TRINONE

Combining the best



INTEGRATED AUTOMATIC FIRE SUPPRESSION AND EXPLOSION PREVENTION SYSTEMS FOR PETROCHEMICAL STORAGE TANK FARMS



SYSTEM SOLUTIONS FOR FIRE PROTECTION AND EXPLOSION PREVENTION


F13

COMPANY STRUCTURE



Company Management



Finance Department



Engineering and R&D Departments



Design Department and Production & Technical Support Services



Production and Quality Control



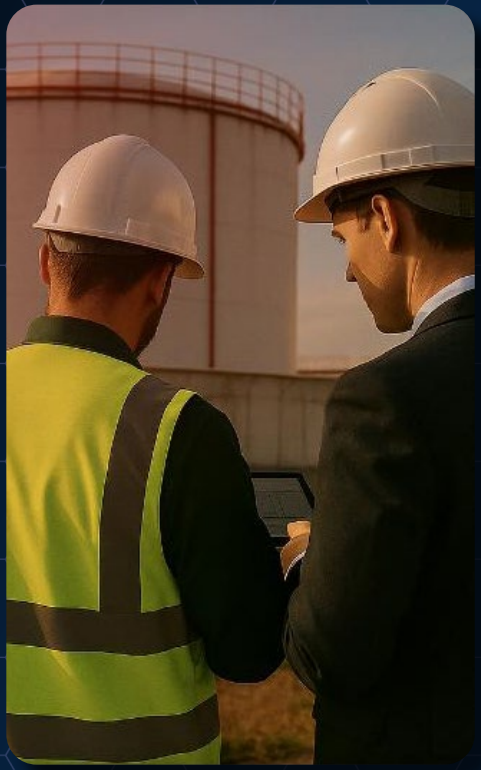
Warehouses



Test site



Logistics and Service Department



OUR PRINCIPLES

01 Individual approach to each client and facility.

02 Development of optimal engineering solutions. Maximum efficiency.

03 Manufacture of high-quality equipment, spare parts, and components.

04 Provision of warranty and service support.

05 Technical and information support. Training of the Customer's personnel.

06 Proper long-term cooperation with the Customer. More than 20 years of successful experience.



UNMATCHED SOLUTIONS

Efficient tank fire extinguishing and explosion prevention

5 FACTORS OF EFFECTIVE TANK FIRE EXTINGUISHING AND EXPLOSION PREVENTION

01 Use of high-density foam mixers (with no analogues). Best flame suppression solutions based on more than 60 years of field experience.

02 Calculation of foam supply configuration depending on the geometry and volume of the tank.

03 Use of solenoid valves (with no analogues) and a system ensuring fire suppression activation within 40 seconds.

04 Automatic activation of the watercooling system for adjacent tanks. Prevention of fire spread.

05 Availability of additional systems for filling the upper part of the tank with a nitrogen-based inert mixture, as well as installation of membranes for directed release of explosion pressure.







SYSTEM HISTORY AND OPERATING EXPERIENCE INNOVATION TODAY

The foundations of these automatic fire suppression systems were developed and modified at the request of state oil and gas companies of the Republic of Serbia after the bombing of Yugoslavia in 1999.

Specialists of the Trinone group of companies adapted this system to regulatory requirements and supplemented it with a set of solutions ensuring the prevention or dissipation of explosion energy.

The systems have been installed at more than 70 enterprises in Serbia, including state-owned enterprises and NIS-Gazprom Neft facilities, including the storage facilities of Belgrade Airport, storage facilities in Novi Sad, pumping stations in ports, and petroleum storage facilities at wells.

MAIN STAGES OF SYSTEM OPERATION

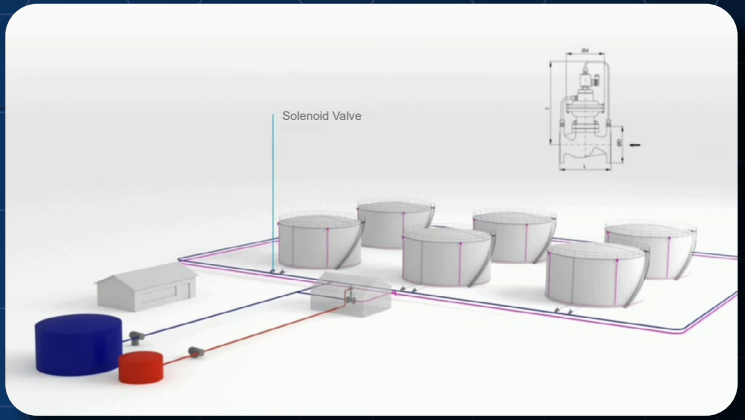
The operating principle of the system is based on generating high-density air foam from a mixture of water and 3% foaming agent at a foam generation unit located outside the tank farm, followed by automatic delivery of foam to the ignition area with simultaneous supply of water for cooling adjacent tanks.

STAGE 1

SYSTEM IN STANDBY MODE

Minimal power consumption in automatic standby mode. The system can be started manually.

Possibility of starting the system manually.

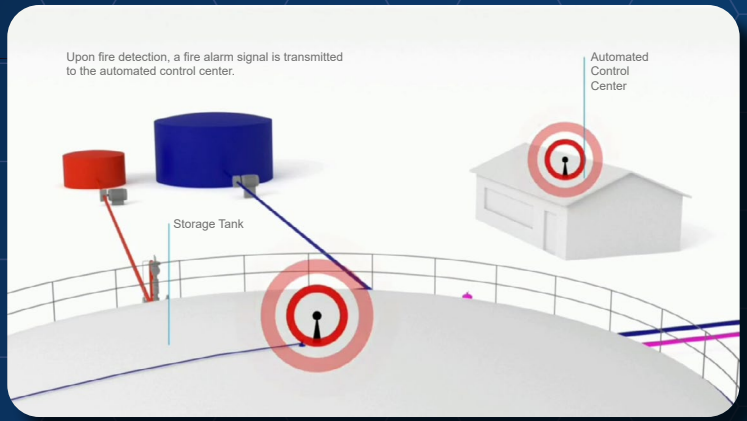


MAIN STAGES OF SYSTEM OPERATION

STAGE 2

Detection of the fire source using special ultra-sensitive thermal elements and sensors, including optical monitoring.

Activation of the alarm system and transmission of a signal to the system control station.



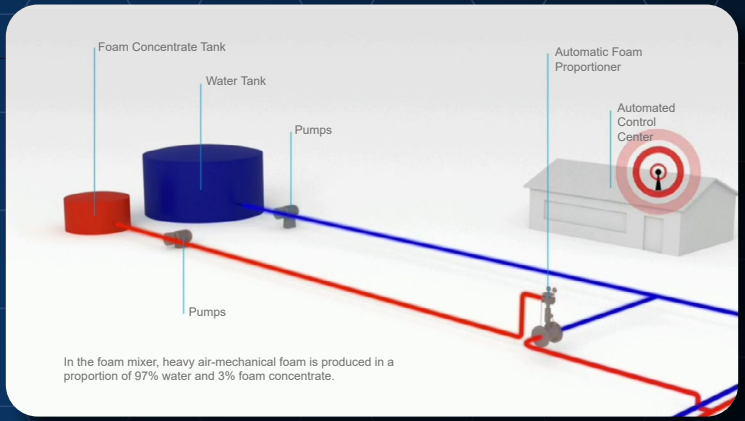
MAIN STAGES OF SYSTEM OPERATION

STAGE 3

Activation of the installation upon receipt of the corresponding signal from the controller:

Supply of agent (red tank) and water (blue tank) to the mixer.

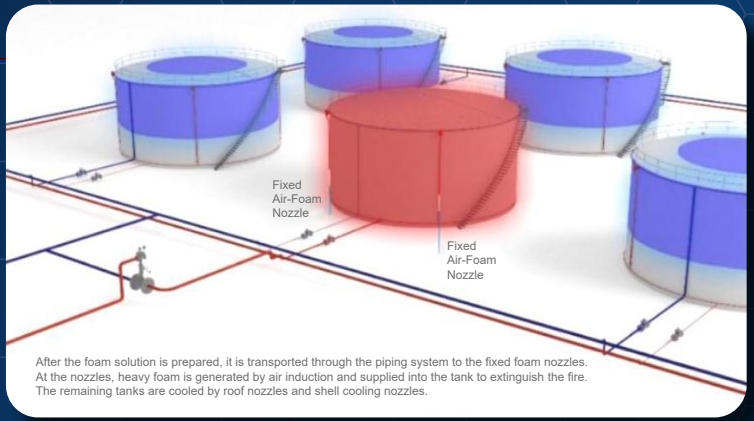
Distribution of foam and water flow in the specified directions.



MAIN STAGES OF SYSTEM OPERATION

STAGE 4

Supply of foam to the fire source while simultaneously creating a water curtain on adjacent tanks or installations.



After the foam solution is prepared, it is transported through the piping system to the fixed foam nozzles. At the nozzles, heavy foam is generated by air induction and supplied into the tank to extinguish the fire. The remaining tanks are cooled by roof nozzles and shell cooling nozzles.

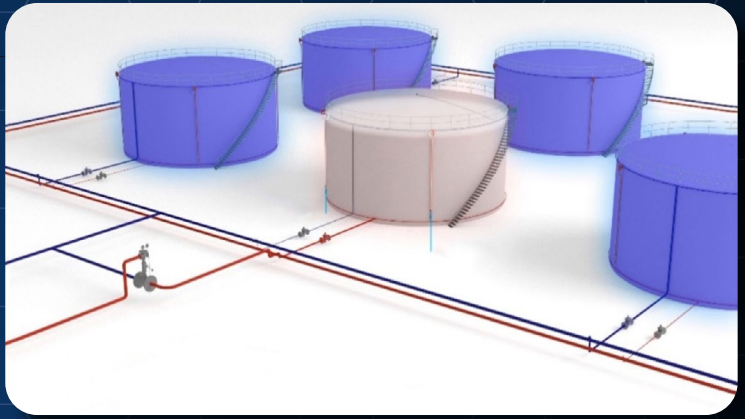
MAIN STAGES OF SYSTEM OPERATION

STAGE 5

Elimination of consequences after fire localization.

Minimal damage to objects and products covered with foam.

Ease of equipment cleaning.



THE MAIN ADVANTAGES OF THIS SYSTEM ARE:

1. Availability of both automatic activation and manual control.
2. Reliability and ease of maintenance in standby mode.
3. Full system activation within 10–15 seconds.
4. Preparation and transition of the system to full 100% firefighting mode, while ensuring preventive protection against ignition of adjacent tanks, within 40 seconds.
5. Ease of operation and monitoring of the system.
6. Prevention of explosion and tank destruction at the initial moment of ignition.
7. Prevention of emissions into the environment and reduction of storage product losses by 3% to 16% per year, depending on the region and the type of product.
8. ignificant reduction of corrosion processes, including thinning of tank walls.
9. Availability of eventive measures against fire spread to adjacent tanks.
10. No need for hum presence in the ignition and explosion zone.

THE MAIN ADVANTAGES OF THIS SYSTEM ARE:

11. High efficiency of fire localization.

12. Reduced water consumption for firefighting by these installations.

13. Minimal damage to objects covered with foam.

14. Foam properties as a harmless extinguishing agent, with minimal need for evacuation of people at the moment of system activation.

15. Possibility of manufacturing the system according to the Customer's individual requirements and the geometric features of the facility.

16. Availability hin the Russian Federation of design, engineering, installation, and commissioning teams with the required permits, including SRO approval for hazardous facilities and EMERCOM license.

17. Availability hin the Russian Federation of service and warranty support units.

18. All system ele nts are certified in accordance with SRPS EN 13565–1:2019 by Bureau Veritas (France), and also hold ISO 9001:2015 certification. More than 25 years of operating experience.

ADDITIONAL SYSTEMS AND MEASURES

TO ACHIEVE THE MAXIMUM LEVEL OF FIRE AND EXPLOSION PROTECTION OF THE FACILITY, THE FIRE SUPPRESSION SYSTEM MAY BE SUPPLEMENTED WITH:

1. A system for filling the upper part of the tank with a nitrogen-based inert mixture, with constant maintenance of the calculated pressure and concentration of this mixture in the tank, making the development of the first primary explosion impossible.

1.1. The system is equipped with control valves and automation for maintaining the calculated pressure and concentration, preventing the occurrence of explosion and fire at the initial moment of impact on the tank.

1.2. The system is equipped with emergency valves providing additional protection against possible pressure increase, including in the event of possible ignition after neutralization of the first primary explosion and incomplete filling of the damaged tank with foam.

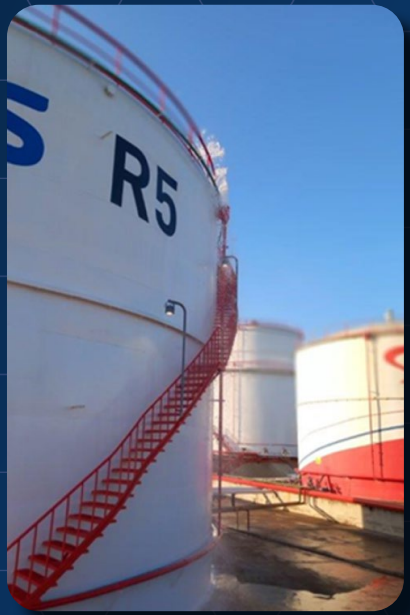
ADDITIONAL SYSTEMS AND MEASURES

2. A system of membranes built into the tank with specified characteristics, providing an additional degree of tank protection against destruction through directed release of explosion pressure in the event of its occurrence.

3. Measures for inspection of the tank bunding and bringing it to a condition capable of localizing spillage of petroleum products from a damaged tank, preventing an increase in the fire area.

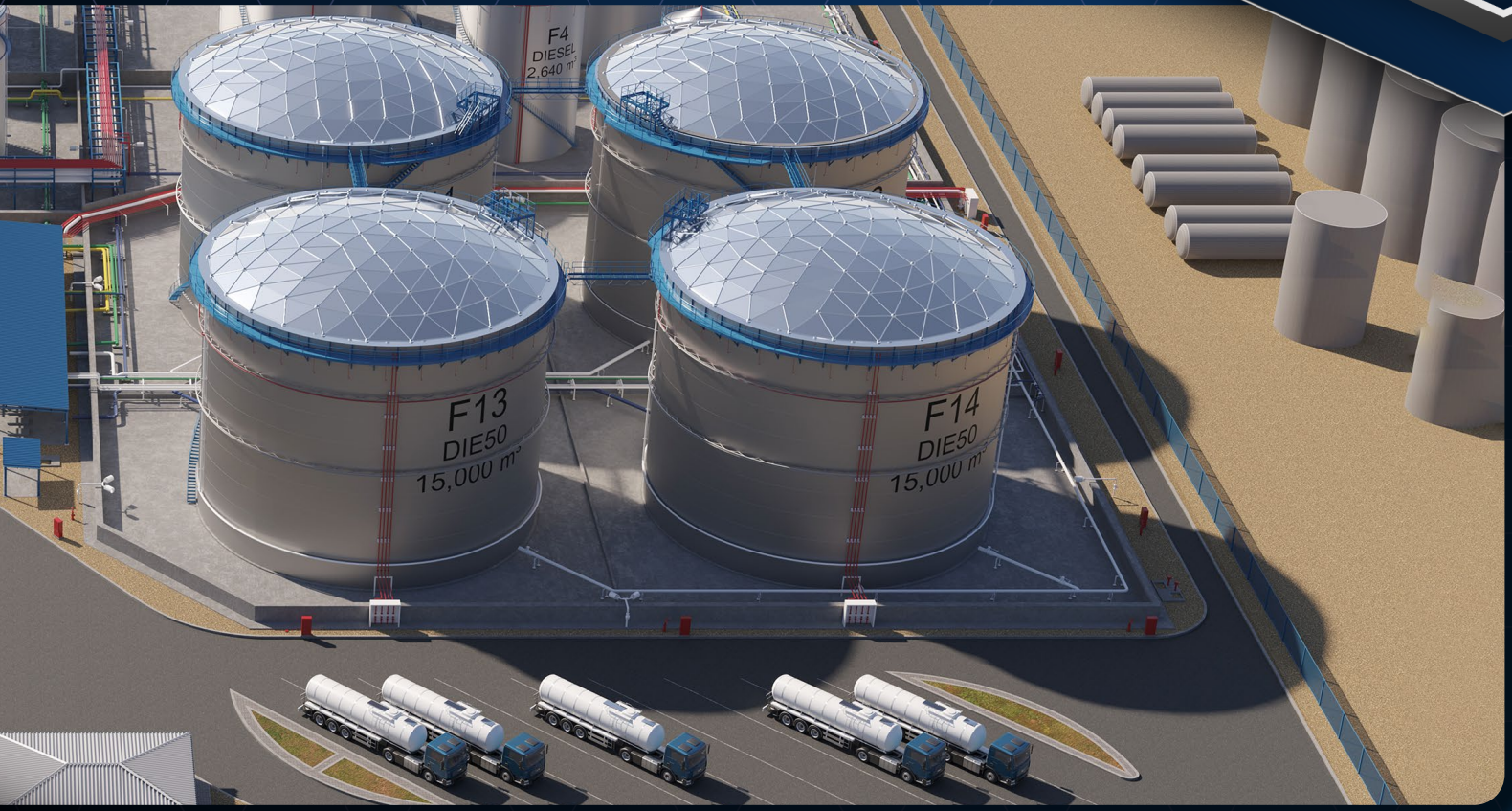
SYSTEM INSTALLATION:

Installation of this system does not require major reconstruction of the storage terminal and, in order to accelerate installation, it may be delivered to the site in prefabricated modular form with a high degree of factory readiness and installed in the shortest possible time.






F8
ULP93
2,600 m³
F7
ULP93
2,600 m³
F6
ULP93
2,600 m³


F4
DIESEL
2,640 m³
F13
DIE50
15,000 m³
F14
DIE50
15,000 m³



TRINONE

Combining the best

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