

# EpsilonSensor

the world's first composite DFOS sensor with strain range up to 4% and elasticity (E = 3 GPa) that does not influence the structural behavior of monitored structure



**EpsilonSensor** enables accurate strain and precise crack measurements over its entire length due to its perfect bond with the surrounding concrete. **Specially selected composite material** provides unique strain reading precision and sensitivity. **EpsilonSensor** is a perfect solution for **laboratory applications**, designed for direct **embedding** into the newly-designed structural members (made of **concrete** or **soil**) or to be **installed within existing structural members** (e.g. reinforced or prestressed concrete girders). Lightweight, low bending radius and **extremely low stiffness** allows the sensor to be installed easily and **not influence the behavior of the lab specimens**.

## SENSOR ADVANTAGES

- **STRAIN AND CRACK MEASUREMENT ALONG THE ENTIRE LENGTH** of the sensor, (optional temperature)
- **NO SENSOR INFLUENCE** on the monitored structural member (negligible stiffness)
- **MONOLITHIC SECTION WITH NO INTERMEDIATE LAYERS** providing accurate measurements
- **SHARP and PRECISE** view of any local phenomena, especially cracks in concrete
- **EASY INSTALLATION** — lightweight sensor, ready to use when unrolled from the storage coil
- **RESISTANT TO ENVIRONMENTAL CONDITIONS**, including electromagnetic fields and lightning strikes

## TECHNICAL SPECIFICATIONS

STRAIN MEASUREMENT RESOLUTION	1.0 $\mu\epsilon$
STRAIN MEASUREMENT RANGE	$\pm 4\%$
ELASTIC MODULUS	3 GPa
OPERATING TEMPERATURE	-20 to +80°C (extended range on request)
SENSOR DIAMETER	$\varnothing 3$ mm
SENSOR WEIGHT	13 kg/km (for $\varnothing 3$ mm)
SENSOR MATERIAL	PLFRP (polyester fiber + epoxide)
SCATTERING USED	Rayleigh, Brillouin or Raman
METHOD OF DELIVERY	coils or straight sections
SENSOR LENGTH	any length made to order

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## APPLICATIONS

- **LABORATORY RESEARCH** — especially observation of crack formation in concrete
- **STRUCTURAL HEALTH MONITORING** of engineering structures
- Reinforced and prestressed **CONCRETE** members

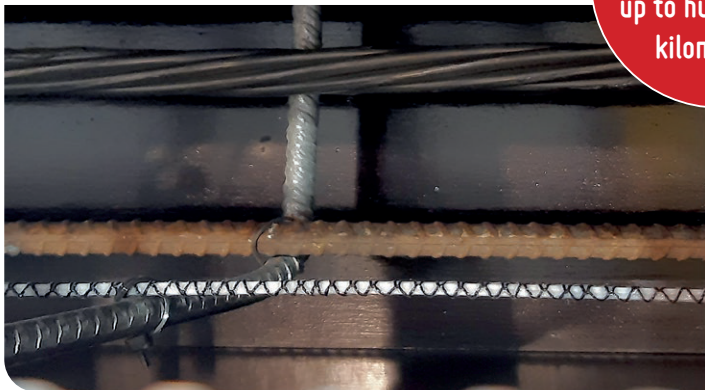


EpsilonSensor before installation in a lab specimen



EpsilonSensor embedded into a reinforced concrete slab

Measurements of structural strains up to hundreds of kilometers!



Prestressed concrete beam with EpsilonSensor



Crack measurements by EpsilonSensor during bending tests

## BENEFITS OF APPLICATION

- **DETECTION OF CRACKS** location in concrete
- **CRACK WIDTH MEASUREMENTS** in concrete
- **CONCRETE STRAIN MEASUREMENTS** next to reinforcing or prestressing steel
- **ESTIMATION OF ANCHORAGE LENGTH** of reinforcing bars and prestressing tendons
- **DETAILED SCIENTIFIC ANALYSIS** by early detection of micro cracks and strains
- **NEGLECTIBLE COSTS** in comparison to construction costs
- **ANALYSIS OF LOCAL PHENOMENA** in different materials
- **NON-INVASIVE DIAGNOSTICS**, enabling control of technical conditions of the structure
- **FULL CONTROL OF THE STRUCTURE** during construction and operation
- Early **DIAGNOSTICS – THE LONGER TIME OF SAFE OPERATION**, the lower the total costs