

the world's first composite DFOS sensor with strain range up to 4% and elasticity ($E = 3 \text{ GPa}$) 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 +60°C
SENSOR DIMENSIONS	typical $\phi 3 \text{ mm}$
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

APPLICATION

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

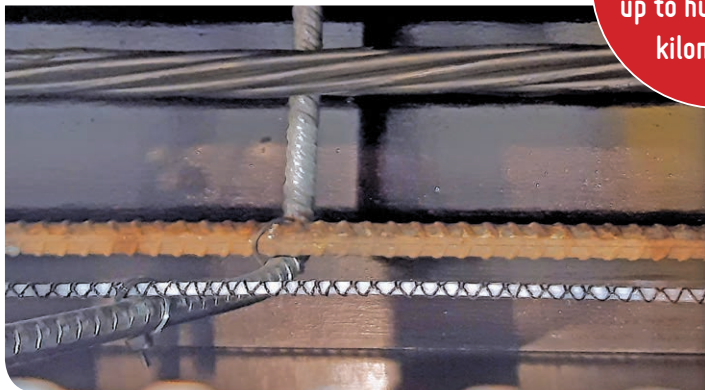


EpsilonSensor before installation in a lab specimen



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 repair costs