# LOCTITE PULSE

KiK|MPi
Kennis- en innovatiecentrum
Maintenance Procesindustrie

**Webinar INNO-BREAK - 04/07/23**

**Rob Helmich** – Account Sales Engineer MRO NL
**Jan Van Put** – Business Development Manager WE MRO4.0

# Henkel

SALES
€22.4 BN

EXPERIENCE
147 YEARS

EMPLOYEES
52,950 EXPERT

EBIT
€2.3 BN

ACTIVE IN
150 COUNTRIES

MANUFACTURING IN
184 SITES

## CONSUMER BRANDS

€11 BN
SALES

Persil · all · Schwarzkopf · Dial

## ADHESIVE TECHNOLOGIES

€11.2 BN
SALES

LOCTITE · BONDERITE · TECHNOMELT · Pattex · Pritt

Fiscal Year 2022

# ADHESIVE TECHNOLOGIES

SALES
€11.2 BN

EBIT
€1.5 BN

- Global market leader
- Only player present across all segments
- Truly global footprint, active in more than 150 countries
- Long trusted partnerships with >130,000 customers across broad range of industries

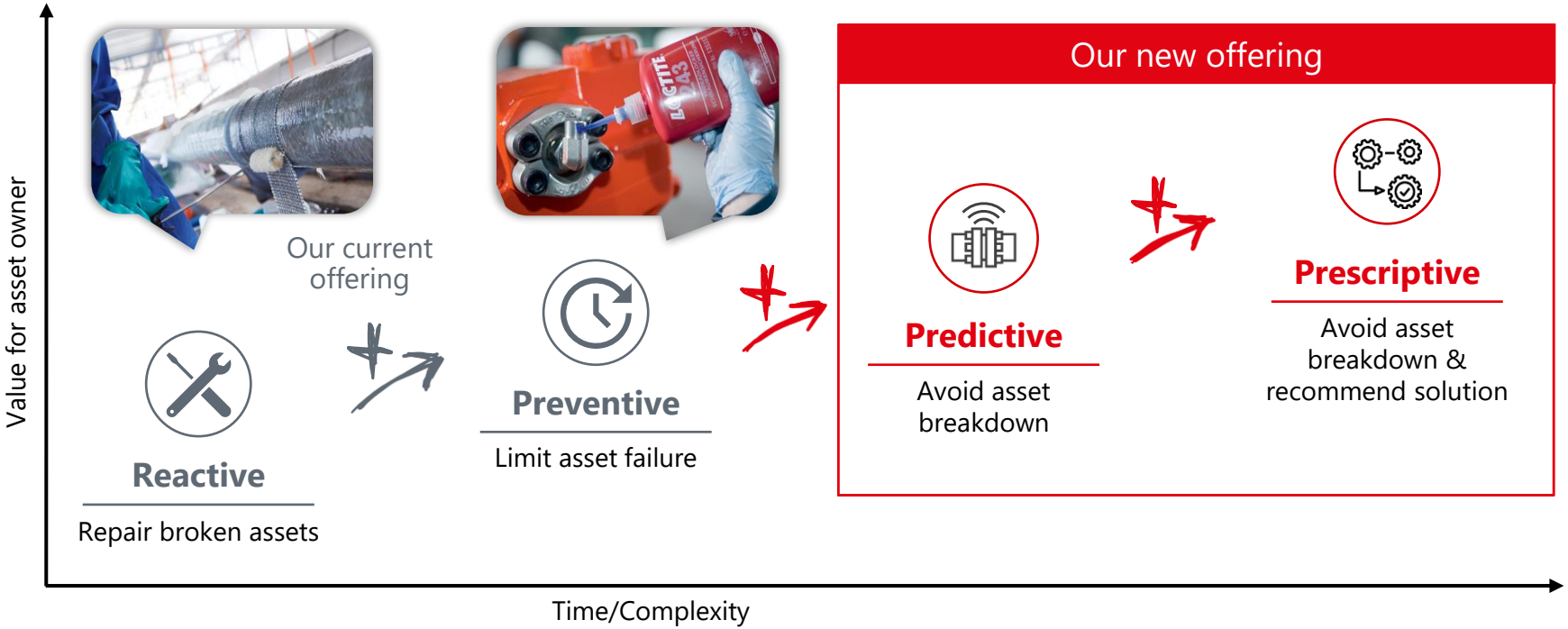
LOCTITE®

SALES
>€3 BN

*The* trusted choice for high-performance adhesive, sealant, coating & cleaner solutions across industries.

# HOW OUR OFFERING EVOLVES

## FROM ‘REACTIVE’ TO ‘PRESCRIPTIVE’




LOCTITE Pulse

# LOCTITE® Pulse is building up on 4 Mega Trends

## Digitalization

- Processing power
- Connectivity
- Storage cost
- Software improvements

## Sustainability

- Increased regulatory requirements
- Shift of stakeholder focus

## Energy Costs

- Increasing cost of fossil fuels
- Energy transition
- Aging infrastructure

## Skills Shortage

- Finding trained workforce becoming more challenging
- Aging workforce
- Increasing labor cost
- Increased skill requirements & complexity

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# PREDICT YOUR EQUIPMENT'S NEXT MOVE

Continuous Monitoring Solution

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# LOCTITE® Pulse

## Available

Smart Flange

Smart Pipe

Smart Steam Trap

## Coming soon

...

...

...

...

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Let's talk about...

# SMART FLANGE

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# KNOWN INDUSTRY PAIN POINTS

Leakages cause **unplanned downtime** and thus significant **opportunity costs**.

**Manual inspection** of critical flanges as well as their **repair** cause significant **personnel** and **material costs**.

Undetected leaks can lead to **catastrophic failures** and present a significant **safety risk**.

Leaks of critical media can result in significant **environmental** and **reputational damage**.

**Manual inspection** and **documentation** lead to **low transparency** about weak points and hamper optimization.

# BENEFITS OF LOCTITE® Pulse

By **detecting leaks before they escape** to the environment, repairs can be planned, and **unplanned downtime reduced**.

Continuous monitoring **reduces need for manual inspection** of critical flanges. In addition, **repair costs** can be significantly **decreased through advance planning**.

**Early detection** of leakages can prevent catastrophic failures and **increase plant safety**. In addition, **HSE risks associated with inspection or repair can be reduced**.

The **leakage of environmentally harmful media** to the environment is **prevented**, thus **increasing sustainability** and protecting **reputation**.

**Continuous digital documentation** of the asset status and its accessibility **increase transparency** and **reveal potential for improvement**.

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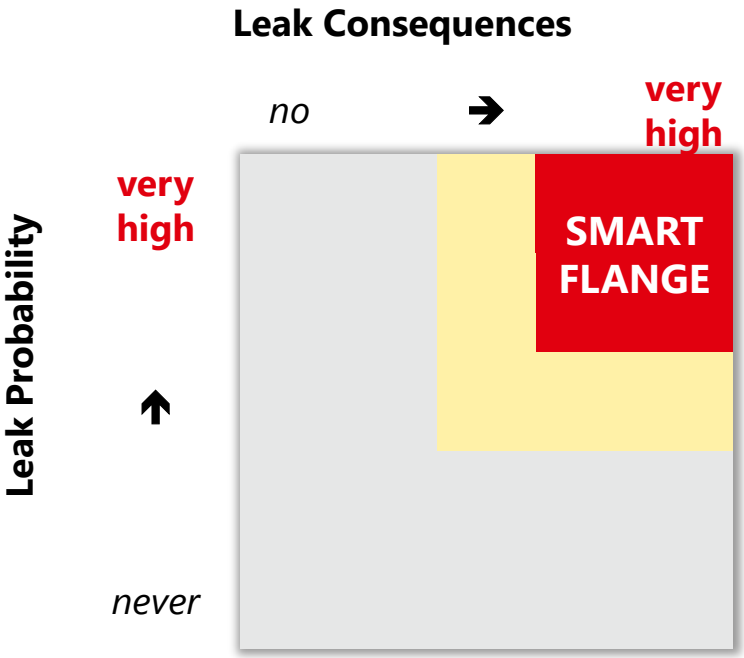
# TOP APPLICATIONS FOR SMART FLANGE

## HOW TO IDENTIFY CRITICAL FLANGES



**Environmental factors**,
Hazardous media, local environmental requirements and conditions

**Safety**
plant condition, corrosiveness of media, people working close by

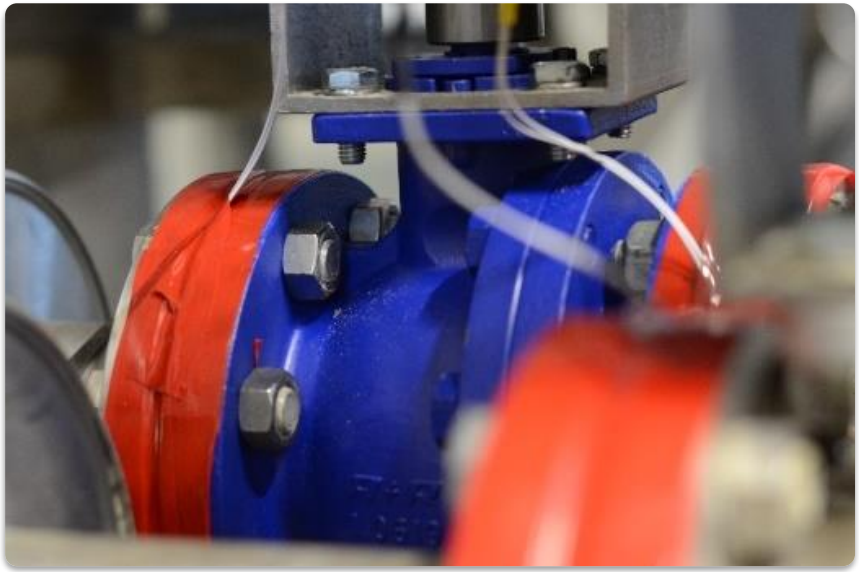
**Hardly accessible & low inspection frequency:**
e.g. buried, under insulation

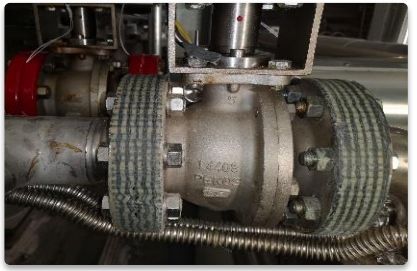
**Technical & Regulatory**
e.g. flange size or recent changes of regulations like adaption of safety precautions so that the operating license remains intact

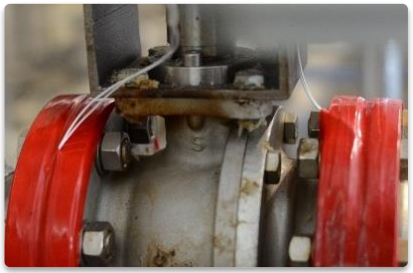
# LET'S TAKE A LOOK AT THE SOLUTION!

## SMART FLANGE INSTALLATION EXAMPLES

MENU







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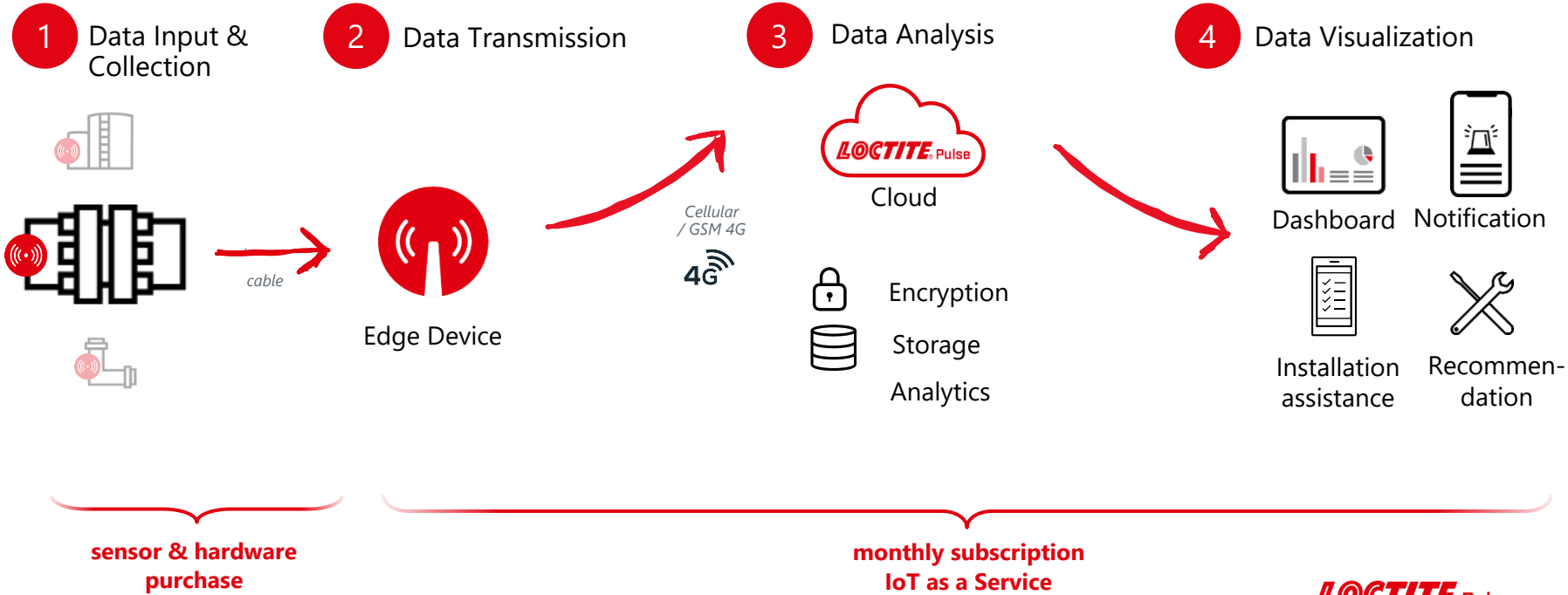
# SCHEMATIC SOLUTION OVERVIEW

## WHAT DOES OUR SOLUTION SET-UP LOOK LIKE?

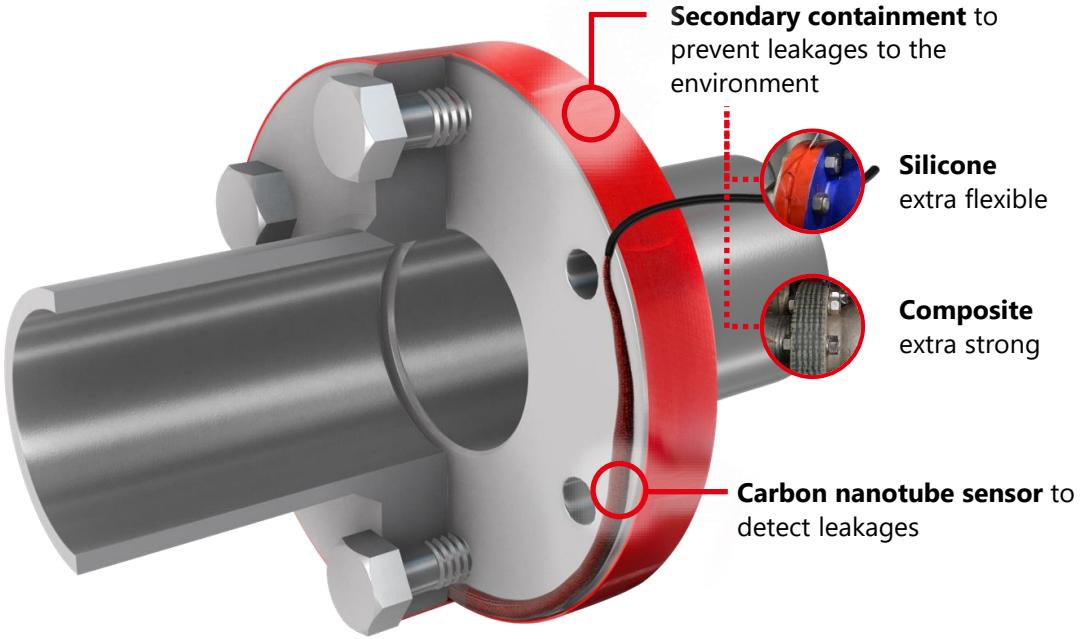


# 1 DATA COLLECTION

## HOW IS THE DATA COLLECTED?

### CONTINUOUS MONITORING OF CRITICAL FLANGES

- **INNOVATIVE**: Novel, patented carbon nanotube technology reacts in < 1 min
- **NON-INTRUSIVE:** Retrofit, no shutdown required
- **PEACE OF MIND** : Secondary containment can slow down the leakage and gives time for planning the repair
- **ALWAYS ON:** continuous reporting of leaks – 24/7, 365 days a year
- **RELIABLE**: Robust and consistent signal generation
- **CUSTOMIZABLE**: Two Secondary Containment options
- **SPECIFIC:** Detection of liquid hydro-carbons. Not influenced by humidity.

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# 2 + 3 DATA TRANSMISSION & ANALYSIS

MENU

## HOW IS THE DATA TRANSMITTED AND ANALYZED?

### DATA TRANSMISSION AND ANALYSIS

- **SELF-SUFFICIENT**: No local power supply needed thanks to battery with a service life of up to 5 years
- **INDEPENDENT**: Independent of local network thanks to cellular communication
- **ROBUST**: Robust design for indoor and outdoor use
- **CLOUD-BASED**: Efficient operation thanks to intelligent division of local and cloud-based data analytics
- **SECURE**: Compliance with state-of-the art IT security standards
- **SAFE**: Certified explosion protection
- **Cost Efficient:** Part of Subscription

**Cellular communication**
independent of corporate or local network

**Battery driven**
with a service life of up to 5 years

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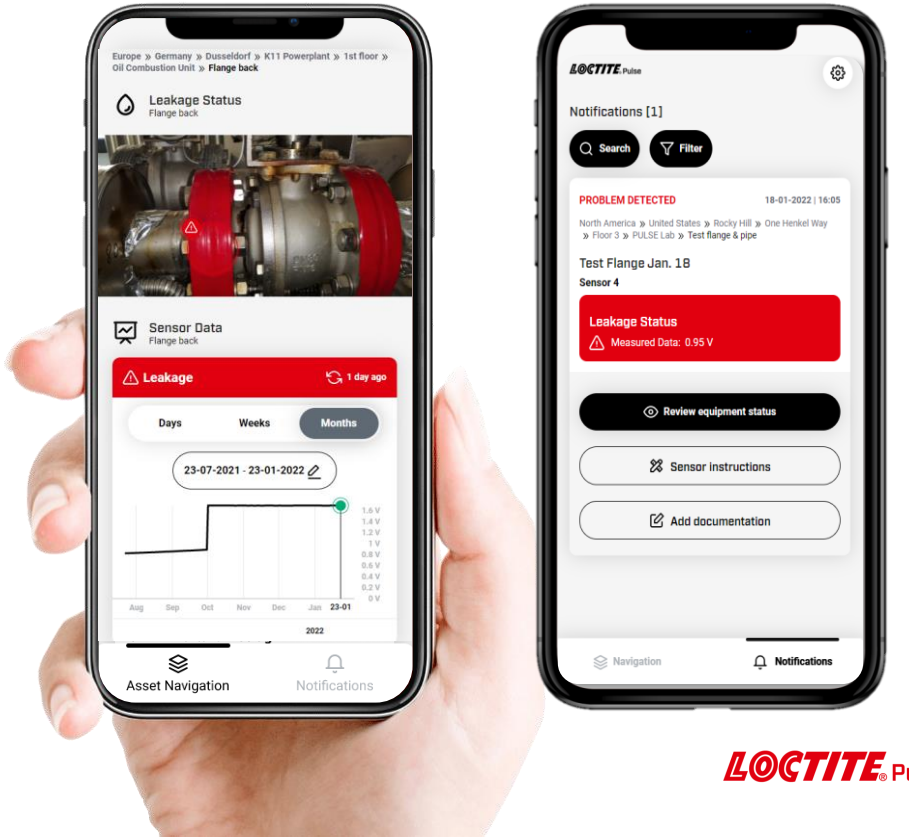
# 4 DATA VISUALIZATION

## HOW IS THE INFORMATION ACCESSIBLE AND VISUALIZED?

### PROVISION OF INFORMATION OPTIMIZED FOR USER NEEDS

- **INDEPENDENT**: Web-based platform independent of end device or operating system
- **ONE-STOP-SOURCE**: All LOCTITE® Pulse solutions are integrated into one system
- **ACCESSIBLE**: Location-independent access to the information
- **USER-FRIENDLY**: Simple and intuitive handling and installation
- **CUSTOMIZABLE**: Content and structures adaptable to customer requirements
- **ROLE-BASED**: Role-dependent preparation of data and functions

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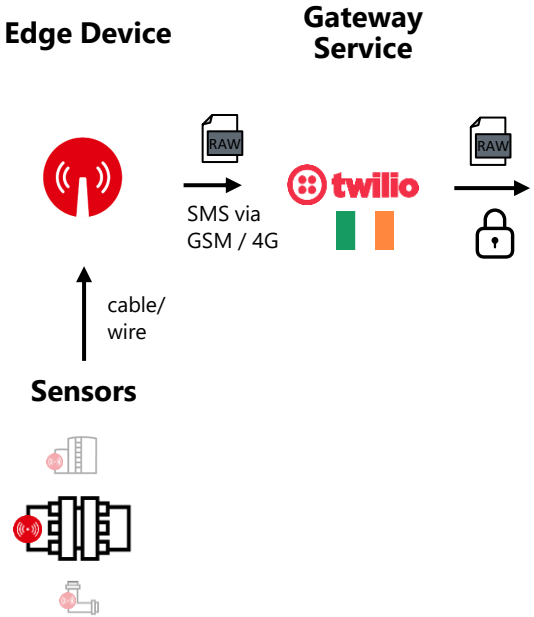
# LOCTITE PULSE SOFTWARE ARCHITECTURE

## SMART FLANGE - OVERVIEW




**Henkel Data Foundation (HDF)**
Azure **Cloud Solution**

**Functions:**

- Data Storage
- raw data ingestion & conversion
- Data transmission across multiple platforms

**Tools:**

- Azure Data Lake Gen 2
- AZ Event Hub
- MS Azure Functions
- AZ Data Factory
- AZ Keyvault

**LOCTITE Pulse Web App**

**Functions:**

- Data enrichment
- Visualization
- Web App Service
- Authentication
- Notification Service

**Tools:**

- AZ SQL database
- AZ Service Bus
- AZ Blob Storage
- MS AZ function
- AZ Logic Apps

Input https

**End User**

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# HOW WE HELPED A REFINERY WITH SMART LEAK DETECTION TO REDUCE COSTS AND DOWNTIME

EXEMPLARY SUCCESS STORY – H&R SALZBERGEN

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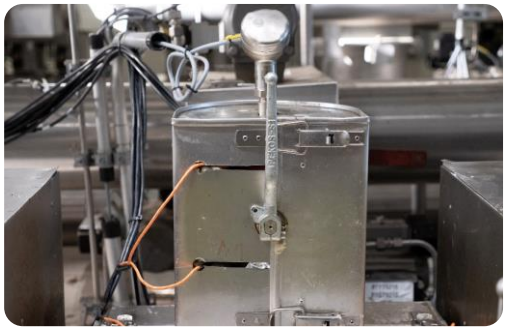
## Problem

Reoccurring hydrocarbon leakages cause unplanned downtime, repair costs and HSE risks.



Covered under **insulation**!

## Solution

Smart monitoring solution warns operator with notifications when a leakage occurs.

Additional safety thanks to **secondary containment**!

## Results

**Secondary** level of safety due to **early detection** of leakages

**Reduction** of **manual inspection efforts** and **removal of insulation**

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# HOW WE HELPED A REFINERY WITH SMART PIPE TO REALTIME MONITOR CRITICAL PIPES

SHELL ENERGY AND CHEMICALS PARK RHEINLAND

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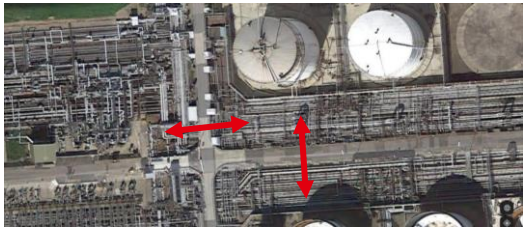
## Problem

Manual inspection of critical pipes at street crossings are mandatory, time consuming and expensive

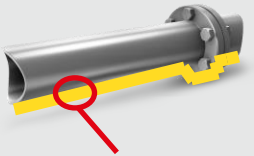


CONFIDENTIAL

## Solution

Continuous monitoring of pipes under the street crossing with carbon nano tube sensors

16 m long sensor set including accessories



**Carbon nanotube sensor** detects even smallest leakages

## Results

**Secondary** level of safety due to **early detection** of leakages

**Reduction** of **manual inspection efforts**

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Let's talk about...

# SMART STEAM TRAP

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# KNOWN CHALLENGES

- Manual inspection
- Delayed fault detection
- Energy losses & CO2 emissions
- Water hammer
- Condensate accumulation & downtimes

# BENEFITS OF LOCTITE® Pulse

- 24/7 inspection with increased detection rate
- React immediately to errors
- Reduction of energy losses
- Reduced risk
- Increased process reliability and quality

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# STEAM TRAPS

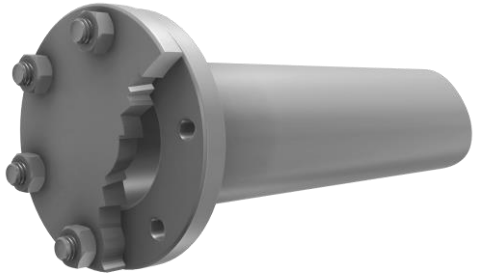
COMMON PROBLEMS

## Stuck Open

- **Steam Loss**
- **CO2 Emissions**

## Stuck Closed

- Water Hammer Consequences
- No Condensate Removal

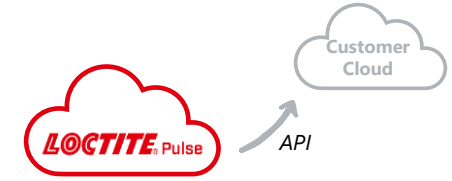


# LET'S TAKE A LOOK AT THE SOLUTION!

# SCHEMATIC SOLUTION OVERVIEW

## FROM SENSOR TO RESULTS

Raw
Data

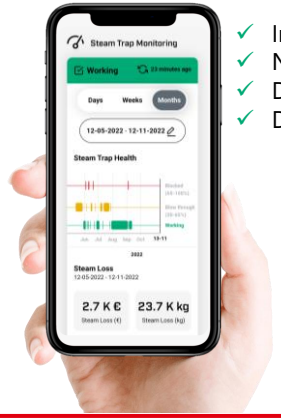



Analyzed
& Raw
Data

Encryption

Storage

Analytics




- ✓ Inst. Assist.
- ✓ Notifications
- ✓ Dashboard
- ✓ Documentation

**sensor & hardware purchase**

**monthly subscription**
**IoT as a Service**

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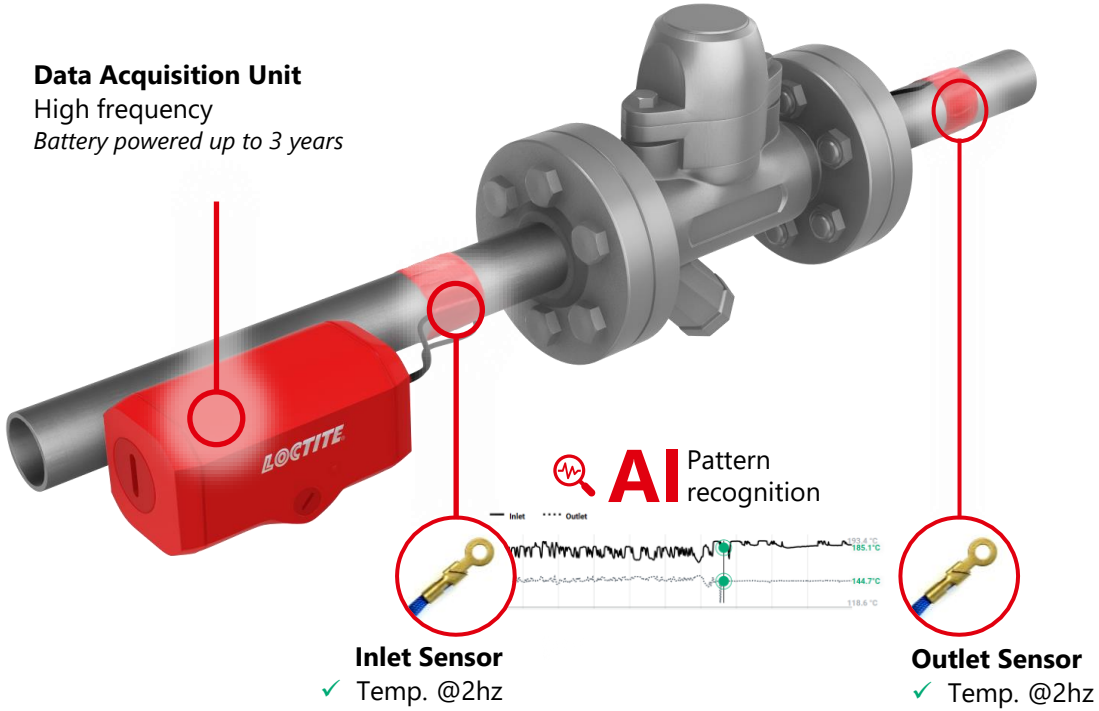
# 1 DATA COLLECTION

## HOW IS THE DATA COLLECTED?




## CONTINUOUS MONITORING OF STEAM TRAPS

- **NON-INTRUSIVE:** Retrofit, no shutdown required
- **QUICK & EASY ROLL OUT:** start monitoring Steam Traps in short time
- **ALWAYS ON:** continuous reporting of failures – 24/7, 365 days a year
- **RELIABLE**: High failure detection probability
- **ALL-IN-ONE:** Detection of all relevant Steam Trap failure types.

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# 2 + 3 DATA TRANSMISSION & ANALYSIS

## HOW IS THE DATA TRANSMITTED?

**COST EFFICIENT & SECURE DATA TRANSMISSION**

- **SECURE**: Independent of local network thanks to cellular communication
- **ROBUST**: Robust design for indoor and outdoor use
- **SAFE**: ATEX certified
- **LOW CAPEX:** Part of Subscription Service

**Cellular communication**
independent of corporate or local network

**Bluetooth Connection**
can connect to up to 4 Steam Traps

**Power**
Requires external power supply

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# 4 DATA VISUALIZATION

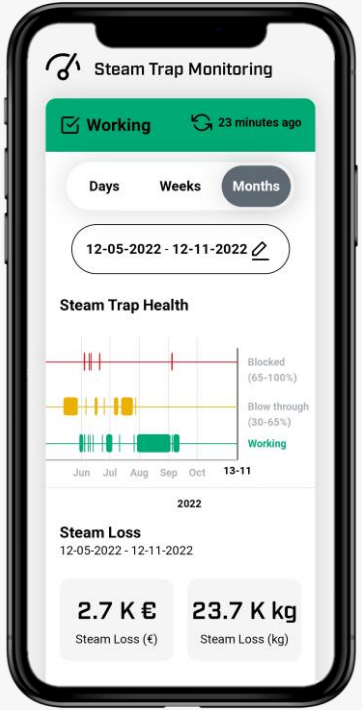
***Photo*** for quick identification of Steam Trap

Current Steam Trap ***Condition*** and access to raw data

***Analytics results*** and condition history

Information on ***steam loss (kg)*** & ***monetary losses (€)***

Steam Trap maintenance ***documentation*** tools & ***history***



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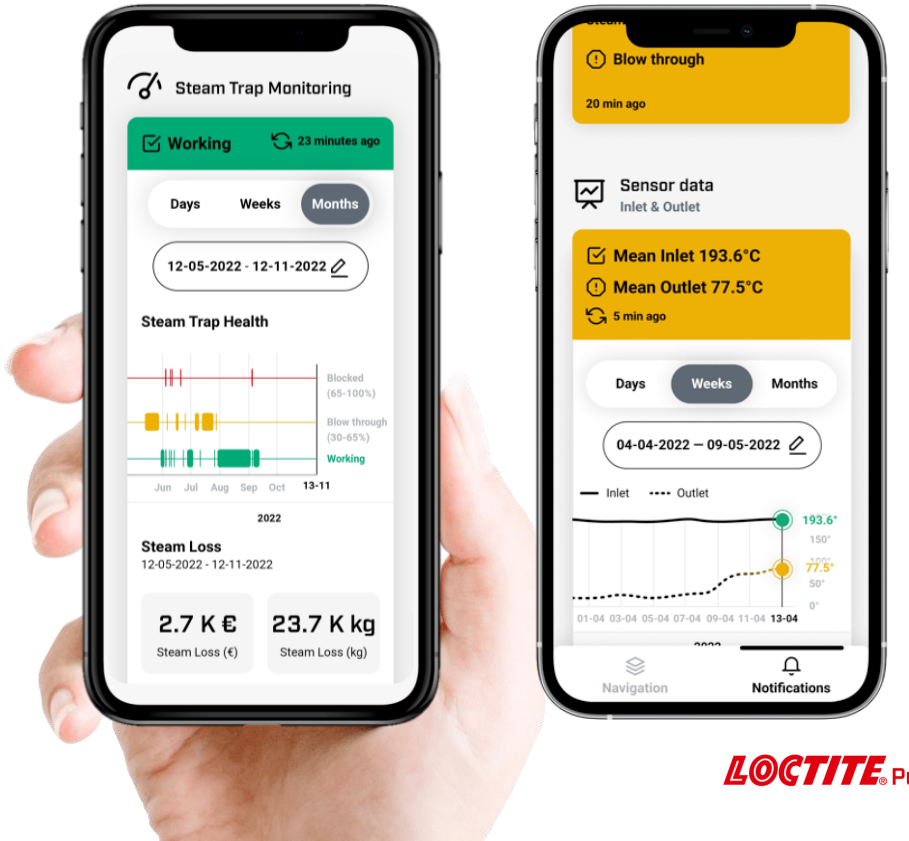


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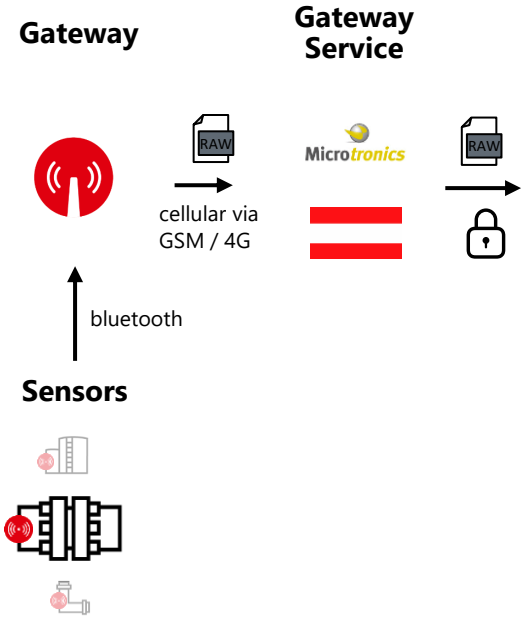
# LOCTITE PULSE SOFTWARE ARCHITECTURE

## OVERVIEW

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Input https

**End User**

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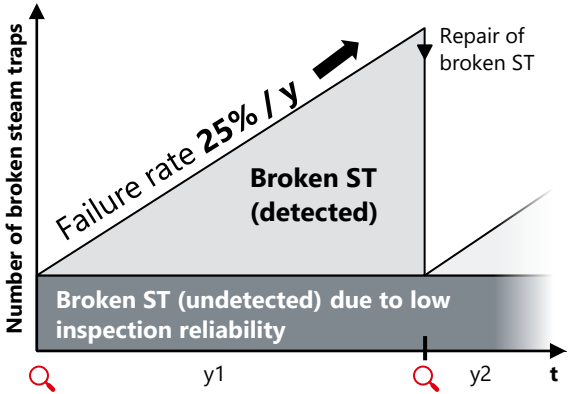
# STEAM TRAP MONITORING – VALUE CALCULATION

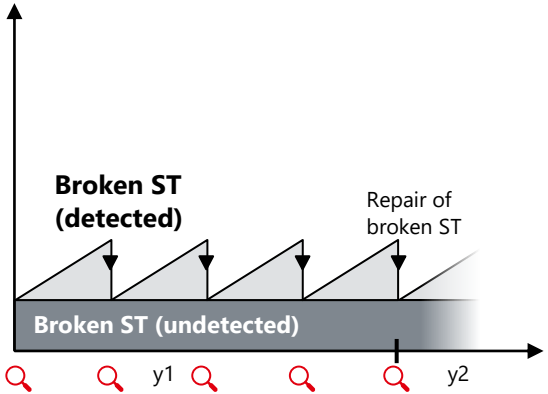
## COMPARISON OF DIFFERENT INSPECTION FREQUENCIES

### Annual Inspection
Standard for most ST



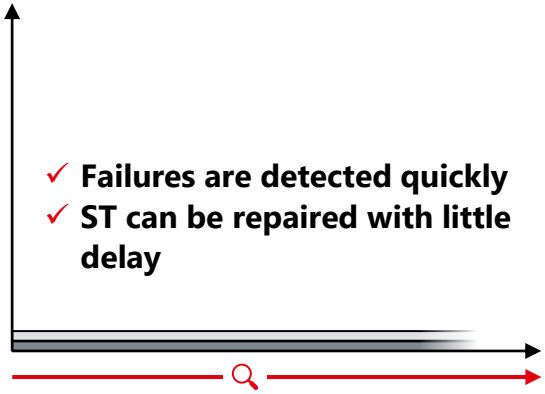

- Very high failure hours
- Low inspection cost
- **High total cost**

### Quarterly Inspection
at increased inspection cost




- High failure hours
- High inspection cost
- **Reduced total cost**

### LOCTITE Pulse
### Continuous ST Monitoring




- Low failure hours
- Medium inspection cost
- **Lowest total cost**

**Inspection & repair**
Detection probability of ST failure with manual inspection ~80% due to tool reliability and changing ST conditions

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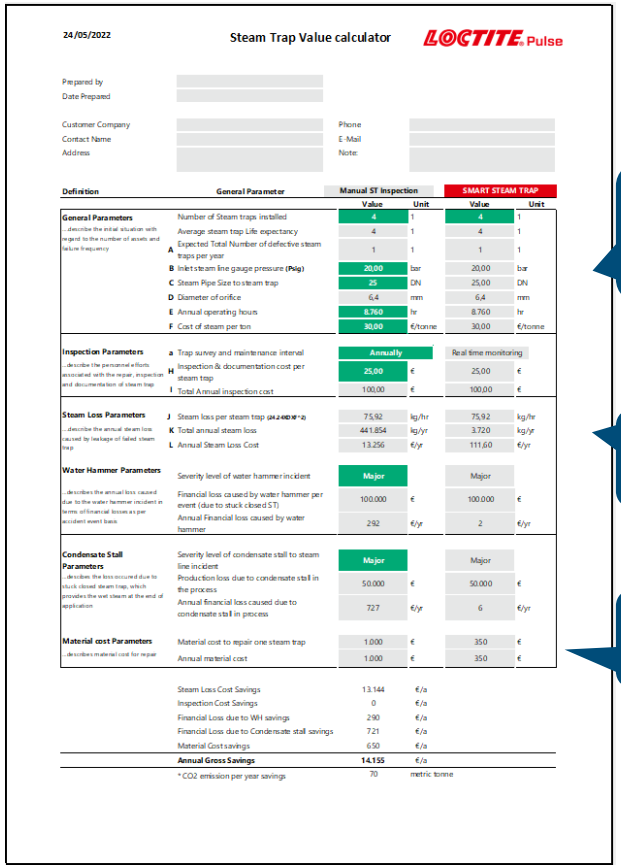
# VALUE CALCULATION

## STEAM TRAP

### YOUR INDIVIDUAL ASSUMPTIONS REGARDING...

- ❑ Number of Steam Trap
- ❑ ST pressure & Size
- ❑ Inspection frequency
- ❑ Inspection cost
- ❑ Energy Cost
- ❑ ...



24/05/2022

**Steam Trap Value calculator**

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| | | | |
|---|---|---|---|
| Prepared by | | | |
| Date Prepared | | | |
| Customer Company | | Phone | |
| Contact Name | | E-Mail | |
| Address | | Note: | |

| Definition | | General Parameter | Manual ST Inspection | | SMART STEAM TRAP | |
|---|---|---|---|---|---|---|
| | | | Value | Unit | Value | Unit |
| **General Parameters** ...describe the initial situation with regard to the number of assets and failure frequency | | Number of Steam traps installed | 4 | 1 | 4 | 1 |
| | | Average steam trap Life expectancy | 4 | 1 | 4 | 1 |
| | A | Expected Total Number of defective steam traps per year | 1 | 1 | 1 | 1 |
| | B | Inlet steam line gauge pressure (Psig) | 20,00 | bar | 20,00 | bar |
| | C | Steam Pipe Size to steam trap | 25 | DN | 25,00 | DN |
| | D | Diameter of orifice | 6,4 | mm | 6,4 | mm |
| | E | Annual operating hours | 8.760 | hr | 8.760 | hr |
| | F | Cost of steam per ton | 30,00 | €/tonne | 30,00 | €/tonne |
| **Inspection Parameters** ...describe the personnel efforts associated with the repair, inspection and documentation of steam trap | a | Trap survey and maintenance interval | Annually | | Real time monitoring | |
| | H | Inspection & documentation cost per steam trap | 25,00 | € | 25,00 | € |
| | I | Total Annual inspection cost | 100,00 | € | 100,00 | € |
| **Steam Loss Parameters** ...describe the annual steam loss caused by leakage of failed steam trap | J | Steam loss per steam trap (24.24DX*2) | 75,92 | kg/hr | 75,92 | kg/hr |
| | K | Total annual steam loss | 441.854 | kg/yr | 3.720 | kg/yr |
| | L | Annual Steam Loss Cost | 13.256 | €/yr | 111,60 | €/yr |
| **Water Hammer Parameters** ...describes the annual loss caused due to the water hammer incident in terms of financial losses as per accident event basis | | Severity level of water hammer incident | Major | | Major | |
| | | Financial loss caused by water hammer per event (due to stuck closed ST) | 100.000 | € | 100.000 | € |
| | | Annual Financial loss caused by water hammer | 292 | €/yr | 2 | €/yr |
| **Condensate Stall Parameters** ...describes the loss occured due to stuck closed steam trap, which provides the wet steam at the end of application | | Severity level of condensate stall to steam line incident | Major | | Major | |
| | | Production loss due to condensate stall in the process | 50.000 | € | 50.000 | € |
| | | Annual financial loss caused due to condensate stall in process | 727 | €/yr | 6 | €/yr |
| **Material cost Parameters** ...describes material cost for repair | | Material cost to repair one steam trap | 1.000 | € | 350 | € |
| | | Annual material cost | 1.000 | € | 350 | € |

| | | |
|---|---|---|
| Steam Loss Cost Savings | 13.144 | €/a |
| Inspection Cost Savings | 0 | €/a |
| Financial Loss due to WH savings | 290 | €/a |
| Financial Loss due to Condensate stall savings | 721 | €/a |
| Material Cost savings | 650 | €/a |
| **Annual Gross Savings** | **14.155** | €/a |
| * CO2 emission per year savings | 70 | metric tonne |

Savings due to improved inspection

CO2 Savings

Annual (net) value added

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# HOW WE HELPED A CHEMICAL PLANT WITH SMART STEAM TRAP TO REDUCE STEAM LOSS

SUCCESS STORY – BASF LUDWIGSHAFEN

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BASF

## Problem

infrequent manual inspection leads to high steam losses, costs & avoidable CO2 emissions

Bi-Metallic Steam Trap

## Solution

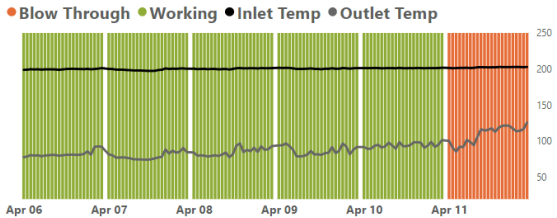
Smart monitoring solution warns operator with notifications when a leakage occurs.

Quick and **easy install**

## Results

Detection of **Blow Through** shortly after installation of sensors

**Secondary** level of safety due to **early detection** of potential condensate stall




LOCTITE® Pulse

# HOW WE HELPED A CHEMICAL PLANT WITH SMART STEAM TRAP TO REDUCE STEAM LOSS

SUCCESS STORY – HENKEL DÜSSELDORF

MENU

## Problem

infrequent manual inspection leads to high steam losses, costs & avoidable CO2 emissions

Floating Ball Steam Trap

## Solution

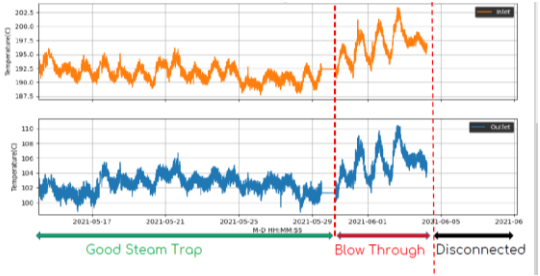
Continuous Monitoring of **45** steam traps of different kinds and sizes

Quick and **easy install**

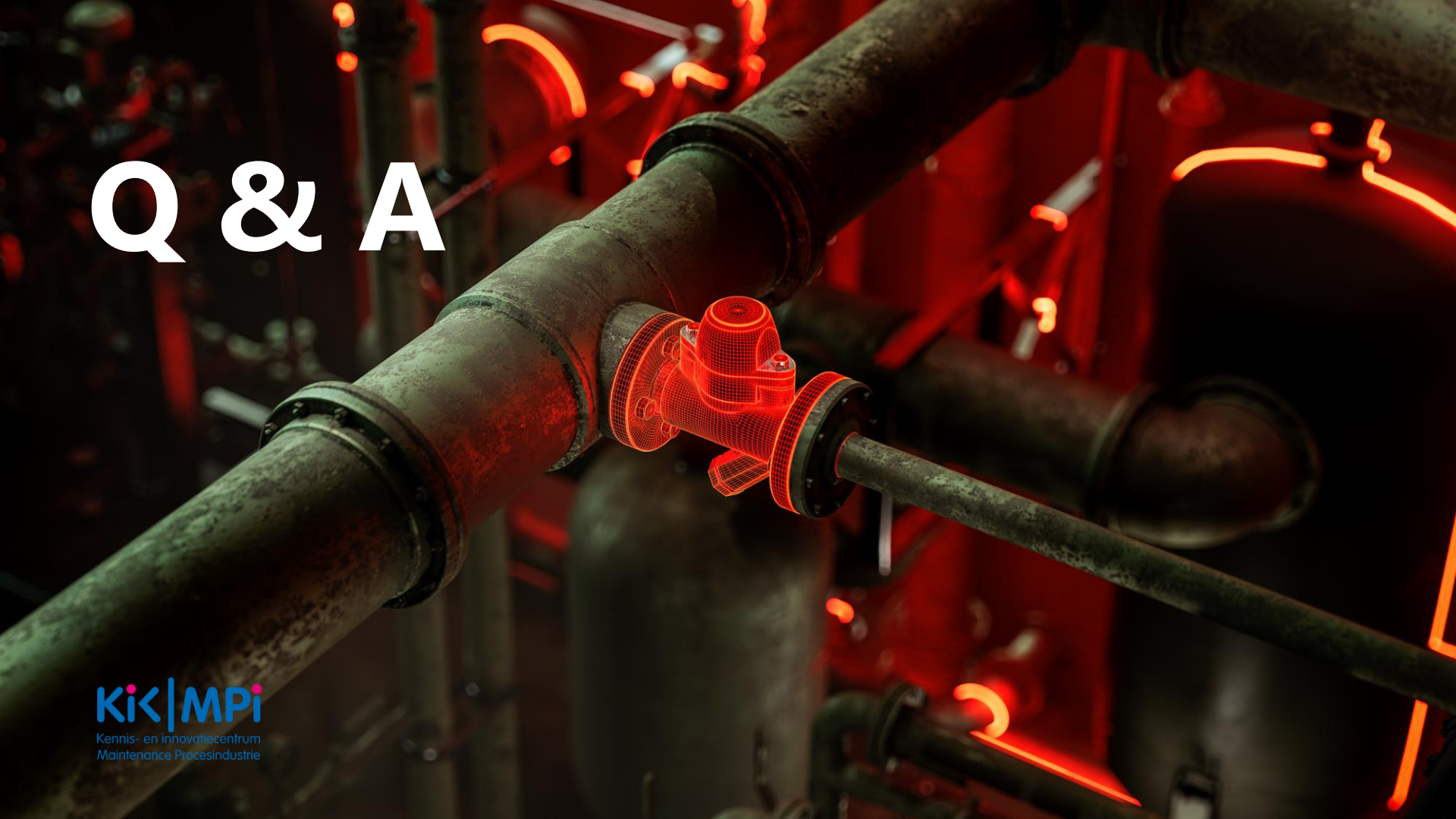
## Results

Detection of **Blow Through** shortly after installation of sensors

**Secondary** level of safety due to **early detection** of potential condensate stall



# Q & A



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