while waiting to bring theory and manipulation closer together.

The user can easily interchange the displacement sensors and comparators to change his bench to the instrumented version or return to the basic version knowing that there is no consequence on the observed physical phenomena. data acquisition and processing EX151 was designed for pc, from the fully instrumented EX150 bench. It consists of a material part :

- Analog-USB acquisition board (requires a free USB port)
- Connectivity and a software part :
- Input-output user interface
- Acquisition card management (data acquisition)
- Data processing
- Presentation of the results

Educational Objectives :

The software allows as before the following studies

Configuration 1 : the study of the stiffness of specimens.

- For this experiment, the four tensile test pieces and the two flexural test pieces supplied with the EX150 bench are used.

Configuration 2 : the study of the distribution of the deformations according to the force applied.

- In bending, the bending beam equipped with EX154 gauges and the EI682 force sensor are used. Four pairs of gauges in a cross-section are used to show the distribution of the deformations (the neutral

fiber), as well as a fifth pair of gauges placed in another section.

- In tension, one uses the traction beam equipped with gauges EX152 and the force sensor EI682. Four pairs of gauges are used to show the uniformity of deformations in the direction of traction. A fifth pair of gauges makes it possible to measure the deformation perpendicular to the traction and to deduce the coefficient of FISH.