QUAKELOGIC

EpsilonRebar

the world's first monolithic strain sensor designed for direct embedding into the structure (concrete or soil)

EpsilonRebar enables accurate strain and crack measurements over its entire length. It takes the form of a composite rebar of any diameter (standard Ø5 mm). It is **designed for direct embedding** into the **newly-designed structures (concrete or soil)** or to be installed within **existing structures** (e.g. **inside grooves in concrete** or **on the surface of pipelines**). Thanks to its high stiffness and tensile strength, **EpsilonRebar** can also be used as **a rebar with a double function: measurment and reinforcement**. Resistance to mechanical loads and environmental conditions makes EpsilonRebar ideal for in-situ applications in construction sites or existing infrastructure.

SENSOR ADVANTAGES

- **STRAIN & CRACK MEASUREMENT ALONG THE ENTIRE LENGTH** of the sensor, (optional temperature)
- **EXCELLENT INTEGRATION** with the monitored structure (ribbed external surface)
- **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

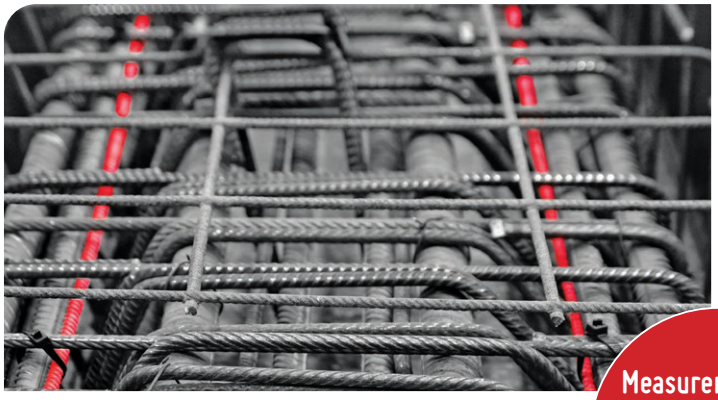
STRAIN MEASUREMENT RESOLUTION	1.0 με
STRAIN MEASUREMENT RANGE	±2%
ELASTIC MODULUS	50 GPa
OPERATING TEMPERATURE	-20 to +100°C
SENSOR DIAMETER	Ø5-20 mm (standard Ø5 mm)
SENSOR WEIGHT	45 kg/km (for Ø5 mm)
SENSOR MATERIAL	GFRP (glass fiber + epoxide)
SCATTERING USED	Rayleigh, Brillouin or Raman
METHOD OF DELIVERY	coils or straight sections
SENSOR LENGTH	any length made to order

QUAKELOGIC

EpsilonRebar

APPLICATIONS

- **STRUCTURAL HEALTH MONITORING** of engineering structures
- **GEOTECHNICAL AND HYDROTECHNICAL ENGINEERING** (e.g. slurry and retaining walls, piles, concrete columns, dams, embankments)
- **LINE STRUCTURES:** roads and bridges, tunnels, railway lines, pipelines and others



Prestressed concrete beam with EpsilonRebar

Road embankment with EpsilonRebar

Measurements of structural strains up to hundreds of kilometers!

Application of EpsilonRebar on a steel gas pipeline

Application of EpsilonRebar in a smart concrete highway

BENEFITS OF APPLICATION

- **REDUCTION OF DAMAGE OR FAILURE RISK** by early detection of cracks or over-normative deformations etc.
- **NON-INVASIVE DIAGNOSTICS**, enabling the control of the technical condition of the structure
- **CHEAPER STRUCTURAL HEALTH MONITORING** – one EpsilonRebar replaces thousands of traditional spot sensors
- **QUALITY IMPROVEMENT** – verification of design assumptions and quality of subcontractors' work
- **FULL CONTROL OF THE STRUCTURE** during construction and operation
- **NEGLIGIBLE COSTS** in comparison to structural costs of the projects
- Process optimization – enabling for better **SELECTION OR MODIFICATION OF CONSTRUCTION TECHNOLOGY** based on measurement results
- Early **DIAGNOSTICS –THE LONGER THE TIME OF SAFE OPERATION,** the lower the total costs