



GreCon Spark Detection and Extinguishing System

Product Presentation

Content

- **Why sparks are so dangerous!**
- Safety for your individual production with Spark Extinguishing Systems
 - Applications
 - Components
 - Safety Control
- Customer Support and Services
- References - Approvals - Certifications

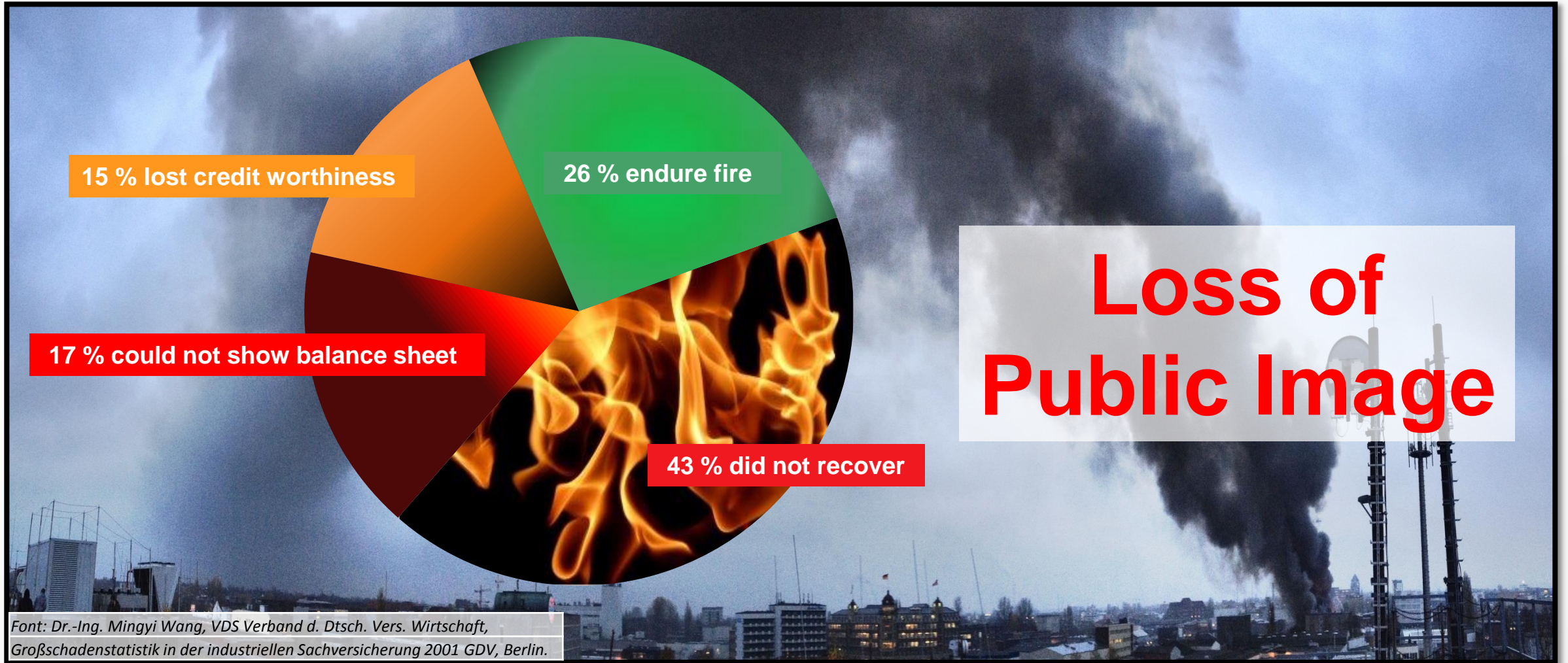
Fire can be beautiful...



... but Fire can become very dangerous!



Statistics about Losses and Damages after Industrial Fires



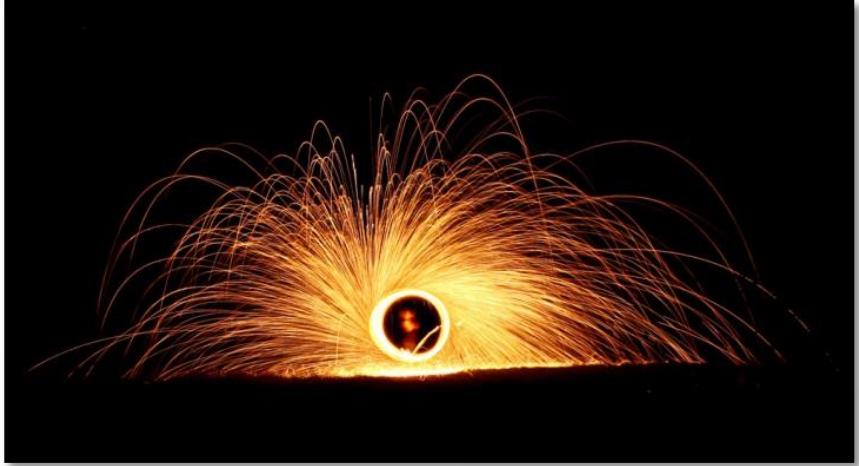
Just a spark?





One
SPARK
can be enough

More than 45 % of fires are caused by sparks or burning embers



Sparks	32.7%
Burning Embers	12.7%
Electrostatics	8.5%
Fire (Power Plants)	7.9%
Self Ignition	6.0%
Hot Surfaces	4.8%
Welding	4.2%
Electrical Defects	3.2%
Others	3.0%
Unknown	17.0%

**If sparks cause
explosions
production facilities
are destroyed
and human life
is endangered!**

Complete Factories were destroyed!



In which areas do explosions mainly occur / start?



Silos / Bins	34.7%
Filters / Dust Extractions	20.3%
Dryers	9.6%
Burners / Power Plants	9.0%
Mills / Shredders	9.0%
Sieves / Separators	5.4%
Conveying Systems	4.2%
Sanders	3.6%
Others	4.2%

Silos



Filters



Dryers



Mills



Sieves



Conveying Systems



Production line – Wood Based Panel Industry





Extinguish
before
Ignition!

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Conventional Fire Fighting Systems



AFTER start of fire

- the fire needs to be fought
- Fire spread has to be avoided
- Damages need to be minimized



Sprinkler



Deluge Systems

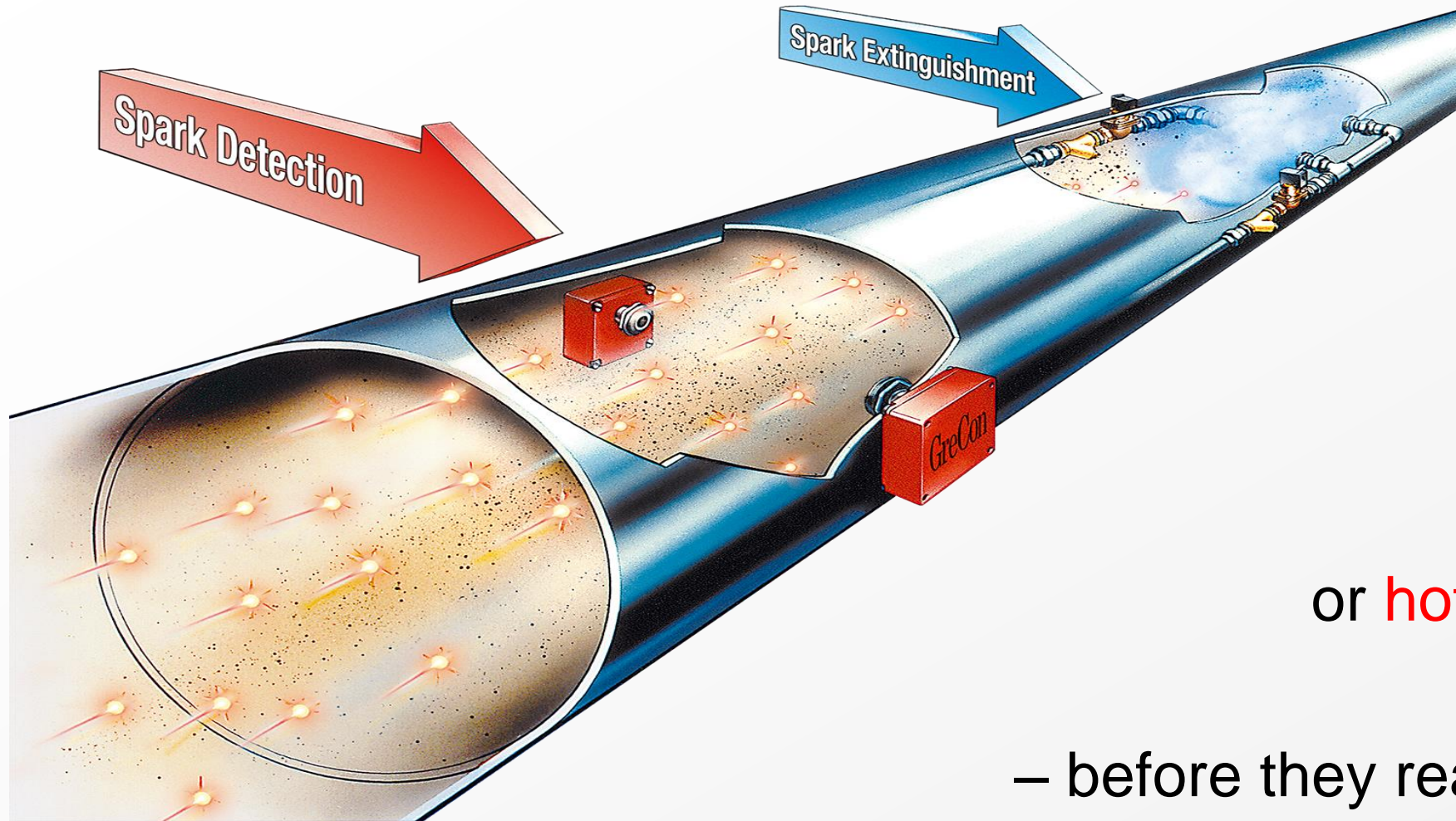
GreCon Spark Detection and Extinguishing System

BEFORE start of fire

- By preventive fire protection
- Ignition energy is eliminated



Principle of spark detection and extinguishment

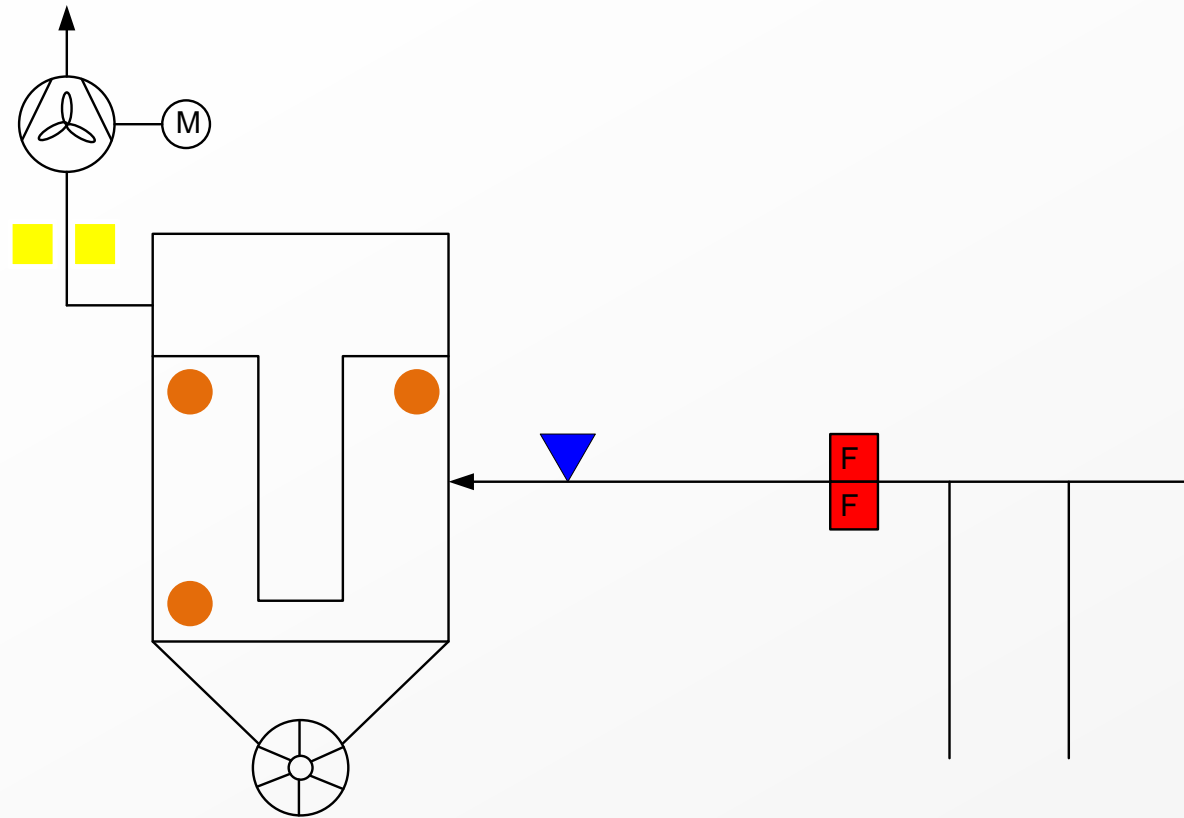


Ignition sources
like **sparks**
or **hot glowing particles**
are **extinguished**
– before they reach filters or silos!

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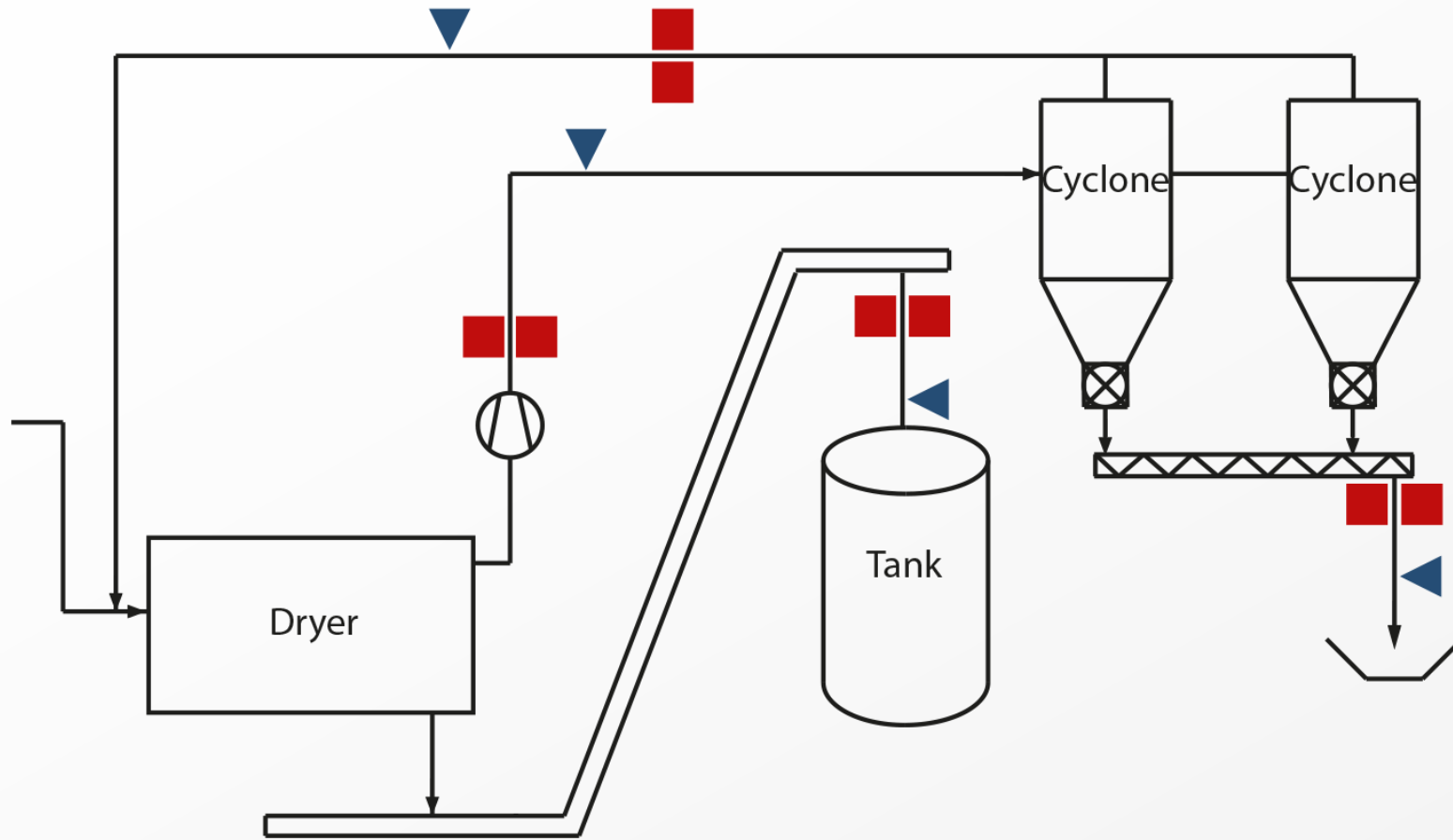
Protection concept for filters



- Spark Detector FM
- ▼ Extinguishing Device
- Thermal Detector
- Daylight / Spark Detector

Further concepts according to your individual process available!

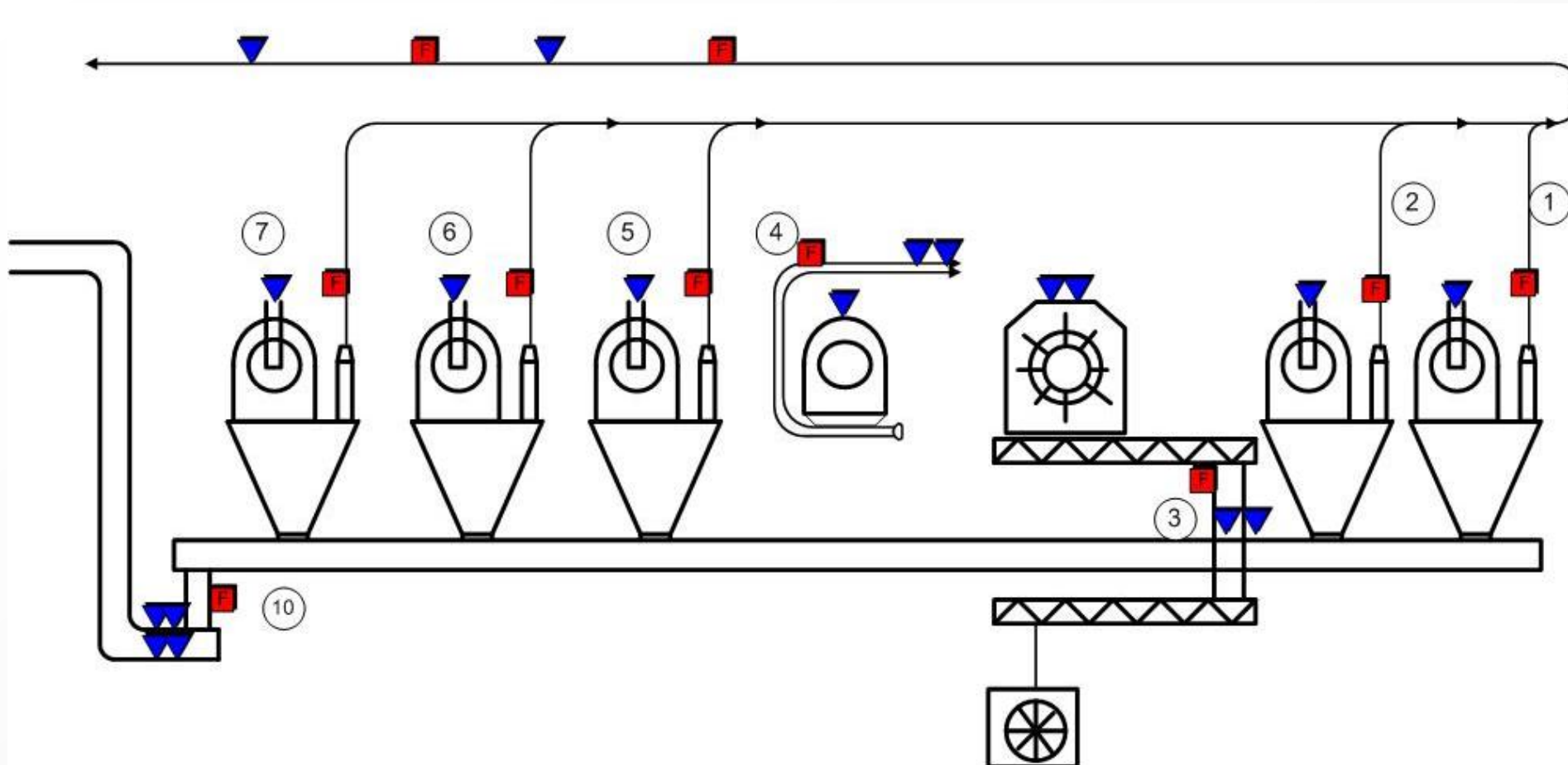
Protection concept for dryers



- Spark Detector FM
- ▼ Extinguishing Device

Further concepts according to your individual process available!

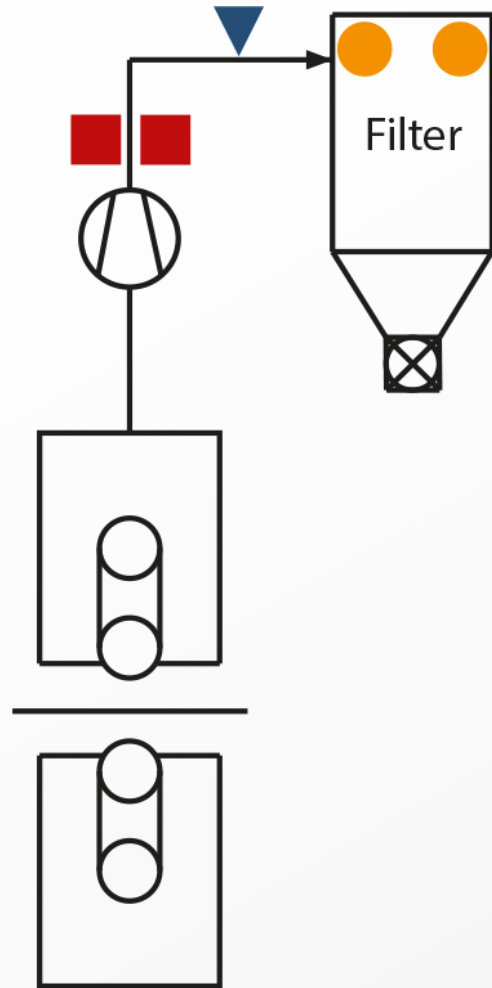
Protection concept for mills / grinding machines



- Spark Detector FM
- ▼ Extinguishing Device

Further concepts according to your individual process available!

Protection concept for industrial sanding



- Spark Detector FM
- Thermal Detector
- ▼ Extinguishing Device

Further concepts according to your individual process available!

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Main components of the GreCon Spark Extinguishing System

➔ Based on your process, an individual protection concept is developed with these components

Detection

- [Infrared detectors](#)
- [Temperature detectors](#)
- [Flame detectors](#)
- [Combustion gas detectors](#)
- [Smoke detectors](#)



Control console

- Flexible, modular design



Spark Elimination

- [Extinguishing Devices](#)
- [Fire traps / Shut-off](#)
- [Diversion Gates](#)
- Use of existing facilities (reversing, switching, stopping)



IR detector with application-specific sensor elements

Sensor element out of silicium (Si)

- Pneumatic transport ducts with (high) load
- Drop chutes with high bulk density
- Applications without light ingress (false alarms)
- [Spark detector FM 1/8](#)
- [Spark detector FM 3/8](#)



Sensor element out of lead sulphide (PbS)

- With light ingress
- Lower sensitivity (1/300 compared with silicium)
- [Daylight detector DLD 1/8](#)

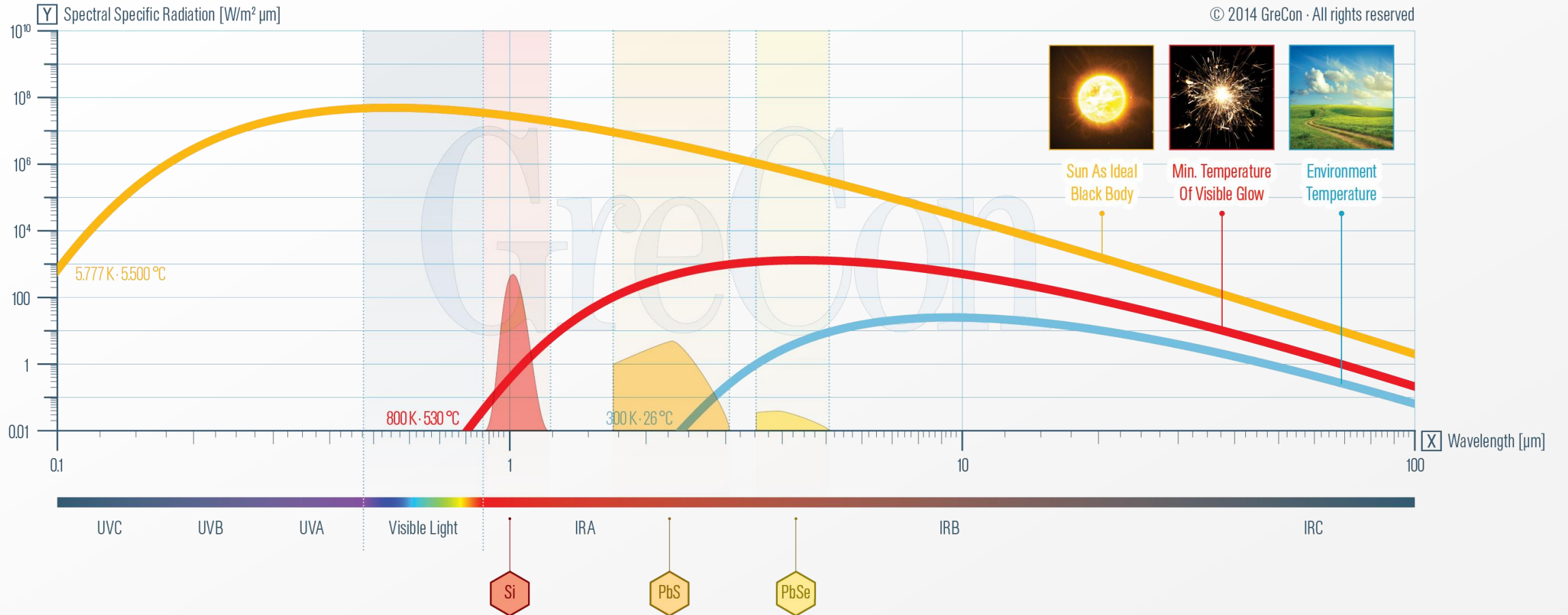


Sensor element out of lead selenide (PbSe)

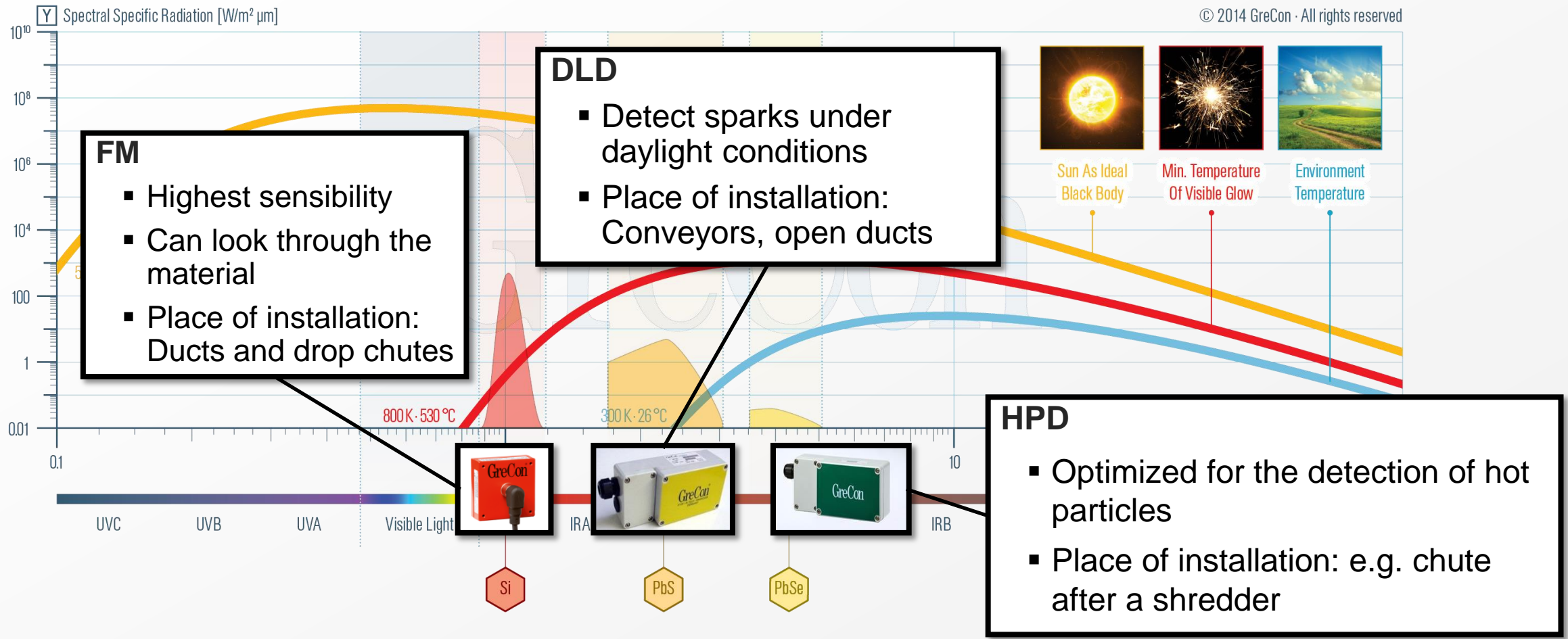
- Detection of hot particles (no sparks)
- Suitable for applications with process-related spark flight
- [Hot particle detector HPD 1/8](#)



Physics of Spark Detection



Physics of Spark Detection



Spark detector FM 1/8 with silicium element

- Highly sensitive spark detector (Si element)
- Installation in transport ducts and drop chutes
- Reliable detection of ignition sources within the product flow, even at high material load and pollution
- Flush-mounted installation of the detector optics for maximum life



Spark detector FM 1/8

Spark detector FM 3/8 with Si element and fibre optic cable

- Highly sensitive spark detector (Si element)
- For use at high operating temperatures (up to 600 °C) with fibre optic cables
- High detection reliability by using three detection elements



Spark detector FM 3/8 with fibre optic cables

Daylight detector DLD 1/8 with lead sulphide element

- Spark detector for light ingress (PbS element)
- Installation in processes with daylight ingress



Daylight detector DLD 1/8

Hot particle detector HPD 1/8

for detection of smouldering fires and hot particles

- Suitable for applications with process-related spark flight
- Installation in extraction systems of hardening shops or recycling plants, for example



Hot particle detector HPD 1/8

Thermal detector TM 1/9 for temperature monitoring

- Collateral trigger functions
- Alarm upon fire-typical temperature rise
- Alarm upon exceeding of a set temperature threshold



Thermo detector TM 1/9

Flame detector FD 1/8 for detection of open flames

- Detection with dual UV/IR technology
- Insensitive to light ingress
- Heated optic for application in difficult conditions
- Early alarm by UV channel in case of arising fire (manual extinguishment)
- If the fire continues to spread, the UV alarm will be confirmed by the IR channel (automatic extinguishment)
- Application for press extinguishment, for example



Flame detector FD 1/8

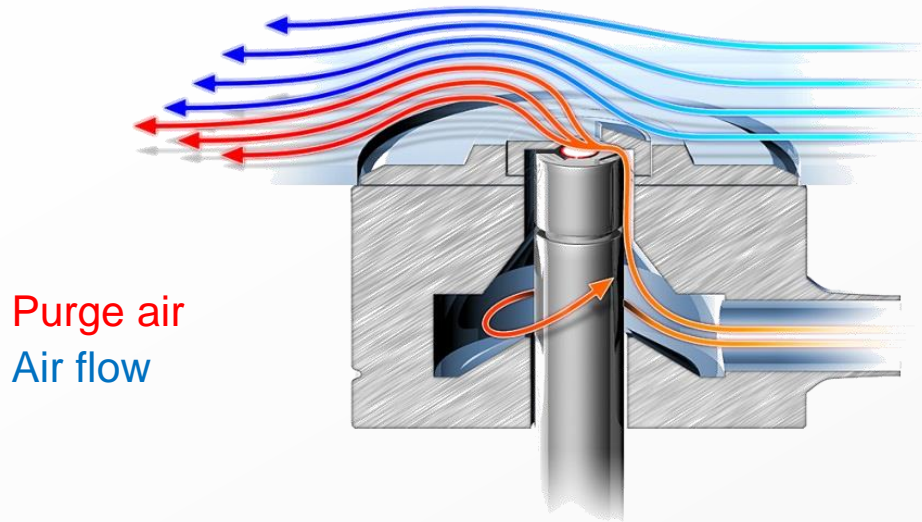
Scattered light smoke detector SRM 9/1

- Detection of fires that develop smoke, e.g. in return-air ducts of dust filters
- Application for fire detection in dust-free areas



Scattered light smoke detector SRM 9/1

Additional Detector Component – Air Purge Adapter



Air purge adapter

- Purged air is used to keep the sensor lense clean
- Dirt particles are removed through the air flow continuously

Additional Detector Component - Slotted diaphragm

for optimisation of the detection performance



Slotted diaphragm

Shielding against ambient light
(artificial light or daylight)

➔ Focus of sensor range

➔ Increased contrast

➔ Application mainly in combination
with thermo detector

Easy installation of the detectors



Drill



Installation



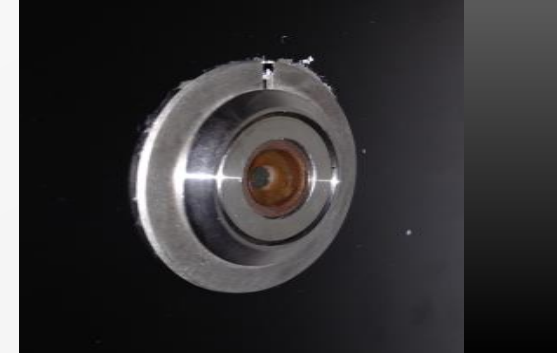
Adapter is mounted



Insert detector



Attach cable



Flush-mounted on the inside wall for a long life

Spark Elimination

→ Extinguishing with water

- Fast
- Cheap
- No process interruption

→ Extinguishing with gas

→ Inerting

→ Use of the existing facilities

- Reversing
- Switching
- Stopping

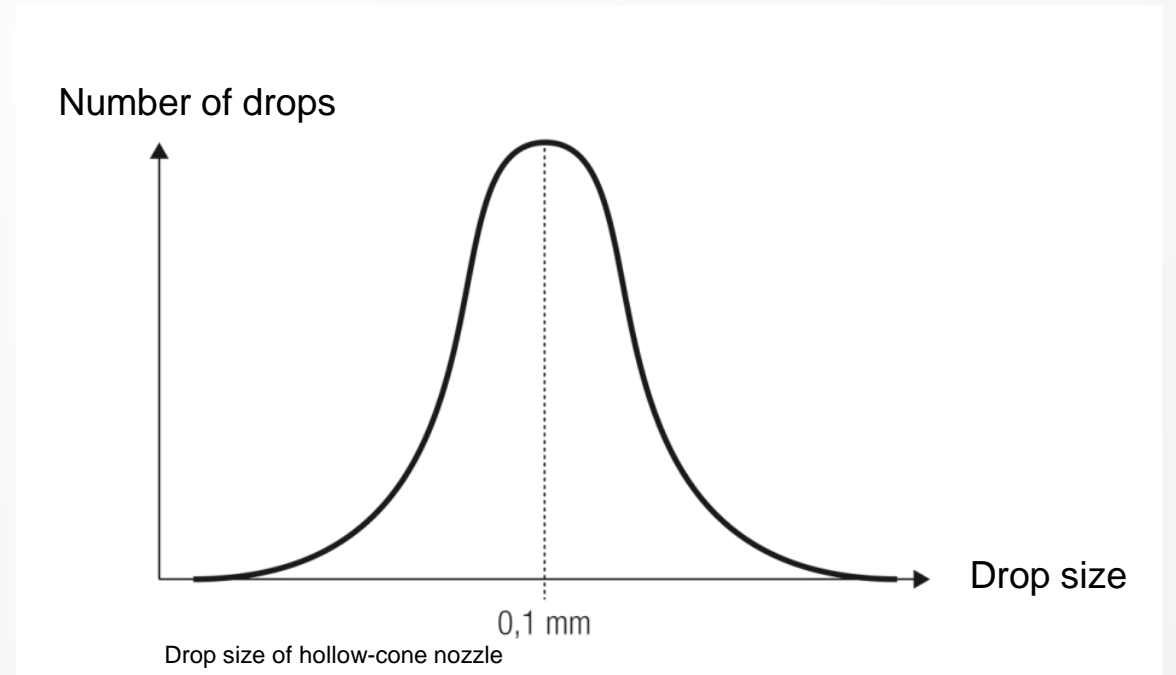
→ Mechanical diversion or shutoff

- Processes where water cannot be used (e.g. food, coffee etc.)

Reliable spark extinguishing with minimum water

Theoretical cornerstones

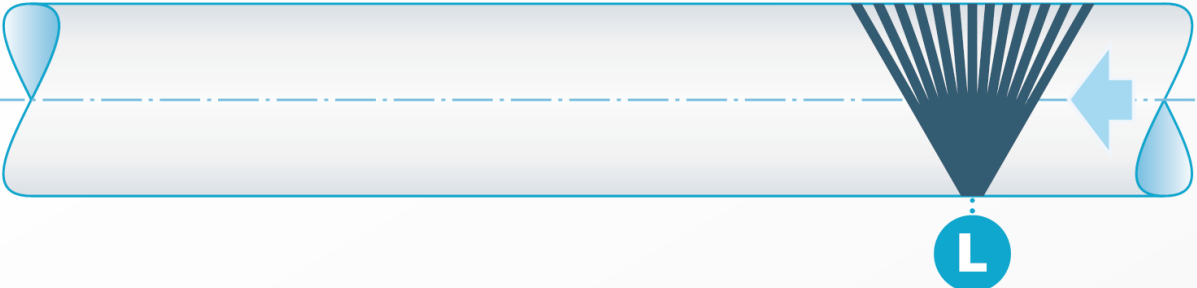
- The smaller the drop, the shorter the throw distance
- The finer the water mist, the larger the water surface
- The finer the water mist, the less water gathers in the pipes
- Minimal use of water by optimum adaptation of cooling effect and throw distance



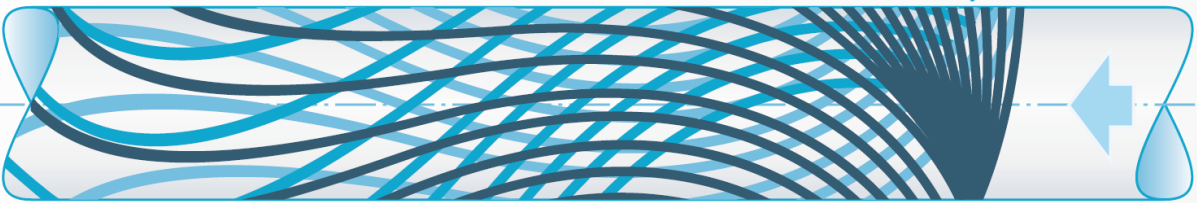
➔ **The ideal drop size – as small as possible and as big as necessary**

The dynamic spray pattern is decisive!

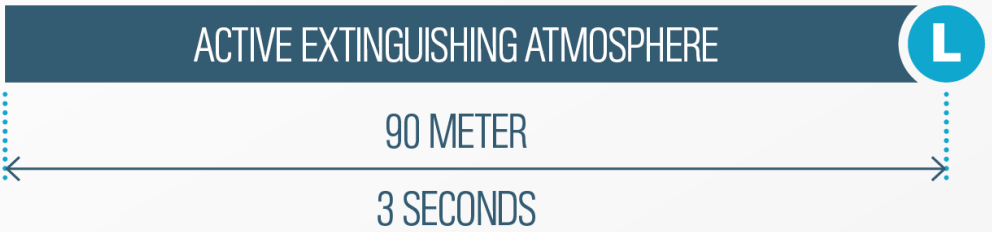
spraying profile of hollow-cone nozzle



static spray pattern

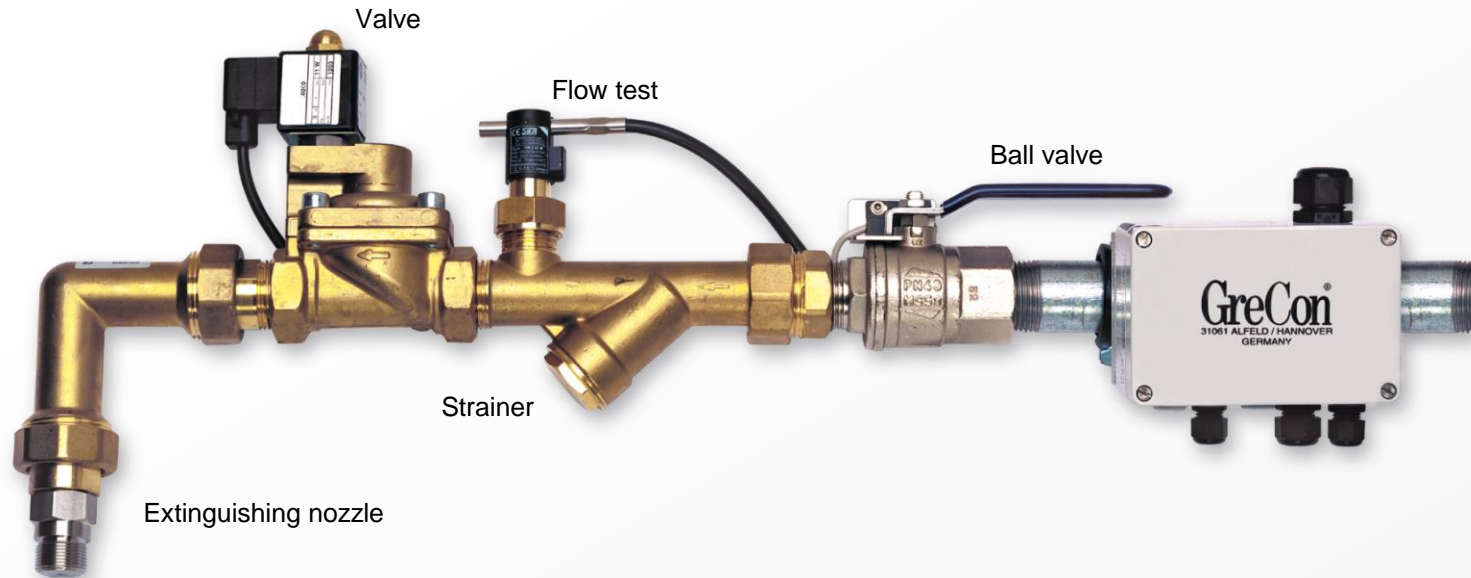


dynamic spray pattern



➔ Optimum distribution of the water mist spray with minimal wetting of the pipe wall

Extinguishing device for fine and efficient water mist



- Short reaction time
- Immediate closure of the shutter cone after extinguishment
- Electrically monitored ball valve
- Integrated flow test switch

Reduction of reaction distance by ultrahigh-speed extinguishment

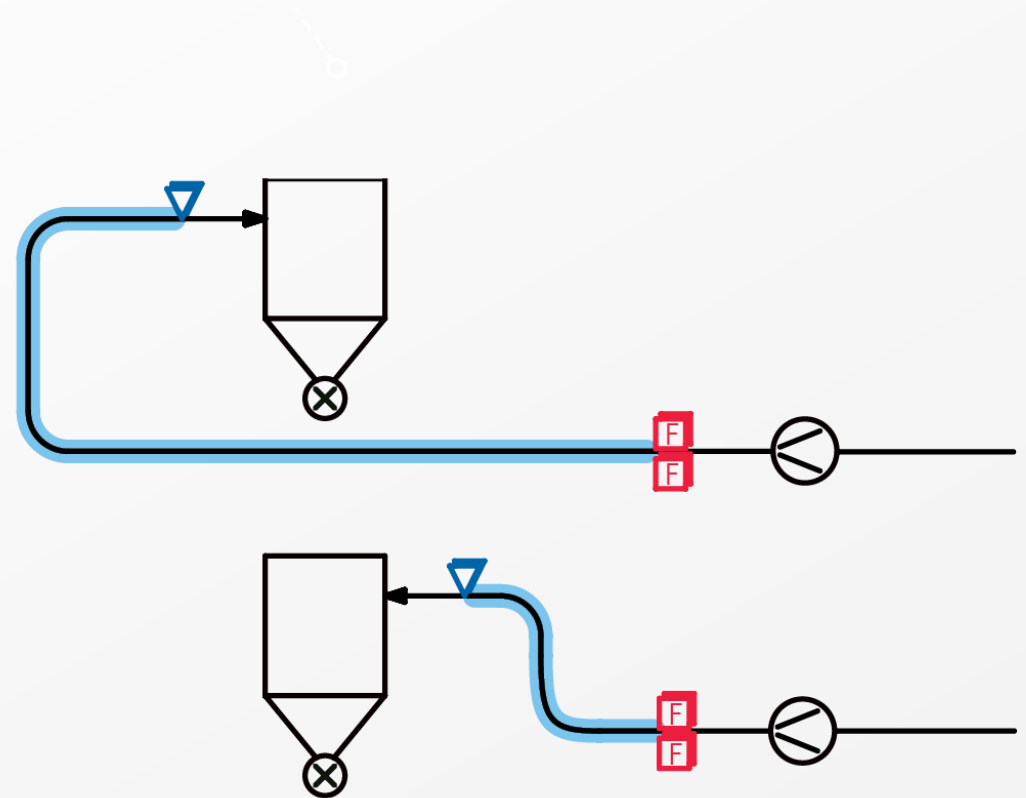
Normal extinguishment

4 to 7 m

Ultrahigh speed extinguishment (UHS)

< 2 m*

* Ø 400 mm at 25 m/s



Easy installation of extinguishing nozzles



Drill



Installation of adapter



Tighten firmly



Screw nozzle



Finished!



Flush-mounted on the inside wall
for a long life

Additional Extinguishing Component - Anti-freeze protection

- Insulating bags
(optional with integrated heating)
 - Universally suitable for all extinguishing devices
 - Weatherproof
 - Solid hook-and-loop fastener

- Heater band to heat water-bearing pipes
 - Self-regulating
 - Optional 10 or 20 W/m

- Heater band control
 - Incl. undercurrent monitoring



Pressure increasing units

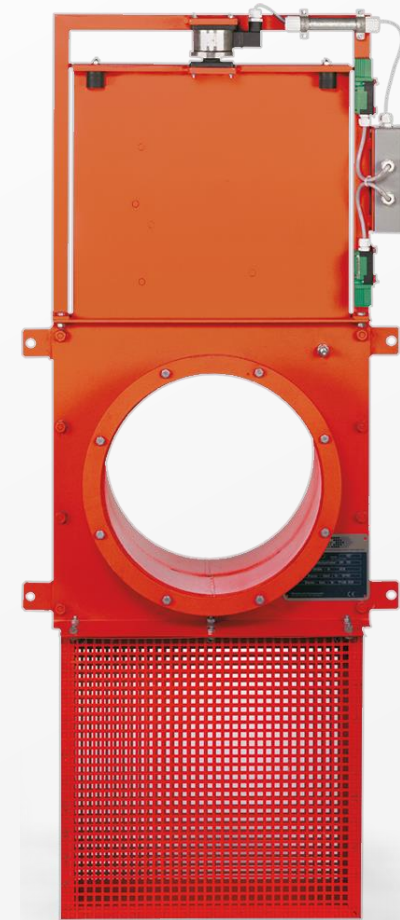
to create the required water pressure / water flow rate

Consisting of:

- Storage tank
- Pump
- Pressure vessel
- Dosing unit for detergent agent

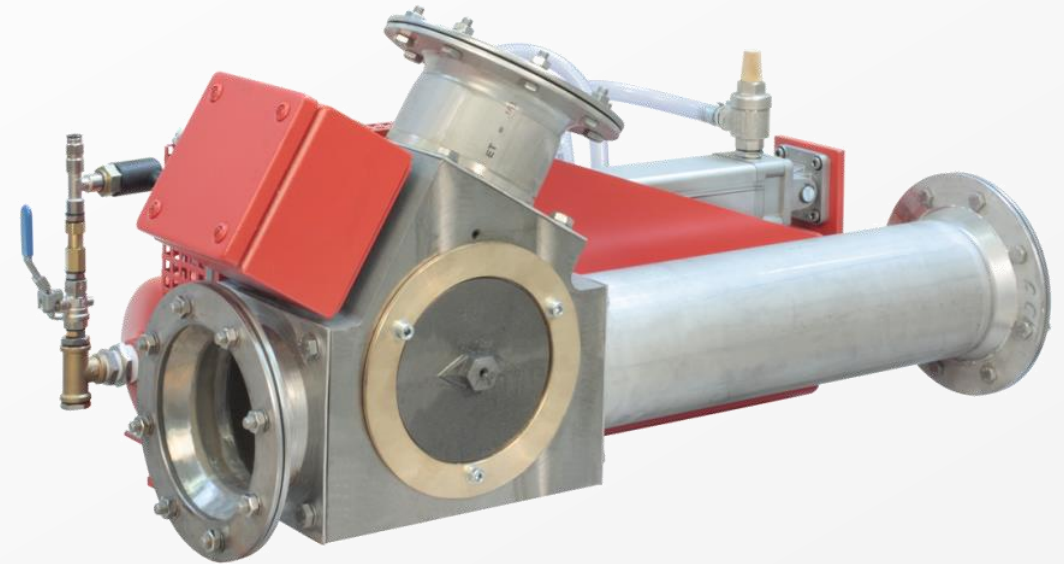


Fire traps and diversion gates to shut off the product flow



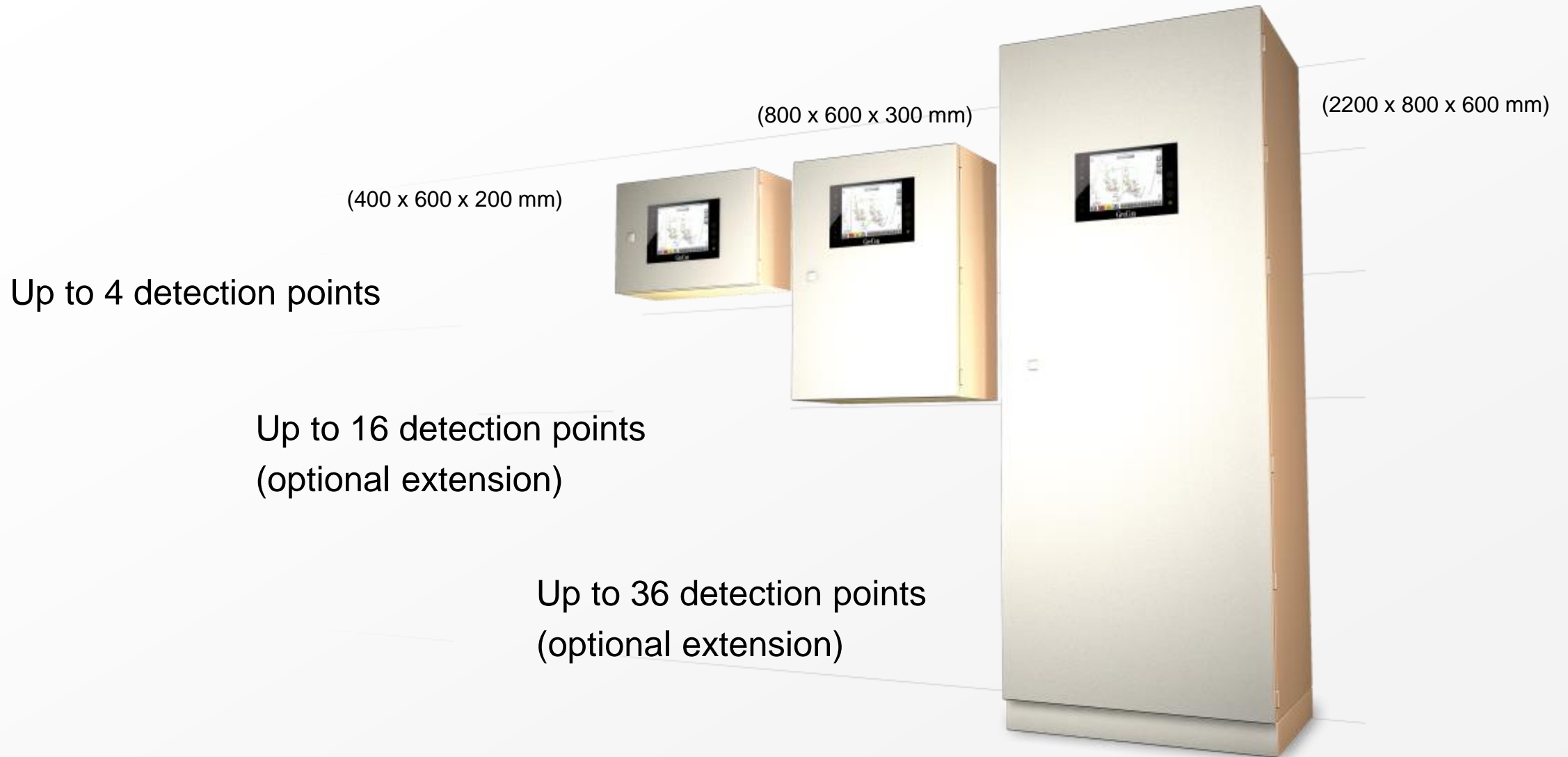
- Reaction time approx. 250 ms
- Available in stainless steel 1.4301

Diversion gates to divert the product flow



- Reaction time approx. 250 ms
- Available in stainless steel 1.4301
- High-speed diversion gate is suitable for fine-grained products

Suitable control consoles for any project size



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User-friendly operation by GreCon BS 7 TOUCH

- Intuitive operation = safe operation
- Important information quickly available
- Extensive analysis possibilities for individual areas and export of data
- Remote support (SATELLITE)



Touch & slide operation on the housing front

From alarm overview to detailed information

The image displays three sequential screenshots of the CC7000 Touch industrial control interface, illustrating the flow from an alarm overview to detailed information.

Overview of all areas: The first screenshot shows a dashboard with four main area buttons: 'Papierhalle Kaliko Zyklon groß', 'Papierhalle Kaliko Zyklon klein' (highlighted with a red star and '3'), 'Nachzerkleinerung Hudo Mühlen', and 'Papierhalle Silo'. A '1' is in a red circle above the first button. A bottom navigation bar includes Home, Alarm, Fault, Disable, Statistics, History, Language, Settings, Info, and Help.

Flowsheet alarm zone: The second screenshot shows a detailed process flowsheet for 'Nachzerkleinerung Hudo-Mühlen'. It features components like 'Zyklon groß (oben)', 'Zyklon klein (unten)', and 'WISI'. A red star and '5' in a red circle highlight an alarm zone. Other numbered callouts (2, 6, 7, 9) are present. The bottom navigation bar is identical to the first screenshot.

Zone details: The third screenshot shows a 'Zone details' window for 'Bereich 05'. It contains a table of alarm events:

	Alarm	Fault	Disable
37576	09/12/2014 08:04:12;825 AM SG 5 Linie MG 5		Sparks 2
37575	09/12/2014 08:01:21;277 AM SG 5 Linie MG 5		Sparks 11
37574	09/12/2014 08:00:58;641 AM SG 5 Linie MG 5		Sparks 13
37572	08/29/2014 08:38:31;411 AM SG 5 Linie MG 5		Sparks 7

A 'Close' button is located at the bottom of the details window. The bottom navigation bar is also present.

overview of all areas

Flowsheet alarm zone

Zone details

Data storage exactly to the millisecond for extensive analyses

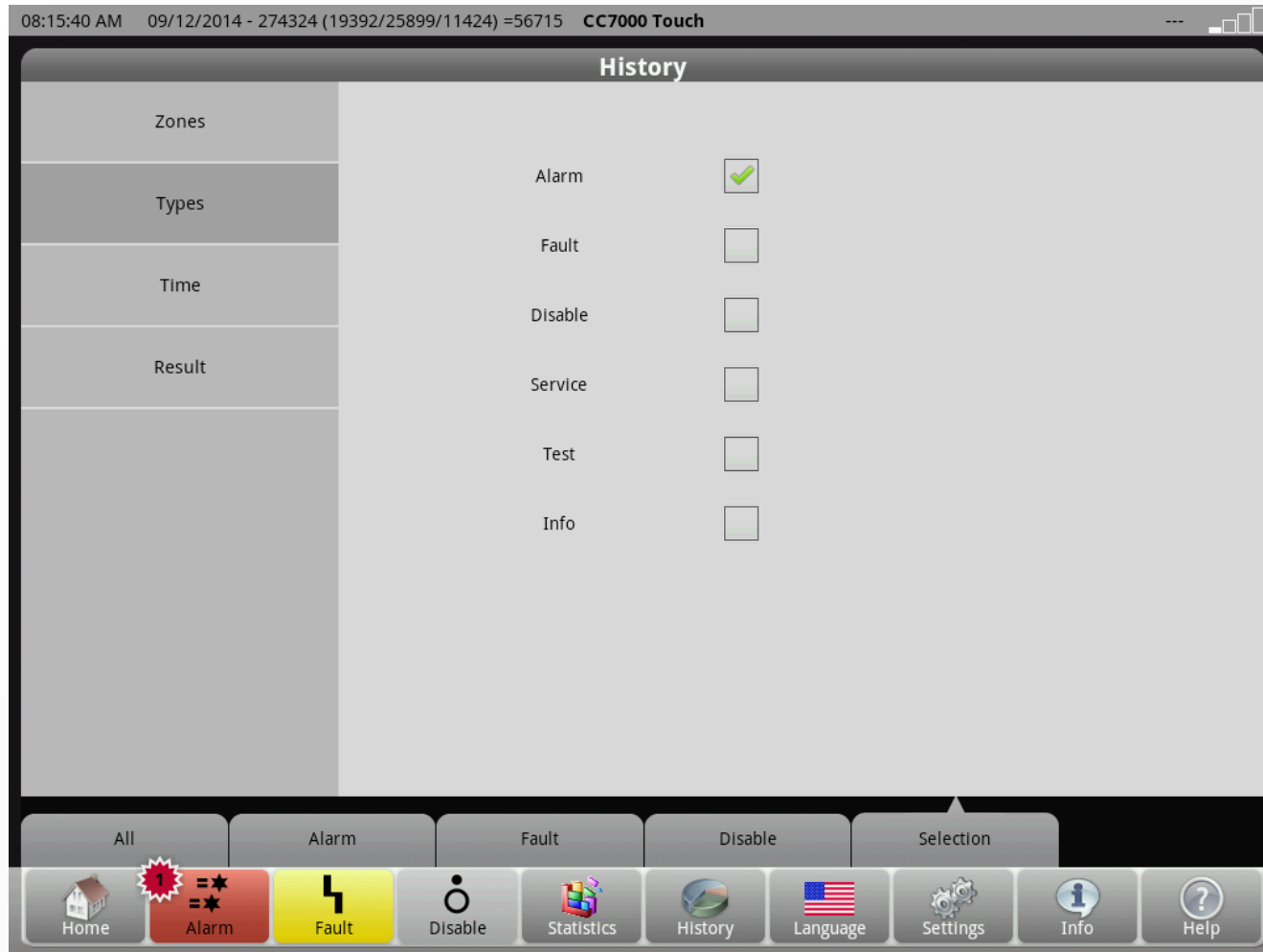
The screenshot shows the 'History' screen of the GreCon CC7000 Touch interface. The top status bar displays the time '08:15:14 AM', date '09/12/2014', and system ID '274496 (19372/25881/11424) =56677'. The main area is a grid of buttons representing different zones, categorized by 'Zones', 'Types', 'Time', and 'Result'. The 'Types' row shows a checkmark next to '7.3 Bereich 05'. The bottom navigation bar includes icons for Home, Alarm, Fault, Disable, Statistics, History, Language, Settings, Info, and Help.

Zones	1.1 Bereich 01	5.1 Bereich 07	6.2 Bereich 06
Types	✓ 7.3 Bereich 05	8.4 Bereich 08	9.1 Bereich 09
Time	10.2 Bereich 10	11.3 Bereich 11	12.4 Bereich 12
Result	13.1 Bereich 13		

Numerous evaluation possibilities directly on the display

■ Zones

Data storage exactly to the millisecond for extensive analyses



Numerous evaluation possibilities directly on the display

- Zones
- Types

Data storage exactly to the millisecond for extensive analyses



Numerous evaluation possibilities directly on the display

- Zones
- Types
- Time

Data storage exactly to the millisecond for extensive analyses



Numerous evaluation possibilities directly on the display

- Zones
- Types
- Time
- Result

Various alarm levels

for optimum protection by individual reactions


Level 1: Detection of sparks

 Extinguishment and logging, no further activities

Level 2: Detection of sparks: either time threshold or a certain number of sparks per time unit (e.g. 20 sparks in 5 seconds)

 Shut-down of the appropriate plant area

Level 3: High number of sparks in different groups in a short timeframe (e.g. 150 sparks in 5 seconds)

 Flooding of the whole plant area

Level 4: Level 2 several times after one another

 Documentation; basis for further analyses



Exact data for process analysis + detailed information for the operator

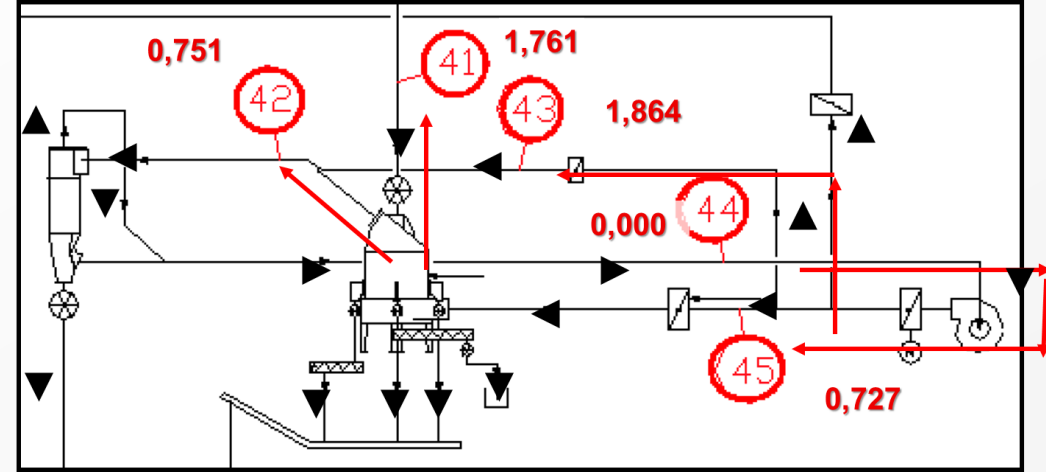
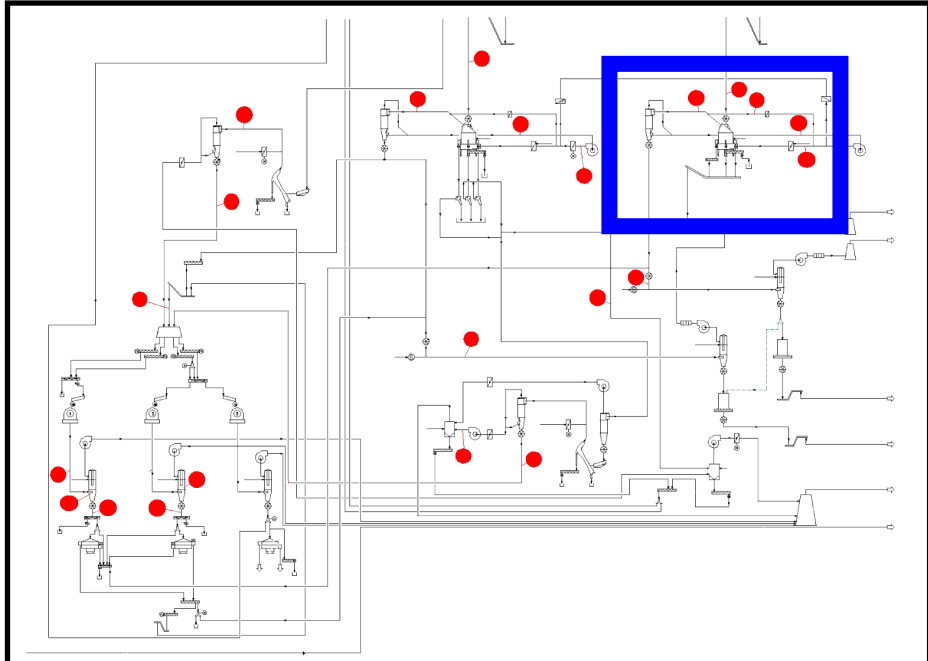
Reduction of damage caused by explosion by level 3 alarm

- A large number of sparks can be the beginning of an explosion!
- This cannot be controlled by a spark extinguishing system!

But:

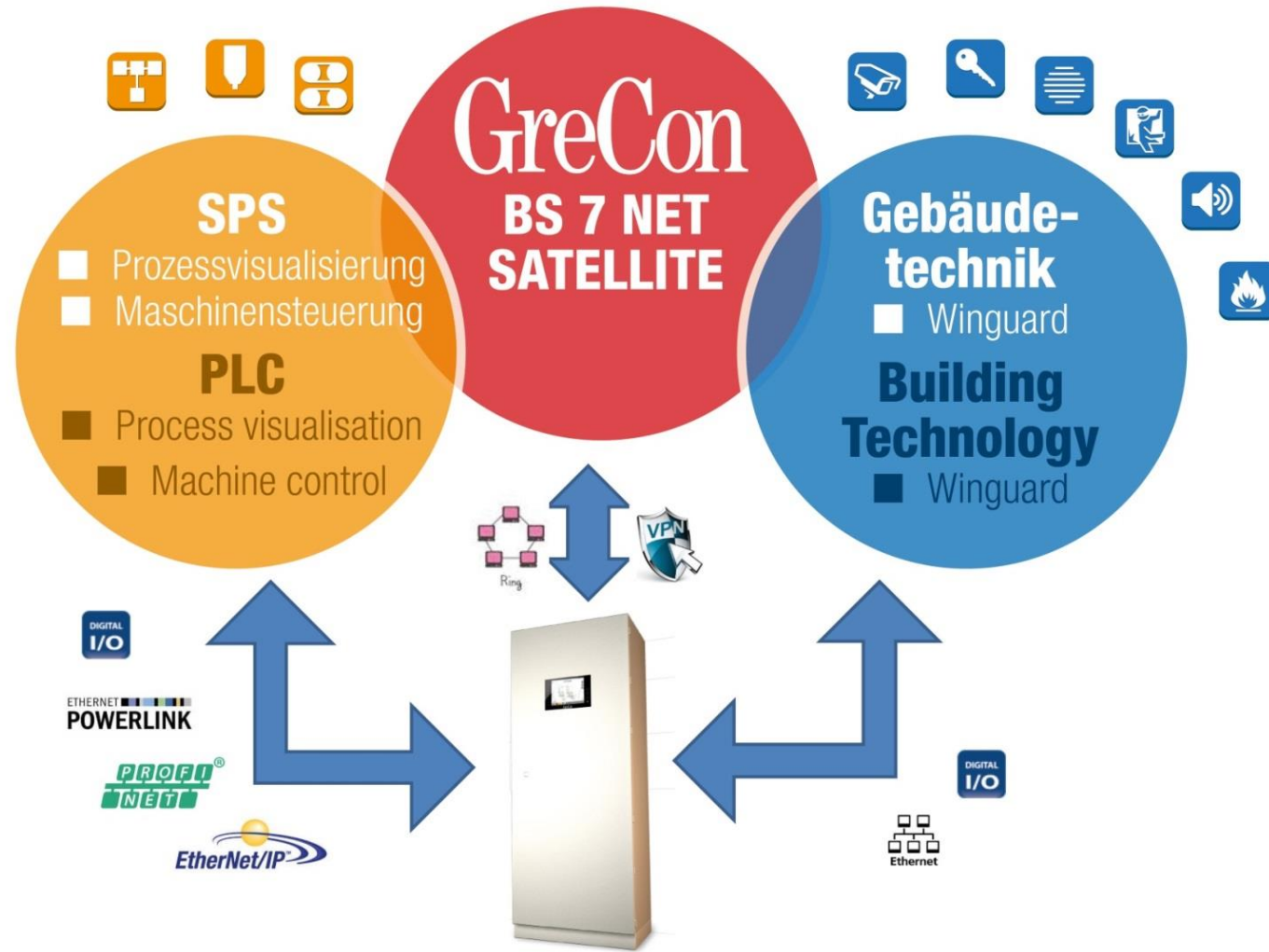
- The GreCon spark extinguishing system is able to analyse such incidents and to activate preventive extinguishing measures.
- The extinguishment soaks the material and the damage caused by the explosion is reduced.

Level 3 alarm using the example of an air separator

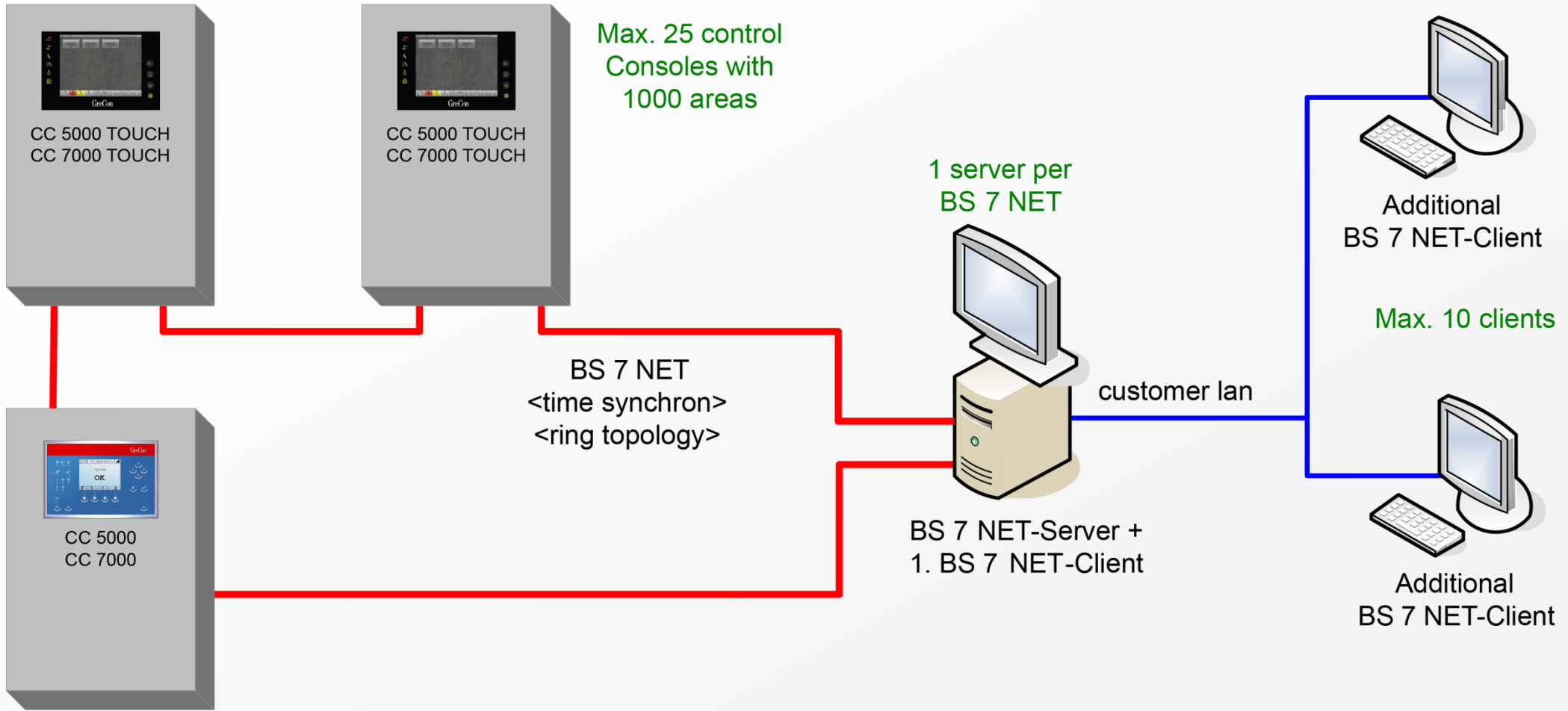


	Time diff. [s]	Alarm 3 [s]	Sparks	Extinguishing time [s]
L44	0,000	0,386	128	19,378
L45	0,727	0,381	50	6,769
L42	0,751	0,398	94	8,951
L41	0,761	0,390	40	5,941
L43	1,864	0,389	238	15,301

Network Connectivity



Networking by BS 7 NET



Networking by BS 7 NET: zone overview

Simulation GreCon BS 7

Home View Report System Config Help Alarm Fault Disable Horn off Reset

CC54.Z3 L003 Schnitzelförderventilator

CC54.Z3 Show History
CC54.Z3 Show Trend Graphic
CC54.Z3 Change disable state

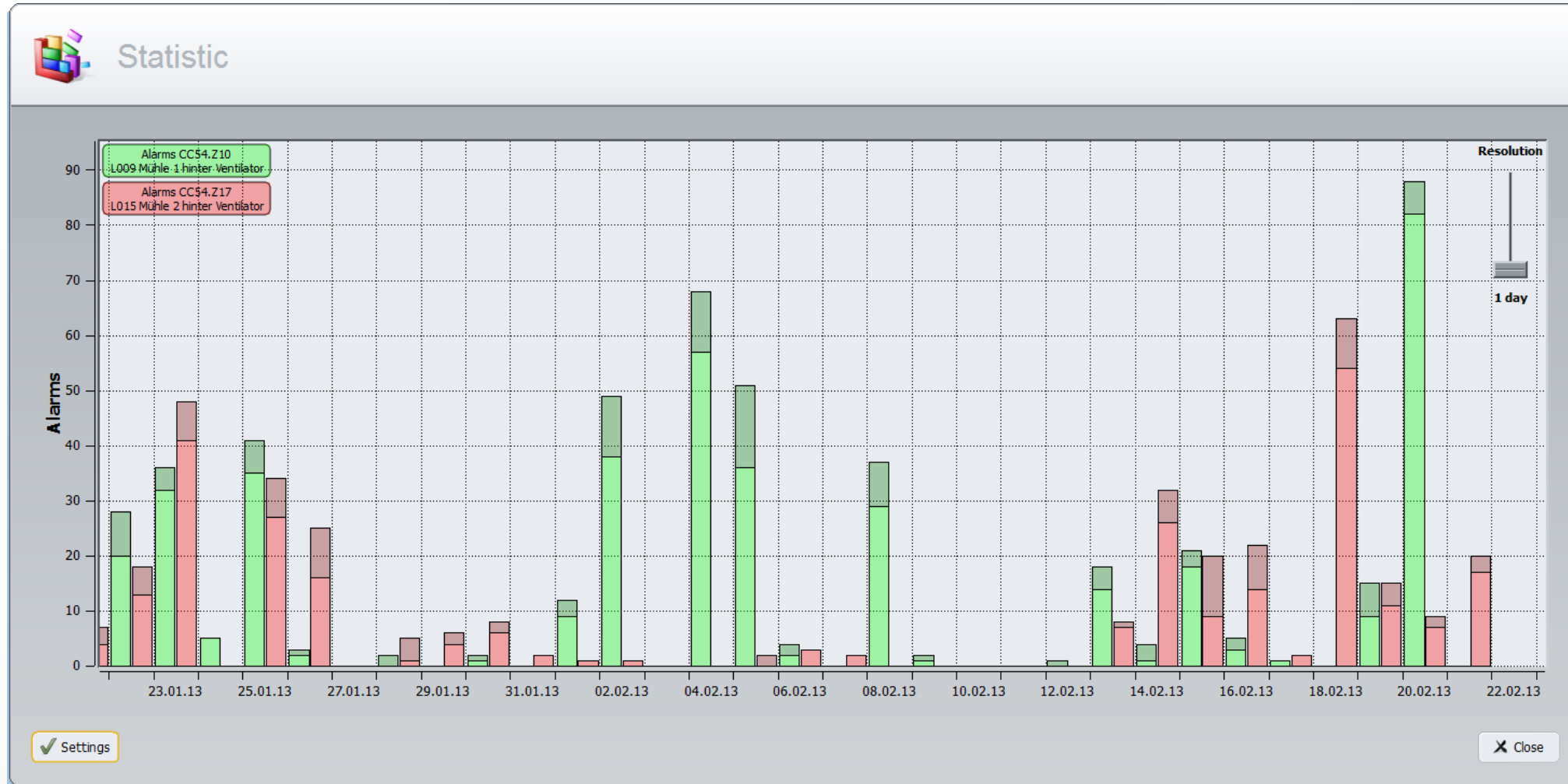
SG CC54.SG3 L003 Schnitzelförderventilator
SG 652 Sparks
SG Start: 03.04.2013 17:13:30,516
SG End: 03.04.2013 17:13:43,362
EG Start: 03.04.2013 17:13:30,516
EG End: 03.04.2013 17:13:43,362
CC Reset: 03.04.2013 17:13:51,624
SG CC54.SG3 L003 Schnitzelförderventilator
SG Start: 03.04.2013 17:10:24,577
EG CC54.EG3 L003 Schnitzelförderventilator

204		206				
L001 Papieraufgabe	L002 Hammermühle	L003 Schnitzelförderventilator	L004 Zyklon	L005 Schnitzelbunker 1 Einfall	L006 Schnitzelbunker 1 Auswurf	L006 Schnitzelbunker 1 Handauslösung
L007 Mühle 1 Keilriemen	L008 Mühle 1 Austrag	L009 Mühle 1 hinter Ventilator	L010 Mühle 1 vor Zyklon	L011 Schnitzelbunker 2 Einfall	L012 Schnitzelbunker 2 Auswurf	L012 Schnitzelbunker 2 Handauslösung
L013 Mühle 2 Keilriemen	L014 Mühle 2 Austrag	L015 Mühle 2 hinter Ventilator	L016 Mühle 2 vor Zyklon	L017 Schnitzelbunker 3 Einfall	L018 Schnitzelbunker 3 Auswurf	L018 Schnitzelbunker 3 Handauslösung
L019 Mühle 3 Keilriemen	L020 Mühle 3 Austrag	L021 Mühle 3 hinter Ventilator	L022 Mühle 3 vor Zyklon	L023 Filter 1 Rohgaskanal	L024 Filter 1 Reingaskanal	L025 Filter 1 Temperaturüberwachung
L026 Filter 2 Rohgaskanal	L027 Filter 2 Reingaskanal	Linie 001 Papieraufgabe	Linie 002 Hammermühle	Linie 003 Schnitzelförderventilator	Linie 004 Zyklon	Linie 005 Schnitzelbunker 1 Einfall
Linie 006 Schnitzelbunker 1 Ausfall	Linie 006 Schnitzelbunker 1 Handauslösung	Linie 007 Mühle 1 Keilriemen	Linie 008 Mühle 1 Auslauf	Linie 009 Mühle 1 hinter Ventilator	Linie 010 Mühle 1 vor Zyklon	Linie 011 Schnitzelbunker 2 Einfall
Linie 012 Schnitzelbunker 2 Ausfall	Linie 012 Schnitzelbunker 2 Handauslösung	Linie 013 Mühle 2 Keilriemen	Linie 014 Mühle 2 Auslauf	Linie 015 Mühle 2 hinter Ventilator	Linie 016 Mühle 2 vor Zyklon	Linie 017 Schnitzelbunker 3 Einfall
Linie 018 Schnitzelbunker 3 Ausfall	Linie 018 Schnitzelbunker 3 Handauslösung	Linie 019 Mühle 3 Keilriemen	Linie 020 Mühle 3 Auslauf	Linie 021 Mühle 3 nach Ventilator	Linie 022 Mühle 3 vor Zyklon	Linie 023 Filter 1 Rohgaskanal
Linie 024 Filter 1 Reingaskanal	Linie 025 Filter 1 Temperaturüberwachung	Linie 026 Filter 2 Rohgaskanal	Linie 030 Filter 3 Reingaskanal	Linie 031 Filter 3 Temperaturüberwachung	Linie 27 Filter 2 Reingaskanal	Linie 28 Filter 2 Temperaturüberwachung
Linie 29 Filter 3 Rohgaskanal						

17:14:07

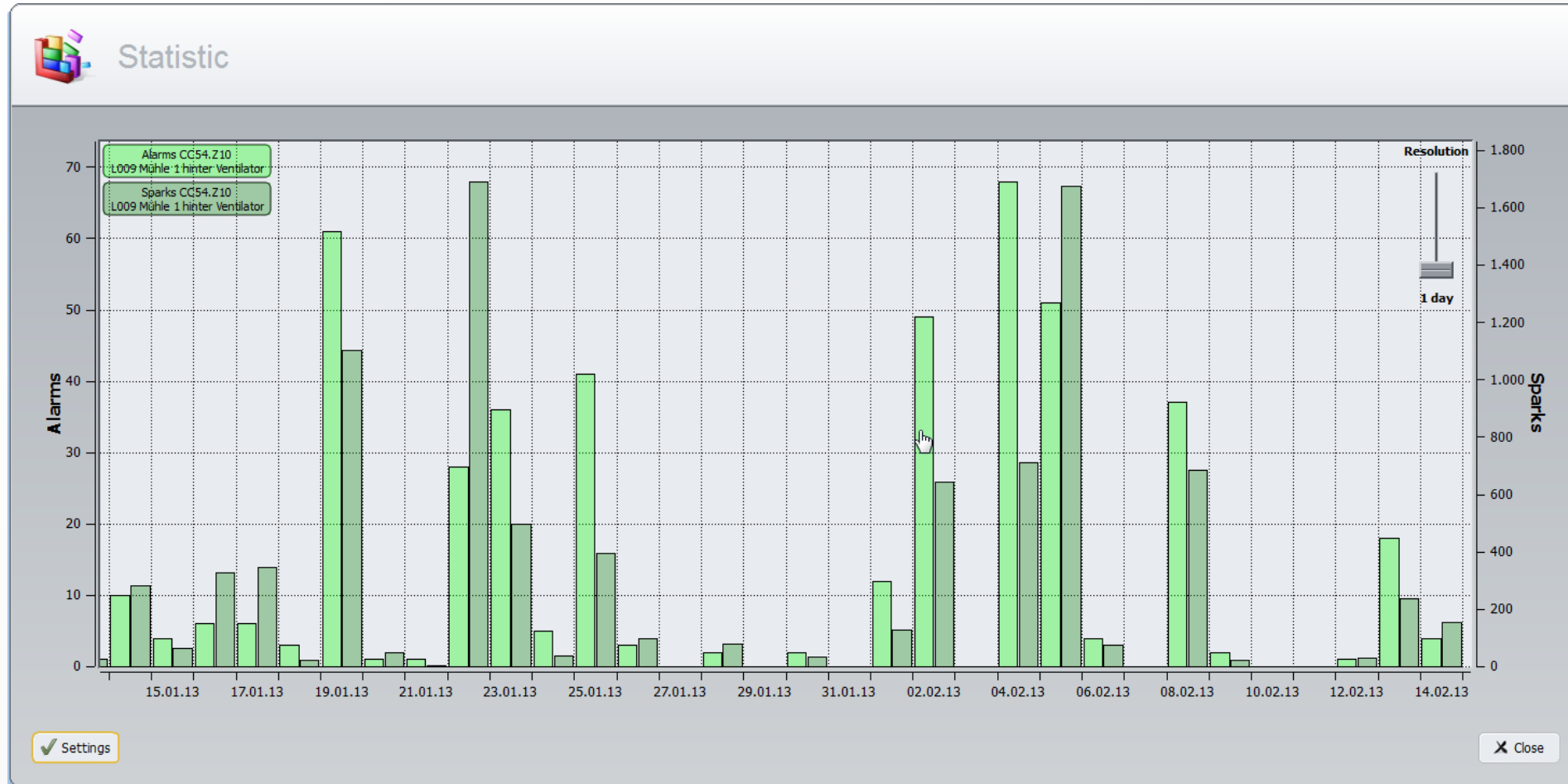
Networking by BS 7 NET

alarm overview of different monitoring zones



Networking by BS 7 NET

alarm overview and spark detection in a monitoring zone



Networking by BS 7 NET

detailed view of the history

Simulation GreCon BS 7

Home View Report System Config Help Alarm Fault Disable Horn off Reset

Statistic **History**

Alarms CC54.Z10 L009 Mühle 1 hinter Ventilator

19.01.13 21.01.13

18.01.2013 00:00:00 20.01.2013 00:00:00 Single event mode

Object: CC54, CC54.SW, CC54.Z1, CC54.SG1, CC54.EG1, CC54.Z2, CC54.SG2, CC54.EG2, CC54.Z3, CC54.SG3, CC54.EG3, CC54.Z4, CC54.EG4, CC54.S2, CC54.Z5, CC54.SG5, CC54.EG5

Type	CC No.	Location	Title	Starttime	Endtime	Description	
0	Alarm	54	SG10	L009 Mühle 1 hinter Ventilator	19.01.2013 21:23:33,341	19.01.2013 21:23:41,340	Alarm level: 2 53 Sparks extinguishment: not available
1	Alarm	54	SG10	L009 Mühle 1 hinter Ventilator	19.01.2013 20:39:21,797	19.01.2013 20:39:26,893	Alarm level: 1 1 Sparks extinguishment: not available
2	Alarm	54	SG10	L009 Mühle 1 hinter Ventilator	19.01.2013 19:08:18,479	19.01.2013 19:08:23,502	Alarm level: 1 1 Sparks extinguishment: not available
3	Alarm	54	SG10	L009 Mühle 1 hinter Ventilator	19.01.2013 19:08:08,458	19.01.2013 19:08:14,324	Alarm level: 1 3 Sparks extinguishment: not available
4	Alarm	54	SG10	L009 Mühle 1 hinter Ventilator	19.01.2013 19:07:11,696	19.01.2013 19:08:07,486	Alarm level: 2, 4 136 Sparks extinguishment: not available
5	Alarm	54	SG10	L009 Mühle 1 hinter Ventilator	19.01.2013 19:06:34,506	19.01.2013 19:07:11,675	Alarm level: 2 53 Sparks extinguishment: not available
6	Alarm	54	SG10	L009 Mühle 1 hinter Ventilator	19.01.2013 19:06:22,385	19.01.2013 19:06:34,028	Alarm level: 1 16 Sparks extinguishment: not available
7	Alarm	54	SG10	L009 Mühle 1 hinter Ventilator	19.01.2013 19:06:10,950	19.01.2013 19:06:21,083	Alarm level: 1 12 Sparks extinguishment: not available

Resolution: 1 day

Line 005 Schnitzelbunker 1 Einfall

Line 011 Schnitzelbunker 2 Einfall

Line 017 Schnitzelbunker 3 Einfall

Line 023 Filter 1 Rohgaskanal

Line 27 Filter 2 Reingaskanal

Line 28 Filter 2 Temperaturüberwachung

Line 29 Filter 3 Rohgaskanal

08:37:12

Content

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- Safety for your individual production with Spark Extinguishing Systems
 - Applications
 - Components
 - Safety Control
- **Customer Support and Services**
- References - Approvals - Certifications

Customer Support and Services

- Worldwide network of highly qualified after-sales engineers.
- Quick reaction for failure removal, assembly and commissioning.
- Low costs thanks to short travelling distances.
- Remote support SATELLITE (highest certified safety standard).
- Maintenance agreements



GreCon Academy

- Transfer of knowledge for the operation, application and technical support of our products.
- Experience and knowledge of decades are available for you.
- Training courses at the Academy in Alfeld as well as internal training courses.



Content

- Why sparks are so dangerous!
- Safety for your individual production with Spark Extinguishing Systems
 - Applications
 - Components
 - Safety Control
- Customer Support and Services
- **References - Approvals - Certifications**

International approvals



International association activities





Extinguish before **Ignition**