



FIRE FIGHTING SYSTEMS

FIRST AID RIM SEAL SYSTEM

APPLICATION

The most likely fire scenario for floating roof fuel tanks is a rim seal fire. These fires develop in the seal area, between the floating roof and the tank wall.

While the rim seal fires hardly progress to full surface fires, provided that the floating roof doesn't sink, fuel burning at the seal may last for days prior it is detected and extinguished, causing expensive damages to the seal aggregate and production interruptions.

An early detection and discharge of low expansion foam at a high density of application is normally sufficient to put the rim seal fires out, without the need for activating alternative, higher flowrate, methods of protection that in some case may even create sinking potential to the floating roof. The FIRST AID RIM SEAL system has been specifically conceived to provide such a fast, high performance and cost-effective protection.

Due to its self-standing nature, the FIRST AID RIM SEAL is particularly suitable for old Halon gas system replacement, as well as for new tank installations.

FUNCTIONAL DESCRIPTION

The FIRST AID RIM SEAL is a rim seal fire protection system is made up of a suitable array of tank assembly units, which are located on the floating roof, along the full rim, according to a modular strategy.

Each unit comprises a pre-mixed foam solution pressure vessel, either stored pressure or externally pressurized by a nitrogen cylinder, equipped with a pressure-operated automatic release on/off valve.

The latter is connected to a thermoplastic pneumatic detection tubing, laid down in a loop according to the special seal type and to the expected fire scenario - e.g., above the mechanical shoe seal or weather shield, between the primary and secondary seals, or in both these regions, which is designed to detect the presence of fire over a whole rim seal circumference sector.

When a fire occurs in the rim area the pneumatic tubing - which is constantly pressurized with nitrogen - starts melting until it reaches, at a given temperature, the bursting point. The consequent pressure drop activates the Automatic On/Off Valve to open the master pneumatic actuated Discharge Valve, causing the instantaneous delivery of high-efficiency water-foam solution to the nozzles placed in the fire region.

The extremely fast reaction makes it possible to deal with the fire at a very early stage, when the size and the related heat release rate are limited. This keeps the damage to the tank seal components to a minimum and, in combination with the large density of foam delivered by the FIRST AID RIM SEAL nozzles, make the extinguishing of the fire very probable.

Each FIRST AID RIM SEAL unit usually covers a rim seal section of 40 meters length and comprises 20 high efficiency foam discharge nozzles. In the standard version the foam solution capacity ranges from 150 litres (Model RS200) to 200 litres (Model RS260). The initial stored pressure, 23 or 25 bar/g, determines the complete foam solution discharge in a period between 20 sec to 40 sec.

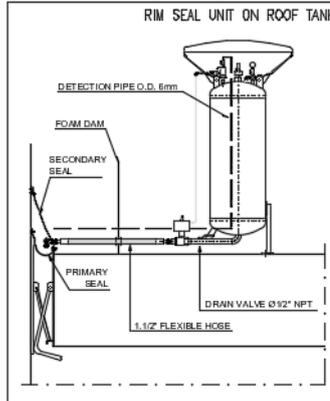
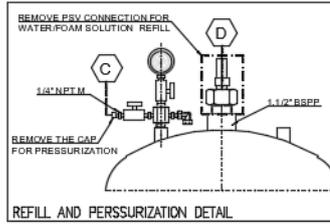
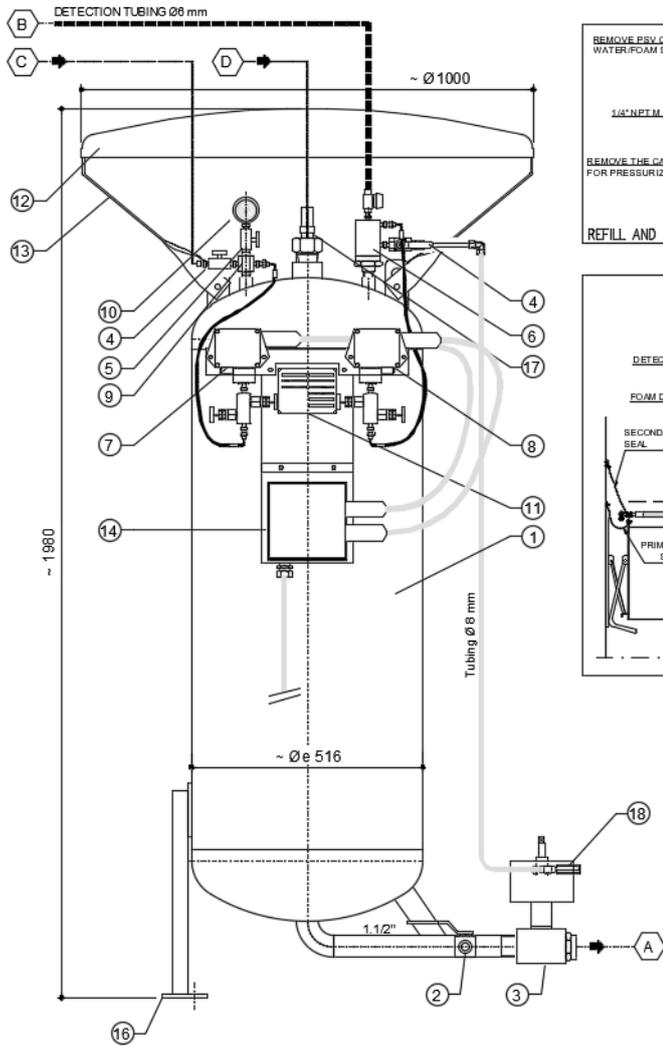


The FIRST AID RIM SEAL is a self-standing system, it doesn't need any external detection to be initiated or any external power to be activated.

The presence of two Ex Pressure Switches permits the supervision of the appropriate tank pressurization status (low pressure switch) and to detect a fire in the rim seal (low-low pressure switch). This makes the FIRST AID RIM SEAL an early indicator of the fire presence even when a separate detection system is not installed. The low-pressure signal and fire signal are made available to the end user via two SPDT contacts at the FIRST AID RIM SEAL Junction Box.

Due to its flexibility, the FIRST AID RIM SEAL system can be configured to discharge on any individual rim seal section in fire only or, conversely, over the full rim seal surface even when just one module detects a fire.

COMPONENTS DESCRIPTION



LEGEND

1. FIRST AID RIM SEAL TANK
2. DRAN BALL VALVE
3. PNEUMATIC ACTUATED DISCHARGE VALVE
4. ISOLATION MANUAL BALL VALVE
5. NEEDLE VALVE
6. AUTOMATIC RELEASE ON/OFF VALVE
7. LEVEL SWITCH (SET 10 BAR)
8. PRESSURE SWITCH (SET 6 BAR)
9. MANIFOLD FOR INSTRUMENTS
10. PRESSURE GAUGE
11. TANK NAME PLATE
12. SUN-SHIELD
13. BRACKET WITH FIXING BOLTS
14. JUNCTION BOX, WITH CABLE GLANDS
15. HEAT DETECTION PLASTIC TUGBING
16. TANK LEG SUPPORT PLATE
17. SAFETY VALVE
18. VENT VALVE

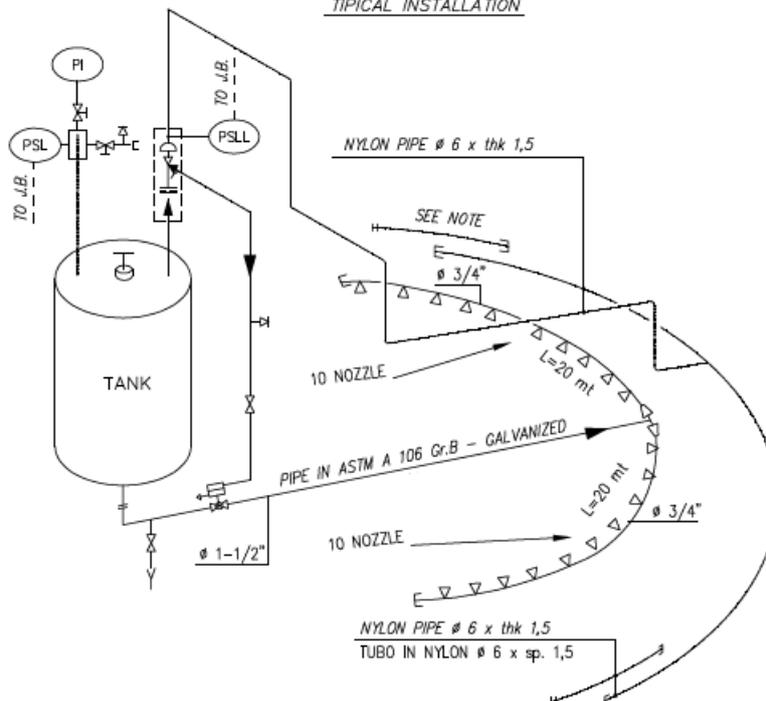
CONNECTIONS

- A. FOAM SOLUTION OUTLET (1½" BSP)
- B. HEAT DETECTION TUBING
- C. PRESSURIZATION (1/4" NPT)
- D. FOAM SOLUTION REFILLING (1½" BSP)

TECHNICAL FEATURES (MODEL RS260)

TANK MATERIAL:	SS 316L
TANK CAPACITY:	260 Lts
DESIGN PRESSURE:	28 bar
WORKING PRESSURE:	23 bar
DESIGN TEMPERATURE:	+5 / +87 °C
OPERATING TEMP.:	+58 °C Max
FOAM SOLUTION:	194 Lts WATER 6 Lts FOAM (FP/AFFF)

TYPICAL INSTALLATION



FEATURES AND BENEFITS

The FIRST AID RIM SEAL system provides many advantages in terms of fire performance, simplicity and safety.

Performance on the fire

- Early fire detection, due to the thermoplastic tubing's sensitivity and to its continuous length coverage in the seal area.
- Fast foam discharge initiation, quicker than a standard foam maker/pourer system.
- Uniform foam distribution the fire, due to the number and position of nozzles, always close to the fire even in such cases where the floating roof is at a low level.
- High density of application, local and direct discharge onto the rim seal
- Re-ignition prevention, due to the foam blanket persistency and to the -film formation (for AFFF). This feature is a real plus compared to gas-based rim seal protection systems.
- Fire control, even if extinguishing is not achieved. This procures extra-time to conventional rim seal pourers or to manual applications for complete extinguishing before fire escalation.

System simplicity and cost containment

- The use of premixed solution (with FP foam concentrate or even more stable and durable AFFF), saves external induction systems which may be subject to failure if nozzles and piping are not constantly flushed and maintained.
- Pressure supervision via two pressure switches, for remote monitoring of the system full efficiency in real time. The optional external pressurization unit provides extra-charge of Nitrogen for additional safety.
- Low maintenance needed, due to its specific design simplicity and to its independency from other external systems.

Reliability and safety

- FIRST AID RIM SEAL operates under any condition if the monitored pressure is within the appropriate range, thanks to the fact it doesn't rely on any external power or any external activation methods.
- FIRST AID RIM SEAL's discharge does not create any potential risks for roof sinking, like monitors, handlines and standard pourers may introduce if their operation is improper.

The FIRST AID RIM SEAL system operates by two possible means of discharge:

- Modular discharge
- Full discharge

In the modular discharge approach any FIRST AID RIM SEAL unit acts independently of the others. For any given module, the thermoplastic tubing operation determines the discharge of that particular unit only. This option is preferred when the priority is keeping to a minimum the water-foam consumption and the refilling operations, still preserving the chance for further discharges in case the fire might propagate to adjacent rim seal areas.

The full discharge mode is achieved when any single Discharge Valve is connected to all the automatic on/off actuators existing on the floating roof. In this configuration, the detection tubing of any FIRST AID RIM SEAL unit initiates the discharge of all the other modules. In spite of all the FIRST AID RIM SEAL units being operated at a time, each of them is still equipped with its proper detection tubing. This choice provides detection redundancy and prevents that malfunctioning of a single Automatic On/Off Valve may result in a discharge failure.

The full discharge approach is preferred when the inertization of the complete rim seal is desired and to keep to a minimum the foam migration from the discharge area to the to adjacent, so maintaining for a longer time the foam blanket at the fire position.

In the basic FIRST AID RIM SEAL configuration, the full discharge mode is allowed up to 8 (eight) FIRST AID RIM SEAL modules. Special arrangements permit to extend this strategy to more than eight modules,

Whatever is the selected discharge mode, the overlapping of two consecutive detection loops - normally 2 meters - ensures detection of the fire regardless which position the hot spot is.