

## RIM SEAL FIRE PROTECTION SYSTEM.

### FLOATING ROOF TANK (RIM SEAL) PROTECTION SYSTEM.

#### 1. GENERAL DESCRIPTION.

Grishma's TANK GUARD - Floating Roof Tank protection is a fully automatic detection cum extinguishing system. The system is designed and manufactured for extremely fast detection and extinction of rim seal fires as per the International Safety Standards.

#### 2. WORKING PRINCIPLE.

To understand the complete working philosophy of the system, the system has been divided in the following sub-systems:-

- Linear Heat Detection System.
- The Foam Based Extinguishing System.
- Fire Alarm Panel & Automation

#### a) Linear Heat Detection System.

The working of the UL listed & VDS Germany approved detection unit is based on the principle of rate of rise in temperature and maximum temperature beyond the pre-configured parameters, which is sensed by means of a microprocessor based intelligent evaluation unit. The Sensor element, i.e. the Stainless Steel / Copper Tube, which is in non-pressurized state (ambient pressure only) senses the rate of rise in temperature (pressure) and triggers an audio visual alarm simultaneously activating the extinguishing systems. The Advance Detection System is Decentralize and has Pre Alarm facility for early warning.

#### Technical Specifications of ADW Linear Heat Detection System:

❖ Approved and Listed by	:	UL (USA) , Vds (Germany).
❖ Supply Voltage Range	:	10.5 to 30 VDC.
❖ Sensor tube Length	:	20 - 130 m.
❖ Sensor tube dia. (internal / external)	:	4/5 mm.
❖ Temperature range of the sensor tube	:	-40 °C to +160°C & above
❖ Response Sensitivity	:	Class AI as per EN54/4
❖ Ambient Humidity of Evaluation Unit	:	95 % RH
❖ Ambient Humidity of Sensor tube	:	100 % RH
❖ Output Signals	:	Potential free contacts for
		➤ FIRE
		➤ Detection system fault



## RIM SEAL FIRE PROTECTION SYSTEM.

### b) The Foam Based extinguishing system.

Foam based extinguishing system is 100% proven substitute of Halon system and is environmental friendly. The foam module is of 250 liter capacity charged with 200 liters of pre-mixed foam solution as per the International Safety Standards. Each foam module can cater 40 Meter Circumference of rim seal area. Foam Discharge Manifold with Spray Nozzles are evenly spaced along the Rim Seal and are designed to discharge required Foam solution to control the fire completely. On detection of smallest fire the detection triggers an alarm & immediately actuates the extinguishing system. The foam concentrate used are UL / FM approved.

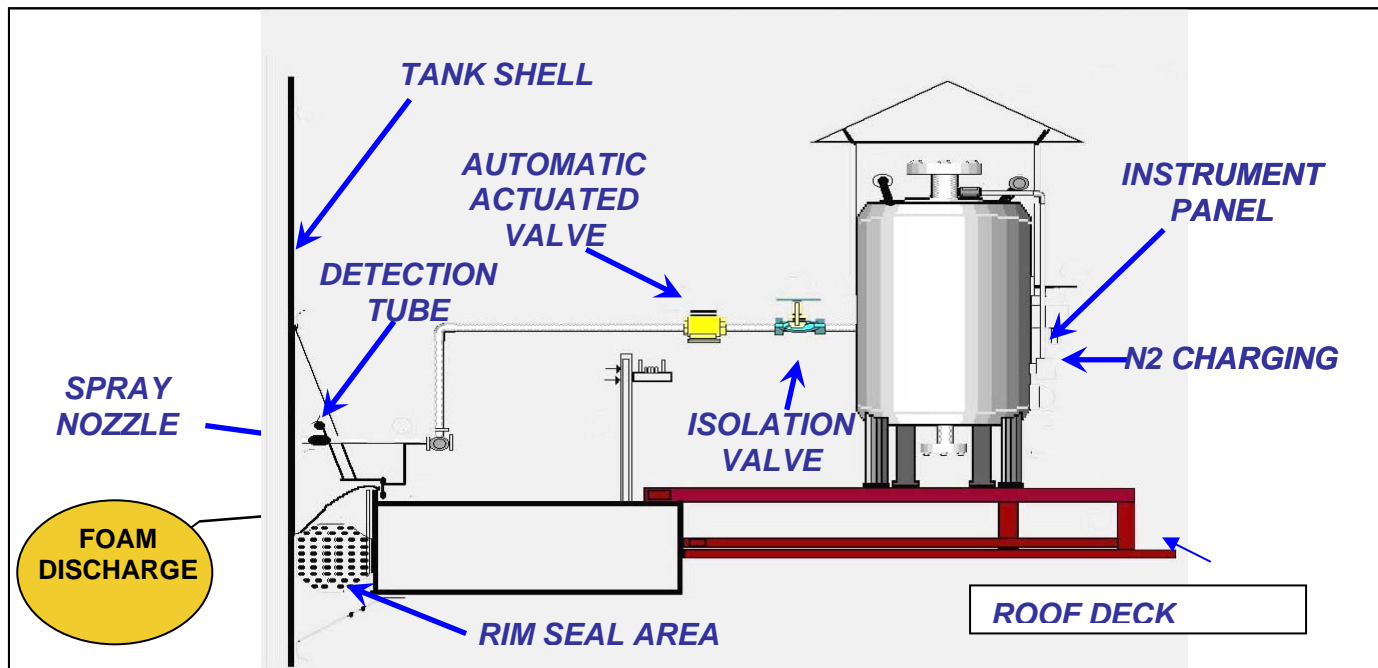
### Technical Specifications of Foam Extinguishing System:

One module caters approx. 40 meters length of rim seal.

❖ Capacity of Each Module	:	250 liters.
❖ Foam Solution (Pre-mix)	:	200 liters.
❖ Material of Foam Module	:	Stainless Steel.
❖ Foam Module Working Pressure	:	14 to 15 Kg/cm <sup>2</sup>
❖ Foam Module Design Code	:	ASME Sec VIII Div I.
❖ Pressure Monitoring Switch	:	ATEX Approved.
❖ Foam Discharge Nozzles	:	16 Nos (Min.)

### c) Alternate Extinguishing system.

The system can also be equipped with clean gas as extinguishing agent as per the hazards application.



## RIM SEAL FIRE PROTECTION SYSTEM.

### 3. FIRE ALARM PANEL & AUTOMATION:

#### a) Fire Alarm Panel

The detection system and suppression system are connected to a dedicated Fire Alarm Panel and the same panel can be located in fire station / control room.

The fire alarm panel configuration is microprocessor based.

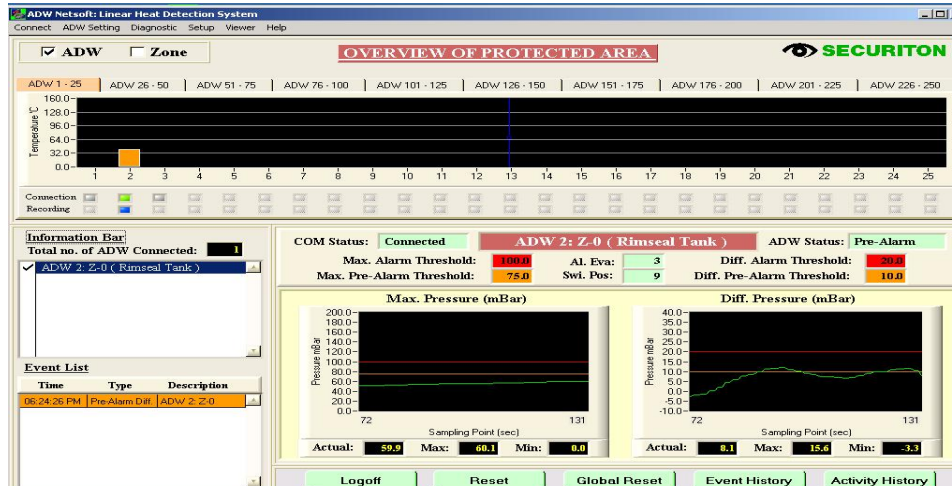
The fire Alarm panel is UL / VdS certified.



**Fire Alarm Panel**

#### b) Automation:

The detection system is supported with compatible software, which is capable to run the system for feeding the parameters, event logging and continues monitoring of events. The dedicates software supports and provide vital information of the status of the system at the control room through PC or Laptop and is capable of real time data acquisition, data and alarm processing, data base downloading excess security with password authentication and shall also display graphic resolution of temperature/pressure event history, user activity history, auto data printing of status of all such detection system installed and integrated with the software. The system has the feature to convey electronic mails during emergencies. The automation software is capable to monitor continuously 250 tanks on single screen.



## RIM SEAL FIRE PROTECTION SYSTEM.

### 4. FAIL SAFE PHILOSOPHY

The system have features that ensure fail safe operation of rim seal fire protection system on floating roof storage tanks even under abnormal conditions viz.

#### Case 1 - Self diagnostic features for fail safe operation.

The system have inbuilt debugging device to check the integrity of evaluation module and sensor tube at periodic interval.

#### Case 2 - Any problem in functioning of Fire Alarm Panel in Control Room

The detection system is independently capable to actuate the extinguishing system locally on the tanks upon detection of fire without any support from the control room (Fire Alarm Panel). The detection system is independent, decentralized and individual for each tank.

#### Case 3 - Failure / cut of any or all signal cables communicating from control room to tank

The detection system have the feature whereby it would still remain functional i.e. it will detect fire and actuate the extinguishing system locally on the tank and will also actuate local buzzer / flasher on tank.

#### Case 4 - Pressure in foam module

The low pressure module indication and alarm shall be displayed on the fire alarm panel in case of reduction in pressure on the foam module.

The above feature of fail sale philosophy makes the system intelligent to remain functional, detect the possible fault and also the decentralized and individual system for each tank ensures that a particular fault shall not affect the system installed on the other tanks.

## RIM SEAL FIRE PROTECTION SYSTEM.

### 5. SALIENT FEATURES FOR DETECTION SYSTEM

1. Class A1 Approved Linear Heat Detection system as per EN 54/4 std.
2. Possible to adjust the detector sensitivity and response behavior at site from, - 40 to +160 deg C & Above.
3. Non - Pressurized System, hence No Chance of leakage.
4. Pre Alarm configurable for Early Warning & High Reliability.
5. Cross zoning facility of Rate of Rise of Temperature & Max Temperature.
6. Each mm of the sensor tube functions as highly sensitive heat detector.
7. Fully automatic self-diagnostic feature for no false alarms.
8. Reusable sensor tube even after exposed to several Hydrocarbon Fires.
9. Continuous Detection at high temperatures.
10. Immune to atmospheric changes & hydrocarbon vapor.
11. Very low operating cost due to unique feature of re-usability of Sensor Tube even after several hydrocarbon fires.
12. System Approved by UL (USA) / VdS (Germany) / VKF (Switzerland).
13. System design Fail Safe.
14. Recommended by VdS Germany for use in tank farm area.
15. Decentralize system makes the system free from total collapse.

### 6. SALIENT FEATURES FOR FOAM BASED EXTINGUISHING SYSTEM

- a. Highly effective in extinguishing of liquid hydrocarbon fire.
- b. UL/FM Approved Foam
- c. Nullifies the possibility of Re ignition.
- d. Highly cost effective on refilling when compared with clean gas system.
- e. Very low turn around time when compared with gas based system.
- f. Stainless construction of foam module hence long life & sturdy performance.

## RIM SEAL FIRE PROTECTION SYSTEM.

### 7. APPLICATION

This unique detection system coupled with & without appropriate extinguishing system is being used world over in critical / sensitive areas floating like roof tank / Tank Farms / Fuel filling stations / transformer protection & many more applications.



**The above Rim Seal Fire Protection System is successfully operating in huge number of Floating Roof Storage Tanks of various sizes from 20 meter dia up to 79 meter dia at Refineries, Oil Terminals, Process Plants, etc.**