

# EXTINGUISHING & ISOLATION



## Extinguishing is as important as detection...

### Water extinguishing

Different applications and problems of fire require totally different types of water extinguishing methods. Large water droplets with powerful full cone water spray is needed to penetrate material flows in chutes or pneumatic conveying systems. For extinguishing of flames in enclosed volumes or open areas, smaller droplet sizes are an advantage due to their high evaporation rate, efficient heat absorption and its ability to displace oxygen. Designing a superior extinguishing system is a well-defined science.

#### FIREFLY EXTINGUISHING CATEGORIES

FULL CONE SPRAY  
WATER MIST  
ISOLATION & INERTING  
DIVERTING  
STEAM EXTINGUISHING

### Extinguishing of sparks and hot bodies

Momentum of the extinguishing water is the key factor for a successful, reliable and effective extinguishing in conveying systems.

The momentum or force depends on two factors, water pressure and water droplet size. A small droplet has less momentum compared to a larger droplet at a given pressure. This in turn means poorer extinguishing effect in conveying systems, as the droplets cannot penetrate the material flow.

Low pressure at the water nozzle reduces the chances of saturating the ignition source. A large droplet size in combination with 7-9 bar pressure that ensures the material flow can be penetrated and the ignition source extinguished.

It is important to consider the dimensions of the chute or duct that will be acting as the extinguishing zone as well as the material flow rate. Large physical dimensions and flow rates needs to be considered while designing the extinguishing zone as the water droplets run the risk of being absorbed in the outer layers of the material, leaving a partially extinguished ignition source.



### Extinguishing of flames

Water mist as fire extinguishing medium is gaining ground and has proven to be very effective in fighting and controlling fires. It has a remarkable potential for suppressing fires and is causing minimal residual damage. It can be used for extinguishing of flames in a number of different applications such as panel presses, hot oil pumps, silos, planers, mills and in sensitive machines etc. Water mist has even been found to be usable in applications that are normally not considered suitable for water based systems e.g. oil fires etc.

Water mist systems work by spraying microscopic water droplets onto a fire. This results in efficient extinguishment using nothing more than water. The water removes heat from the fire that in turn creates steam, which displaces the oxygen and ensures that the combustion cannot be sustained.

#### The facts about water mist

*By Factory Mutual Research*

##### **Cools the fire area and blocking the heat radiation**

Cooling is accomplished due to the greater surface area presented by the quasi-gas created by water mist systems, and the blocking of radiant heat by the many microscopic droplets.

##### **Displacing the oxygen**

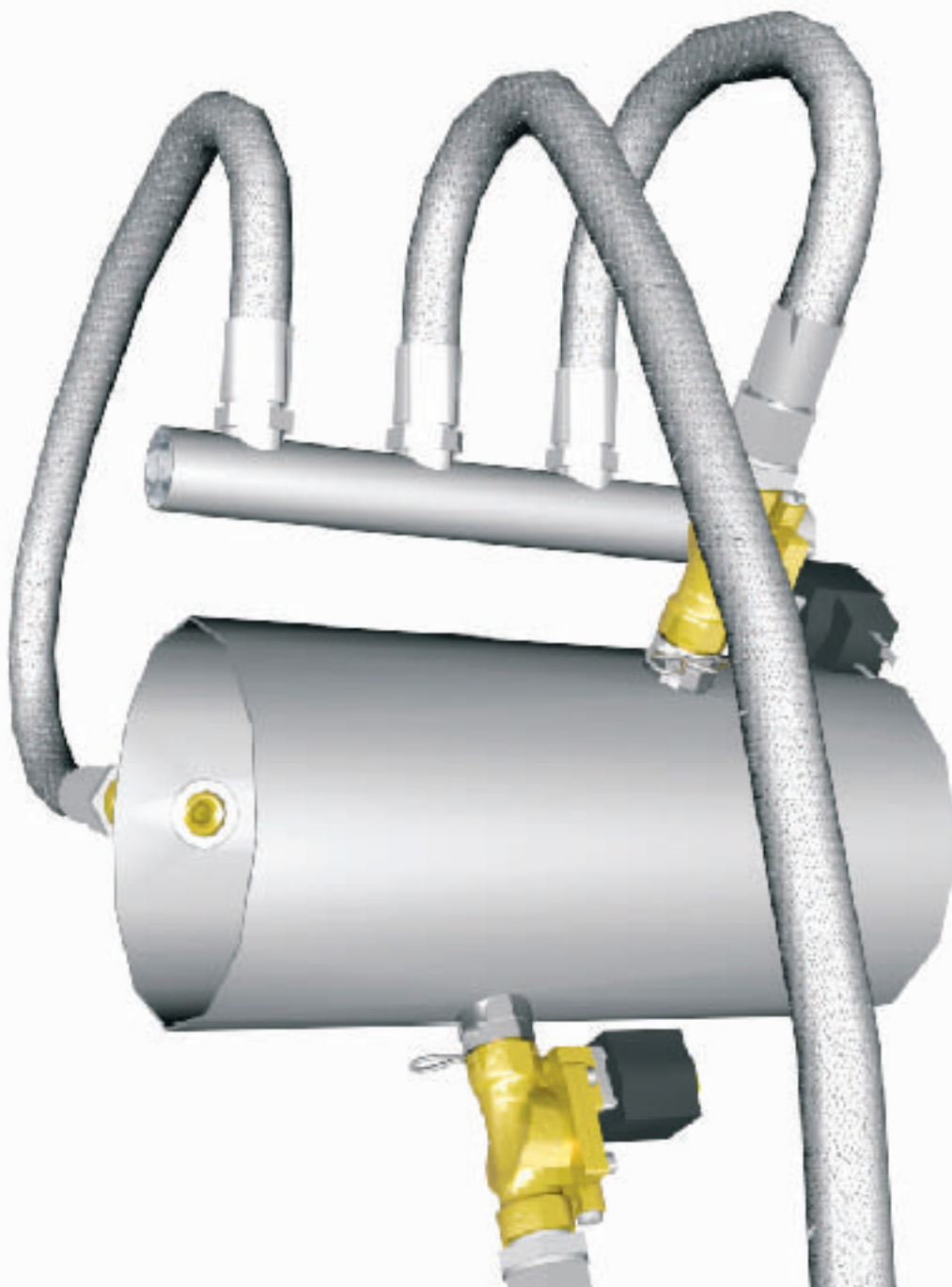
The atomized droplets are drawn to the base of the fire and flash instantaneously to steam, expanding in volume by 1,700 times, thereby displacing oxygen required for combustion.

## FIREFLY FULL CONE SPRAY

Firefly offers a well dimensioned extinguishing system which can penetrate dense material flows. A distinctive part of the Firefly system is the unique water nozzle which provides a large extinguishing zone, a high nozzle pressure and large water droplets. This, combined with the Firefly method of measuring the radiated energy of the ignition source, gives a well balanced and powerful extinguishing force that minimizes damage to filter media and reduces any clean-up operation.

The specification of the nozzles is also determined individually for each application. Firefly water nozzles give a water flow up to 140 L per minute, which allows shorter extinguishing times. The usual extinguishing times are between 1-2 seconds.

Firefly's unique water nozzles are specially designed for powerful extinguishing of ignition sources. The nozzles have a full cone design for a wide extinguishing zone and high water density. They supply larger water droplets to handle large, dense flows of material. The capacity and spray angle of the nozzles are adapted individually for each application.



## FIREFLY WATER MIST

Firefly offers an effective extinguishing method using a spray of fine water particles. This method has been specially developed for extinguishing flames. It is designed keeping in mind the fact that it is unsuitable to sprinkle large amounts of water on a fire core – mainly because too much water will result in longer down-time. The Firefly water mist gives a homogenous, dense spray of fine water particles that both cool the fire core and lower the oxygen content. The method has a number of advantages over other extinguishing methods.

Firefly water mist means greater safety. Since extinguishing can be initiated at an early stage, the fire is prevented from spreading to a larger area. This reduces the risk of personal injury and material damage.

Firefly water mist means higher productivity. With early extinguishing, the amount of extinguishing agent can be minimized. With less water consumption, productivity can be kept at a higher level and minimising the downtime cost.

Firefly water mist means greater operating reliability. Water is taken from Firefly's ordinary preventive system. Since the extinguishing system does not have any discardable components such as gas cylinder, the system can handle several incidents in a row, or follow up a previous unfinished procedure. Should the fire ignite again, the system reactivates. Compared with other extinguishing methods, this gives higher operating reliability.



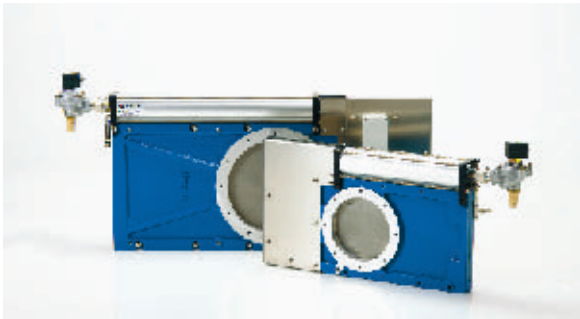
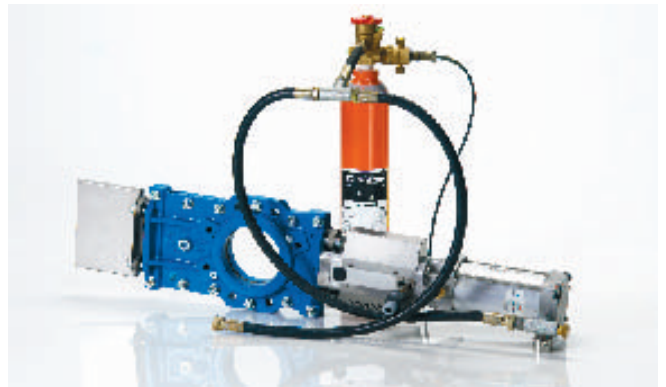
## ISOLATION AND INERTING

In some processes, gas may be more suitable as an extinguishing agent. Carbon dioxide and nitrogen are excellent extinguishing agents provided that the affected section of the process can be isolated. This requires extremely fast acting valves.

Our product range includes a large number of specially designed valves, varying in size. These are regulated using high-speed actuators and closure times down to 50 ms.

### Firefly FIV/PS-G

Firefly isolation valve FIV/PS-G has a guillotine design. The valve is pressure controlled and is usually tripped by means of the pressure from a gas cylinder used for inerting. The valve is intended for installation on pneumatic transport systems. The valve is available in different designs and dimensions up to Ø300 mm. The FIV valve is often used in dense phase environments.



### Firefly GIV

Firefly isolation valve GIV has a guillotine design. The valve is pressure controlled and is tripped by compressed air. The valve is intended for installation on pneumatic transport systems. The valve is available in different dimensions up to Ø600 mm. The GIV valve is often used for lean phase processes.

### Firefly BIV/PS

Firefly isolation valve BIV/PS has a throttle design with spring tensioned pneumatic controller which is electrically controlled. The valve is compact and is fitted between flanges. It is ideal for installation in piping transporting finely distributed materials. The BIV valve is available in different dimensions up to Ø600 mm.



### Firefly JIV

Firefly isolation valve JIV/PS has a louvre design with spring tensioned pneumatic controller which is electrically controlled. It is typically installed in large ducts or in systems where finely distributed material is transported. The JIV valve is available in sizes up to 2000x2000 mm.

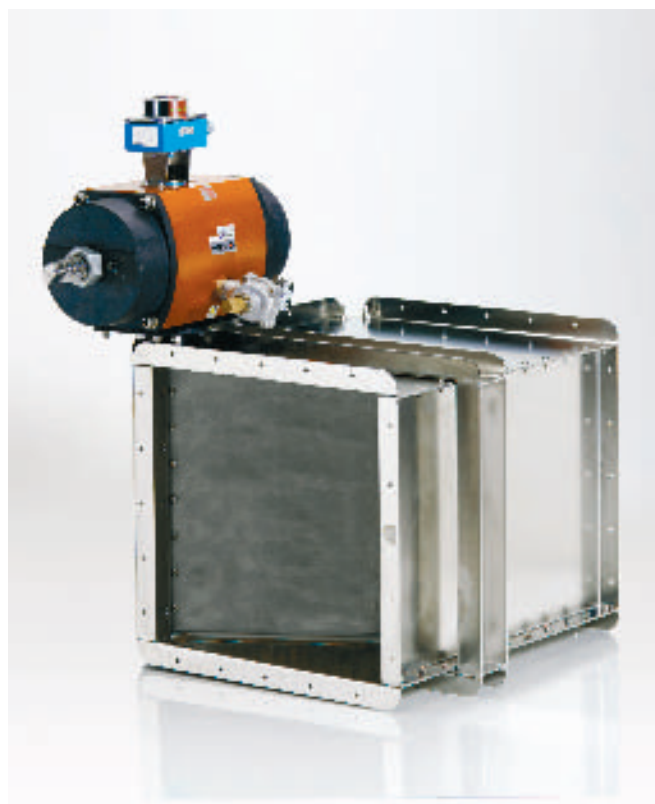
## DIVERTING

Another extinguishing method used in the Firefly system is mechanical diverting. When an ignition source has been detected, a divert valve is opened which redirects the material flow out of the process line. The process itself need not even be stopped.

The Firefly DIV valve is a fast acting valve intended for applications where extinguishing are unsuitable due to the process.

The valve re-routes the process flow to a collection point outside of the process where the extinguishing takes place. The valve then returns to its normal position if no more indications are registered.

The valve is fitted with a spring tensioned pneumatic controller and is available in dimensions up to 500x500 mm. The valve activates in less than 300 ms.



## STEAM EXTINGUISHING

The choice of extinguishing agent is generally determined by the products handled in the process. Another factor is the availability of an extinguishing agent.

If steam is available, this is very good extinguishing agent for many applications.

Firefly steam valve type SV/PS is suitable for steam pressures from 10 to 69 bar. The valve consists of a quick opening ball valve with a spring tensioned pneumatic controller. The valve has a full bore and is available in DN15-DN80. The valve is designed for welding or flange mounting direct into the steam line.