Fire Detection and Diversion System

Introduction :-

In Textile Plant, particularly Spinning Industry, normally Blow room is connected with Carding section and Filter section through material duct, dust duct and waste duct.

If Spark is created while processing the cotton in Blow Room, which travels through duct and spread to Carding and Filter area.

It is always the concept to detect the fire at early stage and confine the fire in one area/ zone and extinguishing the fire within the area/zone.

FireDiversion System is basically designed on the above discussed principle.

SystemOperation :-

The following activities are the key function of the system.

- 1.) Fire Detection,
- 2.) Isolating the Fire by stopping themachineries and operating the Dampers,
- 3.) Diversion Dampers stop thematerial flow and divert thematerial into Diversion Duct,
- 4.) Diverted Materials sucked through Suction Fan to Quenching Tank or Fire Collection Bag,
- 5.) Extinguishing BurningMaterial.

System Consists of :-

- 1.) FireAlarm Control Panel.
- 2.) Electrical Trip Panel.
- 3.) Pneumatic Control Panel.
- 4.) Spark Detector.
- 5.) Heat Detector.
- 6.) Electronic Hooter.
- 7.) Fire Stop Damper.
- 8.) Fire Diversion Damper.
- 9.) PneumaticActuator.
- 10.) Quenching Tank.
- 11.) DiversionDuct&SuctionFan.

Fire Detection :-

Fire can be detected either by Spark Detector or Heat Detectors. Fire can be detected by fixing the Heat Detectors of 60°C. Temp. range in the Machinery enclosure and duct. The spark detector is placed in thematerial duct and dust duct which passes through the carding & filter area.





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DIVERSION SYSTEM

Heat Detector is fixed temperature bi-metal type which operates effectively in any type of environmental condition. Spark Detectors are available with higher efficiency to detect the moving spark in the duct. However direct exposure of day light and sun light may create false alarm. Proper precaution has to be adopted while installing the spark detector in the duct. Our Spark DetectorAssembly consists of 4 Nos./5 Nos. of Infra Red Spark Detectors fixed at 90°/72° angle to cover entire duct.

In our system we have adopted necessary precaution to avoid false fire alarm and to give the best efficient detection method.

FireAlarmControl Panel

Fire Alarm Control Panel is the back bone of the entire system which gives input to the detector and receives the signal from the detectors. It gives audio visual fire indication and also trip machines as per the system requirement and actuates the solenoid to supply the compressed air to the pneumatic actuator to operate Diversion Dampers pneumatically. The Control Panel works with 230 V AC primary input supply and 24 V DC secondary battery back up. The entire system works with 24 V DC.







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- 8. Operating Voltage 24V DC
- 9. Supply Voltage & Source to Detector 22V DC
- 10. Signal Voltage on Control Panel - 12V DC

SPARK DETECTOR **SPECIFICATION;-**

- 1. Application It is designed to fix the Duct to Detect Fire.
 - 2. Colour - Fire Red
 - 3. Painting Process - Coating Process
 - 4. Supply Voltage - 20V DC to 24V DC
 - 5. Ouicent Current - 5mA
 - 6. Alarm Current - 30mA to 100mA
- 7. No. of Sensor - 4 Nos.
- 8. Operating Temp. Range 0°C to 60°C
- 9. Principle of Detection IR Detection Technology
- 10. Response Indication - Two Red LED per Module

HEAT DETECTOR SPECIFICATION;-

- 1. Application It is designed to fix the Duct to Detect Heat.
- 18V DC to 24V DC 2. Supply Voltage
- 3. Ouicent Current - 1.2mA
- 4. Alarm Current - 45mA
- 5. Detector Setting Temp. - 60°C - Bi - Metal Principle
- 6. Principle of Detection
- 7. Response Indication - Two Red LED



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FRONT VIEW

IR DETECTOR



NI CONTROLS



Flap Normal Condition Actuator Working Condition (Duct Open Condition) (Duct Closed Condition)



Actuator Working Condition (Diversion Duct Open Condition)



Pneumatic Actuator

Flap Normal Condition (Diversion Duct Closed Condition)



ELECTRONIC HOOTER WITH FLASHING LAMP SPECIFICATION:-

DIVERSION SYSTEM

- 1. Mounting Type
- 2. Colour
- 3. Painting Process
- 4. Cable Entry
- 5. Working Voltage
- 6. Current Consumption
- 7. Type of Tone

- Wall Mounting Type.
- Fire Red
- Powder Coating
- Bottom
- 24V DC
- 100mA Max.
- Dual Tone

FIRE STOP DAMPER **SPECIFICATION;-**

- 1. Damper Material
- 2. Flap Thickness
- 3. Colour
- 4. Painting Process
- 5. Actuation
- - 3.15mm 10SWG, H.R Sheet
 - 4mm Thickness M.S Sheet
 - Fire Red

- Fire Red

- Powder Coating
- Pneumatic Operation
- Reset from Control Panel

FIRE DIVERSION DAMPER **SPECIFICATION;-**- 3.15mm - 10SWG, H.R Sheet

- 1. Damper Material
- 2. Flap Thickness
- 3. Colour
- 4. Painting Process
- 5. Actuation
- Powder Coating
- Pneumatic Operation
- Reset from Control Panel

- 4mm Thickness M.S Sheet

QUENCHING TANK SPECIFICATION:-

1. Material 2. Thickness

3. Capacity

- M.S Plate
- 5mm Thickness
- 1000 Litres / 2000 Litres





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CO2 FLOODING SYSTEM

TECHNICAL REVIEW ON STANDARD CO2 FIRE EXTINGUISHING SYSTEM

Introduction

bala-wa CO₂ Flooding Fire Extinguishing system & Components are engineered, designed, manufactured / procured to meet NFPA-12 / IS15528 : 2004 standards.

Scope of our offer

The scope of this offer is supply of CO2 Fire Protection System for Machineries as per your enquiry. Independent CO2 Cylinder banks are considered for this offer to protect specified area as per the specification.

System Description

High pressure CO2 System is offered. The system consists of the followingmain components.

- 1. 68 Ltrs.W/CSeamless CO2 Cylinder to fill 45Kg CO2 gas.
- 2. Master & Slave CO2 Cylinder Valves.
- 3. Discharge & Actuation Hoses.
- 4. CO2 FrameAssembly with Manifold.
- 5. CO2 Discharge Nozzles.
- 6. FireAlarm cum Gas Discharge Panel.
- 7. ManualGasDischarge Station.
- 8. Electronic Hooter with Flashing Lamp.
- 9. Discharge Warning Display Board.

Cylinder bank, consisting of required Nos. of 45 Kg Gas capacity CO2 Cylinders. First cylinder of Cylinder bank will be fitted with 24 V DC Solenoid operated master valve. Remaining cylinders will be fitted with pneumatically operated slave valves. From the cylinder valves $\frac{1}{2}$ " H.P Discharge hoses will be connected to CO₂ Manifold through NRV. Actuation hoses will be connected from Master NRV to slave valve. Seamless Sch.80 pipes will be connected from the manifold to discharge nozzles.

Required Spark & Heat Detectors along with Manual Gas Discharge Stations, External Hooter, with Discharge Warning Display Board will be provided at the entrance of the each Protected Area.

Fire Alarm Panel & Gas discharge panel will be provided for interconnecting the Detection signal from Detectors and other instruments.





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CO2 FLOODING SYSTEM

The system can be operated by any one of the following method.

- 1. Automatic detection and automatic extinguishing.
- 2. Manual detection and Manual discharge through Manual Gas Discharge Stations
- 3. Mechanical Manual discharge by operating manual release lever

Automatic detection and automatic extinguishing

On receipt of signal from any spark / Heat detector

- 1. Inbuilt Fire Hooter ON.
- 2. External Hooter ON.
- 3. Fire Signal will be provided to Gas Discharge Panel.
- 4. Delay Timer ON.
- 5. Tripping signal will be provided.

After the lapse of preset time delay, Gas Discharge Panel will send 24V DC supply to Solenoid Valve of master cylinder valve . Solenoid valve will open the master valve and CO_2 will be discharged to manifold through discharge hose and master NRV.

Further entire gas will be discharged to Protected area discharge nozzle by using distribution piping from the discharge header. Pressure switch, which is fitted on manifold, will be actuated due to the availability of the pressurized gas in the CO_2 manifold. Simultaneously it will send gas discharge indication to control panel.

Manual detection and Manual discharge by through Manual Call Point

During the actual Fire condition, without waiting for actuation of detectors, Fire signal can be provided to control panel for discharging the CO2 gas to the protected area, by breaking Glass and pressing both the discharge push button simultaneously. If we press both the push buttons simultaneously, the same will be treated, as a Fire Signal and the other function will be done as explained above.

Mechanical Manual discharge by operating manual release lever

Apart from the above two methods, CO2 cylinder can be opened by pressing the manual releasing knob of master cylinder valves.





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PROTECTION OF BLOW ROOM MACHINERIES WITH CO2 FLOODING FIRE EXTINGUISHING SYSTEM







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