TELESTO MIST SYSTEMS for EPS production facilities

Presentation for Partners

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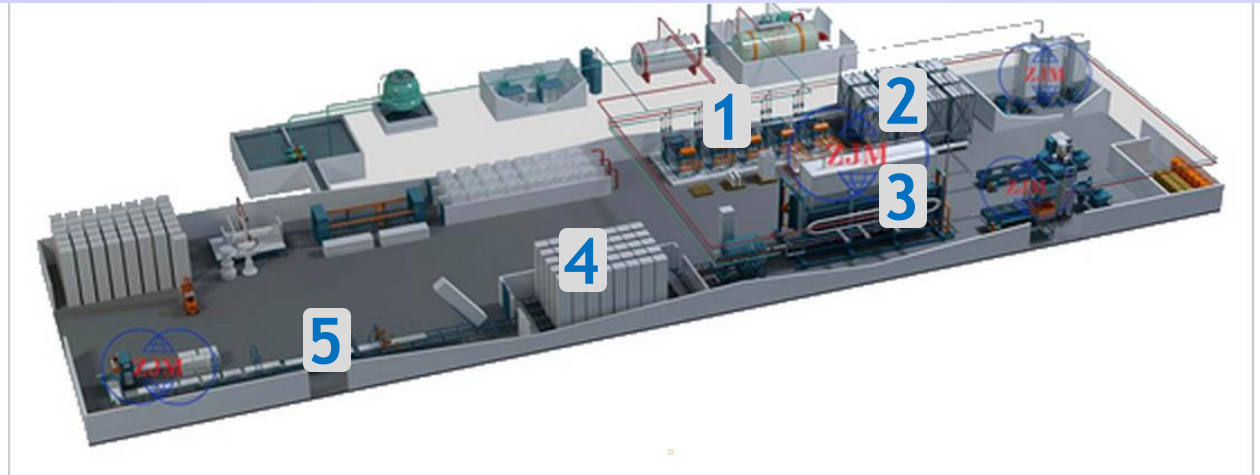
How EPS is made?

- To learn more about how EPS is made please watch the following youtube movies. The manufacturing methods will vary from site to site but the general rule is almost the same.
  - https://www.youtube.com/watch?v=XXMque-pLhA
  - https://www.youtube.com/watch?v=dmUDp8Kbe4k

Telesto solutions for EPS manufacturing plants

This presentation has been prepared for Telesto partners to demonstrate Telesto experience with EPS manufacturing plants and solutions that Telesto has developed for this industry.

EPS Process and factory layout



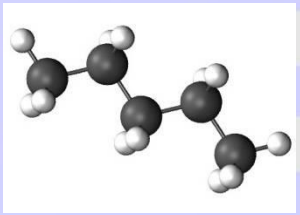
Almost all factories will have:

- Raw materials storage
- Expanders (1)
- Silos where the expanded granulate is stored (2)
- Forming machines / moulding machines or film confinous process(3)
- Warehouse for blocks or rolls(4)
- Cutting machines or trays forming(5)
- Warehouse for ready goods

The granules are usually transported between poins by pneumatic transport inside special pipes

Major risks

- In the production process usually a gas called pentane or butane is observed as it is kept inside the raw granulate and then escapes in the expansion process.
- This gas is transparent, odorless and heavier than air, so it stays near the floor.
- It is a flammable gas.
- The highest concentration of pentane is observed in material silos where the granules are after first the expansion process and in the warehouse of blocks or rolls where they mature (24-72 hours).
- The block when it is being cut also still holds pentane.



Major risks

- EPS manufacturing plants usually have rigorous rules regarding smoking or any work that might involve sparks. They also care about electrostatics a lot.
- They often install pentane level monitoring equipment and effective ventilation to eliminate the risk of fire.
- EPS itself has different ability to burn depending on its class, so the major risk is the pentane gas inside.
- In the cutting process a hot wire is used, which in the case when machine stops can cause a fire.
- When trays are formed in continous process initial process is heating and these ovens often catch fires
- Also breaking wires can cause fires.
- There are known cases where machinery containing hot oil would break and spill the oil onto the EPS blocks thus causing fire.

EPS Cutting Line solutions

TELESTO ROTOR EPS

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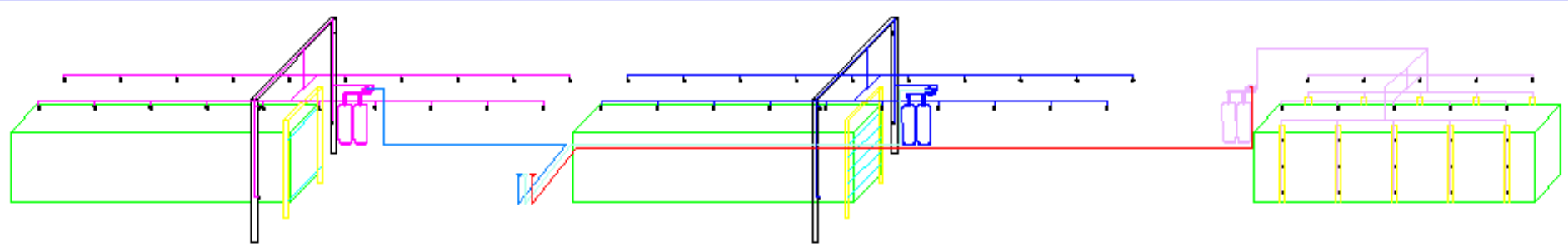
EPS Cutting lines solutions

- A typical cutting line will have 3 cutting point:
  - Horizontal cutting
  - Vertical cutting
  - Initial side cutting or final cutting to pieces
- The cutting points are usually gates with hot wire

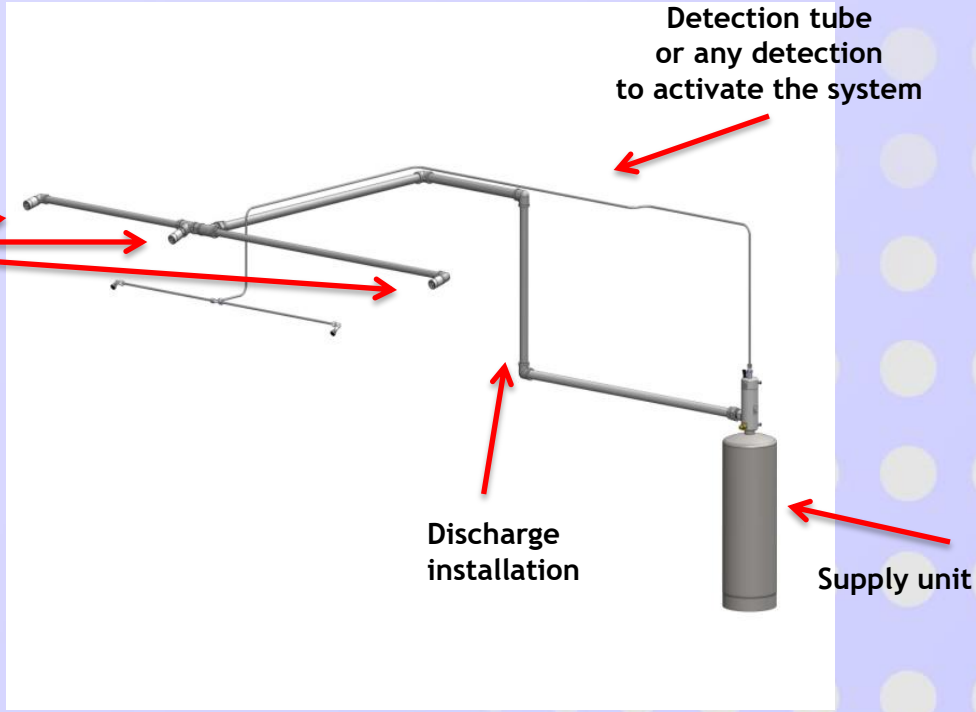
EPS Cutting lines solutions

- Water mist is a good solution for the EPS block cutting line as it uses very little extinguishing agent which is also clean – and will not cause damages to the product, machinery or surroundings.
- People can use this system even for a small fire as there is almost no damage after it is used.
- The TELESTO ROTOR EPS solution is a stand-alone system used to protect crucial places along the line



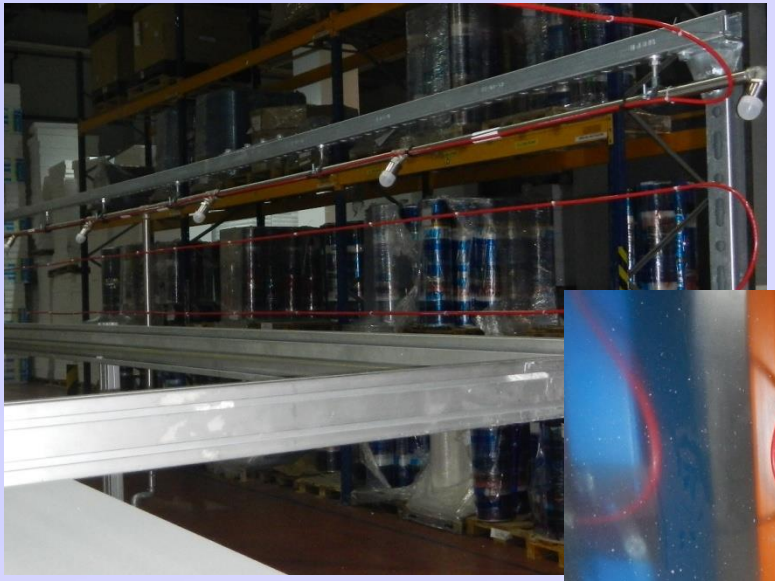
EPS Cutting lines solutions

- The TELESTO ROTOR EPS solution is a stand-alone system composed of
  - Supply unit in a form of a cylinder or group of cylinders
  - Valves
  - Piping
  - Nozzles
  - Detection system
  - Manual actuation



EPS Cutting lines solutions

- The TELESTO ROTOR EPS solution



Pneumatic detection
(red tube)

Manual actuation

Water mist nozzle
with protection cap

EPS Cutting lines solutions

- The TELESTO ROTOR EPS solution

Sample supply units

EPS Cutting lines solutions - detection

- Possible detection solutions
  - Pneumatic tubing
    - Easy to install
    - Requires flame/heat to be activated
    - Does not require any additional cabling
    - Mechanical
    - Fully independent from external sources of power supply
  - Flame detection
    - Very fast detection system – suitable for water mist
    - Requires flame to be activated
    - Proper design necessary – the sensors have to „see” the possible flame sources
    - Needs external power supply
    - Control panel
    - Requires solenoid valves to operate the water mist installation

EPS Cutting lines solutions - options

- Additional options:
  - Visual and/or sound signal of the system actuation – from the flow meter or detection system
  - Local Control Panel to operate the system and to show system readiness
  - Providing signals to the building/main control/fire system

EPS block extinguishing at TELESTO lab

EPS Storage and warehousing

TELESTO solutions

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Solutions for warehouses

- Storage in silos during the production process
- Main risk – at the bottom of the silos where the pentane gas would be located
- Possible fire scenario: fire starts at the bottom of the silos and spreads fairly quickly throughout the whole storage area as it is the gas burning. The silos material (unless made of flame retardant material) would start burning quickly.

Solutions for warehouses

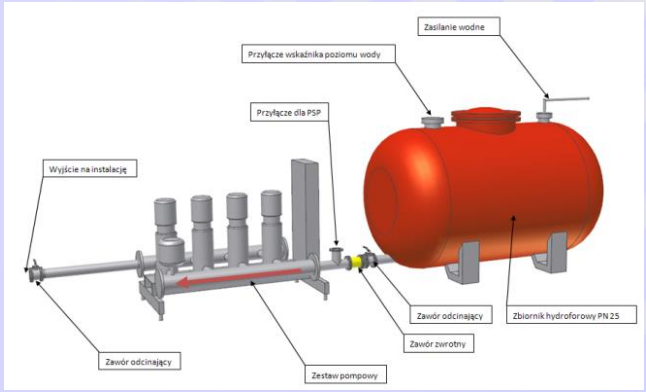
- Telesto – together with one of its customers and the insurance company conducted a test in its tests facility in Suchedniow to confirm effectivness of the water mist solution for this type of risk.
- Two silos filled with EPS granules where located in the room and trays with heptane where used to immitate the heat from burning gas

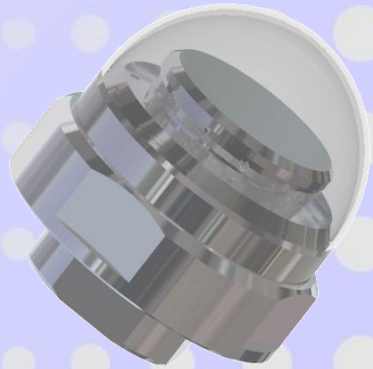
Solutions for warehouses

- The silo material was quickly burnt and the granules where spread in the floor.
- The pentane and the silo material were burning.
- The water mist system was activated and the flames were quickly extinguished.
- The conclusions were:
  - Fast detection is necessary as the fire spreads fairly quickly
  - The granules will drop from the silos so a barrier/fencing is needed to prevent further spread of the fire
  - Water mist is very effective in quenching the flames
- The full test can be seen at:
- https://www.youtube.com/watch?v=kEq1dODLYfg&feature=youtu.be

Solutions for warehouses

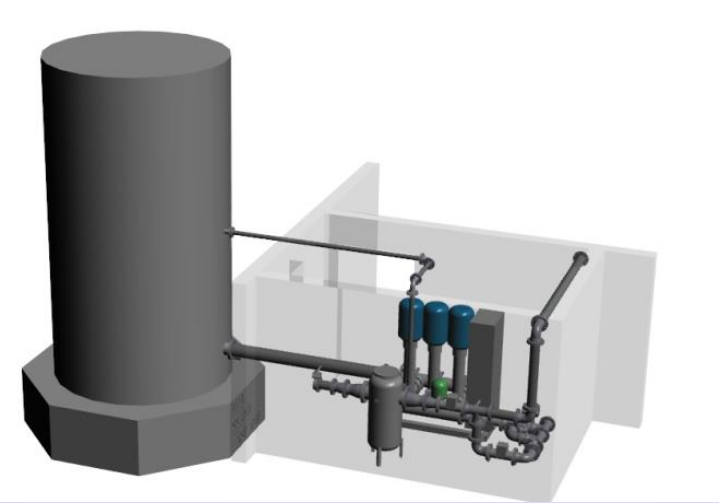
- The system designed for the silo warehouse would be:
  - Low pressure system
  - Using water tank or water from the main
  - Using pump to reach proper pressure
  - With fast detection
- System components
  - Detection system
  - Water tank (or water from the main)
  - Pump station (mainfold)
  - Filters
  - Actuation valves
  - Piping system
  - Nozzle with proteciton caps

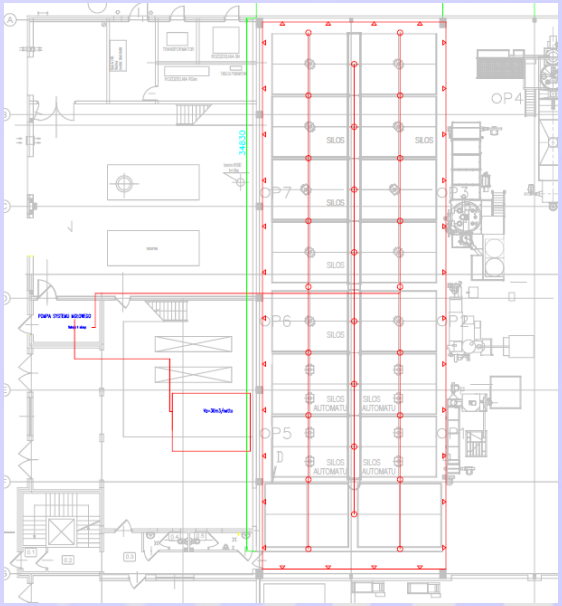




Solutions for warehouses

- The system designed for Telesto customer had:
  - External water tank with heating (due to subzero temperatures)
  - Pump station with control panel
  - Piping and water mist nozzle as one section
  - Detection system using flame detectors in the bottom part of the silos and heat/smoke detection in the upper part





Offering the solutions

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Helping the customer

- How to sell these solutions to the customer?
  - Customer had a **fire history** – ideal sitution as they are aware of the risks and consequences – if there is a history of sucha a fire in your country – great ☺. Such fires usually mean the company will stop manufacturing for some time, which often may mean going out of business.
  - Insurance company – our observation is that the ESP factories are often difficult to insure and insurance companies tend to impose stricter requirements on the owners if they want insurance
  - Sometimes they choose not to insure a customer if they have no protection system
  - Often insurance company would offer a better rate if a fire protection system is in place, as they judge the risk differently.
  - Telesto usuallys start with the protection of the cutting line as the investment is not that extensive and this is where the fires would normally occur most often.

Helping the customer

- In each case an analysis of the customer situation (insurer, previous problems) and well as the risks (what do they really need to protect, to they have other systems in place) is necessary to propose the best solution.
- It is crucial to work with all the stakeholders in the process (owner, manager, fire brigade, fire consultant, insurer, insurance broker or specialist) to reach an optimum solution.

Thank you

For specific inquiries please contact us directly

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