

FLUVES

WE CARE ABOUT YOUR CRITICAL EQUIPMENT. WE MONITOR IT.

PIPELINES

Fiber optic sensing technology prevents:

- **LEAKS**
- **THIRD-PARTY INTRUSION**
- **CORROSION**

FURNACES

Fiber optic sensing technology prevents:

- **DOWNTIME OF FURNACES**
- **HOTSPOTS**
- **UNEVEN HEAT DISTRIBUTION**
- **WEAR & TEAR OF INSULATION**

TANKS & REACTORS


Fiber optic sensing technology monitors:

- **PROCESS TEMPERATURE**
- **STRUCTURE HEALTH**
- **INSULATION DEFECTS**

CABLE

Fiber optic sensing technology monitors:

- **DEPTH OF BURIAL**
- **INTRUSION**
- **CABLE FAULTS**
- **CABLE RATING**



REDUCE DOWNTIME
EXTEND ASSET LIFETIME
BOOST ENERGY EFFICIENCY
AND INCREASE SAFETY



FLUVES

WHY IMPLEMENT FIBER OPTIC SENSING TECHNOLOGY?

POINT SENSORS

VS

FIBER OPTIC SENSING

Point sensors are prone to wear and lack robustness.



With fiber optic sensing technology, one robust telecom fiber equals thousands of point sensors.

Point sensors cannot provide complete coverage of large assets.



With fiber optic sensing technology we can monitor every meter, every minute.

Incomplete monitoring coverage may cause delays in the detection of critical problems such as leaks, third-party intrusion or temperature fluctuation.



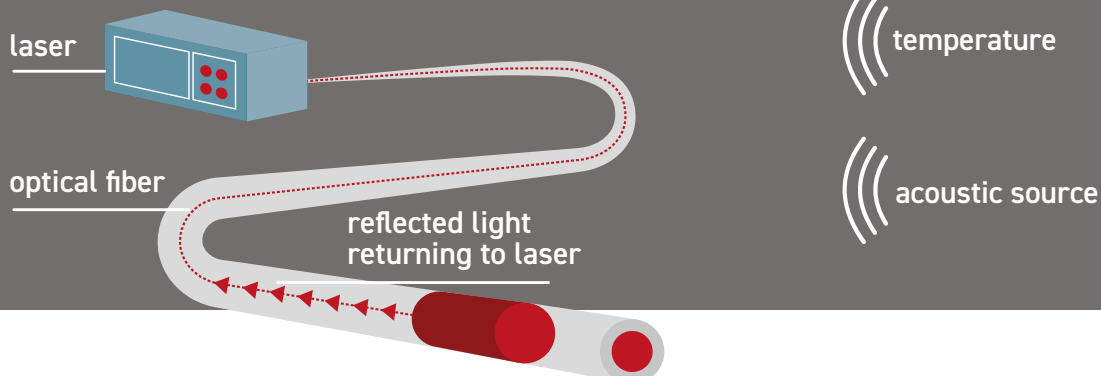
With our technology you get an instant alert when our system detects a leak, a fluctuation in the temperature or third-party intrusion on your assets.

The delays in detection are causing needless replacement of damaged infrastructure and a large number of manual inspections.



We can locate the problem with a one meter accuracy, so you can take immediate and precise action when a problem arises. This keeps the incidents and downtime to a minimum.

FIBER OPTIC SENSING TECHNOLOGY:





THE BENEFITS OF FIBER OPTIC SENSING

SPATIALLY DISTRIBUTED: One fiber equals thousands of sensors, enabling to monitor an entire site.

COST-EFFECTIVE solution for continuous long-term monitoring: Every minute a measurement over several years.

WELL-TESTED: Based on proven Distributed Temperature or Acoustic Sensing technology using standard fiber optic cables.

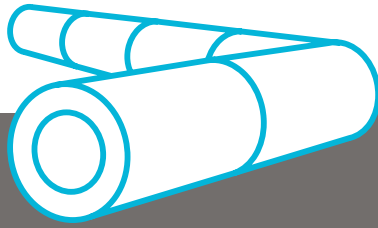
AUTONOMOUS SYSTEM: No site inspection visits are needed anymore. The system is independent of additional field power supply or additional communication installations. Data is sent in real-time to web portals.

ROBUST: Only a fiber optic cable, designed for harsh environments, is installed on the asset. All sensitive hardware is installed remotely.

HIGHLY ACCURATE: Fiber optic cables are insensitive to EMC. The parameters can be monitored with high precision, without any drift.

ATEX PROOF: No electricity involved. Only light is sent through the fiber.





UNDERGROUND PIPELINE MONITORING

LEAKS & INTRUSION

Leaks or intrusions in **underground** pipelines can be extremely hard to detect. By combining the newest Distributed Sensing technologies with our expertise on flow physics, we can detect the smallest leaks in pipelines.

Fluves joined forces with *Vigotec*, a supplier of innovative pipe systems. Together, we engineered **DALI®**.

DALI® stands for Distributed Acoustic sensing for Leakage and Intrusion.

It's an all-in-one solution for underground pipeline monitoring, that can be installed without ground works.

“Dali has a high potential to detect leaks and intrusions in our transport pipeline network in real time and at affordable cost”

WIM JACOBS innovation manager at FARYS

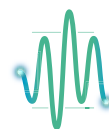
- ▶ ROI < 2 years.
- ▶ You prevent damage due to leakage
- ▶ You save massively on maintenance cost.
- ▶ Instead of having to replace large sections of underground pipelines, only the affected pipeline meter needs repairing.

HOW DOES DALI® WORK?

Every leak creates a sound, which is measured by the fiber.

Fluves' algorithms detect the typical sounds for different type of leaks and intrusions. Our web portal shows the condition of every meter of your pipeline in real time, controlled by an easy-to-use graphical interface.

- ▶ DALI® enables to precisely locate the leak along your pipeline, in the earliest stage.
- ▶ DALI® provides a vibration and acoustic sensor every meter in your pipeline for 50+ km.



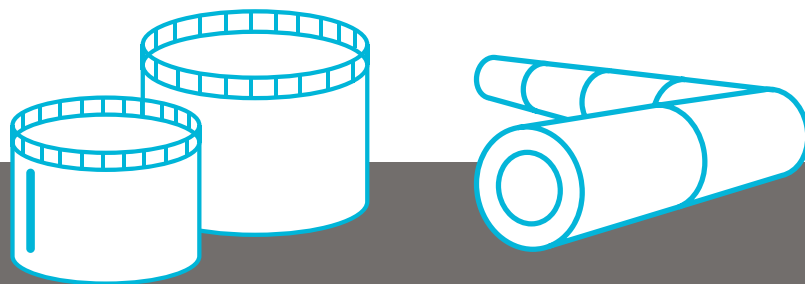
D A L I
PIPELINE MONITORING



FIBER OPTIC MONITORING AGAINST CORROSION: CUI-CONTROL

- **Detect corrosion at the earliest stages**, even before it happens.
- **Accurately pinpoint where exactly** (one meter accuracy) the corrosion is happening.
- The metrics can **differentiate** between **spots with a high risk for corrosion** and spots in the early stages of risk.
- As a bonus, our system monitors the integrity of the **insulation** layer of your **pipeline or tank**.
- You can follow the metrics via a digital dashboard on your computer and you will be **notified** when needed.

WWW.CUI-CONTROL.COM



CORROSION UNDER INSULATION

MONITOR YOUR PIPELINES 24/7 FOR CORROSION UNDER INSULATION WITH CUI-CONTROL.

Monitor your pipelines and tanks for Corrosion Under Insulation **24/7**. CUI-CONTROL continuously measures and monitors for corrosion. Whereas, previously used manual inspections are only a snapshot in time.

With CUI-CONTROL, you can easily **detect early-stage corrosion or even prevent it before it starts.**

Financial data has shown that **40-60% of pipe maintenance costs are due to CUI**. Start saving on maintenance costs today and never let corrosion happen to begin with. **Extending the lifetime of your industrial assets** is not only profitable, but also better for the environment.

“CUI-CONTROL, powered by Fluves, is able to find the exact locations of potential corrosion sites. The system is able to measure the degree of corrosion risk with great precision. Their system has the added advantage that it can be applied on the outer layer of the jacketing, without having to dismantle anything.”

Robin Guldentops
Asset Manager ESP/IL at BASF

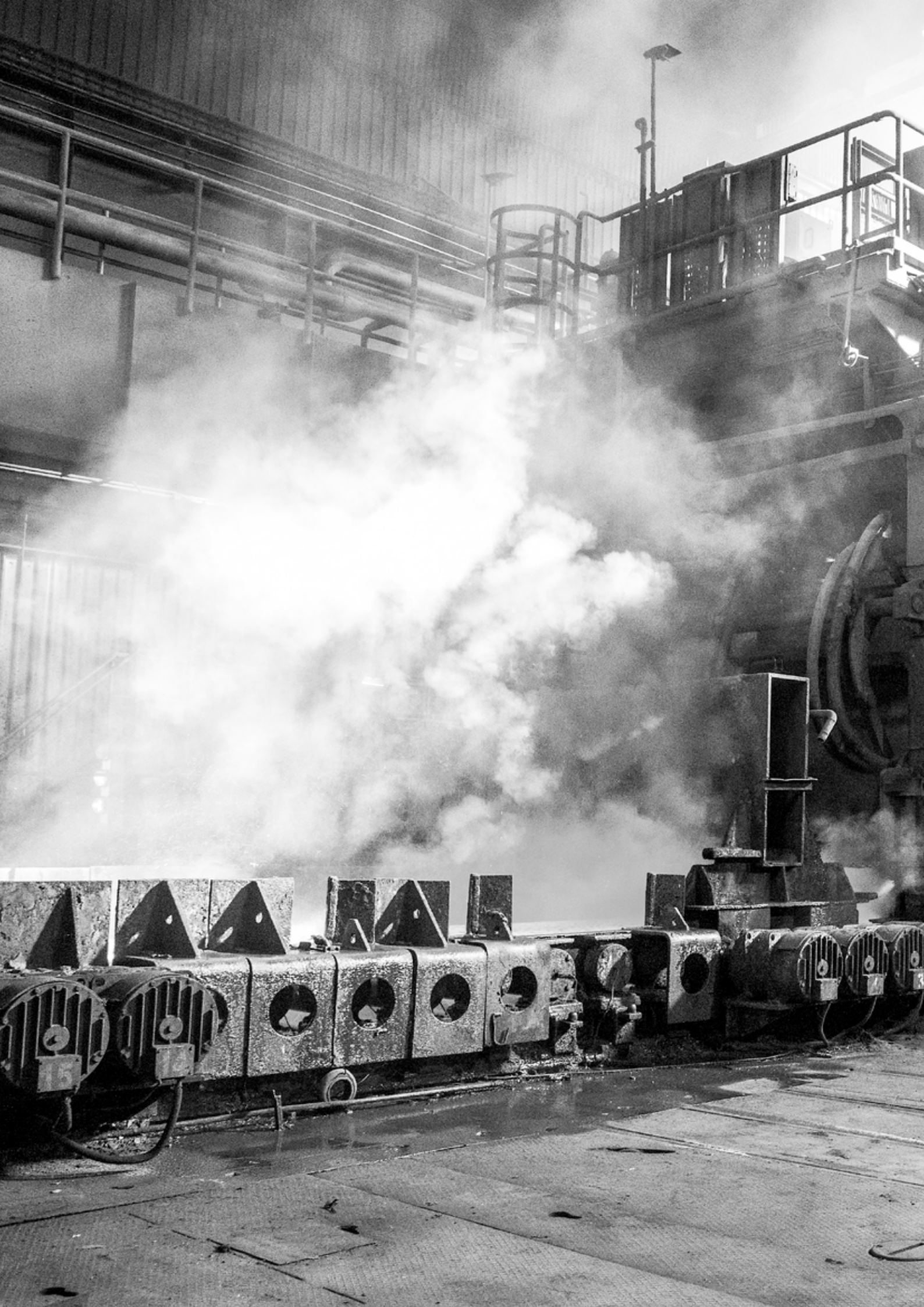


We create chemistry

► INSTALLATION = NON-INTRUSIVE

CUI-CONTROL can be installed on the outer layer of the jacketing. Nothing needs to be dismantled or punctured for the installation process. **It's easy to install.**







FURNACE MONITORING

OPTIMISE THERMAL MANAGEMENT

Our experience shows that fiber optic monitoring technology significantly reduces downtime and maintenance costs of large industrial furnaces.

CASE STUDY: APERAM

Aperam, a global player in stainless steel manufacturing, operates large industrial furnaces, which cannot be monitored using standard inspection techniques such as thermal cameras.

By applying Distributed Temperature Sensing (**DTS**), we measure temperature on every m² of the outside of the furnace, during its operational heat cycles.

Our technology can quickly delimit the areas where the thermal insulation of the furnace needs replacement.

ATEX PROOF: No electricity involved. Only light is sent through the fiber.

When the temperature increases abnormally during the heat cycles, the thermal insulation failed on these locations.

Raw DTS measurements are converted to a user-friendly heat map of the furnace, displayed in a web portal for the operational team.

In the case of the Aperam furnace, our technology could confirm that most parts of the furnace were in perfect condition, only a small section of the furnace needed repair.

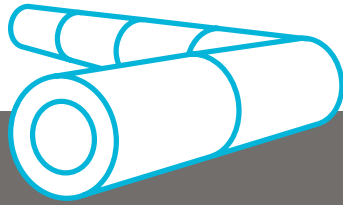
Our technology also prioritizes the locations according to the remaining lifetime of the thermal insulation.

This knowledge results in a significant reduction of maintenance costs.

“The expectations we had of the Fluves monitoring system were largely exceeded.”

— ERIK INDESTEEGE supervisor repairables and instrumentation at APERAM





FIBER REMOTE INSPECTION FOR INTEGRITY OF SEWERS

CHECK THE STATUS OF YOUR SEWER BY MONITORING THE PERFORMANCE OF EVERY METER.

Based on distributed temperature sensing (DTS), we can monitor the hydraulic performance of every meter of a sewer, including undesired water ingress and blockages.

A DTS system measures ambient temperature along a fiber optic cable. When firing laser pulses in a fiber optic cable, a small fraction of the transmitted light is reflected, and the intensity and frequency of the reflected light are dependent on the cable temperature. With such a laser, the temperature can be measured continuously every meter for up to 50 kilometers with a high level of accuracy (0.1°C) along the fiber in the sewer. Measurements can be performed every meter along the cable on a designated basis (minute, hourly, daily, monthly).

"In many regions, up to 50% of the water arriving in sewage treatment plants is not polluted water, but unwanted infiltrations, leaks and illicit connections."

► Benefits

The distributed and continuous nature of the temperature measurements is used to localise cold or hot water ingress in the sewage system. Cold water ingress comes from rain or ground water entering the sewage system through leaks in the sewage pipes. Hot water ingress comes from household connections. The time series of the temperature measurements are visualized for the client in a dedicated dashboard. Based on the temperature measurements and advanced data analytics, sewage blockage can be detected. Our algorithms also enable to estimate flow velocity of the sewer fluids.

► **Detect sewage blockage and estimate flow velocity of the sewer fluids.**





GET TO KNOW FLUVES

WE CARE ABOUT YOUR CRITICAL EQUIPMENT. WE MONITOR IT.

Once an engineering start-up of five employees, Fluves is now a market leader and key innovator in the monitoring industry.

What about your company?
Is all your critical equipment adequately monitored?

Better call Fluves.

We provide monitoring services for flow and thermal processes in industry and utilities.

As experts in innovative Distributed Fiber Optic Sensing technology, we create new measurement possibilities for a range of industrial facilities that are otherwise hard to monitor.

The real value of this technology comes when our in depth analytics software converts the raw data - such as leaks - into relevant and understandable metrics. They are presented in a real-time dashboard that notifies you instantly with an automatic alert when a problem arises.

CONTACT US



www.fluves.com



T. +32 9 346 85 30



sales@fluves.com



Stropkaai 55
9000 Ghent
Belgium



SOME OF OUR FLUVES CLIENTS

BASF
We create chemistry

Farys

SIBELCO

PARK WIND

DJN Jan De Nul GROUP

Pidpa

TIG environmental

operam



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Here you see two of our engineers, Thijs and Douwe, setting up the hardware that is connected to the fiber on your assets.

After the installation is done, the process is completely autonomous. There is no need anymore for manual site inspections.

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www.fluves.com



T. +32 9 346 85 30



sales@fluves.com



Stropkaai 55
9000 Ghent
Belgium