

# smartex<sup>®</sup> Leak detection for long-lasting watertightness in flat roofs

Good to know that the roof is tight.

smartex<sup>®</sup>-Leak monitoring system from PROGEO will make sure that you know the condition of your roof at all times. Even the smallest leaks are reliably located.

**“Watertight or not?”** This question, based on hopes and fears, no longer needs to be asked, because it can be answered quickly, directly and easily with our special test equipment.

## Advantages:

- Provides security knowing that the roofing membrane is being checked at all times.
- Warns of damage when it happens.
- Locates leaks precisely.
- Tests watertightness during roof installation, for final acceptance, and when other trades are working over the roofing.
- Helps avoid damage to building elements and the resulting high repair costs by early detection.
- Helps preserve elements of the building structure, saves on material costs.
- Cost effective.



## mx, is, vm, vt or lp:

There is always a **smartex®**-leak detection system behind it  
- for each request, the appropriate solution.

### **mx** - high standard of safety and comfort

**smartex® mx** is the automatic, always-on leak detection system from PROGEO. It monitors the entire roof surface 24/7. Leaks are automatically and immediately recognized as soon as water penetrates into the roofing envelope. This minimizes the risk of realizing too late that the waterproofing membrane is leaking and reduces consequential damage. You will know the condition of your roof at all times.



### **is** - security for bituminous roofing systems

**smartex® is** is an electro-resistive system specialized for monitoring bituminous waterproofing and roofing systems. You can specify the time of the testing, and can even carry out the tests yourself with the use of our specialized hand-held testing terminal. Or you can use the permanently installed leak detection version of **smartex® is** for constant monitoring.

### **vm** – for regular monitoring of single-ply and roll roofing

The **smartex® vm** conductive layer under the membrane makes the systematic testing of the entire membrane possible. This is applicable for owner acceptance of the roofing system, final inspection for the manufacturer's guarantee or as a as-needed inspection procedure.



### **vt** - the leak monitoring system to retrofit into existing roofs

**smartex® vt** now makes automatic, early detection of dangerous levels of moisture in the roofing envelope possible.

Moisture levels can occur through leaks in the membrane or flashing or water vapor coming through the vapor barrier.

**smartex® vt** is easily retrofitted into existing roofs.

### **lp** - precise location of leaks in existing roofs

**smartex® lp** describes a series of leak location methods to discover unknown leakages in your existing roof without having an already built-in leak detection system.

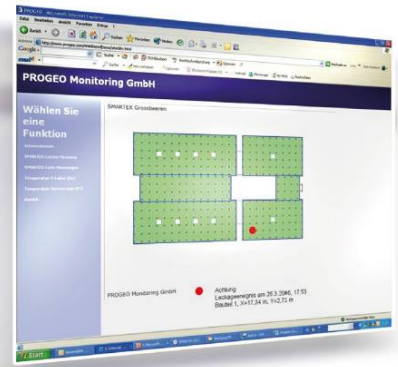


# High standard of safety and comfort



smartex® mx is the automatic, always-on leak detection system from PROGEO.

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## Installation and measurement

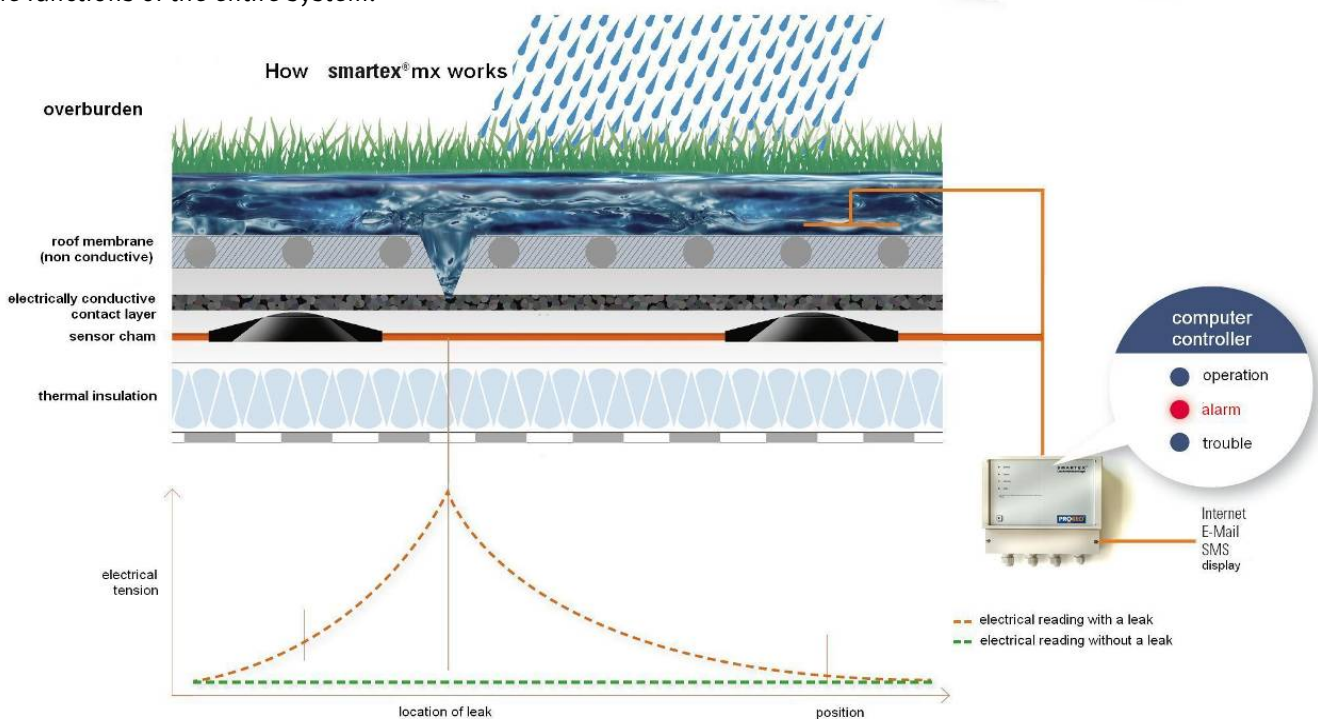
smartex® mx is suitable for all types of roofing. The system, permanently installed under the membrane, consists of sensor modules and a conductive layer, all of which are connected to a computer which generates and measures the electrical tension in the grid. The computer constantly generates status reports describing the condition of the roof at any time as it controls all the functions of the entire system.

This minimizes the risk of realizing too late that the waterproofing membrane is leaking and reduces consequential damage.

You will know the condition of your roof at all times.

## Location of Leaks

If the computer detects a leak in the roof or a fault in the system itself, it sounds an acoustical alarm. smartex® mx then calculates the location of the leak, which can be read by building column designation or by a grid overlay of a plan of the building. Connections to the internet and alarm notification by SMS and email are also available options.



**s m a r t e x® mx****Product features at a glance:**

- **Leak detection system:** s m a r t e x® conductive layer and chains of sensing modules built into the roofing envelope.
- Can be used in all available roofing systems – single-ply or hot or cold bitumen.
- Permanent, automatic roof monitoring.
- Automatic leak detection and location.
- Automatic data acquisition (optional visual representation of the roof via internet available).
- Can be used under most constructions on the roof.
- Other measurements such as temperature, moisture in the roof envelope, CO<sub>2</sub> etc. are available.

**Quality – made in Germany**

s m a r t e x® - Leak detection components are manufactured according to ISO 9001 and the DQS certified management system.

**for more information**

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## Security for bituminous roofing systems

### Installation and measurement

The core of the system is a heat resistant, conductive glass felt which is embedded between the bituminous layers in the waterproofing system. If water penetrates the upper layer, it will contact the felt which causes the signal on the roof to conduct into the felt.

The waterproofing can be tested on a regular basis within the guidelines of the building quality assurance documents, or during building use by the hand-held terminal. It can also be monitored by a permanently installed leak sensor.

Immediate and positive determination of leakage in the upper layer of the roofing is possible with this system.

**smartex® is** is an electro-resistive system specialized for monitoring bituminous waterproofing and roofing systems.

You can specify the time of the testing, and can even carry out the tests yourself with the use of our specialized hand-held testing terminal.

Or you can use the permanently installed leak detection version of **smartex® is** for constant monitoring.

### Location of Leaks

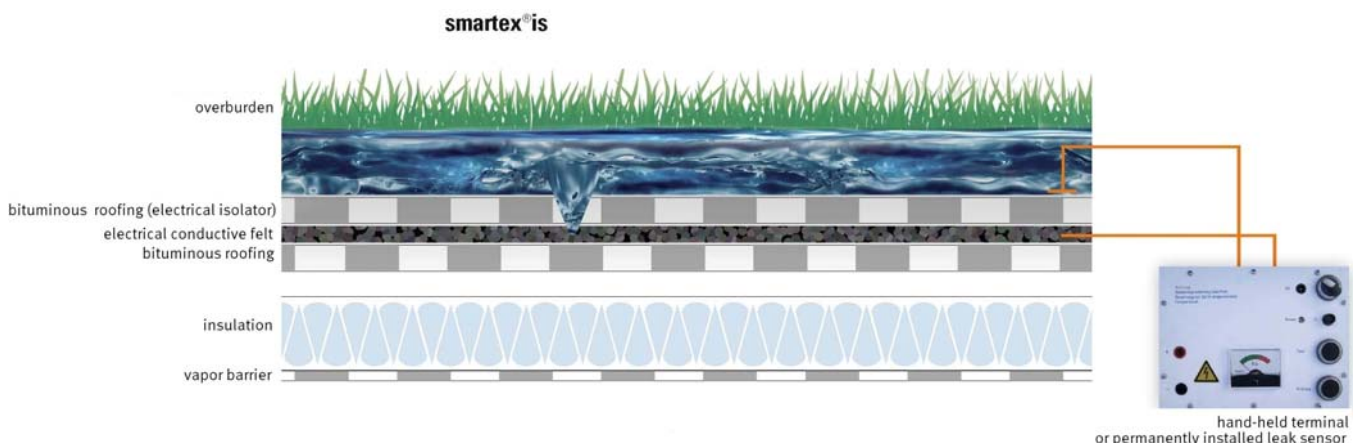
Once leakage is detected, the leak can be located by a proven method, such as **smartex® lp**. The leak is easier to locate if the conductive felt under membrane has already been partitioned into smaller testing cells.



This system makes it possible to maintain the good condition of the roofing membrane and to conserve elements of the building itself in a simple and cost effective manner.

**smartex® is** requires an electrical field on the surface of the membrane.

For best results, the measurements should be taken during, or shortly after a rain event, or the surface should be wetted by hose or mop.



hand-held terminal or permanently installed leak sensor



### Quality – made in Germany

smartex®-Leak detection components are manufactured according to ISO 9001 and the DQS certified management system.

## smartex® is

### Product features at a glance:

- Leak detection system: Install an electrically conductive layer in the roofing envelope.
- Can be used with bituminous roofing.
- The conductive layer is installed between plies of the roofing.
- Flexibility in testing by means of the independent hand-held testing terminal.

OR

- Constant monitoring with the automatic system.
- Reliable recognition of damage to the membrane.
- Leak location accomplished with specialized diagnostic methods, such as smartex® lp.
- Can be used under almost any roof covering.



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**NEW**  
Now also available for bituminous roofing

# The basic system for regular monitoring of single-ply and roll roofing

## Installation and measurement

The smartex<sup>®</sup> vm conductive layer is installed under the roofing membrane and is connected to a junction box located above the membrane. A signal cable is placed around the perimeter of the area to be tested and is also connected to the junction box.

When testing is desired by a service technician, a portable signal generator is connected to the junction box, providing electrical tension between the conductive layer under the membrane and the perimeter signal cable.

The smartex<sup>®</sup> vm conductive layer under the membrane makes the systematic testing of the entire membrane possible. This is applicable for owner acceptance of the roofing system, final inspection for the manufacturer's guarantee or as a as-needed inspection procedure.

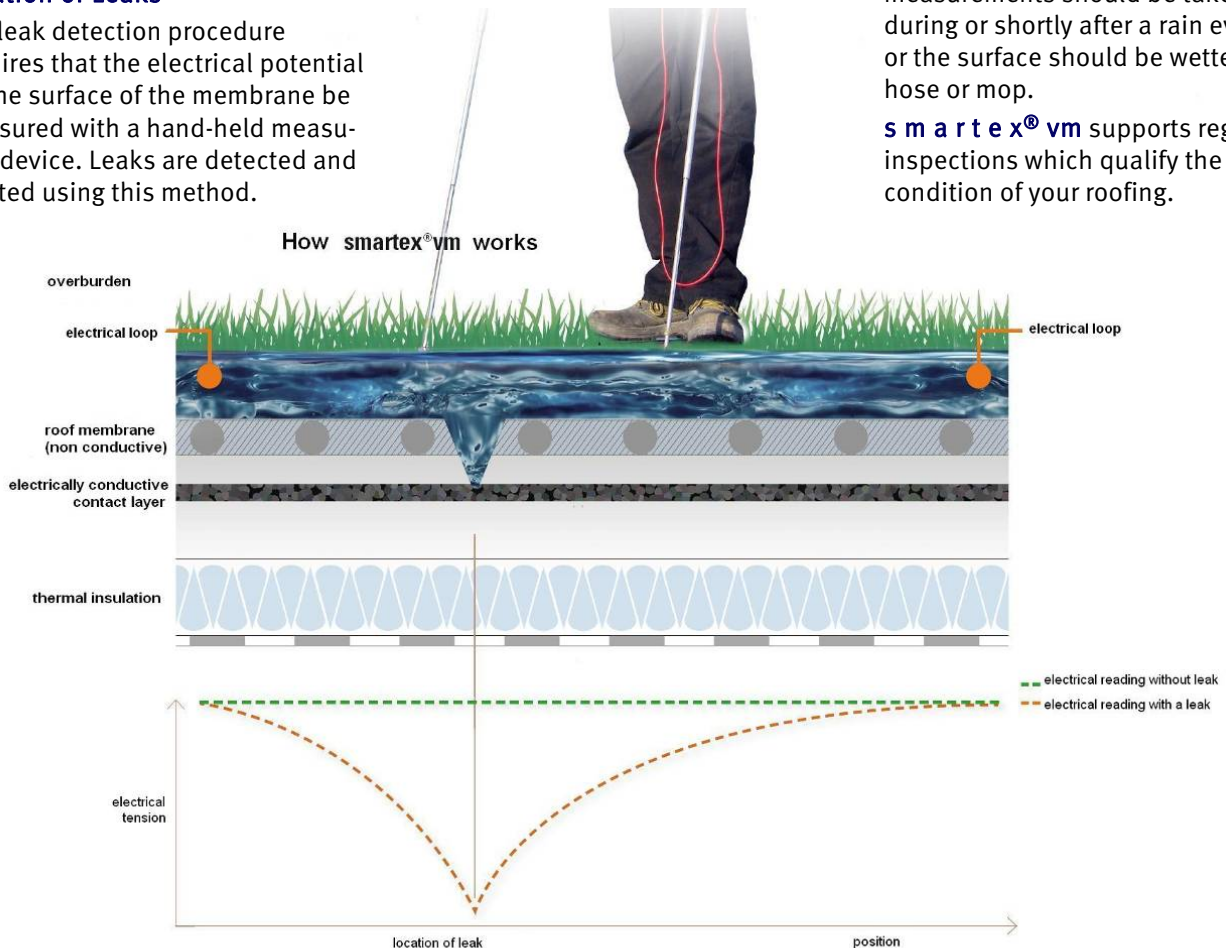


## Location of Leaks

The leak detection procedure requires that the electrical potential on the surface of the membrane be measured with a hand-held measuring device. Leaks are detected and located using this method.

Part of the smartex<sup>®</sup> vm requires measurement of an electrical field on the membrane surface. For best results, the measurements should be taken during or shortly after a rain event, or the surface should be wetted by hose or mop.

smartex<sup>®</sup> vm supports regular inspections which qualify the condition of your roofing.





## smartex<sup>®</sup> vm

### Product features at a glance:

- Leak detection system: Installation of an electrically conductive layer under the uppermost water-proofing layer to provide as-needed testing of the watertightness of the entire membrane
- Used with single-ply and roll roofing.
- You decide when the testing will occur.
- Leak testing and location can also be accomplished on an as-needed basis by using **smartex<sup>®</sup> lp**.



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## Precise location of leaks in existing roofs

PROGEO developed a leak location procedure called **smartex® lp**. This is far superior to conventional test methods, such as Impulse testing, in safety, reliability and speed.

The conventional method for qualifying a membrane which is in a constantly damp or wet condition is to flood test the membrane. This often requires building dams to maintain the depth of the test water, and can be quite expensive when testing large areas.

It is not possible to use flood testing when a roof is not bounded by walls or parapets, or if the roof is sloped.

**smartex® lp** describes a serie of leak location methods to discover unknown leakages in your existing roof without having an already built-in leak detection system.

These conditions are exactly where **smartex® lp** is of most use.

A current is applied to the roofing membrane and a probe is moved along the membrane to pick up any current coming through the membrane, indicating a leak.



If there is already leakage in the roofing, one can use a spark tester which is applied to the surface of the roofing in the area where the leak might be. Through this method, the smallest leak can be found.

### Real Application – Real Results



**smartex® lp** was first used for testing the roofing membrane at Chep Lap Kok, Hong Kong's international airport. The testing found 1,300 pinholes in an area of 160,000 m<sup>2</sup>.



**smartex® lp** is adapted for all non-conductive waterproofing and roofing membranes and for locating leaks in existing installations.



## smartex® lp

### Product features at a glance:

- **Leak location method:** Trained technician is called in to test the roofing membrane, which does not have a built-in leak location system.
- Used in all available roofing and waterproofing systems, e. g. with single-ply, bitumen or coatings, also with gravel/sand or green covering.
- You determine the time when the testing will occur.
- Testing of watertightness and location of leaks are accomplished by manual methods.



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# The leak monitoring system to retrofit into existing roofs



smartex® vt is an automatically operating leak detection system, which detects the level of moisture in the roofing envelope caused by damage in the membrane or the vapor barrier.

smartex® vt can be installed on new and refurbished roofs as well as retrofitted into existing roofs.



## Function

Where there is moisture, there is also water vapor and our atmosphere is mostly composed of water vapor. The water vapor content varies, depending on how much evaporable water is available and what temperature the water has.

This relationship applies to the vapor contained in the roofing envelope, as well. As long as the membrane and vapor barrier are intact, the air inside the envelope will contain only that amount of water vapor which can be exchanged with the air outside the envelope.

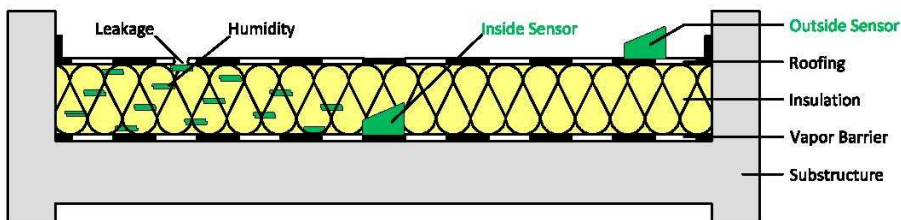
However, if the vapor barrier is not air tight or the roofing membrane leaks, then extra water or water vapor is drawn into the roofing envelope, resulting in a measurable increase in moisture.

Appropriate and continuous measurements of the water vapor content in the roofing envelope can confirm unacceptable levels of vapor and can locate the general area where leakage of the vapor barrier or roofing membrane is occurring.

For this purpose a combination of sensors which measure the water vapor and temperature in the roofing envelope, automatically transmit these data for continuous analysis. The system efficiently and effectively minimizes the risk of unknown long-term damage to the roofing envelope.

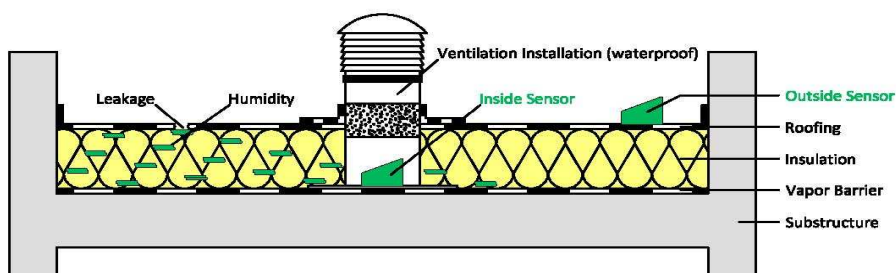
## Installation

smartex® vt is able to be retrofitted into almost any existing roofing, and can also be placed in new and reroofing work.



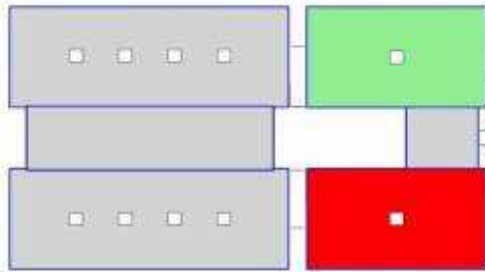
### for new construction and reroofing:

Installation of sensors into or below the insulation

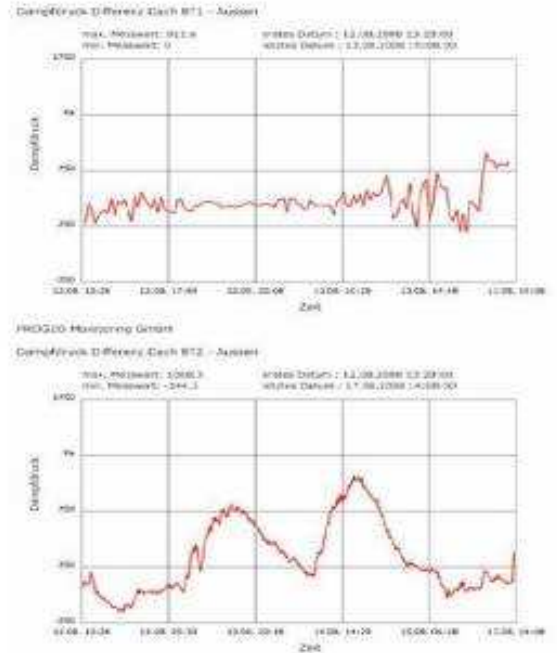


### for retrofitting into existing roofs:

Installation of a roof ventilator, in which sensors can be built in



- not monitored
- monitored, dry
- monitored, wet



**Quality – made in Germany**

smartex® -Leak detection components are manufactured according to ISO 9001 and the DQS certified management system.

**smartex® vt**

**Features at a glance:**

- Leak detection system: constant monitoring by means of permanently installed, automatic data acquisition modules
- Access to data possible via the internet
- The system is easy to install in new and reroofing work as well as to retrofit into almost every existing roof
- Early warning of moisture build-up and timely notification via E-mail, SMS, etc.
- The more sensors in place, the greater the ability of the system to localize the problem
- Constant verification of the proper functioning of the roofing envelope
- Building management receives a yearly report of conditions of the roofs



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