

Sealing Control System

smartex® mx-PEEL

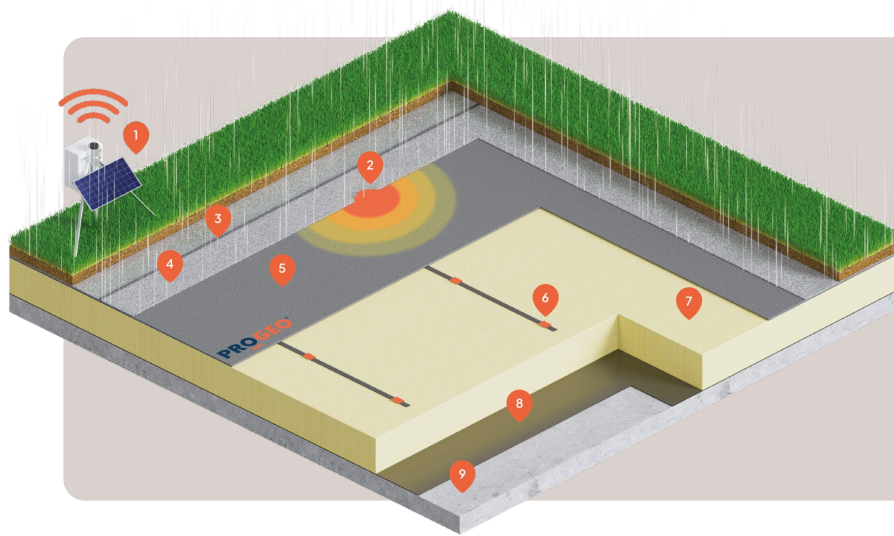
smartex® mx-PEEL

Ideal for flat roofs, green roofs and solar roofs

Summary

smartex® mx-PEEL is an innovative monitoring system for monitoring waterproofings. The system consists of a fleece and a sensor matrix below the membrane as well as a counter electrode above. In this way, the sealing is monitored over its entire surface and in real time.

In the event of a leak, the system immediately reports the damage to the building operator - before water can spread in the roof structure. The sensor matrix also enables precise location of the affected area and allows for a targeted, fast and cost-effective repair.



1. ProGeo® Measurement Unit (PV Variant)
2. Pinpoint Leak Location
3. Counter Electrode
4. Waterproofing Membrane
5. Conductive ProGeo® Contact Layer
6. smartex® mx Sensor Matrix
7. Thermal Insulation
8. Vapor Barrier
9. Building Structure

Features



Exact Leak Location

smartex® mx enables the highest degree of locating capability. Through the sensor matrix, the ProGeo® Monitoring Portal calculates a heatmap and exact coordinates of the leak. This enables targeted repairs and saves costs.



Full-surface Monitoring

The smartex® mx systems measure the integrity of the waterproofing by means of sensors and fleece over the entire surface. Full-surface monitoring is a significant added value compared to conventional moisture sensors.



Real-time Capability

Through closely timed measurement intervals and direct connection to the measurement unit, the data is transmitted in real time to the Monitoring Portal.



Direct measurement-based monitoring of sealing

During the smartex® mx measurement method, the moisture in the roof structure is not measured, but the integrity of the sealing.



Immediate Leak Detection

Direct monitoring of the sealing guarantees immediate detection of leaks. The procedure therefore enables detection of leaks before water spreads in the structure and causes damage.



Physical Proof of Sealing

Compared to conventional manual sealing tests or moisture measurements, with moisture a complete physical test of the sealing is performed.

System Description

smartex® mx is a microcontroller-controlled monitoring system for **real-time monitoring** of sealing membranes. With smartex® mx, the sealing is monitored over its entire surface. Occurring leaks are immediately detected and automatically located.

The system consists of a **conductive contact layer** made of an electrically conductive glass fleece below the sealing to be monitored in conjunction with **counter electrodes** on the sealing membrane as well as a **sensor matrix** of special, ready-to-lay pre-assembled multipoint linear electrodes, with which the electrical potential distribution in the contact layer below the sealing membrane is measured and by a connected measurement unit in conjunction with our **internet-based database server** is evaluated.

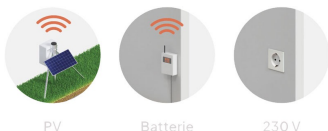
If a leak occurs in the sealing, a **compensating current** flows from the counter electrodes on the sealing over the wet surface of the sealing and the leak to the contact layer below the sealing and leads to a measurable **change in electrical potential distribution**. Based on these changes, the **leak event is detected** and the leak position is calculated.

The monitoring system works with a connection to our internet-based **Monitoring Portal**. The data measured on site are automatically stored and evaluated there in a project-related manner. Furthermore, the user has access to a comfortable user interface via any internet-enabled PC. This includes automatic **alarming** in case of alarm with specification of the calculated leak position as well as in case of faults via e-mail and/or SMS to any recipients specified, the **alarm management**, the display of detected **leak events** in tabular form as well as pinpoint **display in the monitoring plan**, furthermore the evaluation of data as time series and location-related distributions, furthermore the user and access management as well as many other useful features. The connection to an existing **building management system** is possible.

With smartex® mx, the level of information about the moisture protection of the building is significantly improved. Through early detection and automatic location of leaks, **costly substance losses are avoided** and an important contribution to achieving the **Sustainability goals** is made. With smartex® mx, building owners gain the assurance that their building is efficiently protected and potential damage is detected in time.

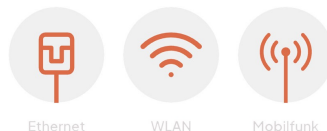
Data Transmission and Power Supply

Power Supply of the Measurement Unit



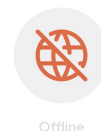
Power is supplied via a 230V/120V connection, battery or PV with a buffer battery.

Internet Connection of the Measurement Unit



Internet supply of the measurement unit is via WiFi, LAN or mobile phone.

Offline Systems



In exceptional cases, the ProGeo® systems can also be supplied in an offline mode.

Web-based Monitoring Portal



Alarm Status

Check active alarms and monitor the condition of your roof reliably and accurately.



Data Analysis and Visualization

Analyze moisture development over time series and identify critical saturation precisely with clear Heatmaps.



Documentation

Document all processes related to the monitored object.



Suitable Areas of Application

Roof Structures

- Loosely laid, mechanically fastened sealing systems
- Self-adhesive sealing systems with hot bitumen primer
- With electrically non-conductive materials of the sealing
- Thermal insulation with non-metallic surface
- Also suitable when using Foamglas and inverted roofs

Alternatives for other roof structures

- For peel-and-stick and welded sealing membranes, the system smartex® mx-va is used
- For a metallic surface of thermal insulation, the system smartex® mx-al is used

Roof Usage

- Flat roofs
- Green roofs
- PV roofs
- Retention roofs
- Intensively used roof areas, for example in data centers

Other Areas of Application

- Foundation Slabs
- Bridges

References – A selection from over 4000 projects



Louvre Conservation Centre, Liévin (France)
The Louvre Conservation Centre in Liévin, designed by Rogers Stirk Harbour + Partners, is a pioneering facility for the conservation and research of the Louvre's artworks. A smartex® mx real-time monitoring system monitors the roof area completely to ensure the safety of the collection.

- 15.450 m²
- Green roof



State Library of Berlin
The Senate Department for Urban Development and the Office for Architecture and Building History trust ProGeo®: smartex® monitors the 5,270 m² roof area of the State Library of Berlin.

- 5.270 m²
- Flat roof

Object	DESCRIPTION	AREA	YEAR
Immeuble Victoire (FRA)	Renovation of an office and hotel building in Paris	580 m ²	2024
Munich Fire Station	Full-surface monitoring of the parking deck	2.000 m ²	2024
University Pittsburgh (USA)	Recreation and Wellness Center	3.300 m ²	2024
TSO / BSO Waiblingen	Control and technical site of the German Railway	1.100 m ²	2024
YTR Bus Garage	Bus depot of York Region Transit	600 m ²	2024
Oberkrämer Logistics Hall	New construction of a logistics hall	660 m ²	2024
AHS Memphis, USA	Alliance Crisis Center for Wellbeeing	700 m ²	2024
BRK Wiesentheid	Laboratory and office building for the Bavarian Red Cross	700 m ²	2024

System Components

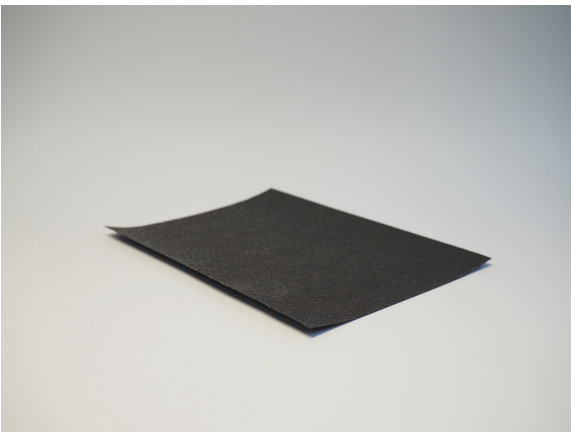
Multipoint Linear Electrodes



The smartex® Multipoint Linear Electrodes (MPLE) represent passive electrical contacts of the smartex® -leak detection system. Individual measurement contacts are applied on a cable at intervals of 3 m. PROGEO pre-assembles the smartex® Multipoint Linear Electrodes according to the specific design of the area to be monitored individually and provides them with a unique identifier.

Maximum length incl. lead	100 m
Measurement contacts per chain	Max. 20
Measurement contacts – distance	3 m
Measurement contacts – contact length	300 mm
Measurement cable – dimension (Cross-section)	27 mm x 3,5 mm
Measurement cable – outer material	Polyethylene
Measurement cable – structure	20 x 0,40 mm, Raster 1,27 mm
Measurement cable – temperature Range	-40 °C to +100 °C
Measurement cable – thermal stability (short-term)	Up to 220 °C

Conductive Contact Layer

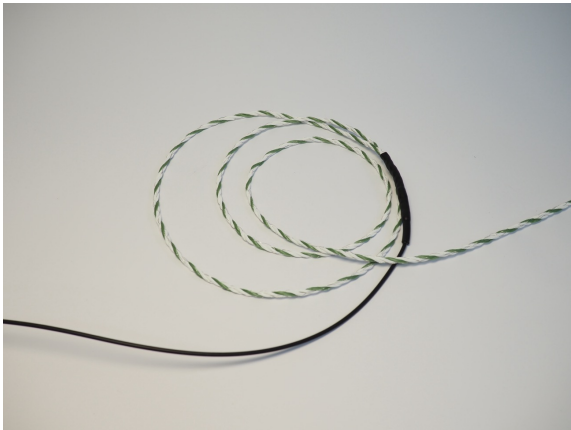


The smartex® Fleece F-120 is an electrically conductive glass fiber fleece. The fleece serves as contact layer for the leak detection and monitoring system smartex® mx. It is laid out completely under the sealing (in overlapping sections) and is in direct contact with the Multipoint Linear Electrodes smartex® (MPLE). The fleece has high thermal stability and can therefore be laid directly under bitumen welded membranes.

Width	2,00 m
Length	bis 100 m
Grammage	120 g/m ² ± 10 %
Thickness	0,6 mm
Tensile Strength	6.4 kN/m longitudinal, 4.8 kN/m transverse
Elongation	approx. 0%
Temperature Usage Range	-40 °C to +100 °C
Fire Behavior	DIN 4102 – A2
Chemical Resistance	resistant in contact with construction-standard media

System Components

Counter Electrode



The smartex® Counter electrodes are used to generate the signal potential. At least one counter electrode is required per roof area. For larger contiguous roof areas, one counter electrode is to be provided per 500 m².

Number of stainless steel conductors	6 (Stranded stainless steel-plastic wire)
Breaking Load	350 kg
Diameter	6 mm
Resistance	3,87 Ω/m
Conductor	0,20 mm
Lead-in	Stranded 1.5 mm²
Sheath Material Lead-in	Polyethylen (PE)
Max. Length of Lead-in	500 m

Measurement Unit



The smartex® - microBOX plus is a measurement unit for automatic, program-controlled measurements of smartex® monitoring systems. The data can be transmitted for evaluation to the ProGeo Monitoring Portal or - depending on the respective system type - also locally evaluated. The device is built in a plastic housing IP65. WiFi, LAN or LTE data modules are available as interfaces. The 8 built-in measurement inputs can be expanded modularly by 16 measurement inputs each. The following technical data applies in detail:

Operating Voltage	5V DC
Maximum Current Consumption	1A
Electrode Outputs	1
Output Voltage	12V
Electrode Inputs	8 (+n x 16)
Input Voltage Range	0 - 10V DC
Input Impedance	100k Ohm
Interfaces	WLAN, LAN, LTE
Dimensions	250 x 180 x 110 mm



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