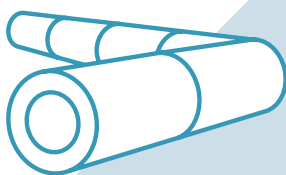


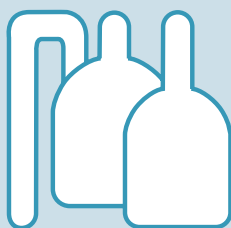
# FLUVES

## MONITOR EVERY METER OF CRITICAL ASSETS THROUGH FIBER OPTICS

Increase safety ~ Reduce downtime ~ Extend asset lifetime



PIPELINE



TANK-REACTOR



FURNACE



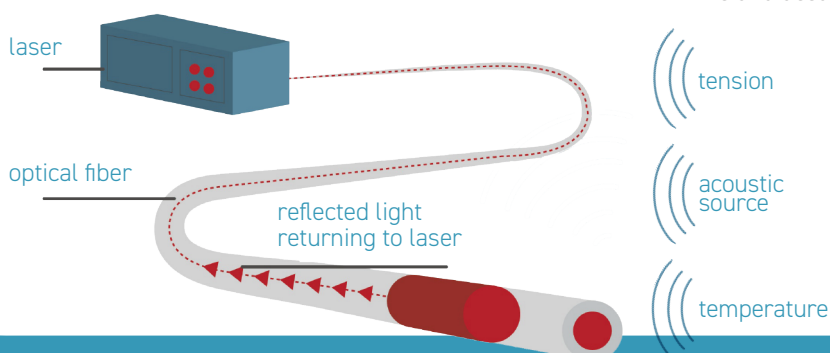
CABLE

### SHORTCOMINGS OF POINT SENSORS

The process industry extensively relies on point sensors to monitor critical assets and processes. However, point sensors cannot provide complete coverage of large assets, leading to delays in detecting a leak, needless replacement of infrastructure and a large amount of manual surveys. This is especially true for difficult-to-reach infrastructure, such as underground pipelines, reactors, furnaces or tanks. Moreover, traditional point sensors are often cumbersome to install, prone to wear and lack robustness.

### FAST AND ACCURATE MONITORING WITH FIBER OPTIC SENSING

With fiber optic sensing technology, one robust telecom fiber equals thousands of sensors. This enables to locate leaks and other faults as soon as they appear, **avoiding downtime and extending the lifetime of your entire site.** Parameters such as temperature, fluid flow, leakage, pressure, third-party intrusions or insulation thickness can be measured every minute and every meter along the entire fiber length. **This provides unprecedented response time and accuracy in leak or fault detection.**



FLOW MONITORING





# PIPELINE MONITORING WITH ROI < 2 YEARS

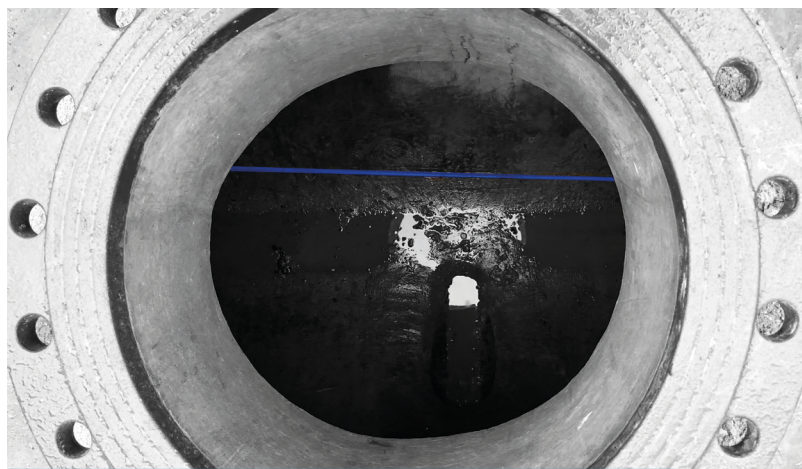
## LEAK & INTRUSION DETECTION

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 underground pipelines.

Fluves joined forces with Vigotec, a supplier of innovative pipe systems. Together, we engineered **DALI®**, an all-in-one solution for underground pipeline monitoring, that can be installed without ground works!

## DALI PIPELINE MONITORING

**DALI®** stands for **Distributed Acoustic sensing for Leakage and Intrusion**. DALI enables a secure installation of a fiber in your pipeline, providing a vibration and acoustic sensor every meter in your pipeline for 50+ km.



**DALI**  
PIPELINE MONITORING



## ROI < 2 YEARS

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. You are not only preventing damage due to the leakage, but also save massively on maintenance cost.

**Instead of having to replace large sections of underground pipelines, only the affected pipeline meter needs repairing. The ROI on DALI is generally less than 2 years.**



# REDUCING MAINTENANCE COST AND DOWNTIME OF INDUSTRIAL FURNACES

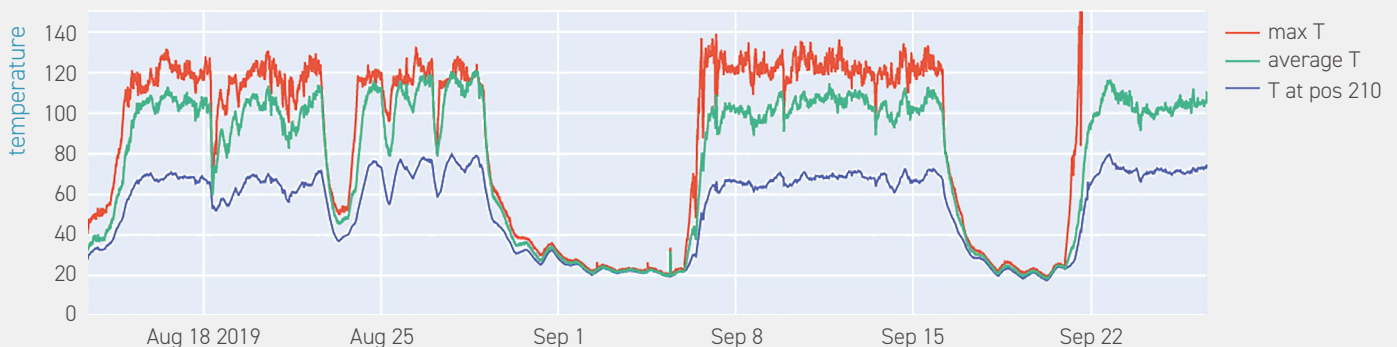


## THERMAL INSULATION REPLACEMENT

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) in 2019, **Fluves could quickly delimit the areas where the furnace's thermal insulation needed replacement.**

## TEMPERATURE MEASUREMENTS

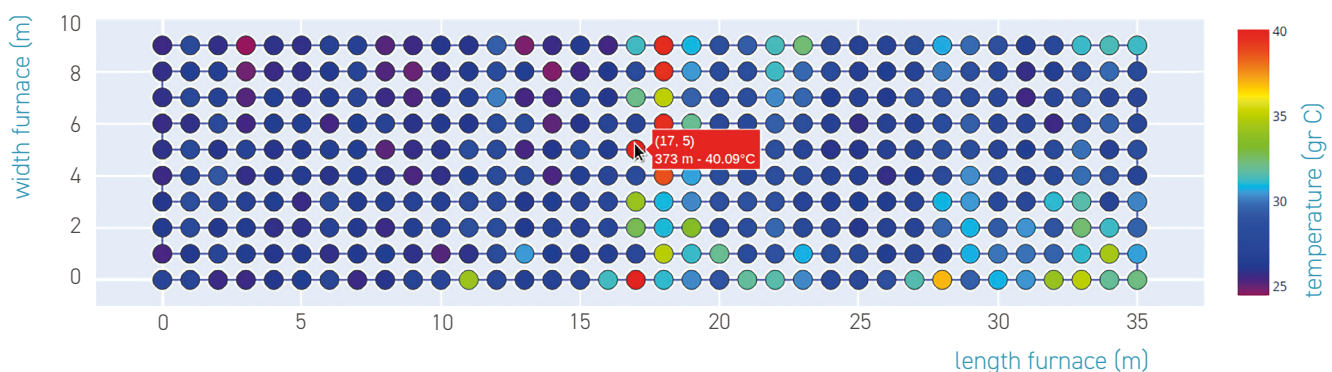
**Our DTS technology measured temperature on every m<sup>2</sup> of the outside of the furnace, during its operational heat cycles.** If the temperature increases abnormally during these cycles, the thermal insulation failed on these locations.



## CUTTING MAINTENANCE COST IN THE FIRST WEEKS OF OPERATION

Raw DTS measurements were converted to a user-friendly heat map of the furnace, displayed in a web portal for the operational team of Aperam. As Fluves could confirm that most parts of the furnace were in perfect condition, only a small section of the furnace needed repair, resulting in a

significant reduction in maintenance costs. Fluves could also prioritize the locations according to the remaining lifetime of the thermal insulation. **The expectations of Aperam of our monitoring solution were largely exceeded.**



# FLUVES AND DISTRIBUTED FIBER OPTIC SENSING

## ABOUT FLUVES

**Fluves is an engineering company providing monitoring services for flow and thermal processes in industry and utilities.**

We specialize in **Distributed Fiber Optic Sensing**, creating new measurement possibilities for a range of industrial facilities that are otherwise hard to monitor.

**But we go beyond measurements:** our analytics software converts raw data into relevant, understandable metrics presented in a real-time dashboard.

Through reflection of laser light pulses, temperature, vibration or sound is continuously measured. Distributed Temperature Sensing (DTS) and Distributed Acoustic Sensing (DAS) are fully distributed monitoring systems, sensing temperature and acoustic sources every meter over the entire fiber length. They can measure up to 50 kilometers and more, providing more than 50 000 sensors.

**From the measurements, parameters such as liquid flow, leakage, pressure, intrusion or insulation thickness can be measured on every meter along the entire fiber length.**

## SOME OF OUR CLIENTS



## FEATURES

- ~ **Spatially distributed:** One fiber equals thousands of sensors, enabling to monitor an entire site.
- ~ **A cost-effective solution for continuous long-term monitoring:** Every minute a measurement over several years.
- ~ **Based on well-tested Distributed Temperature or Acoustic Sensing technology:** Using standard fiber optic cables.
- ~ **Autonomous measuring system:** Independent of additional field power supply or additional communication installations. Data is sent in real-time to web portals. No site survey visits are needed anymore.
- ~ **Robust:** Only the cable, designed for harsh environments, is installed on the asset; all sensitive hardware is installed remotely.
- ~ **High accuracy:** Fiber optic cables are insensitive to EMC, parameters can be monitored with high precision, without any drift.
- ~ **ATEX compliant:** No electricity is involved, only light is sent through the cable.

**MORE INFORMATION?  
PLEASE GET IN TOUCH!**

# FLUVES

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