The Ultimate Firefighting Solutions

PT. SURYA API SELAMAT SEJAHTERA

3s-firestop.com | protec-a-home.co.id

PT. Surya Api Selamat Sejahtera

PT. Surya Api Selamat Sejahtera telah berpengalaman lebih dari 20 tahun sejak tahun 2002 dalam dunia fire safety. Kami fokus dalam bidang perencanaan dan pemasangan sistem pelindung kebakaran antara lain dalam pendeteksian kebakaran, pemadaman kebakaran, proteksi kebakaran preventif dan teknik penyegelan untuk kabel, pipa dan instalasi listrik terhadap unsur gas dan air (Tekanan Statis dan Dinamis).

PT. Surya Api Selamat Sejahtera merupakan pabrik yang mengembangkan dan merakit di Indonesia berbagai jenis alat pemadam api dengan brand Protec-A-Home, Salah satu produk unggulan kami yaitu pertama di indonesia yaitu alat pemadam untuk kebakaran minyak goreng.

Kami juga telah bekerjasama dengan prinsipal yang berpengalaman lebih dari 30 tahun di bidangnya, dalam penjualan dan distribusi alat-alat proteksi kebakaran seperti sprinkler, sistem deluge, foam, proteksi bahaya kebakaran khusus, alarm kebakaran dan linear heat detector.

Visi kami menjadi pemberi solusi sistem proteksi kebakaran dan produk keselamatan lainnya untuk melayani klien dengan cara spesifik dan bermakna untuk mencerminkan implementasi praktis dari nilai nilai perusahaan kami.

Misi kami adalah dedikasi untuk melayani anda dalam area beraktifitas yang lebih aman dengan menyediakan produk atau sistem proteksi kebakaran dan pemadam api untuk memastikan kepuasan dan kenyamanan anda.

Product Ranges

Linear Heat Detectors	Fire Extinguishers	Sprinklers & Control Valves
Foam Concentrates & Hardware	Manual & Remote Monitors	Special Hazard Detectors
Fire Detection & Control Panels	Hydrant Equipments & Hose	Groove Coupling & Fittings
Gas Detectors	Flame Detectors	Aspirating & Beam Smoke Detect
Ultrasonic Level Indicator		Multi Cable Transit & FR Coating

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Introducing Our Brand

PROTEC-A-HOM3®

Protection for your home and family

PROTEC-A-HOM3®

KITCHEN SAF3®

PERTAMA DI INDONESIA PEMADAM API KHUSUS UNTUK KEBAKARAN MINYAK GORENG

WET CHEMICAL

Kapasitas : 450 ml

MODEL	AEAF450W
Isi Bersih	450 ml
Fire Rating	1A / 5F *)
Material Kaleng	Alumunium
Suhu Simpan	-2˚s/d 50˚C
Lama Semprot	45 - 50 detik
Jangkauan	3 - 4 meter
Tinggi	272 mm
Diameter	66 mm
Berat Kotor	720 gram *(plus bracket)*
Warna Kaleng	Putih Matt

Apa itu Kitchen Safe?

Kitchen Safe adalah produk pemadam api yang dirancang untuk memadamkan kebakaran golongan A (solid material) dan golongan F (cooking oil / fat fires), dengan pengoprasian yang mudah digunakan oleh siapa saja dan bebas perawatan

Dimanakah penggunaan Kitchen Safe ?

Kitchen Safe cocok digunakan untuk melindungi dapur dan rumah anda dari bahaya kebakaran terutama dari minyak goreng mendidih yang terbakar. Juga bisa digunakan di cafe - cafe kecil yang menggunakan minyak goreng tidak lebih dari 2 liter dalam sekali proses memasak

Bagaimana Kitchen Safe memadamkan api?

Cairan kimia Kitchen Safe akan mendinginkan api sehingga padam dan membentuk lapisan kerak di permukaan minyak goreng yang akan menghalangi oksigen, karenanya kebakaran ulang dapat dicegah.

Untuk mendapatkan pemadaman yang sempurna bila menggunakan kompor gas, tutup saluran gas sesudah api padam atau bila menggunakan kompor listrik, matikan aliran listrik secepatnya.

Apakah Kitchen Safe aman?

Cairan kimia Kitchen Safe tidak beracun, berwarna bening seperti air dan bio-degradable sehingga ramah lingkungan. Cairan tersebut larut dalam air, bilas dengan air sebanyak-banyaknya bila terkena mata atau kulit.

carEXSAF3®

AUTOMOTIVE FIRE EXTINGUISHER

ABC DRY POWDER
Kapasitas : 500 gram

AB FOAM
Kapasitas : 500 ml

MODEL	CS-P50ABC	CS-F50AB
Isi Bersih	500 gr	500 mL
Fire Class	A, B, dan C	A dan B
Bahan Aktif	MAP	AFFF 3% mixture
Material Kaleng	Alumunium	Alumunium
Suhu Simpan	-20 s/d +49 C	+2˚s/d +49˚C
Lama Semprot	6 - 8 detik	16 - 20 detik
Jangkauan	1 - 2 meter	2,5 - 3 meter
Tinggi	293 mm	293 mm
Diameter	66 mm	66 mm
Berat Kotor	685 gram *(plus bracket)*	707 gram *(plus bracket)*

Apa sumber bahaya kebakaran di otomotif?

Ingatlah dalam mobil ada bahan-bahan yang mudah terbakar serta material lain yang membantu menjalarnya api, seperti bahan bakar kendaraan, cairan rem dan kopling, oli mesin,oli power steering, bagian body yang terbuat dari plastik, hubung singkat pada kelistrikan mobil.

Apa pemadam yang cocok untuk otomotif?

Plastik material interior mobil, fabrik jok tergolong bahaya kebakaran kelas A; Bensin, cairan rem, oli mesin tergolong bahaya kebakaran kelas B; Hubung singkat / korsleting di perkabelan mobil tergolong bahaya kebakaran kelas C. Dengan demikian pemadam yang cocok untuk bahaya kebakaran di otomotif harus berjenis pemadam api ABC.

Jangan salah pilih, Car eX-Safe model P50ABC dengan kandungan aktif bahan pemadam api Mono Ammonium Phosphat (MAP) cocok digunakan memadamkan kebakaran dikendaraan kesayangan anda.

Mengapa memilih pemadam api jenis busa?

Pemadam api jenis busa akan menutup bahan yang terbakar sehingga oksigen tidak dapat masuk untuk proses kebakaran. Pemadam api jenis ini cocok untuk kebakaran kelas A dan kelas B.

Plastik material interior mobil, fabrik jok tergolong bahaya kebakaran kelas A; Bensin, cairan rem, oli mesin tergolong bahaya kebakaran kelas B.

Jangan salah pilih, Car eX-Safe model F50AB dengan bahan pemadam api busa cocok digunakan untuk memadamkan kebakaran dikendaraan kesayangan anda dan mudah dibersihkan.

3SAFE®


3SAFE
ABC POWDER
FIRE EXTINGUISHER
CAPACITY 12 KG
CAPACITY 9 KG
CAPACITY 4,5 KG
HOLD UPRIGHT
PT SURYA API SELAMAT SEJAHTERA

LULUS UJI SERTIFIKASI
PMK JAKARTA
183/ LHU / XII / 2021

STORED-PRESSURE | PEMADAM API PORTABEL

ABC DRY POWDER

Katub (valve) schradder

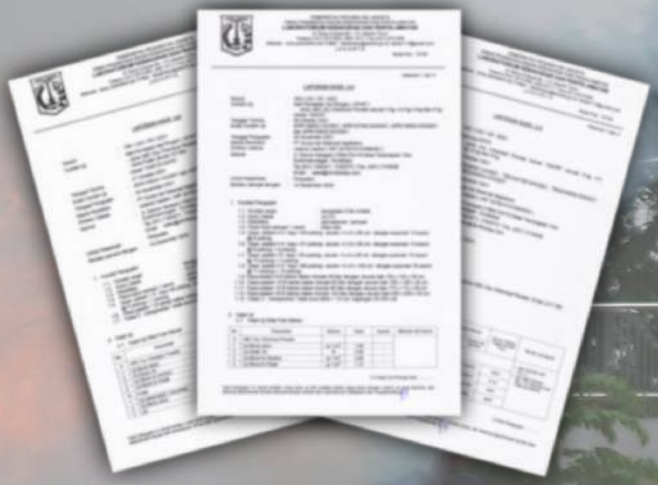
3SAFE ABC Multi-purpose Tabung Pemadam Api dipergunakan untuk pemadaman api kebakaran kelas A, B dan kebakaran peralatan listrik & gas (C). Tabung pemadam dibuat dari bahan baja dengan ketebalan sesuai Standar EN (Eropa). Bahan pengisi menggunakan racun api berkualitas tinggi untuk menjaga efektifitas pemadaman api.

3SAFE menggunakan katub schradder (pentil). Pengisian gas Nitrogen (N2) dapat dilakukan dengan cepat. Dalam keadaan darurat bisa diisi udara kompresor tekanan tinggi melalui saluran schradder ini. Tipe schradder ini sama dengan yang dipakai di kendaraan. Katub juga dilapisi dengan Nickel-plated untuk menjamin keawetannya terhadap karat.

MODEL	3S-P30	3S-P45	3S-P60	3S-P90	3S-P120
Kapasitas (Kg)	3	4,5	6	9	12
Tekanan (bar) +/- 1 bar	9	14	14	14	14
Lama Semprot (detik)	11 - 15	11 - 15	17 - 21	20 - 24	25 - 32
Tinggi Keseluruhan (mm)	440	510	503	580	662
Diameter Tabung (mm)	145	146	166	182	184
Berat APAR (kg) +/- 50 gr	5,3	7,2	9,4	12,4	17,2
Jenis Bahan Pengisi	M A P	M A P	M A P	M A P	M A P
Fire Rating (BS EN 3 – 7)	13A 55B C	21A 70B C	27A 113B C	34A 144B C	43A 233B C
Gas Pengisi	Nitrogen	Nitrogen	Nitrogen	Nitrogen	Nitrogen
Schradder	Tanpa	Ya	Ya	Ya	Ya

**spesifikasi dapat berubah sewaktu-waktu*

LULUS UJI SERTIFIKASI PMK JAKARTA



3SAFE®

ABC DRY POWDER

KAPASITAS :
3 KG | 4,5KG | 6KG | 9KG

carEXSAF3®

ABC DRY POWDER
500 gram

AB FOAM
500mL

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PMK JAKARTA
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CHEF SAF3®

PERTAMA DI INDONESIA PEMADAM API KHUSUS UNTUK KEBARAN MINYAK GORENG

WET CHEMICAL

Kapasitas : 6 Liter

MODEL	CS-6FEX
Kelas	A / F
Kapasitas	6 Liter
Berat Kotor	10,7 Kg
Tinggi	578 mm
Lebar	21 cm
Diameter	16 cm
Jarak Semprot	3 - 3,7 meter
Lama Semprot	45 - 50 detik
Standart Bracket	Wall Bracket
Material Tabung	Stainless Steel 316

ChefSafe adalah produk pemadam api yang dirancang untuk memadamkan kebakaran golongan A (solid material) dan golongan F (cooking oil / fat fires), dengan pengoprasian yang mudah digunakan oleh siapa saja dan bebas perawatan.

Chef Safe termasuk dalam Wet Chemical Extingusher (APAR) dimana ini adalah jenis yang terbaik unutk aplikasi dapur restaurant, hotel, catering skala besar, sekolah, rumah sakit, dan tempat tempat lainnya yang memiliki dapur skala besar.

APAR ini telah diuji di pabrik untuk pemadaman sampai 50 Liter minyak goreng dengan ukuran 1,2 m x 0,6 m x 0,2 m dengan hasil baik (pemadaman < 10detik)

Bahan kimia yang digunakan adalah tidak beracun (non-toxic) dan mudah terurai (bio degradable) sehingga ramah lingkungan. Sangat cocok dipakai untuk pemadaman kebakaran minyak goreng nabati / minyak goreng dari hewani (lemak).

Karena bahan kimi jenis wet chemical mudah larut dalam air, sehingga proses pembersihan juga cukup mudah yaitu dengan disiram dengan air saja.

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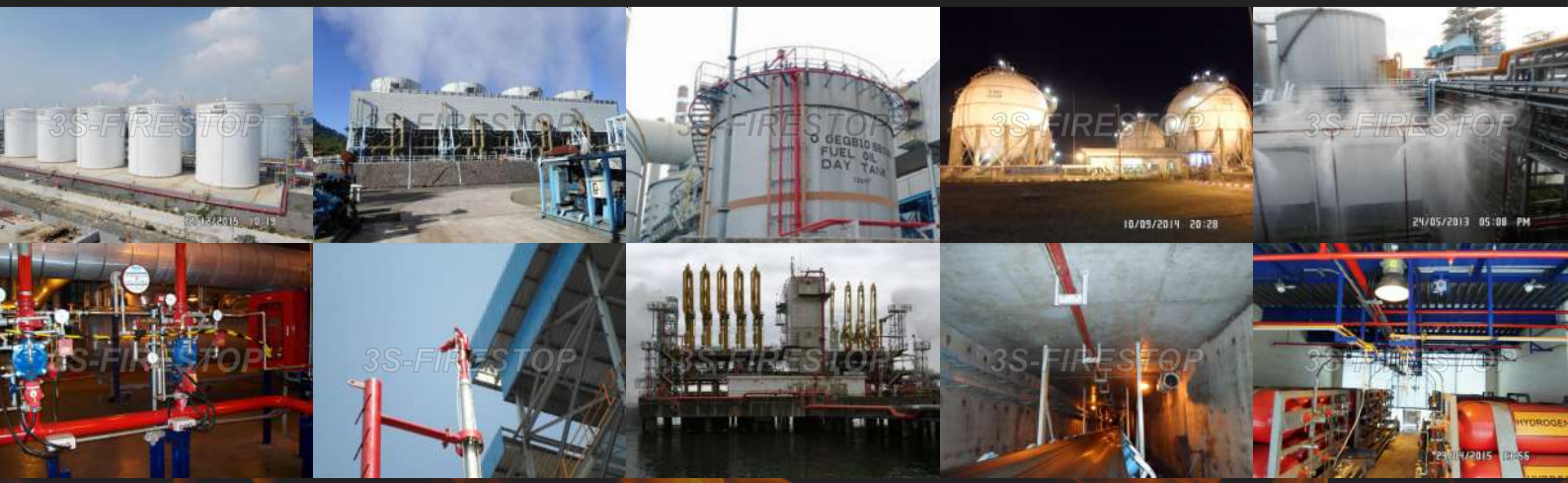


Focus on Fire Protection System

3s-firestop supplies fire protection valves, sprinklers, spray nozzles, fire alarm and detection equipment, special hazard equipment, foam systems, fire extinguishers as well as offers fire protection system designs, installation and maintenance.

Our Partners

Reliable® TECHNOLOGY • QUALITY • SERVICE

IFP INTEGRATED FIRE PROTECTION

Mircom Safer • Smarter • More Livable Buildings

PROTECTOWIRE FireSystems

FGD

STANG®

3SAFE®

LITH SAFE™

Product Lines

Sprinklers

Valves

Linear Heat Detectors

Foam Concentrates

Flame Detectors

Fire Alarms

Monitors

Industrial Spray Nozzles

Quick Response Sprinklers

F1FR Series Sprinklers

F1FR-SS Series Stainless Steel Sprinklers

G5 Series Concealed Pendent Sprinklers

G6-56 Series QR Concealed Sidewall Sprinklers

Model KFR56 Series Sprinklers

F1FRXLH Series Quick-Response Sprinklers

Model KFR80 Series Sprinklers

XL Commercial Flush Series

Storage / Warehouse Sprinklers

Storage sprinkler systems are designed to protect the storage of raw materials and components, commodities, or finished goods according to defined commodity classes and the configuration of the storage facility.

GL112 Series CMDA Sprinklers

GXLO Series CMDA Sprinklers

G Vello Pendent (CMDA) application Sprinklers

J168 Upring (CMDA) application Sprinklers

Intermediate Level Sprinklers

HL22 ESFR/Specific Application Pendent Sprinklers

JL14 & JL17 ESFR Pendent Sprinklers

P22/P25 ESFR Pendent Sprinklers

Specific Response Sprinklers

Specific purpose sprinklers are designed to protect unconventional and challenging areas such as attics and combustible concealed spaces, metal structures, MRI rooms, high-security and mental health institutions, hallways, and more. Each special sprinkler is designed to produce effective, efficient coverage while providing superior fire protection for highly specific use cases.

WP Series Window Sprinklers

Atttic Sprinklers

KFR-CCS 56 Sprinkler

LT56 Series “Hallway” Sprinkler

F1FR-FS56, F1FR-FS42 Flat Spray

F1S5-FS56, F1S5-FS42, F1S5-FS LO Flat Spray

F1FR-FS Flat Spray

F4FR-NF MRI Room Sprinklers

F1-FTR Pilot Line Detector Sprinklers

Standart Response Sprinklers

F1 Series Glass-Bulp Sprinklers

F1-SS Series Stainless Steel Sprinklers

F1XLH Series Standart Response Sprinklers

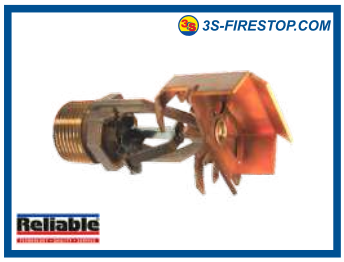
Extended Coverage Sprinklers

Extended coverage sprinklers are designed to protect larger areas than specified by installation rules for standard spray sprinklers. By using extended coverage sprinklers may reduce both material and installation costs by reducing the number of sprinklers, branch lines, fittings, and installation time.

F1FR56 QREC Series Sprinklers

DH56 / DH80 Side Wall Sprinklers

JL112 / J112 / J112SS Sprinklers



MBEC-14 Metal Building Sprinklers

N252EC CMDA/CMSA Pendent Sprinklers

Quick Response Sprinklers

F1 Series Glass-Bulp Sprinklers

F1-SS Series Stainless Steel Sprinklers

F1XLH Series Standart Response Sprinklers

Sprinklers Accessories

Cover Plates

FT Recessed Escutcheons

Sprinkler Guards and Water Shields

General Purpose Valves

Model BFG300
Supervised Butterfly
Valve Grovved 300 PSI

Model BFG-350
Butterfly Valve Grooved
Tapped Body 350 PSI

Reliable Model L399
OS&Y Gate Valves

Model REL-OSY-333FF
Large Size Resilient
Seated OS&Y Gate Valve

Model G - Swing Check

Model REL-FCV-50FF
Flanged Check Valve
Resilient Seat

RASCO Check valve
Wafer type - 175psi

Reliable RBVT / G
Series Bronze
Butterfly Valves

Model REL-BL
Full Port Ball Valves

Model A - Relief Valves

Model REL-3W
Three-Way Valves

Deluge System

Deluge systems are designed to protect high-hazard areas such as tunnels, oil refineries, chemical facilities, offshore platforms, and power plants. These locations frequently contain highly flammable, combustible, or explosive materials that require robust fire protection systems.

Deluge systems utilize open nozzles or open sprinklers, with system piping open to atmosphere **and water under pressure held below the clapper of the valve.** Deluge systems require a detection and release system. When activated by a detector, the valve opens, allowing water to flow into the system pipe and through all nozzles or open sprinklers.

Model DDX - Clapper
Manual Reset Deluge

Model DDV - Automatic
Reset Diaphragm
Deluge Valves

Pre-Action Systems

Preaction systems are designed to protect water-sensitive areas such as freezers, museums, computer rooms, and clean rooms. These locations contain water-sensitive equipment, precious objects, or are sensitive areas where accidental water discharge is undesirable. Preaction systems may take the place of dry systems.

Preaction systems utilize closed sprinklers, compressed nitrogen or air in the system piping, and water under pressure held below the clapper of the valve. Preaction systems require a detection and release system. When activated by a detector, the valve opens, allowing water to flow into the system pipe and sounding an alarm. When the heat source activates a sprinkler, water flows through only the open sprinklers.

Model DDX-Single Interlock Pre-action Deluge System

Wet System

Model E - Alarm Check Valves

Air / Nitrogen Supply

Model C-SI (220 VAC) Air Coompressor Panel

Model A - Automatic Pressure Maintenance Devices

Model B - Automatic Pressure Maintenance Devices

Specialty Equipments

Model AAV
Automatic Air Vent

Model TD
Test & Drain Valve

SURE-OFF Tester

Quick Response Sprinklers

Model C - Mechanical
Sprinkler Alarm

Model LP
Dry Pilot Actuator

Model A Hydraulic Manual
Emergency Pull Box

Model S1
Retard Chamber

STANG Model 925 - Station Monitors

Remote-controlled Monitors

ELEVATED MONITORS

NOZZLES

Installation of Remote Controlled Monitors

Standart Digital (PHSC)

PROTECTOWIRE Standard Digital Heat Sensitive Cable (PHSC) Linear Heat Detector can best be described as a continuous run of spot heat detectors. It is capable of sensing heat anywhere along its length and initiates an alarm once its fixed activation temperature is reached.

The Standard Digital (PHSC) Linear Heat Detector works in the following manner. Once the ambient temperature meets or exceeds its fixed temperature, the heat sensitive polymer weakens, which in turn allows the twisted spring steel conductors to make contact, which results in an electrical short that triggers an alarm signal.

Model PHSC Protectowire Heat Sensitive Cable

Model PLR - Protectowire Low Resistance "Universal" versions

Model PIM - Protectowire Interface Modules

Model MFL92 Manual Fault Locator

Fiber Optic (System 8000)

This product is best described as a continuous linear thermometer actively reporting temperature readings in realtime. The restorable linear heat detector is comprised of quartz fibers enclosed in a low smoke zero halogen jacket. Immune to all EMI and RFI, the fiber optic linear detector can be configured to offer custom alarm criteria and zone sizes up to 30,000 feet (10 + km) in length. UL Listed Alarm Operating Temperature is programmable from 135°F (57°C) to 235 °F (113°C)

PFS Series Fiber Optic Sensor Cable

PTS Controller

Linear Heat Alarm Panels

SRP-4x4 Conventional Fire Alarm / Releasing Control Panel

FireSystem 2000 Conventional Modular Fire Alarm Control Panel

Confirmed Temperature Iniation (CTI)

PROTECTOWIRE Confirmed Temperature Initiation (CTI) is a twisted pair of dissimilar spring conductors which are insulated with a heat-sensitive material. This material is designed to soften and allow the conductors to short when exposed to a specific alarm temperature. The dissimilar conductors, when shorted, form a temperature measurement junction called a thermocouple.Using thermocouple technology, the CTI LHD can distinguish between a short caused by physical damage or a short caused by heat actuation. Dissimilar metal conductors enable the CTI LHD to determine the exact alarm point location as well as the temperature of any short. If the temperature of the short is below the linear heat detecto's fixed temperature, a short fault or trouble condition is initiated. If the temperature of the short is above the linear heat detector's fixed temperature, an alarm condition is initiated. Therefore Detector MUST be connected to a CTM-530 interface module.

Model CTI - Protectowire
CTI Heat Sensitive Cable

Model CTM-530
Interface Modules

Installation Accessories

ZB - 4 - QC - MP
Junction Box

ZB - 5 - QC - MP
Junction Box

ZB - HD - 4 - QC
Junction Box

ZB - HD - 5 - QC
Junction Box

ELR - HD - 10 - QC
EOL Box

ELR - HD - 4 - QC
EOL Box

SR-502 Junction Box
Sealed Strain Relief
Connector

SR-505 Junction Box
Sealed Strain Relief
Connector

PWTX Extension
Cable for CTI Series

MS-3091T
Retractable Cable

Fasteners &
Mounting Clips

Foam Bladder Tank
Proportioning System

Ratio Controller

Foam Concentrate
Control Valve

Inline Foam Inductor

Foam Chamber

High Back Pressure
Foam Generator

Bund Pourer™

Synthectic Foam Concentrates

Foam Bladder Tank Proportioning System

Foam Bladder Tanks offer a reliable and simpler method of foam proportioning. Bladder Tank system includes a pressure-rated tank with an internal rubber bladder (made of Buna-N rubber bladder). Tank made to ASME Code Section VIII Div I and Carbon Steel or Stainless Steel Construction. Maximum working pressure is 12 Bar.

Upon system actuation , incoming water applies pressure to the rubber bladder, which supplies pressurized foam concentrate to the proportioning device (ratio controller). The foam ratio controller meters the foam concentrate into the fire water line, creating foam solution. The solution is then piped to the discharge devices flowing through distribution pipe line to the hazard area. Bladder tanks are available in horizontal and vertical mounting with a completely pre - piped option.

UV/IR Flame Detector
model FlameSpec-UV-IR

UV/IR Flame Detector
model FlameSpec-UV-IR-HD

UV/IR Flame Detector
model FlameSpec-IR3

UV/IR Flame Detector
model FlameSpec-IR3-HD

UV/IR Flame Detector
model FlameSpec-IR3-H2

UV/IR Flame Detector
model FlameSpec-IR3-H2-HD

Conventional Panels

FA-300 Series Fire Alarm Control Unit

FR-320R/W Deluge / Agent Releasing Control Unit

Addressable "CLIP" Device

MIX-200 Series Intelligent "CLIP" Addressable Sensors

MIX-M500 Series Intelligent "CLIP" Addressable Modules

MS-700 ADU Series Intelligent "CLIP" Addressable Manual Stations

Addressable Mix-4000^{NEW} Devices

MIX-4000^{NEW} Series - MGC (Mega) Protocol Addressable Smoke & Heat Detectors

MIX-4000^{NEW} Series MGC (Mega) Protocol Addressable Modules

MS-700MP (U) Series - MGC Protocol (MP) Addressable Manual Stations

MS-400MP (U) Series - MGC Protocol (MP) Addressable Manual Stations

Addressable AP Devices

SELECT Series^{NEW} Advanced Protocol Addressable Smoke & Heat Detectors

MIX-M500AP Series Advance Protocol (AP) Addressable Modules

MS-700AP Series - Advanced Protocol (AP) Addressable Manual Stations

MS-400AP Series - Advanced Protocol (AP) Addressable Manual Stations

Conventional Devices

SD-100 Series - Photo Electric Smoke Detectors

SD-2 / SD-4 Series - Photo Electric Smoke Detectors

MIR-65 Series Conventional Smoke & Heat Detectors

5600 Series - Mechanical Heat Detectors

CR / CF Series - Moisture / Explosion - Proof Heat Detectors

302 Series - All-Weather / Explosion-Proof Mechanical Heat Detectors

MS - 400(U) Series Manual Stations

MS - 403 / 404(U) Series Manual Stations

MS - 700 Series Manual Stations

SGX32 Series Explosion Proof Pull Stations

M400K Conventional Call Point (Break Glass)

Addressable Panels

FLEX-NET™ FX-2003-12NDS

Single-Loop Addressable Panel - FX-3318

FLEX-NET™ FX-4003-12N[NEW]

FLEX-NET™ FX-4009-12N[NEW]

FLEX-NET™ FX-4017-12N[NEW]

Addressable Fire "Agent" Release Control Unit - FX-3500 RCU

Devices Related to Deluge / Suppresion System

XAL-53 Explosion-Proof Manual Fire Alarm Station

WFD Series Water Flow Detectors

OSYSU-EX Explosion Proof OS&Y Gate Valve Supervisory Switch

PS10-EX Explosion Proof Pressure Type Waterflow Switch

OSYSU Series Outdoor OS&Y Gate Valve Supervisory Switch

EPS-10 Series Alarm Pressure Switches

Notification Appliances

FH-400 Series - LED Notification Appliances

MIX-4050[NEW] Sync Module

MH-25 Series Mini Horns

SpectrAlert® Advance Series Audible Visible Notification

SYSTEM SENSOR Selectable Output Horns, Strobes, and Horn Strobes

SSM SERIES ALARM BELLS

Power Supplies & Accessories

BPS Power Supplies

INX-10A Intelligent Booster Power Supply

ABS Whirljet Right Angle
Hollow Cone Spray Nozzle

Air Nozzle

Air Atomizing Spray Nozzle

Corkscrew Ceramic Nozzle

Eductor Nozzle

Flat Fan Spray Nozzle

Full Cone Spray Nozzle

Hollow Cone
Spray Nozzle

Right Angle Hollow Cone
Spray Nozzle

Spiral Full Cone Spray Nozzle

Straight Line Hollow
Cone Spray Nozzle

Corkscrew Ceramic Nozzle

Cases

- Bolier Feed Pump
- Coal Tunnel
- Elevated Monitor
- LLNG Loading Dock
- Conveyors
- Cable Tray
- Methanol Spill
- Motor Fan Geothermal
- Hydrogen Storage
- Storage Tank
- Sperical Tank
- Spray Nozzles

BOILER FEED PUMP TURBINE

In a thermal power plant, the BFP is one of the critical auxiliary machines that are equivalent to the heart of the plant. In thermal power generation, high-pressure steam is used to drive a turbine, which in turn rotates the generator directly connected to the turbine to generate power. The steam is produced by feeding hot water to the boiler from the BFP. This means that an unexpected stop of the BFP completely stops power generation and therefore the BFP requires a very high level of reliability.

One of the danger BFP may pose is fire hazard. Therefore the BFP shall be protected by fire protection system. What is the main ingredient in a BFP fires? Several hundred liters of relatively low flash point mineral oil. Put it under pressure and confine it within piping, seals or removable opening covers. Then, provide an available “hot” surface—hot enough to ignite mineral oil … nearby steam piping or turbine casing will do the job. Now, wait until a flange leaks, a pipe breaks, a seal fails or a cover is left off an opening— and sim sala bim, have a “recipe” for one of the largest fires could ever imagine

One of the common fire protection used in this application is water-based system. The heart is a deluge system. However, as said "hot surface" has been there, pouring water directly to those hot surface shall be avoided unless real fire has occured. The appropriate system is single pre-action deluge system, as an alarm signal from electronic or mechanical-type detectors won't actuate the deluge directly. There should be the second condition for the discharge initiated. The purpose is to avoid false discharge which is initiated by false alarm.

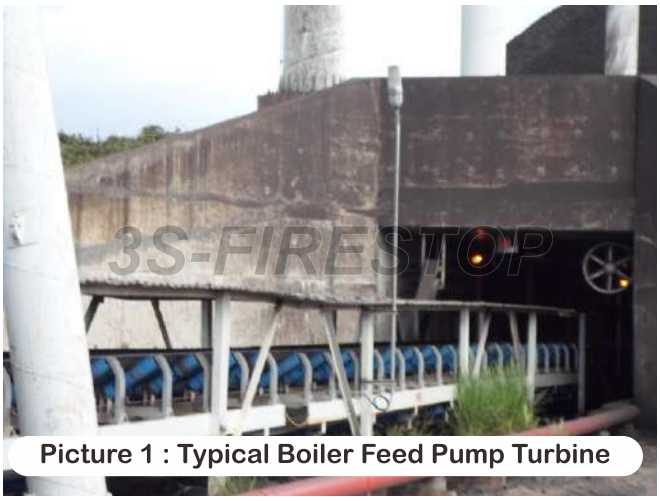
The fire sensor used can be fixed-point heat detectors, prefereably mechanical type as the environment mostly unfriendly to an electronic equipments. The other alternative is to use linear heat sensor cable. You can use Protectowire Heat Sensor Cable series PHSC. PHSC-280-XCR having alarm temperature at 138°C PHSC-356-XCR having alarm temperature at 180°C Those two models can be used for this application.

Picture 1 : Typical Boiler Feed Pump Turbine

Picture 2 : Sigle Pre-action Deluge System Installation

COAL DUST HAZARD MITIGATION

Coal mining poses to explosion hazard due to coal dust. In several coal mining fields, collected coal from site are taken to the collecting field by truck. An underground construction is made for the conveyor to run under this coal stack. Buldozer pushes the coal to the hole on the tunnel concrete ceiling below,so the coal will fall onto the top belt of the running conveyor. This will safe more time than using an an excavator to upload to the truck bin to take to the river or dock.



Picture 1 : Typical Boiler Feed Pump Turbine

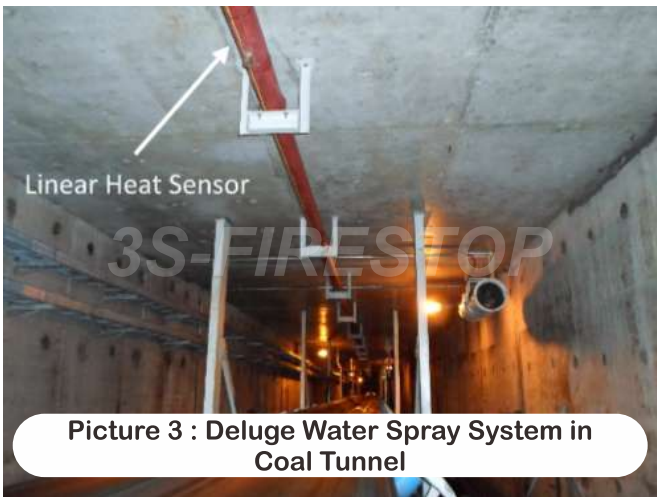
Narrow passage with entrance just at both ends. The construction in picture - 1 has 300 meters long, it is at South Kalimantan. As coal dust may accumulated in along the conveyor frame and roller, the roller bearing sometimes might build up the heat and reach the flash point of the coal dust. When this happens, an explosion may occur.

Fixed-spot type heat detector is not appropriate for this application as heat may build anywhere along the conveyor length. Protectowire Heat Sensor Cable can solve the problem. Having construction like a cable which the detection point is continuously along its long body. The linear heat sensor can be installed on both sides of the conveyor near the roller bearing or on the center top above the upper belt. Most cases the fire coming from the jammed bearing that become hotter.

Picture 2 : PROTECTOWIRE Linear Heat Sensor

The problem when the sensor installed near the roller bearing , unaccidentally acts may cause the sensor broken or short. This short in the sensor cable body will cause a false alarm. To overcome this problem, Protectowire has CTI (Confirmed Temperature Initiation) technology. With CTI model, a short can be differentiated between actual fire or mechanical faults.

To mitigate the coal dust hazard, electrically-actuated deluge water spray system shall be employed. The solenoid used shall be of explosion - proof type as the system may operate in hazardous atmosphere. In the Picture-03, the linear heat sensor cable were run at the water spray pipe line above the conveyor.



Picture 3 : Deluge Water Spray System in Coal Tunnel

THE BENEFITS OF ELEVATED MONITOR

Picture 1 : Manual Elevated Monitor

Picture 2 : Typical Installation

Some processing plants might have high rise construction ie. Petro chemical processing plants. Most of the time the plant floors are only having fire hoses or hose reels. Not every plant floors having sprinkler or water spray system. In the case the fire getting big, it is impossible to get firemen or emergency response team members to be there to spray water onto the fire using fire hoses. In such case, consider to use "elevated" monitors to make the extinguishing by water possible and on the other hand not to risk the life of the emergency response team.

3S-Firestop Indonesia has experiences for the installation of such monitor. From operation side, there are two models available :
- Manually-controlled Elevated Monitor
- Remotely-controlled Elevated Monitor

Elevated Monitors are used to elevate the water discharge above structures, fire events, and to increase vertical / horizontal reach. Manual Elevated Monitor is designed so the operator can initiate, control, and maintain the monitor from the ground level. All systems are available with several options in regards to nozzles, column intake bases, valving, remote greasing equipment, and control systems (for remotely controlled models).

We offer elevated monitors with 2.5" / 3" / 4" water way bodies. For free-standing models as shown in the Picture - 2 are available up to 40' (12.2 meter) height. Please be aware that a reaction support pole must be installed for this free - standing models.

Hydraulic Remote Controlled Water Monitors at LNG Loading Dock

Picture 1 : Typical LNG Loading Dock

3S-FIRESTOP is Fire Protection Supplier & Contracting company with product range covers both active and passive fire protection systems.

In mid of 2008 cooperated with STANG INDUSTRIES Inc. , the manufacturer of water control equipments with experience more than 70 years, has won contract for installing water monitor to protect LNG Loading Dock of PT. Badak NGL, the 22-million tons LNG/year producer.

The location of the project is so called LNG Loading Dock II. The total unit installed is 8 units each 1,500 US GPM capacity. The monitor is remotely-controlled driven by hydraulic motor.

Scope of work including supply and install remote water monitors, control valve pneumatic-type with ex-proof 24 Vdc solenoid actuator, power and control cable erection, cable tray, stainless steel tubing (almost 12 km total length), tubing support, HPU fabrication, control table and control panel, construction of the operator room as well.

We offer elevated monitors with 2.5" / 3" / 4" water way bodies. For free-standing models as shown in the Picture - 2 are available up to 40' (12.2 meter) height. Please be aware that a reaction support pole must be installed for this free - standing models.

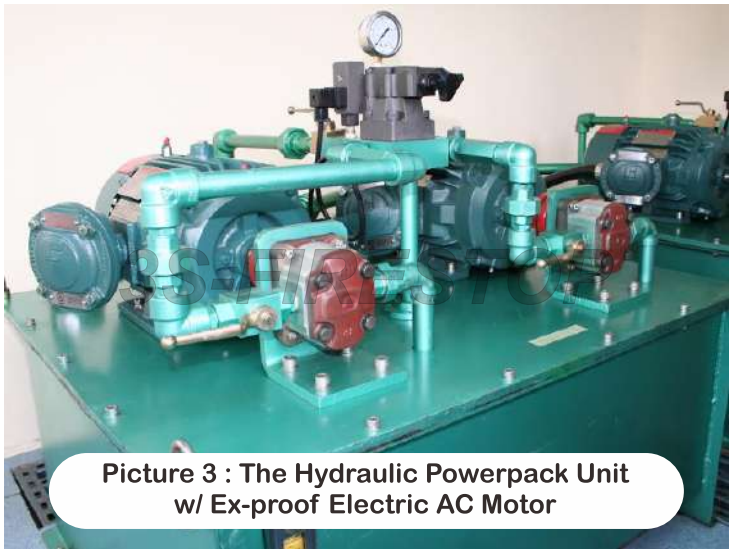
While the contract agreement reached by almost end of August 2008, the job shall be handed over prior to end of year 2008.

This was very challenging, but by the end of the story 3S-Firestop can complete the job on December 31, 2008.

The purpose of using hydraulic type due to hazardous area classification (Zone 1 Div. 1). Second consideration that hydraulic system needs less maintenance comparing with electric motor driven type. This model needs frequent checking and greasing, otherwise the lifetime of the gear will be short due to exposure to sea water environment.

For safety purpose, all cables and tubing penetrations were sealed by 'bst Firestop' cable sealing, fire proof, water – and gas – tight.


Picture 2 : Typical Remote-controlled Hydraulic Motor Driven Water Monitor size 4" Waterway cap. 1,500 US GPM (Courtessy of Stang Industries Inc.)


Picture 3 : The Hydraulic Powerpack Unit w/ Ex-proof Electric AC Motor


Picture 4 : The Hydraulic Motor Control Table


Picture 5 : Situation inside the operator room

Picture 6 : The Control Valve, Pneumatic-type, with 24Vdc Solenoid and Limit Switch Box

The challenge of water monitor installation is the vaporizing size of water droplet. The smaller the water droplet (like mist), the better heat absorption. This is in correspond to avoid the LNG vapor to reach its "flash point", in case there's a leak and fire incident occured. STANG Monitor has proven good reach distance of water throw range in jet spray mode and good water vaporizing in fog spray mode. The following pictures will show the spray of the monitor.

As seen in the figure 7 and figure 8, the fog spray mode give very wide spread of water throw and vaporizing result.

It is like a cloud from the discharge of the monitor. This type of discharge is good for protecting the valuable assets due to it's high energy heat absorption.

However, the water supply capacity is also has to be taken into consideration. The main supply line is 16-inches size pipeline with several fire pumps backup. It will give enough water supply capacity and pressure.

Picture 7 : Monitor in Jet Spray Mode

Picture 8 : Monitor in Fog Spray Mode

Picture 9 : LNG Loading Dock II of PT. Badak NGL

Conveyors

Conveyors naturally have fire hazard risks from the failure of its components ie. jammed bearing and others. The carrying materials have self ignition intrinsic charateristic as well said coal as an example.

LINEAR HEAT SENSOR

The basic model for conveyor fire protection is fire detection. The most common sensor used in conveyor application is LINEAR HEAT SENSOR CABLE. With this type of detector, raising of temperature detection can be along the conveyor length. It is advisable to use the same brand for the linear heat sensor and the control panel. However if the panel brand is different, an interface module shall be employed in order to avoid mismatch impedance problem. Please be aware that most linear heat detector material has higher impedance than copper. Protectowire has several models ie. PIM-430D / PIM-530.

Protectowire Interface Module (PIM) has feature so called "location meter" to display the "hot" point for long distance sensor installation. Fire Alarm Control Unit is used for fire detection & notification, depends on the application, if just monitor you can use Fire Alarm Control Panel (FACP) ie. Mircom FX Series. If a deluge water spray system is applied as in Picture-1, Fire Release Control Unit (FRCU) shall be employed like Mircom FR-320 or FX-3500RCU or Protectowire Conventional Releasing Panel SRP - 4x4.

Other fire sensor technology with optical-based can be applied like Amber Detector. Amber Detector is suitable for coal fire spectrum as it is different with hydrocarbon fires. Special care shall be taken for application in dusty area. Do not forget to use lens cleaning equipment.

DELUGE

Deluge water spray system is used for fire extinguishing & sometimes to be used for coal dust cleaning as well. Deluge like RELIABLE model DDX offers simplicity in the maintenance and reliable as well. I've used this model in many projects with satisfactorily results. For the nozzle mostly "medium velocity" spray nozzles are common. There are many options for the K-Factor, spray angle and the material (bronze, stainless steel). For dust mitigation, spiral full-cone pattern nozzles ie. 3SAFE / BETE can give good performance.

CONCLUSION

Linear Heat Sensor for fire detection in conveyor systems and for active fire extinguishing system using water by using deluge system are common in protecting the conveyor structure. Please see below link to see typical conveyor fire protection :

https://www.youtube.com/watch?v=9MNrH3lTzL0

Picture 2 : Setting Protectowire Interface Module

UNDERGROUND CABLE TRAY TUNNELS

A relatively minor cable fire can cause widespread disruption and consequential losses out of all proportion to the incident itself. In factory, cables run in the cable trays. Some have underground tunnels for putting the cable trays in large number. The problem is that such areas rare to be visited. Therefore minor fire can lead to catastrophic disaster which may interrupt the business operation. Protectowire Linear Heat Detector detects the location of an overheat condition anywhere in a plant's cable tray system. Power and control cables are protected and vital systems are kept in operation.

Picture 1 : Underground Cable Tray Tunnel

There are several models can be choosen : PHSC Series, PLR Series, CTI Series with rated temperature choices : 68oC, 88oC, 105oC, 138oC and 180oC . To suit with different site and environment conditions, the jacket material of the sensor cable can be choosen :

- Flame Retardant Vinyl Outer Jacket (-EPC)
- Fluoropolymer Outer Jacket (-XCR)
- Jacket material for subzero installation (-XLT)
- Low Smoke Zero Halogen (-LSZH)

Check this link for rated temperature and jacket material selection.

Picture 2 : Protectowire Interface Module

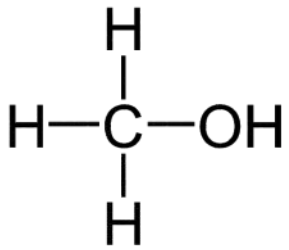
There several model of FACP provided by Protectowire, the most common is SRP-4x4, which is a conventional releasing control panel. If the addressable fire alarm panel is used, PIM shall be added to the system (PIM = Protectowire Interface Module) to overcome impedance mismatch problem. There are several models can be choosen :

- Single-zone Mini Interface Module (PIM - 120)
- Dual-Input Interface Module w/ Display (PIM - 430)
- Single-zone Interface Module w/ Analog Output & LCD Display (PIM - 530)

Picture-2 showing JBFA with PIM-430 installation. This type of interface module has (optional) LCD Display to show alarm location, so the "hot spot" can easily located.

METHANOL SPILL PROTECTION

To make biofuel, one of the chemical components is alcohol. Usually one of these two alcohols : Methanol or Ethanol. Methanol is a colourless liquid that boils at 64.96°C (148.93°F) and solidifies at -93.9°C (-137°F). It forms explosive mixtures with air and burns with a non-luminous flame. If a methanol spill occurs, stop or reduce discharge of material if this can be done without risk. Isolate the spill or leak area immediately for at least 330 to 660 feet in all directions.



Eliminate all sources of ignition, as the mixture of Methanol vapor with air is explosive. Herewith some considerations to be taken when handling Methanol :
Methanol is a flammable, easily ignited liquid that burns and sometimes explodes in air.
The molecular weight of methanol vapor is marginally greater (denser) than that of air (32 versus 28 grams per mole). As a result, and depending on the circumstances of a release or spill, Methanol liquid will pool and vapor may migrate near the ground and collect in confined spaces and low-lying areas. If ignited, methanol vapor can flash back to its source.
In certain specific circumstances, Methanol vapor may explode rather than burn on ignition. Methanol containers are subject to Boiling Liquid Expanding Vapor Explosion (BLEVE) when heated externally.
Methanol is totally miscible in water and retains its flammability even at very high concentrations of water. A 75v% water and 25v% Methanol solution is considered to be a flammable liquid. This has important consequences for firefighting. Minimum four times of the Methanol amount to make it less flammable.

Picture 1 : Methanol Tank Farm 5 x 5,000MT

Picture 2 : Foam Discharge into The Bunwall

In Picture - 1 there's Methanol Tank Farm 5 x 5,000 MT surrounded by a bun wall. As said above that Methanol is miscible in water and to reduce the explosion risk, it should be mixed with a large amount of water (minimum four times of the leakage or spill volume). To protect if somehow Methanol spills inside the bunwall, the interior of the bunwall will be flooded by foam. As we know that big part of the foam solution is water. Therefore Alcohol Resistant - AFFF 3% is used. The water part of the foam solution will dillute the Methanol liquid, the foam bubble on the surface will block the Methanol vapor to get away to the atmosphere.

In Picture - 2 you will see the interior floor of the bunwall is flooded by foam. The foam forms a layer that block the Methanol liquid getting vaporized in the air. With this system, catastrophic disaster can be avoided when there is accidental discharge or spill happens. Call 3S-Firestop for fire protection of Methanol. Check this link to see video demonstration of the discharge.

HEAT DETECTION IN MOTOR FAN OF THE GEOTHERMAL COOLING TOWER

The main components in a geothermal power plant are the steam turbine, generator, condenser, cooling tower, gas removal system and hydrogen sulfide abatement system. Thermal energy in the form of pressurized steam flows from wells, through pipelines and to the power plant. The steam enters the turbine at 40 - 100 PSI. As the steam expands through the turbine, thermal energy is converted into mechanical shaft energy. The steam turbine is directly coupled to the generator, which converts mechanical energy into electrical energy.

Cooling Tower in Geothermal Power Generating Plant

In the cooling tower, there're series of motor to drive the cooling fan. As the fan is critical if it is not working / stucked which will make the temperature raised to critical level whereas the cooling tower constructions are from wood or fiber-glass frame.
Picture - 2 showing fan motor which drives the fan shaft. In this area pull station and linear heat sensor can be installed around the motor body. As the environment in geothermal a bit acidic due to the presence of sulphuric gases, the appropriate model is using fluoropolymer jacket (Protectowire model PHSC-xxx-XCR).

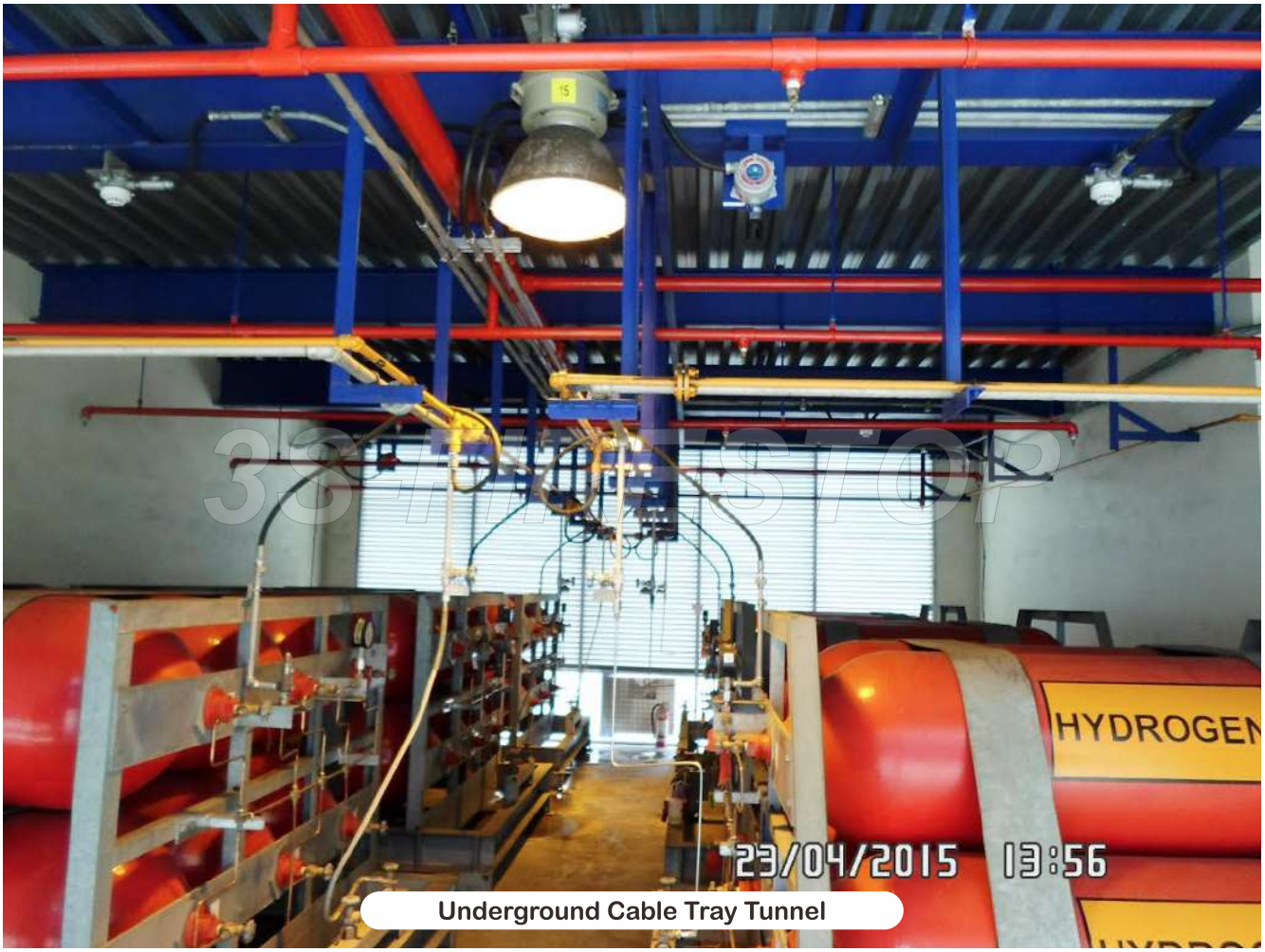
The other places that need linear heat sensor installation are cooling tower structures near the fan rotor and the fan rotor it self. Every components for installing the linear heat sensor shall be made of stainless steel. Protectowire model JD-1 stainless steel clip and stainless steel bolt are used in order to reduce the risk of corrosivity of the corrosive gas, humid and high temperature. Those are conditions accelerate the corrosiveness to the materials.

Each cooling tower has two detection zones plus one pull station. So total we will have eight detection zones. As these zones shall be integrated to the existing fire alarm panel which was Notifier model AM-2020 , PIM-430 becomes the interface module between Protectowire linear heat sensor and Notifier addressable mini input modul model FMM-101. All these assembled into Ex-proof Fiber Reinforced Plastic (FRP) box as shown in Picture - 04. There are eight PIM-430 represent eight detection zone total.

Junction Box Fire Alarm

HYDROGEN IN POWER GENERATING PLANT

Hydrogen (H2), a colourless, odourless, tasteless, flammable gaseous substance that is the simplest member of the family of chemical elements. This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200). Hydrogen is flammable gas category 1. LEL of Hydrogen is 4%.



Underground Cable Tray Tunnel

Why Hydrogen? Hydrogen is used to cool the windings of large power plant generators because of hydrogen's high heat capacity and low density. Power plants utilizing hydrogen-cooled generators must maintain optimal hydrogen purity and pressure in the generator casing for proper operation, efficiency, safety, and equipment reliability.

Hydrogen Storage

3S-Firestop has ever installed fire protection system in Hydrogen storage facility. The system completed with deluge water spray system as well. Lets take a look at the system components :

Deluge Water Spray


The System

Gas Detector
This gas detector shall be model specifically designed to detect gas hydrogen. The detector used was Detcon model DM501 IS-H2 and with panel model X40-8-N4X

Flame Detector
FGD model FlameSpec-UV-IR flame detector provides ultra fast response, high performance and reliable detection of a large variety of fires including hydrocarbon fires (visible and non visible), as well as Hydrogen fires.

Heat Detector
Heat Detectors shall be Ex-proof type suitable for hazard class of Hydrogen. This detector is used for actuation of the deluge water spray system together with flame detector using crossed-zone algorithm.

Deluge System
Deluge is used to deliver water to the spray nozzles. The deluge is electrically actuated via Ex-proof Solenoid. All conduit fittings used is Ex-proof type as well. The spray nozzle used is spiral nozzle.

Full-cone Spiral Spray Nozzle
Spiral nozzle is a kind of full cone nozzle, spray angle range is 60°-170°. Liquid flow rate range is 5.5-410 L/min. This compact nozzle has design of smooth flow channels which can minimize the block of liquid to make liquid reach max flow in given pipe size.

PROTECTION FOR STORAGE TANKS

Fuel Storage Tank at Power Plant

Storage tanks in some industries may carry potential hazard, ie fuel storage tank & flammable chemical liquid tank. Almost in every industries which is using liquid material for the production or store their final product in liquid form using storage tank. From single tank to multiple tanks as usually said tank farm.

3S-Firestop has designed and installed fire protection systems for storage tank, from single fuel storage tank to multiple storage tanks. The largest system ever installed was the protection system for Methanol Tank 5 x 5,000 MT. Our installations are in several power generating plant, bio-diesel plant, and chemical industries. Water spray and foam system using foam chamber are most common in this type of tank fire protection. Lets take a look :

Heat Detector
Linear heat sensor cable is the most common heat detector model used. The Protectowire has several models can be selected : PHSC Series, PLR Series, CTI Series with rated temperature choices : 68°C, 88°C, 105°C, 138°C & 180°C.

Flame Detector
Flame often happens due to improper grounding, lightning strikes, spill and other cause. Install flame detector will give faster response for your fire alarm or fire releasing control mechanism. FlameSpec range of triple IR (IR3) and UV IR flame detectors are faster in detection time and perform over longer distances while maintaining and improving on false alarm immunity. The optional in-built High Definition (HD) video camera allows for live video streaming of the area being protected.

Gas Detector
Gas detectors can improve the safety of the area or in the perimeter of the hazard zone. Tank farm of Methanol tanks with Methanol Gas Detector can give early warning of a leakage if happens. This gas detector has analog 4 - 20 mA and RS-485 output which can be connected to the plant Emergency Shutdown System.

Fire Alarm & Release Control System
This is the heart of the whole system, this panel will collect all data / signal from the field instruments (detectors, manual pull station, pressure switches, tamper switches) and acts as per pre-programmed sequences to do the protection. For notification only, Fire Alarm Control Panel (FACP) fulfill the purpose. However if there's deluge water spray in the system, Fire Release Control Unit shall be used. Panel like Protectowire conventional release control panel model SRP-4x4, Mircom model FR-320 or more complex panel like Mircom model FX-3500RCU Addressable Fire Releasing Control, the selection depends on the complexity of the system built and the budget. The last model has input module that can accept 4 - 20 mA analog input.

Deluge System
Deluge valve is the heart of the deluge system. The spray system is controlled by deluge valve. When the fire alarm panel gets alarm signal, as pre-programmed configuration, a deluge valve may be actuated to initiate discharge. Reliable model DDX is the robust construction with minimum rubber parts. The maintenance is also simple. Just open the front cover to clean the interior of the valve. DDX Deluge Valve has range from 2", 2.5", 3", 4", 6" and 8" size. Stainless steel body material also available on request. For the isolating valve, Reliable has butterfly valve with hand wheel.

Spray Nozzles
The most common model for spraying water to the tank vertical surface is medium-velocity spray nozzle. There are various K-Factor and spray angle selection to suit to the design. Common material use is brass, but stainless steel also available. The purpose of the water spray system is to cooling the tank, temperature to reach boiling point of the tank content is not allowed.

Foam Systems
To avoid catastrophic fire damages and spreading of fire to the adjacent tanks in tank farm, foam solution is injected to the interior of the burning tank . To make proportional mix of water and foam concentrate, Foam Bladder Proportioning Tank can be considered as it does not need external energy like electric foam pump. Horizontal or Vertical Tank available, however for large capacity > 1,500 gallon the option only the horizontal ones.

Foam Chamber used to mix foam solution with air and injected into the tank interior. Foam Chamber installation is the tank side wall. In case no spare flange is prepared at the tank side wall, another method of foam injection shall be considered.

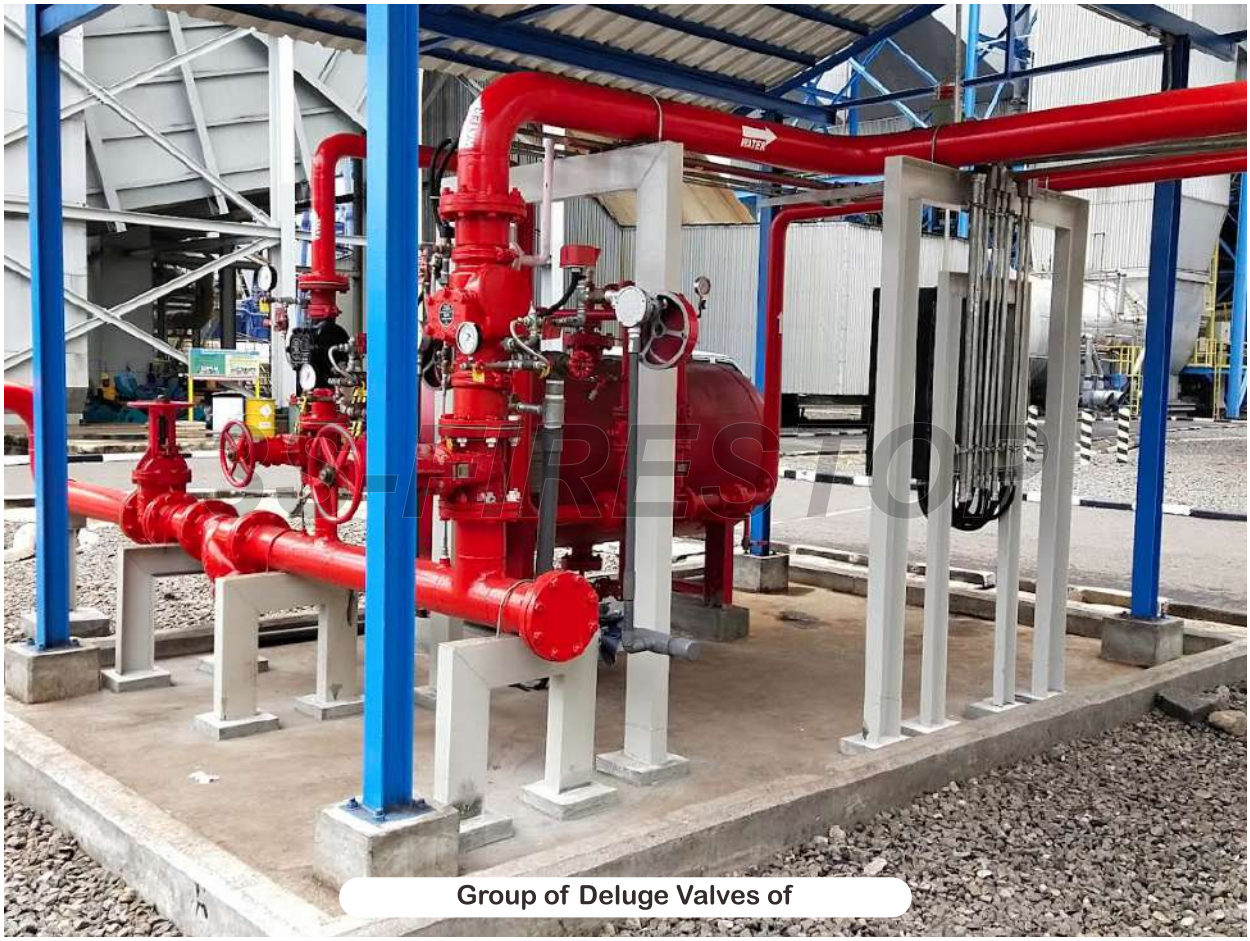
High Back Pressure Foam Generators (HBPGs)
HBPG is used in subsurface foam injection system which are primarily designed for the protection of fixed roof tanks applicable for hydrocarbon fuels only. Designed to produce low expansion foam with an expansion of around 4:1, these Fixed Foam Generators will operate efficiently against a back pressure of up to 40% of the foam solution inlet pressure. The material is made of steel with coating and stainless steel. Six models are available with flows from 600 to 2000 LPM (160 to 530 GPM) to cater for a broad range of applications.

Foam Concentrates
There are numerous types of foam, but these days the synthetic foam concentrates are most common to apply. Environmentally Responsible FireFilm® foam concentrate is a superior quality aqueous film forming foam (AFFF) which is used at 1%,3% and 6% concentration to extinguish fires in hydrocarbon fuels. Most applications use 3% concentration as 1% more costly.

AFFF foam concentrates are designed for rapid fire knockdown by producing a thin aqueous film which spreads across the surface of the fuel, separating the fuel from oxygen. This is accomplished by allowing the foam solution to quickly drain from the foam bubble which in turn, improves long term sealability and burnback resistance. The aqueous film is produced by the fluorocarbon surfactant reducing the surface tension of the foam solution to the point where the solution can be supported by the surface tension of the fuel. All FireFilm®-AFFF fluoro-surfactants are based on C6 chain. Do NOT contain PFOS or PFOA and low energy input AFFF-requires minimal agitation.

AR-AFFF is used for polar solvent liquid like Methanol or Ethanol and other polarized liquid. AR-AFFF stands for Alcohol-Resistant Aqueous Film Forming Foam. FireFilm®-AR is an AR-AFFF concentrate with a special biosynthesized polymer. This polymer is designed to fulfill two functions. The first is to form a protective membrane between the fuel and the foam as it contacts the water-miscible fuel, making extinguishment possible. This layer will prevent the flammable vapor meets with Oxygen from the air. The second function is to make the foam more stable and heat- resistant, resulting in better burnback resistance and sealability compared to conventional AFFFs .
Check this link : https://www.youtube.com/watch?v=X3vWNIUr65c

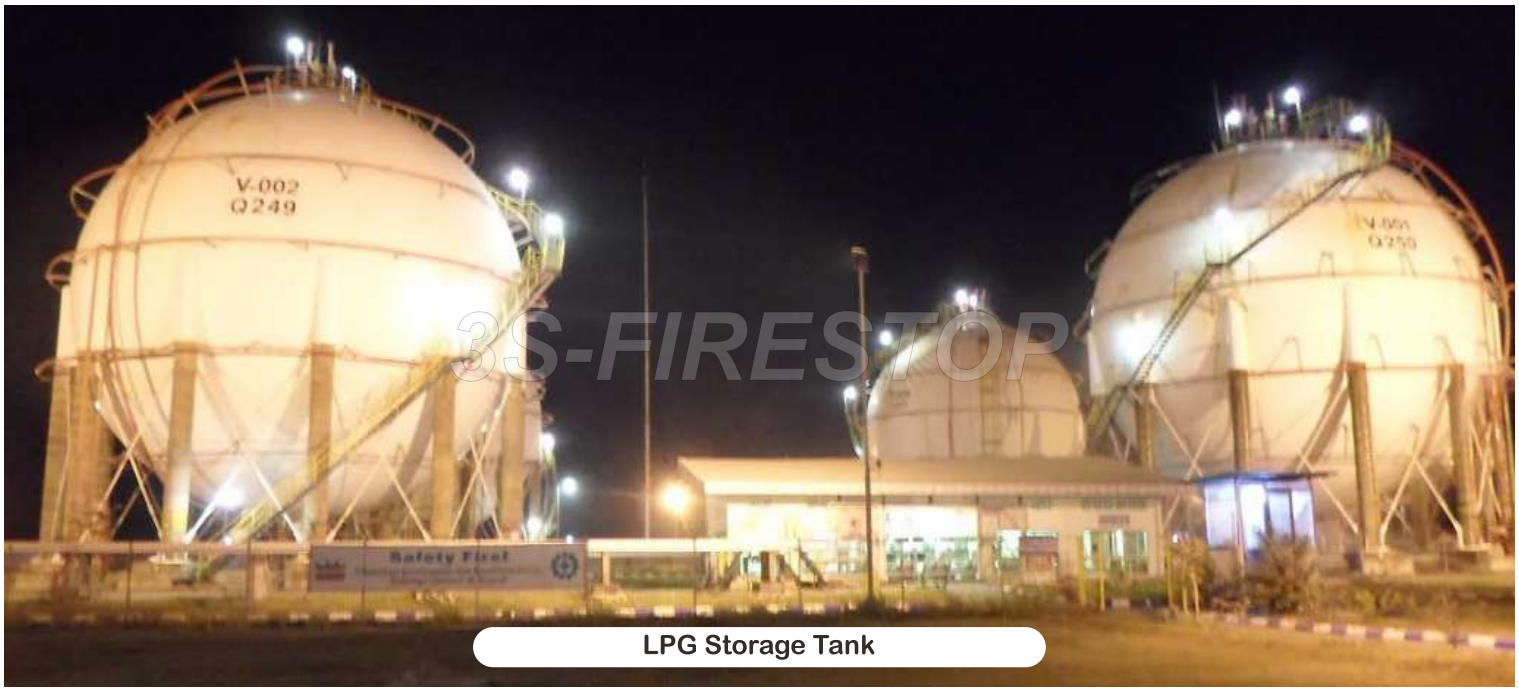
Methanol Storage Tank Farm



Group of Deluge Valves of

Foam Bladder Tank Proportioning System

Spherical Tank



LPG Storage Tank

Spheres are typically used to store below ambient temperature liquids and pressurized gases such as ammonia, propylene, LPG, butadiene, etc. Most (or many) spheres operate at low temperatures with -50°C (-58°F) as a lower limit. Gases are stored under pressure at a temperature lower than their liquefaction temperature. Why a tank is spherical? The spherical shape allows even distribution of stress, therefore reducing the risk of fracture or failure. Since 'Leak before Failure' concept is used in the design, it presumes and ensures that primary barrier (tank shell) will fail progressively and not catastrophically.
What are the instruments used in spherical tank fire protection ?

Heat Detectors
Spot-type heat detector is not suitable for application at the spherical tank. Linear heat sensor cable is installed at each of circular water spray ring. As per norms of NFPA 15, the spacing between circular ring fulfills the spacing requirement between each linear heat sensor lines as per NFPA 72A as well. Protectowire has several models : PHSC Series, PLR Series, CTI Series with rated temperature choices : 68°C, 88°C, 105°C, 138°C and 180°C.

Gas Detector
The gas detector model must match with the stored substance ie. Methanol gas detector for Methanol storage tank, combustible hydrocarbon gas detector for hydro carbon fuel storage tank. These gas sensors are having relay ouput for connection to FACP, analog 4-20 mA output to PLC / ESS, and RS-485 output.

Flame Detector
As most spherical tank is used for ammonia, propylene, LNG, LPG, butadiene and other hydrocarbon derivatives ; the most common flame detector used is UV/IR or IR3 type. FGD flame detector model is FlameSpec-UV-IR or FlameSpec-IR3. Flame detector can give faster response than any other type of detectors.

Deluge Water Spray
Water spray is used to cool the tank to avoid BLEEVE. Deluge is used to deliver water to the spray nozzles. The deluge is electrically actuated via Ex-proof Solenoid. All conduit fittings used is Ex-proof type as well.

Type of Spray Nozzle
Due to strong wind, the appropriate spray nozzle types are medium - velocity spray nozzle or high-velocity spray nozzle. Full-cone spiral (whirl) spray nozzle is not suitable due to smaller droplet size. The water droplets can be easily taken away by the wind. Reliable has medium - velocity spray nozzle model.

Methanol Storage Tank

Deluge Valve with Eletric Trim Set


DETCON Methanol Gas Detector

DIFFERENT EFFECT OF SPRAY NOZZLES

In dry fire protection systems, water does not enter the pipes until a remote valve (ie. deluge valve) is activated by a sensor, making them ideal for outdoor applications, or in places where the system will be exposed to temperatures when fire incident happens. Nozzle effectiveness in these systems is greatly impacted by the design of spray patterns, the calculated spray angle, the size of the droplet and the nozzle flow rate. From an efficiency standpoint, the smaller the size of a droplet, the greater the surface area to volume ratio. The greater ratio translates to faster heat transfer and faster evaporation and results in energy being removed from the fire faster. Herewith some models have used in 3S-Firestop's projects in the past.

MEDIUM VELOCITY

HIGH VELOCITY

WATER CURTAIN / FAN

SPIRAL / WHRIL

MEDIUM VELOCITY NOZZLES

Medium Velocity Water Spray Nozzle is an open orifice, directional spray nozzle, designed for use in water spray fixed systems for fire protection applications. MV nozzle comes in various materials of construction. The nozzle is available in brass, stainless steel 316 and aluminium bronze construction. If use Reliable brand, MV Nozzle is UL Listed, FM Approval. The nozzle has an external deflector that discharges a uniformly filled cone of medium velocity water droplets. It comes with option of several k-factors and spray angles and therefore any system designer is able to effectively integrate the nozzle for water spray applications. One versality of using this MV model is 0o - 180o free orientation.

HIGH VELOCITY NOZZLES

High Velocity Water Spray Nozzle is an open orifice and non-automatic directional spray nozzle. HV nozzle is designed for use in fixed water spray fire protection systems where a high velocity water application is needed. This includes applications such as protection of beam structures, storage tank, loading bay etc. Compared with MV nozzle, this nozzle having higher water kinetic velocity as HV does not have external deflector that will block and disperse the water solid discharge. As per experience, do not use for application like in electrical transformer, circuit breakers or other objects those don't allow water penetration to the interior when direct impingement of water sprayed. HV nozzle comes in brass or stainless steel materials of construction. For non-UL/FM products, use brand 3SAFE .If UL Listed certified & FM Approved, several brands from India or USA can be used. K-factor available K-22 x 75°, K-18 x 80°, K-26 x 100°, K-32 x 90°, K-42 x 115° and K-23 x 120°. Size comes in one choice 3/4" BSP/NPT-Male only.

WATER CURTAIN NOZZLES

Water Curtain Nozzles (or Fan Flat as the spray pattern is flat) are non-automatic open, outside sprinklers intended for the protection of windows, walls, steel beams, columns, roofs and any other structures against exposure fire and heat penetration. Water Curtain nozzles are generally installed with orifice slot pointing downwards direction. The curtain spray absorbs and reflects heat radiation, minimizing the amount of heat reaching the structure/area to be protected. The curtain spray absorbs and reflects heat radiation, minimizing the amount of heat reaching the object to be protected. Available K-Factors are K20, K23, K32, K42, K58 and K79. Material can be Brass or Stainless Steel. Size only one choice 1/2" BSP/NPT-Male. In the YouTube link below, these nozzles are used to protect nearby Central Control Room of plant operation as the buiding just 20 meter away from the plant structures : https://www.youtube.com/watch?v=tD0ks0AQXQY

Spray Pattern of Flat Fan Nozzle

SPIRAL / WHIRL NOZZLES

Spiral nozzle is a kind of full cone or hollow cone nozzle, spray angle range is 60°-170°. Liquid flow rate range is 5.5- 410 L/min. This compact nozzle has design of smooth flow channels which can minimize the block of liquid to make liquid reach max flow in given size pipe. Spiral nozzle can be installed or updated on most piping system. The available nozzle is NPT or BSPT (male) threaded type. Usually 1/4''-2'' nozzle can separately use brass, 316 stainless steel casting, teflon. Other material can be used if they are applied to special fields.

Conn. Size : 1/4''; 3/8'' ; 1/2'' ; 3/4'' ; 1'' ; 1-1/2'' ; 2'' ; 3'' ; 4''

Spray Pattern : Full Cone / Hollow Cone

Spray Angle : 60° ; 90° ; 120° ; 150° ; 170°

Material : Stainless steel (303,304,316) ; Brass; Plastic (PP, PVDF, PTFE)

As said nozzle effectiveness in these systems is greatly impacted by the size of the droplet and the nozzle flow rate. From an efficiency standpoint, the smaller the size of a droplet, the greater the surface area to volume ratio. The greater ratio translates to faster heat transfer and faster evaporation and results in energy being removed from the fire faster. Anyway the smaller the size of a droplet, it can be easily swept away by the wind and do not reach the targeted object surface. In certain application, a hollow cone whirl nozzle SHALL be applied. The spiral design allows the largest droplets to migrate toward the outside of the pattern, thus providing protection to the smaller droplets allowing them to penetrate the target area (larger droplet will be in outer ring and smaller droplet in the center of the spray ring pattern. For cost effective non-fire protection application uses brand 3SAFE®. Anyway as most nozzles used in fire protection application needs UL Listed and FM Approval, use brand like BETE Nozzle from USA.

Spiral Nozzle can designed for use in water spray fixed systems for fire protection applications (special hazard application). With free orientation of the installation, Spiral Nozzle can be used for gas scrubbing and dust scrubbing as well like application in coal tunnel. Extinguishing of cable fires in cable trays inside the underground tunnel is also effective as small droplet can easily enter spaces between two vertical trays.

BETE Hollow Cone Spray Pattern

Application example in oil & gas field :

BETE model TF is used for water wall protection system on an oil rig. The purpose of the system is to protect equipment and personnel from the extreme heat generated by the natural gas flare when it was operated. The extreme 150° and 170° spray angles included in the TF series offer the best coverage, but at the cost of atomization.

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