

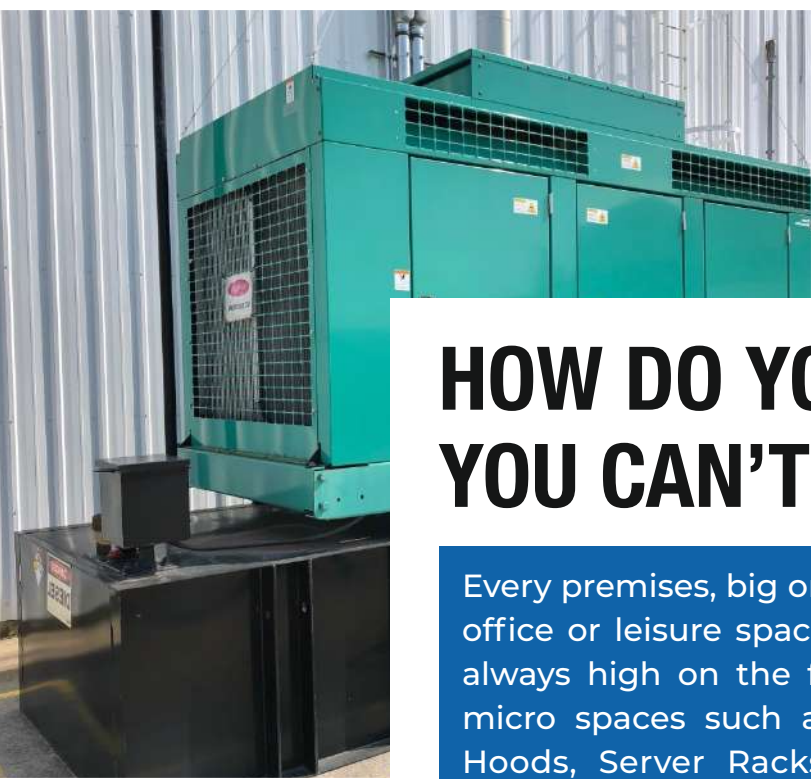
# FIRE PROOFING



# MICRO ENCLOSED SPACES



**CEASEFIRE TUBE BASED SUPPRESSION SYSTEMS  
FOR HIGH RISK SMALL ENCLOSED SPACES**



# HOW DO YOU FIGHT FIRE THAT YOU CAN'T EVEN SEE

Every premises, big or small, whether residential, commercial, office or leisure space, has certain vulnerable spots that are always high on the fire risk. These are also often enclosed micro spaces such as electrical panels, MCB boxes, Fume Hoods, Server Racks, Generators or CNC machines that become the source of fire due to a short circuit resulting from faulty wiring, loose fittings, power fluctuation or overheating.

Fire fighting in such high risk spaces becomes challenging due to the fact that they are enclosed in nature and often situated in a remote location within the premises, making manual fire detection impossible, till it reaches a point when flames have already reached dangerous intensity levels.

What makes matters worse for anyone trying to extinguish fire in such spaces is that they are most often electrically charged and live, making the risk of electrocution high. On the other hand, availability of trained firefighters at the site with appropriate fire extinguishing equipment with the right extinguishing agent, is never guaranteed.





# ANSWERING THE CHALLENGE

Fire-proofing such high risk enclosed spaces in a premises many times is equal to fire-proofing the entire premises. This is because fault lines on fire safety are plugged in the premises when such spaces are safeguarded.

Need of the hour is of specialised fire suppression systems that are one, automatic in nature as manually monitoring such spaces 24x7 is virtually impossible and two, the suppression system must be specifically designed to protect such high risk enclosed spaces.



# THE NEED OF THE HOUR

The need for automatic fire detection and suppression in such spaces is important also because the fire needs to be quelled the very minute it is detected and needs to be extinguished while it is still small. Any delay in this can easily lead to fire spreading into surrounding areas in a premises taking the fire emergency to a whole new level.

Whereas the need for suppression systems to be designed specifically for such spaces is important because the systems need to arrest the unique characteristics of the fire risk present in these spaces. Whenever we depend on generic fire safety equipment available at the premises like fire extinguishers or total flooding for such hot-spot spaces, it is often a delayed response and the damage is already caused.



Also, what is the point in flooding the entire room or premises with hundred KGs of extinguishant (could be expensive clean agent gas in a total suppression system present at the site or high-collateral damage- causing conventional agents like ABC powder or water) when all that was needed to be done was to extinguish flames in a small cabinet.

# CEASEFIRE IN-PANEL SOLUTIONS

## 1.) CEASEFIRE IN-PANEL TUBE BASED SUPPRESSION SYSTEMS (CQRS)



Direct Systems



Indirect Systems

## 2.) CEASEFIRE MINI (MICRO-ENVIRONMENT FIRE SUPPRESSION)



Adaptive



Intuitive





# A GROUND-BREAKING FIREFIGHTING SOLUTION

Fights Fire That You Can't Even See.

# 1.) CEASEFIRE IN-PANEL TUBE BASED SUPPRESSION SYSTEMS (CQRS)

Considering the need for automatic fire protection, Ceasefire presents an In-Panel Tube Based System for micro enclosed spaces, specifically designed to protect high risk enclosed spaces. This system is driven by a Heat Sensing Tube based fire detection and a mechanical and automatic fire suppression by a localised fire extinguishant available in a stored-pressure form.

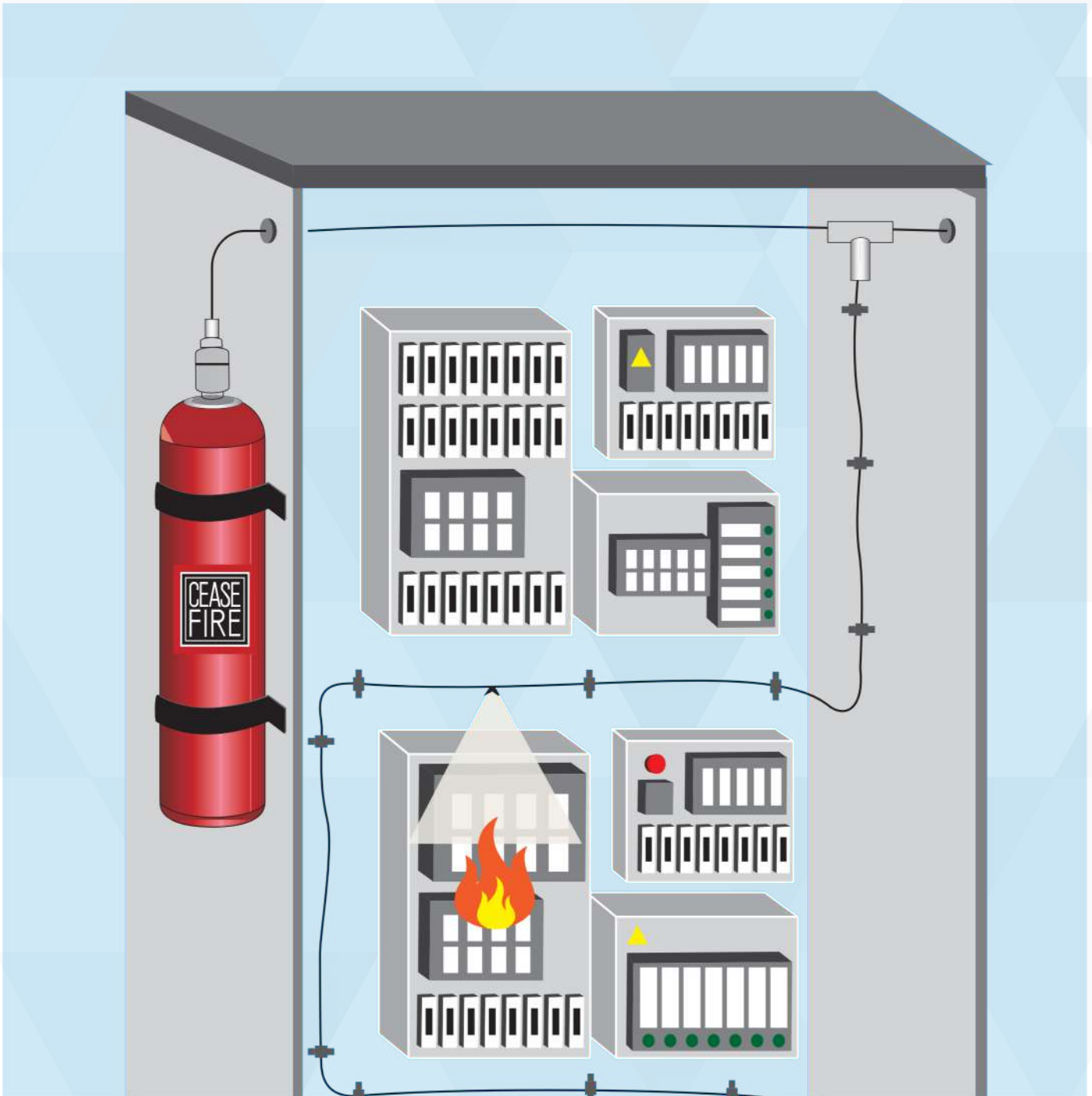
The system is designed specially to protect high risk enclosed spaces considering the complex construction, shape and characteristics of such spaces such as electrical panels, MCB boxes, server racks, CNC machines, etc where the fire risk is randomly distributed inside these spaces and any point inside could become a source of fire due to the complex nature of wirings, integrated circuits, fuses and power connections present inside.



A signature component in Ceasefire's In-Panel Tube Based Systems is the specially designed heat-sensitive pneumatic polymer tube. In the event of a fire, the heat-sensitive tube detects an increase in temperature and bursts upon coming into contact with flames, activating the system automatically and extinguishing the fire at the source.

# HOW THE SYSTEM WORKS?

This heat-sensitive pneumatic polymer tube is connected to an extinguishing agent container at one end, while the rest of it runs unobtrusively inside the micro space that needs to be fire protected, covering all high risk points inside the space. In the event of a fire, the flames come in contact with this heat-sensitive tubing and upon reaching a temperature level of 150° - 180°C, this tube bursts open and activates the system.



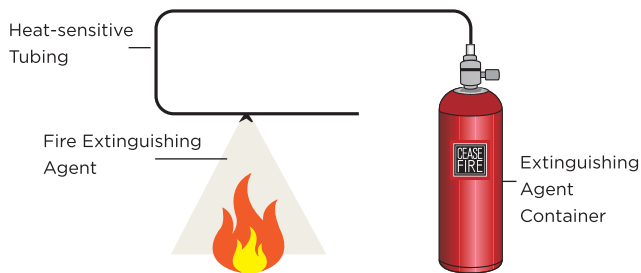
The technology makes this system entirely self-activated, and requires no human intervention once it has been installed. This makes it especially beneficial for high risk micro- environments that are vulnerable to fire and cannot be manually monitored 24x7.



# THE TWO PRIME SYSTEM VARIANTS

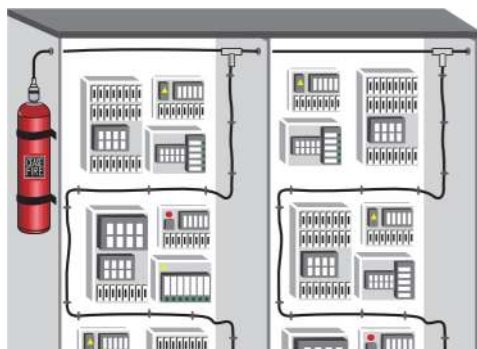
The system is available in two prime technologies and the choice of selection of

## DIRECT SYSTEM



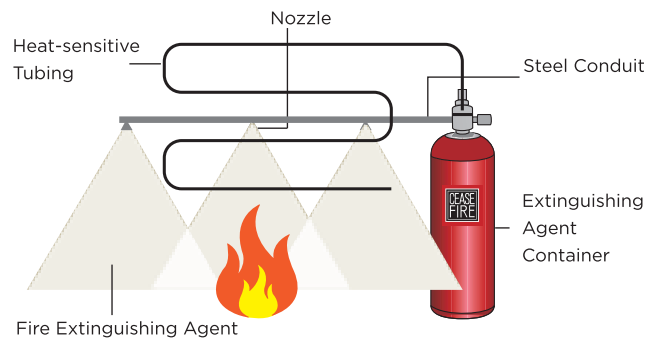
In the Direct System the heat-sensitive tubing acts as an extinguishing agent delivery system. The tube bursts at the point where the fire is detected, forms a miniature nozzle and sprays the extinguishing agent. This system can run intricately and unobtrusively through Panels, MCBs, Gensets and electrical mains boxes that are often compartmentalised in nature, and is triggered instantly and automatically.

This eliminates the need for human intervention and provides a swift and comprehensive solution. This is available in low-pressure and high-pressure systems.



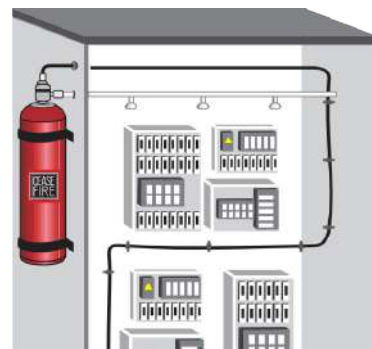
The system variant depends upon the nature of the space that needs to be protected.

## INDIRECT SYSTEM



In the Indirect system, the heat-sensitive tubing only acts as a detection device. The extinguishing agent is delivered through a steel conduit and sprayed across the entire area through strategically placed nozzles.

This system configuration is ideal for spaces that are non-compartmentalised and total flooding in the entire cabinet / chamber is possible. For example, in a large electrical cabinet, where a voltage surge can short-circuit components at multiple locations and cause them to catch fire. This system variant too is available in both, low-pressure and high-pressure systems.



## DIRECT SYSTEMS

	Fluoroketone (FK-5-1-12)	HFC-227ea	HFC-236fa	ABC Powder (MAP 90)	Foam (Fluorine Free)	CO <sub>2</sub>
Direct Low Pressure	—	—	—	1 kg	1 ltr	—
	—	2 kg	2 kg	2 kg	—	—
	3 kg	—	—	—	3 ltr	—
	4 kg	4 kg	4 kg	4 kg	—	—
	6 kg	6 kg	6 kg	—	6 ltr	—
	9 kg	9 kg	9 kg	—	9 ltr	—
Direct High Pressure	—	—	—	—	—	2 kg
	—	—	—	—	—	5 kg



# INDIRECT SYSTEMS

	Fluoroketone (FK-5-1-12)	HFC-227ea	HFC-236fa	ABC Powder (MAP 90)	Foam (Fluorine Free)	CO <sub>2</sub>
Indirect Low Pressure	2 kg	2 kg	2 kg	2 kg	2 ltr	—
	3 kg	—	—	—	3 ltr	—
	4 kg	4 kg	4 kg	4 kg	—	—
	6 kg	6 kg	6 kg	6 kg	6 ltr	—
	9 kg	9 kg	9 kg	9 kg	9 ltr	—
Indirect High Pressure	—	—	—	—	—	2 kg
	—	—	—	—	—	5 kg
	—	—	—	—	—	22 kg





# DIVERSE RANGE OF EXTINGUISHING AGENTS TO ADDRESS A VARIETY OF APPLICATIONS

Ceasefire's In-Panel Tube Based Suppression System offers flexibility of configuration not only in terms of the Direct and In-Direct System configuration, but also on the basis of wide variety of extinguishing agents like ABC MAP90 Powder, Clean Agents (Fluoroketone, HFC-227ea and HFC-236fa) and Foam (Fluorine Free) in Low-Pressure Technology, and CO<sub>2</sub> in High-Pressure Technology, making it possible for system designers to configure any type of a micro-environment suppression system to suit any kind of an application to address its unique fire risks.



ABC Powder MAP 90



Foam (Fluorine Free)


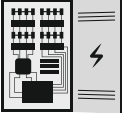


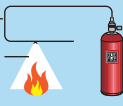
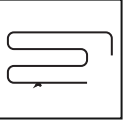





Clean Agent



CO<sub>2</sub>

# SYSTEM FEATURES

	<p><b>Classification</b> Fights Class A, B, C and Electrically started fires.</p>
	<p><b>Application</b> Ideal for places where fires can break out in localised areas.</p>
	<p><b>Self – Contained</b> Does not require any power supply and will function normally in the event of a power outage.</p>
	<p><b>Wide Choice of Agents</b> The system comes in a host of extinguishing agents like ABC MAP90 Powder, Clean Agents (Fluoroketone, HFC-227ea and HFC-236fa) and Foam (Fluorine Free) in Low Pressure and CO<sub>2</sub> in High Pressure technology, making the system highly versatile and applicable to a large number of spaces.</p>
	<p><b>Instant Self-activation</b> Eliminating the need for human intervention, the system is in a perpetual state of readiness to combat a fire as soon as it breaks out.</p>
	<p><b>Extended Reach</b> Flexible tubing extends protection to areas that are difficult to access and may not be able to accommodate any other means of detection.</p>
	<p><b>Easy Installation</b> Simple design, and can be installed within a few hours, which means a significant reduction in labour costs and downtime</p>
	<p><b>Rugged Design</b> Can withstand even harsh conditions where other types of detection systems might be rendered inadequate.</p>
	<p><b>Certifications</b> BSI tested, LPCB, UL and PED certified.</p>

# CONTROL PANEL

An In-Panel Fire Suppression System is a mechanical, pressurized system activated on the principle of pressure differential. By digitally monitoring these systems, one can ensure they are always ready to respond. In larger premises with scaled-up systems, it's even more essential to have the system in working condition.

Ceasefire's In-Panel Fire Suppression System comes equipped with a state-of-the-art Control Panel that monitors up to four-cylinder systems. Plus, the provision allows monitoring of the status of each of these four system valves and pressure switches.



Ceasefire's Control Panels come equipped with a relay output that enables users to install additional Hooters (sound alarms) and Lamp Flashers (visual indicators) on the Detection Line.

They can be installed near the system anywhere, depending on the requirements of the premise or the user.



A close-up photograph of a person's hand holding a small, red fire extinguisher. The extinguisher is mounted on a black bracket and has a silver nozzle assembly with a pressure gauge. The label on the extinguisher is partially visible, showing the words 'EASE' and 'RE'. In the background, there is an orange electrical panel with several terminals and wires. The overall scene is set in an industrial or utility environment.

**HELLO, MINI!**

The Biggest, Smallest Firefighter.

## 2.) CEASEFIRE MINI

Introducing the Ceasefire Mini, the biggest, smallest suppression system in town; and proof that some of the best things do come in small packages.

The Mini is a state-of-the-art micro-environment suppression system designed by Ceasefire. The size of your palm, it sits snugly inside small enclosed spaces that are vulnerable to fire. When the temperature of the micro-environment exceeds a preset limit, the Mini swings into action and automatically extinguishes the fire. Place it inside your server. Pop it in the fuse box. The Mini fits anywhere, and protects everywhere!

### EVOLVED TO PROTECT

At Ceasefire, our products have evolved to take the fight to the fire. First, came simple home extinguishers. Then, complete flooding systems followed by advanced suppression systems. And now, the Mini, the smallest firefighter that takes on a fire the moments it starts.

Tested by  
**bsi.**



# TYPES OF CEASEFIRE MINI

Ceasefire has designed a Mini to protect practically every kind of micro-environment, including those that cannot be reached by humans.

The Mini – Adaptive System is an indirect suppression system designed for those micro-environments which are too small to even accommodate a Mini, let alone other firefighting systems. In this case, the Mini container is installed outside, with its heat-sensitive glass bulb inside the micro-environment.



Adaptive

The Mini – Intuitive System is a direct suppression system which protects the micro-environment from inside. Place it inside or attach it to the inner wall of the micro-environment, and the Mini is ready to protect.














Intuitive





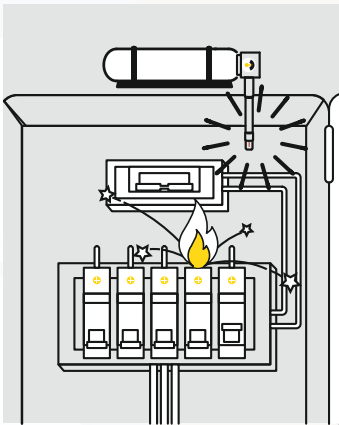
# SYSTEM FEATURES

	<p><b>Ease of Use:</b> Being automatic, the Mini requires no prompt to start firefighting.</p>
	<p><b>Fits Anywhere:</b> The Mini can easily fit into the spots that are most prone to fire.</p>
	<p><b>Electronics-friendly:</b> The Mini is filled with clean agents (Fluoroketone (FK), HFC-227ea) that cause no damage to your electronics.</p>
	<p><b>Maintenance-free:</b> The Mini comes with 6 year warranty and the assurance of no leakage.</p>
	<p><b>Easy to Install with 2 Mounts:</b> The Standard and Busbar mounts make installation a breeze.</p>
	<p><b>Self-actuation:</b> Since the Mini is self-actuated, it spots the fire and protects even when no one is around.</p>
	<p><b>No Power Supply Required:</b> The Mini uses a mechanical release mechanism to start firefighting.</p>
<p>A,B,C, </p>	<p><b>Works on All Classes of Fire:</b> The Mini can be used on any kind of fire, making it a truly versatile firefighter.</p>
	<p><b>Different temperature settings:</b> Mini variants are available in 3 heat thresholds : 57°C, 68°C and 93°C.</p>
	<p><b>Protects all Micro-environments:</b> Available as an Intuitive or Adaptive System, the Mini protects everywhere.</p>
	<p><b>Heat-sensitive Glass Bulb:</b> The Mini's glass bulb acts as a heat sensor that detects a rise in surrounding temperature.</p>

# TECHNOLOGY MEETS DESIGN IN THE HANDY CEASEFIRE MINI.

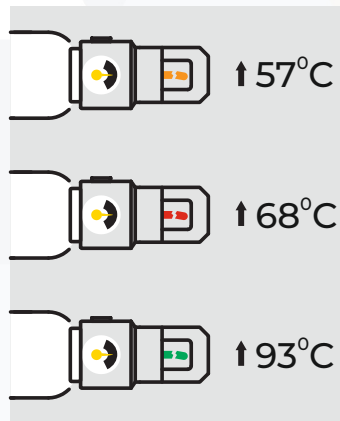
Built to protect micro-environments, the Ceasefire Mini automatically kicks into action in a fire situation.

## a. ADAPTIVE SYSTEM



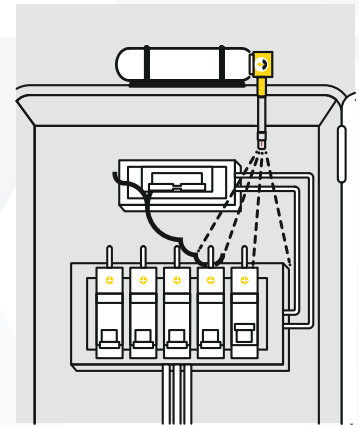
### Stage 1:

A fire sparked by a short circuit causes the pressure inside the Mini's glass bulb to increase.



### Stage 2:

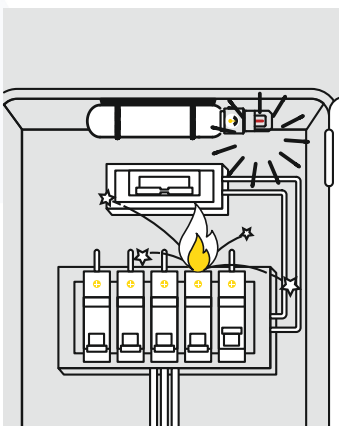
The very second the temperature rises beyond a point, the bulb breaks and activates the system.



### Stage 3:

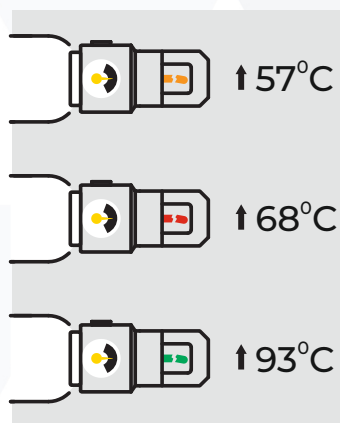
Instantly, the extinguishing agent is dispersed, killing the fire in its early stages.

## b. INTUITIVE SYSTEM



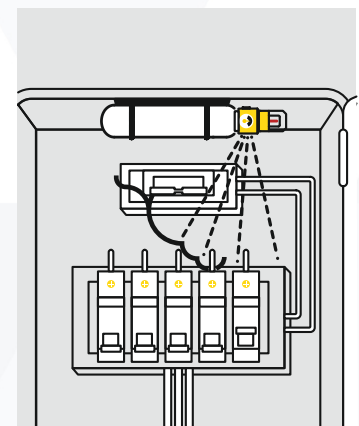
### Stage 1:

A fire sparked by a short circuit causes the pressure inside the Mini's glass bulb to increase.



### Stage 2:

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### Stage 3:

Instantly, the extinguishing agent is dispersed, killing the fire in its early stages.



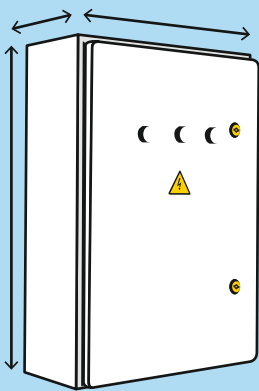
The green Ceasefire Mini is available in HFC227ea & Fluoroketone (FK).

Fluoroketone is a clean agent that causes no collateral damage to your electronics or the Earth, making the Mini absolutely safe.

# MINI SUPPRESSION SYSTEM. ZERO HASSLES.

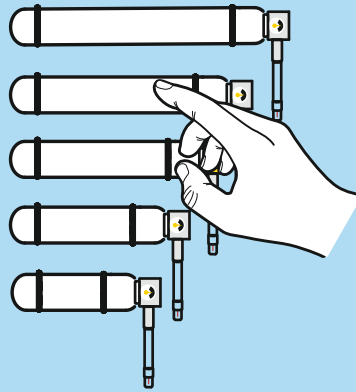
Fitting the Mini is as easy as 1-2-3. It's the only suppression system in the market which can be installed without any help or technical support.

## INSTALLING THE MINI - ADAPTIVE SYSTEM



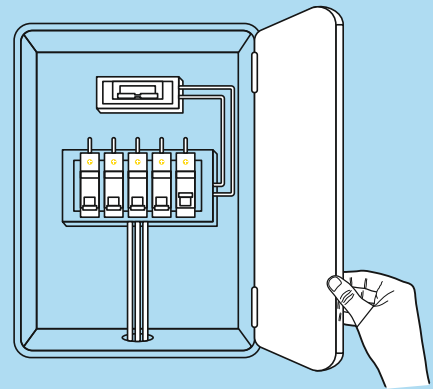
### Stage 1:

Measure the approximate volume of the enclosure you want to protect.



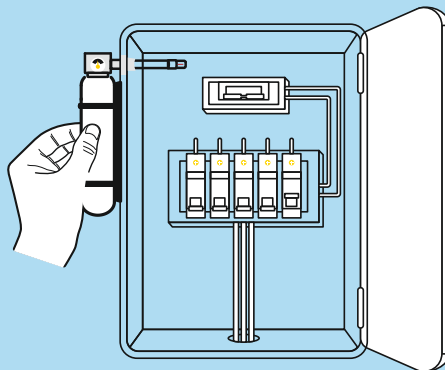
### Stage 2:

Choose the right variant of the Mini - Adaptive System.



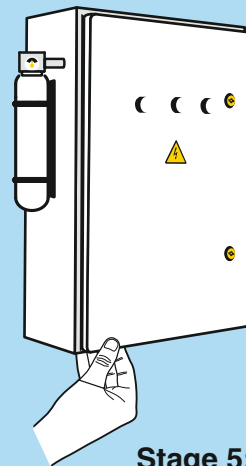
### Stage 3:

Drill a hole in the wall of your electrical cabinet.



### Stage 4:

Place the Mini on the outside such that the barrel passes through the hole and the heat-sensing bulb is inside the cabinet.

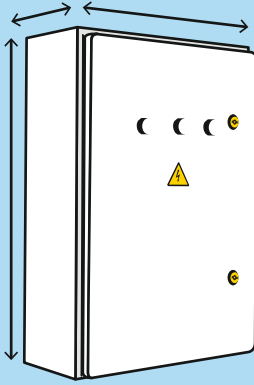


### Stage 5:

Close the enclosure.

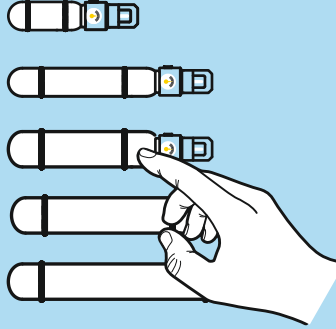


# INSTALLING THE MINI - INTUITIVE SYSTEM



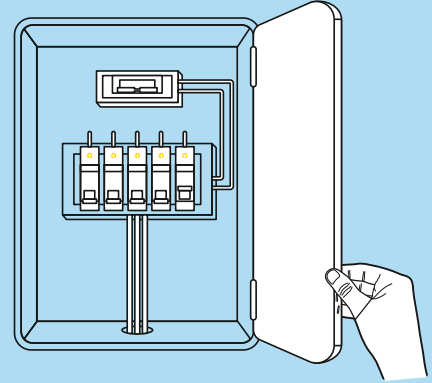
## Stage 1:

Measure the approximate volume of the enclosure you want to protect.



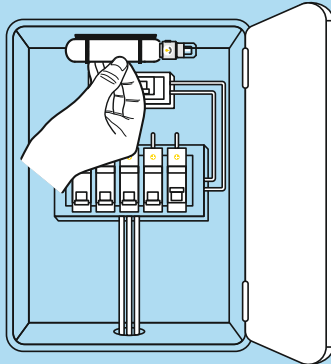
## Stage 2:

Choose the right variant of the Mini - Intuitive System.



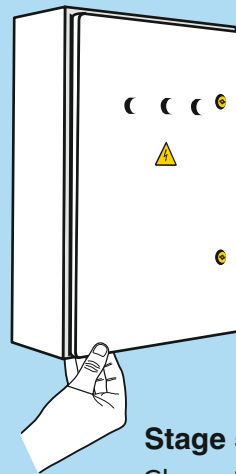
## Stage 3:

Open your electrical cabinet, AHU or machinery.



## Stage 4:

Place the Mini inside, vertically or horizontally. In case of large enclosures, you could screw its bracket to the wall inside and place the Mini on it.



## Stage 5:

Close the enclosure.

# APPLICATION AREAS

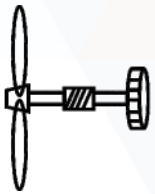
## WIND TURBINES

### The Fire Risk

Discover the future of wind turbine safety. Wind turbines are advanced systems that harness natural wind energy, converting it into vital power. However, their significant capital investment demands prolonged functionality for economic viability. Fire emerges as a prime cause of downtime, fuelled by moving turbine parts and lightning strikes. Once ignited, the chances of dousing the blaze are low due to the extreme height & the remote locations they are present in.

Therefore, a conventional suppression system might not help when it comes to suppressing the fire risk that these remote machineries carry.

### Common Causes Of Fire In Wind Turbines



Mechanical Breaking System Fault



Fire Debris from Forest or Bush Fires



Electrical Overload & Overheating



Failure of SCADA System



Generator Malfunction



Lightening Strikes



Electrical Equipment Failure



Mechanical Malfunctions



Arching in Transformer

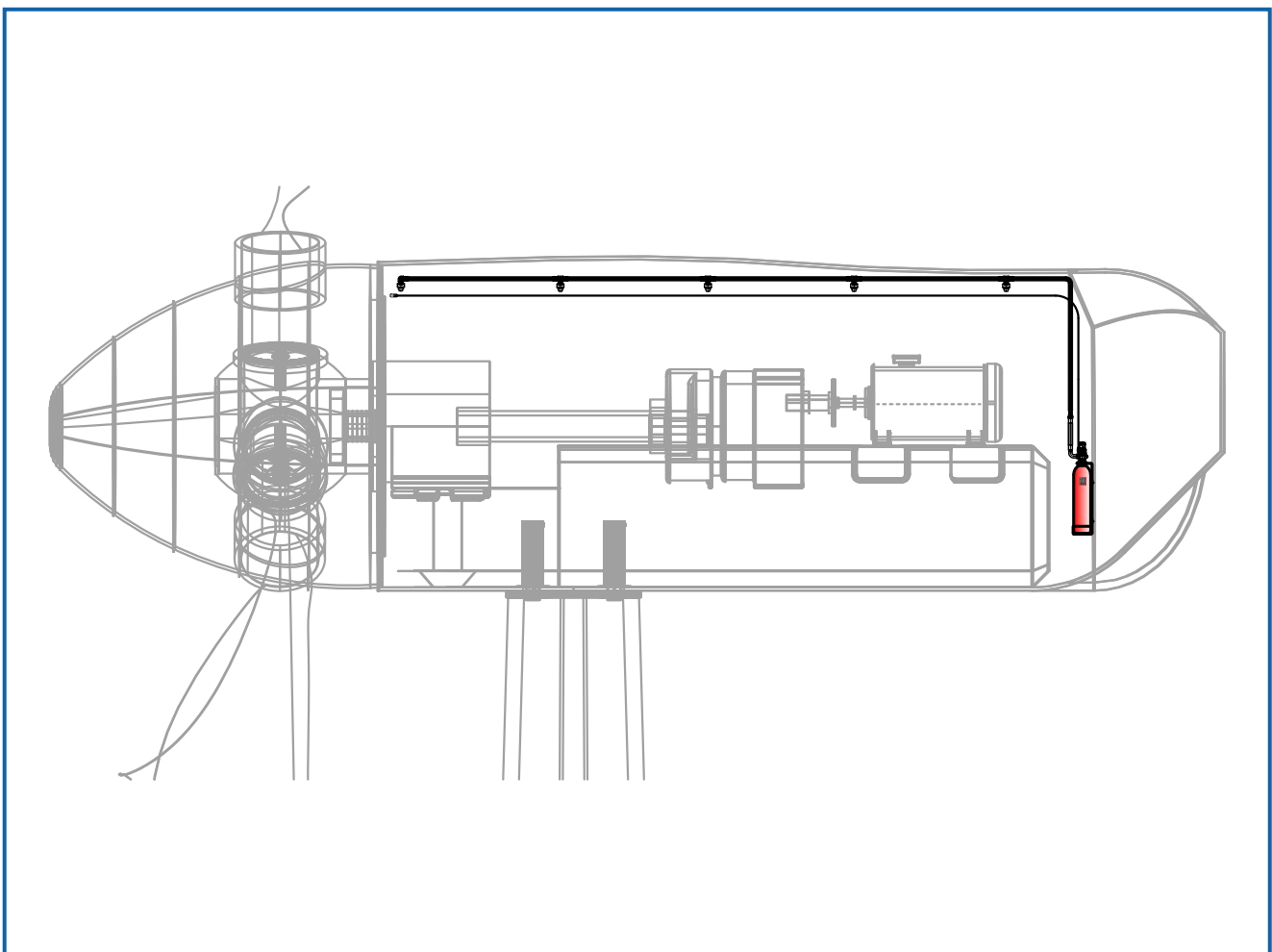


Inadequate Lubrication



## Ceasefire Recommends

System Variants		Agents
In-panel Tube Based Direct System	Low Pressure	Clean Agent Gases
	High Pressure	CO <sub>2</sub>
In-panel Tube Based Indirect System	Low Pressure	Clean Agent Gases
	High Pressure	CO <sub>2</sub>





# FIRE FACTS

## Did You Know?

“ Worldwide, there had been hundreds of fire accidents in wind turbines. Due to highly flammable materials within the nacelle and other factors, fire accounts for a "substantial fraction of accidents" in any year - about 10 to 30%.

- Uadiale et al. (2014)

“ Top causes of accidents in wind turbines - Blade failure (19%) Fire (15%) Structural failure (9.7%)

- CWIF

“ In 90 percent of the cases, the fire leads to substantial downtime or a total loss of the wind turbine.

- Imperial College, London and SP Technical Research Institute, Sweden



# ELECTRICAL PANELS

## The Fire Risk

Short circuit in electrical panels is often the leading cause of fatal fires in buildings. Safeguarding these highly vulnerable risk points mean safeguarding the entire premises. Ceasefire's specialised fire systems are designed considering how dangerous it gets to arrest fires in these electrically charged spaces and how manual firefighting is often never an option when it comes to dousing fire in electrical panels.

## Common Causes Of Fire In Electrical Panels



Electrical Overloads



Over Currents



Wrong Selection of  
Cables



Harmonics



Mismatch of Fittings  
Ratings



Earth Fault



Improper or Poor  
Maintenance



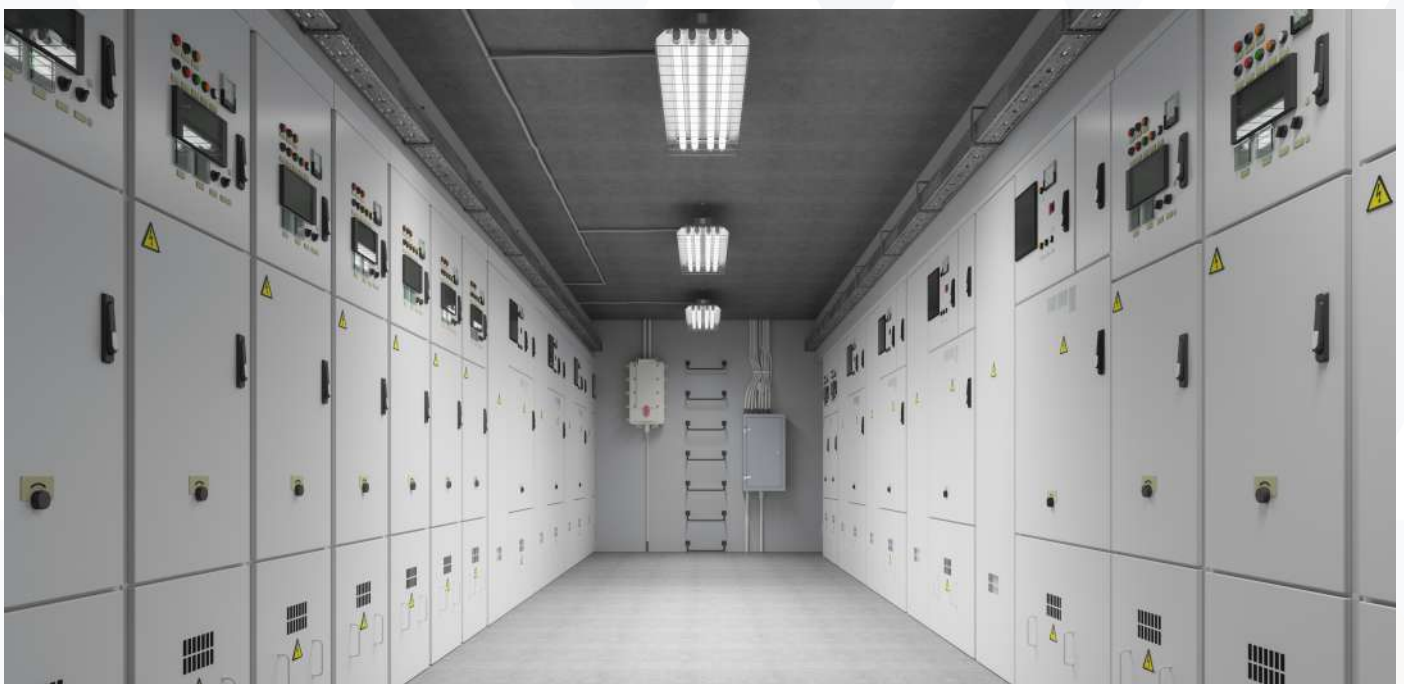
Electric Arcs and Loose  
Connections



Outlived or Damaged  
Equipment

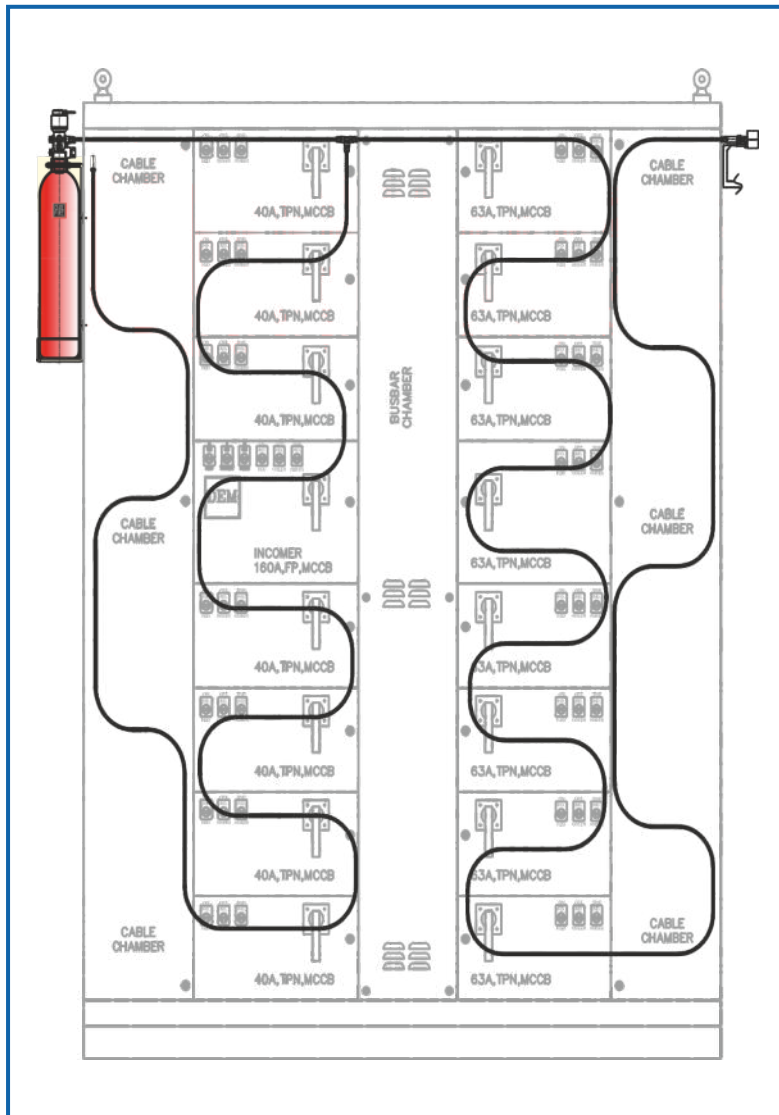


Over Voltages and  
Arcing



## Ceasefire Recommends

System Variants		Agents
<b>In-panel Tube Based Direct System</b> (For electrical panel with multiple compartments)	Low Pressure	Clean Agent Gases
	High Pressure	CO <sub>2</sub>
<b>In-panel Tube Based Indirect System</b> (For electrical panel with limited compartments)	Low Pressure	Clean Agent Gases
	High Pressure	CO <sub>2</sub>
<b>Ceasefire Mini</b>	Adaptive / Intuitive	Clean Agent Gases





# FIRE FACTS

## Did You Know?

“70% of the fire incidents in Mumbai take place due to electrical short circuits. ‘Electrical Safety is non-Negotiable’ in the city.

- Sunil Rathod, Chief Engineer, BMC to Indian Express

“56% of industrial fire breakouts are due to electrical faults in control panels.

- The Hindu

“10,256 electrical panel fires were reported in India in 2021 alone.

- NDMA.

“As per Fire Services Department, between 2015 and 2021, close to 18,000 of 59,000 fire incidents happened because of electrical short circuits in electrical cabinets or junction boxes.

- The Times Of India

# NETWORKING RACKS

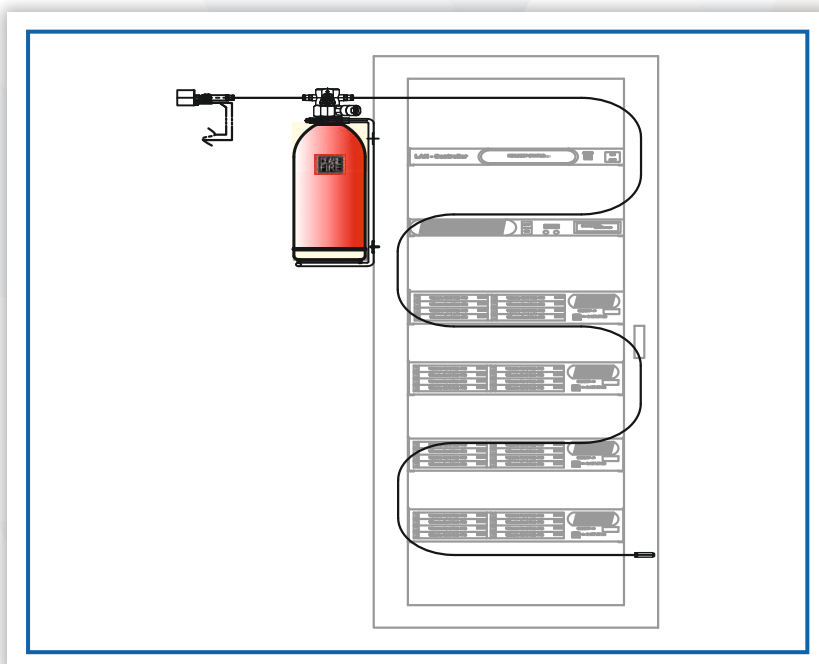
## The Fire Risk

Generally used for the storage of routers, patch panels, switches and a wide variety of networking equipment and networking accessories, networking racks do not generate the same amount of heat as that housed inside a server rack. But poor ventilation, electrical issues, improper installation, or overheating may lead to a fire situation, causing business downtime and loss of data.

This makes it essential to install an In-Panel Tube Based System (CQRS) or Ceasefire Mini in server rooms to detect and suppress fires automatically.

## Ceasefire Recommends

System Variants		Agents
In-panel Tube Based Direct System	Low Pressure	Clean Agent Gases
In-panel Tube Based Indirect System	Low Pressure	
Ceasefire Mini	Adaptive / Intuitive	



*"In 2021, there were over 1,000 data centre fires, with an average cost of \$1 million each. About 20% of these fires were caused by networking racks."*

*- Uptime Institute's 2022 Data Center Industry Trends Report*

# WAVE SOLDER MACHINES

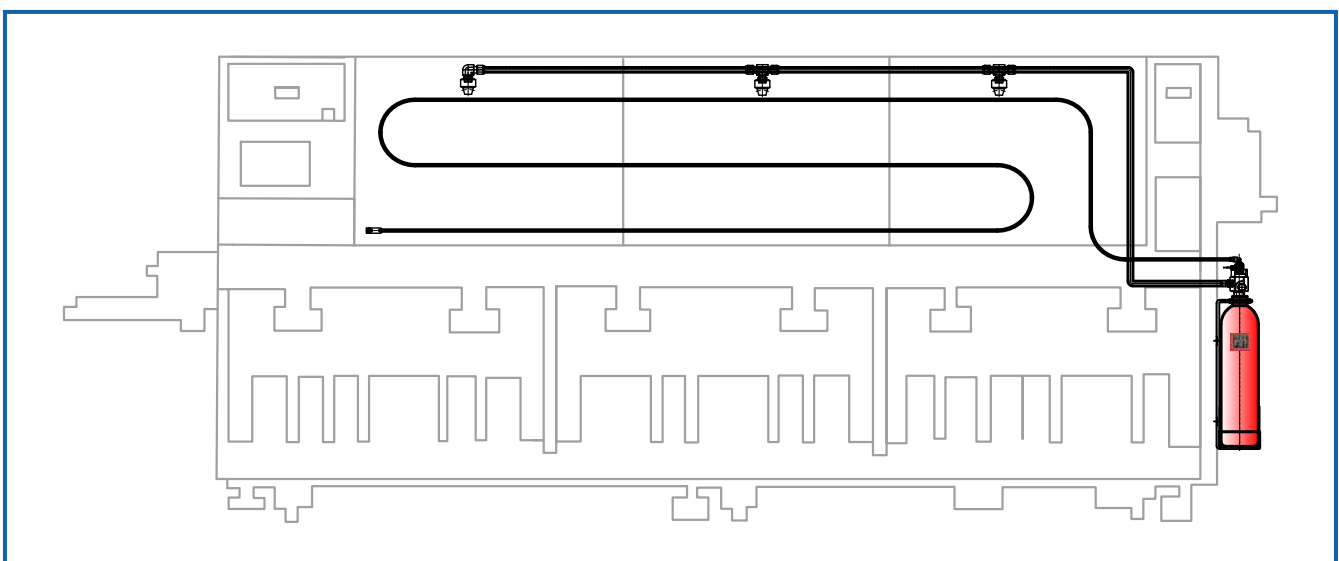
## The Fire Risk

The chance of a fire occurring in a wave solder machine can be relatively high due to the presence of flammable materials such as solder and flux, as well as the high temperatures generated during operation. Wave solder machines utilise molten metal to solder components onto printed circuit boards, which can generate a significant amount of heat and pose a risk of ignition if not properly maintained.

Installing fire prevention measures like an automatic fire suppression system is recommended to ensure fire safety of the machine.

## Ceasefire Recommends

System Variants		Agents
In-panel Tube Based Indirect System	Low Pressure	Clean Agent Gases
	High Pressure	CO <sub>2</sub>



The average cost of a fire on an electronics manufacturing plant in India is ₹10 million. - Indian Express 2022



# SERVER RACKS

## The Fire Risk

At Ceasefire, we understand the critical role that server racks play in storing invaluable business data and facilitating seamless operations within your organisation. However, it's important to acknowledge the inherent risks associated with server racks, particularly when it comes to fire hazards.

One of the key challenges in mitigating these risks is that server rooms often operate without continuous human presence, which means that potential fires could go undetected until it's too late.

## Common Causes Of Fire In Server Racks



Technical Defect



Subflooring Wiring Problems



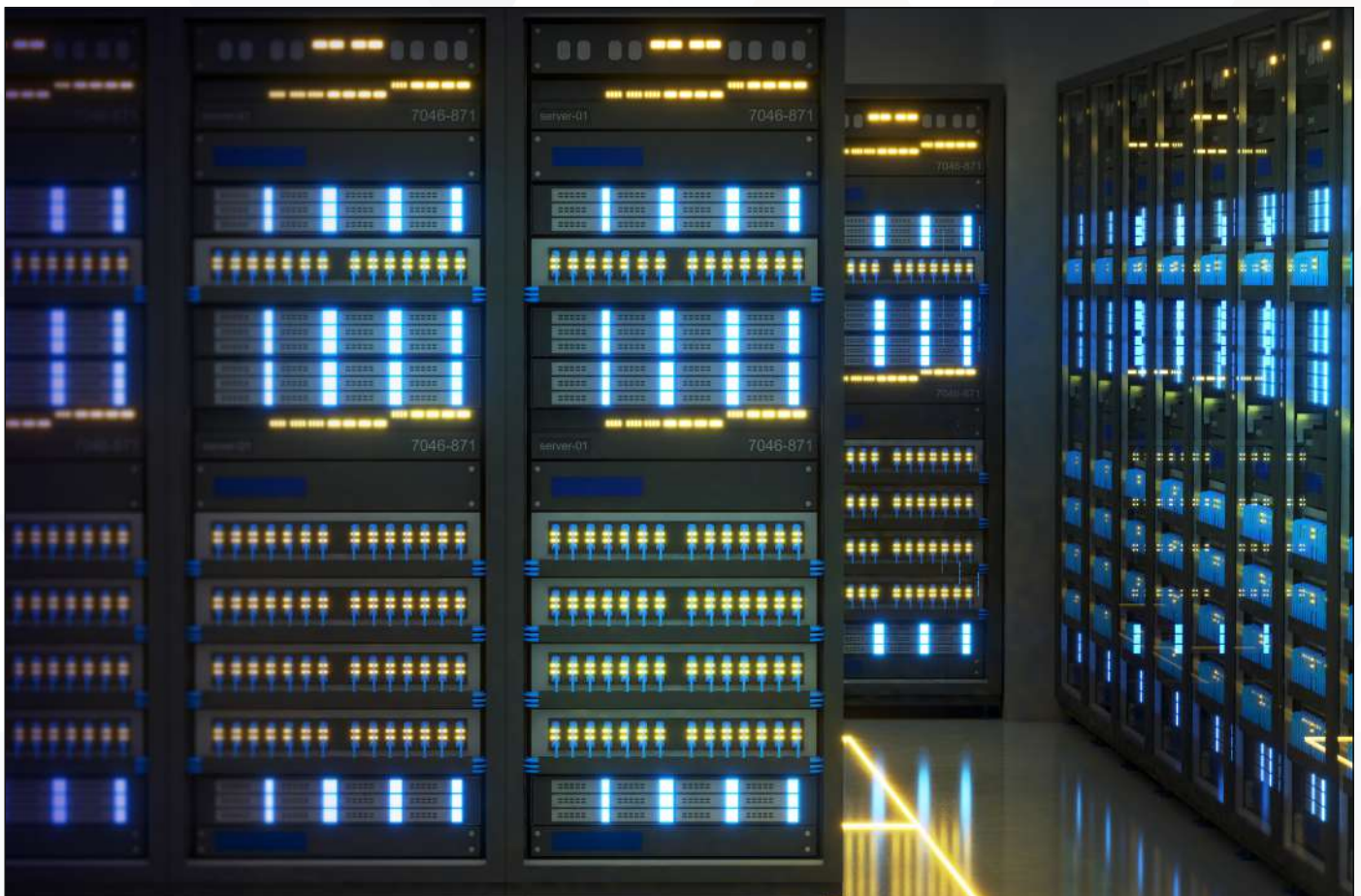
Overheating



Insufficient Cooling of Server Racks

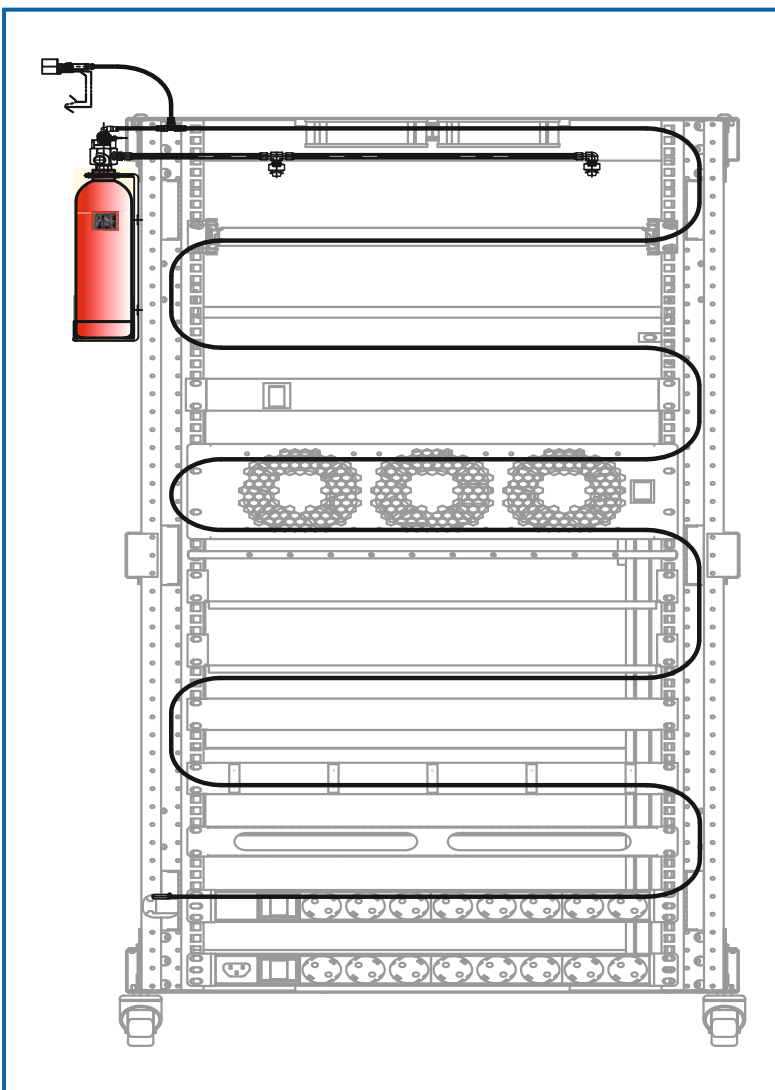


Electrical Equipment Failure



## Ceasefire Recommends

System Variants		Agents	
(For server racks up to 4U)	In-panel Tube Based Direct System	Low Pressure	Clean Agent Gases
		High Pressure	CO <sub>2</sub>
	In-panel Tube Based Indirect System	High Pressure	CO <sub>2</sub>
(For server racks above 4U)	In-panel Tube Based Direct System	High Pressure	CO <sub>2</sub>
	In-panel Tube Based Indirect System	Low Pressure	Clean Agent Gases
		High Pressure	CO <sub>2</sub>
Ceasefire Mini		Adaptive / Intuitive	Clean Agent Gases



# FIRE FACTS

## Did You Know?

“According to one industry statistic, 29 percent of companies that suffer a major fire-related data loss and are not able to resume operations within 10 days are not likely to survive.

“Data loss due to a fire in a data center can be catastrophic, with some estimates putting the cost at \$100,000 per hour.

“According to the National Fire Protection Association (NFPA) there were an average of 1.17 fires per million square feet in data centers in 2020.

“The most common cause of fires in server racks is electrical failure, accounting for about 60% of all fires.

“Server Rack fires account for an average downtime of 17.5 hours due to fire incidents.



# CNC MACHINES

## The Fire Risk

From the exquisite wonders of technology, CNC Machines bring to the fore an effortless way of performing complex day to day operations at manufacturing units. While these highly advanced machines render numerous benefits to the industry, they also possess a significantly high risk of fire.

CNC machines carry out repetitive robotic movements and use flammable oils, lubricants, and other metalworking fluids at high speeds and temperatures, this creates extreme levels of friction and heat that can eventually lead to a flash fire. Since these machines operate in automatic mode, they do not require human intervention 24 hours a day, which makes the situation even more alarming.

## Common Causes Of Fire In CNC Machines



Unmanned Remotely  
Managed Operations



Presence of  
Lubricants



Oil Based Coolants



Specialised Machining  
Metals



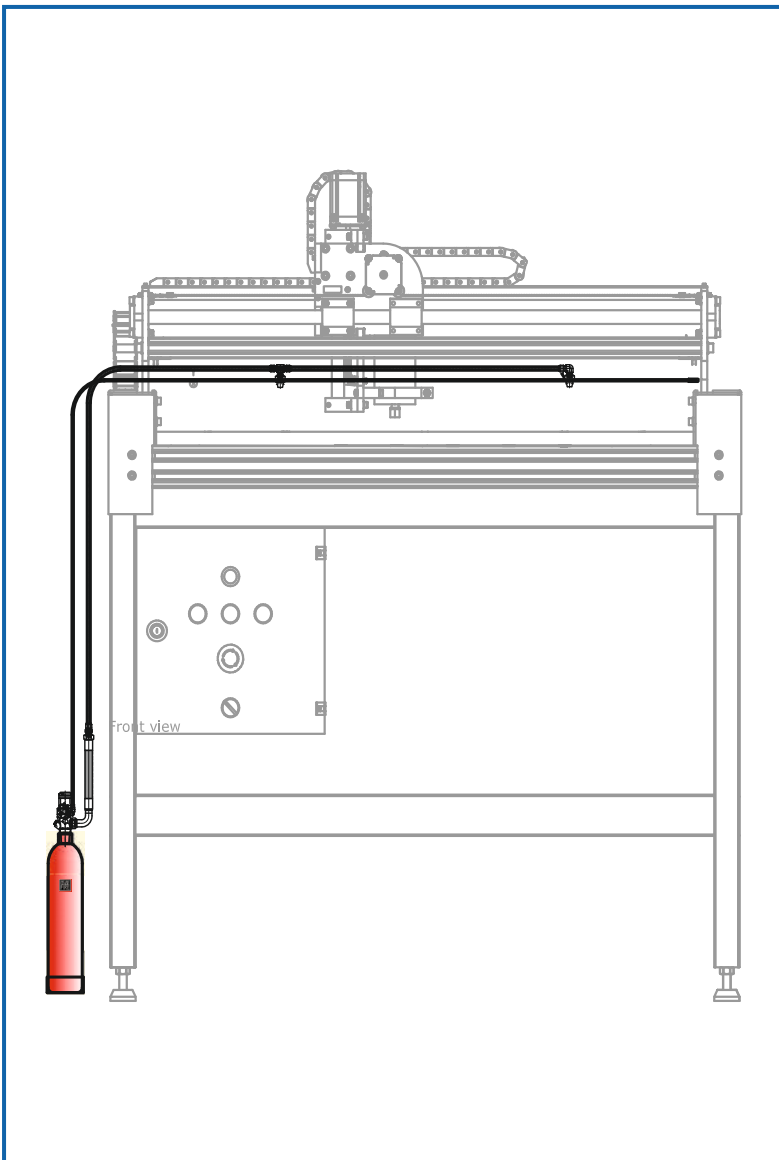
High Speed  
Operations





Ceasefire Recommends

System Variants		Agents
In-panel Tube Based Direct System	Low Pressure	Clean Agent Gases
	Low Pressure	Foam (Fluorine Free)
	High Pressure	CO <sub>2</sub>
In-panel Tube Based Indirect System	Low Pressure	Clean Agent Gases
	Low Pressure	Foam (Fluorine Free)
	High Pressure	CO <sub>2</sub>
Ceasefire Mini	Adaptive / Intuitive	Clean Agent Gases



# FIRE FACTS

## Did You Know?

“ *Mechanical failures are one of the most common causes of fires involving CNC machines, accounting for 25% of all fires.*

- ISO

“ *Bureau of Indian Standards (BIS) specifies that CNC machines must be equipped with fire extinguishing equipment that is suitable for the type of fire that is likely to occur.*

“ *As per BIS, electrical faults are one of the most common causes of fires involving CNC machines, accounting for 40% of all fires.*



# DUST COLLECTION MACHINES

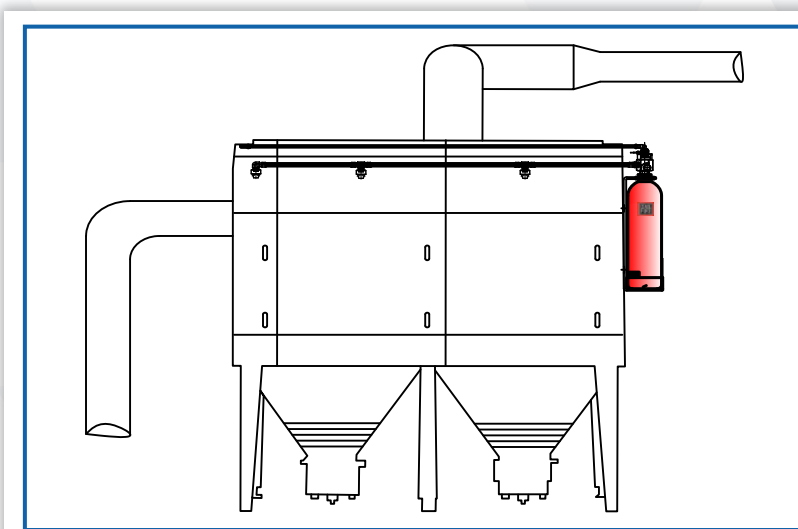
## The Fire Risk

From metalworking and woodworking to food processing, dust collectors constantly pull combustible dust off the floor. This dust, along with the filter material themselves, is a continuous source of fuel for the fire triangle. This means there is a constant source of replenished oxygen circulating through the dust collector. In metal working processes, such as welding, grinding, or cutting, sparks can get swept up into the dust collector and act as fuel to ignite a fire. Friction from processes can build up heat, which could build up enough to reach the flashpoint of the fuel within the collector.

With a Tube based suppression system installed inside the Dust Collector Machine, the system will release a suppression agent at the source of the fire, before you realise a fire has started.

## Ceasefire Recommends

System Variants		Agents
In-panel Tube Based Indirect System	Low Pressure	Foam (Fluorine Free)
	Low Pressure	ABC Powder MAP 90
	High Pressure	CO <sub>2</sub>



*In 2021, there were a total of 500 fire incidents involving dust collection machines in India.*

# INJECTION MOULDING MACHINES

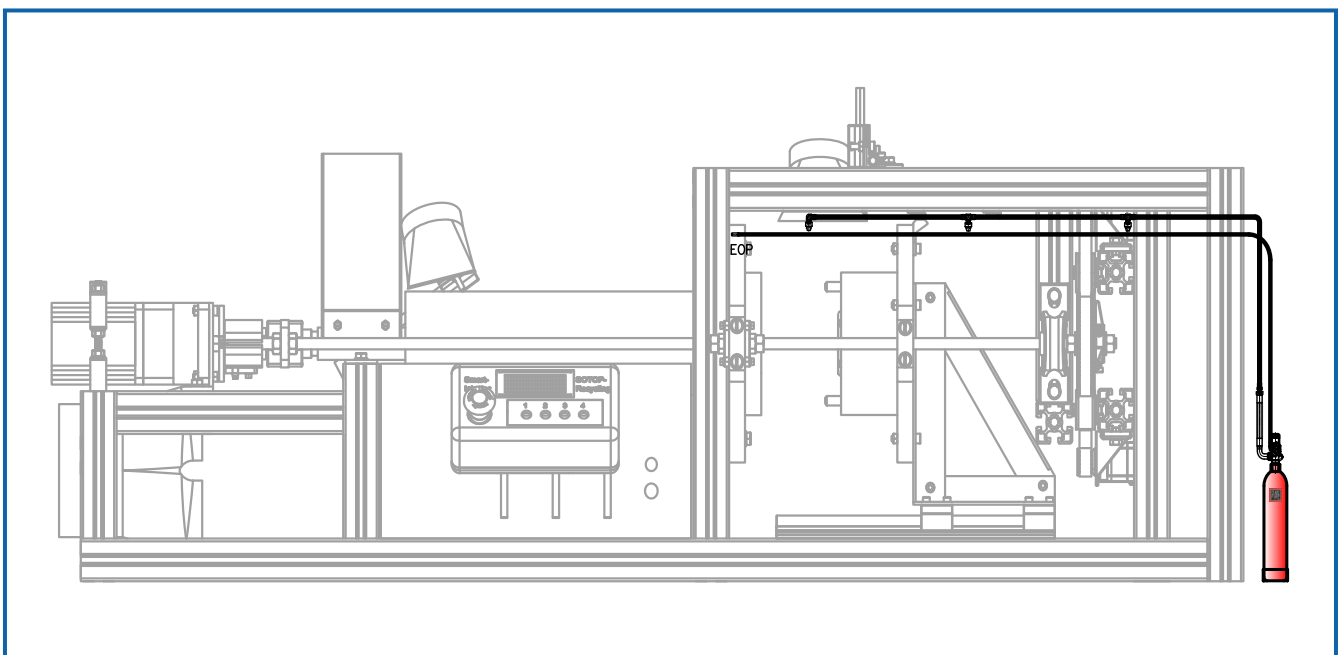
## The Fire Risk

There are many reasons that can ignite a fire in the injection moulding machine including electrical faults, overheating due to blocked ventilation or insufficient cooling, and ignition of residual plastic or other materials inside the machine.

Since these machines are working at high pressure, high speed, and high temperature, it is essential to ensure that the machine is used in a properly ventilated area.

## Ceasefire Recommends

System Variants		Agents
In-panel Tube Based Indirect System	Low Pressure	Foam (Fluorine Free)
	High Pressure	CO <sub>2</sub>



*Overheating is responsible for about 70% of all injection moulding machine fires.*

- NFPA



# HEAVY & LIGHT VEHICLE ENGINES

## The Fire Risk

Vehicle fires are not new to us. We've witnessed them every now & then. While these vehicle engines convert fuel into motion and make our lives & commute easy, they also possess a major threat of catching fire. With the presence of a lot of frictional components, flammable liquids and complex electric wiring, fire is one of the most common hazards in vehicle engines.

With engines being located mostly outside the passenger area, detection of fire becomes even more critical and so does the suppression. A fire prevention system that can automatically detect any signs of fire & mitigate the risk in such small enclosed spaces is what these engines require.

## Common Causes Of Fire In Vehicle Engines



Electrical Malfunction



Engine Failure



Low Engine Oil



Overheating

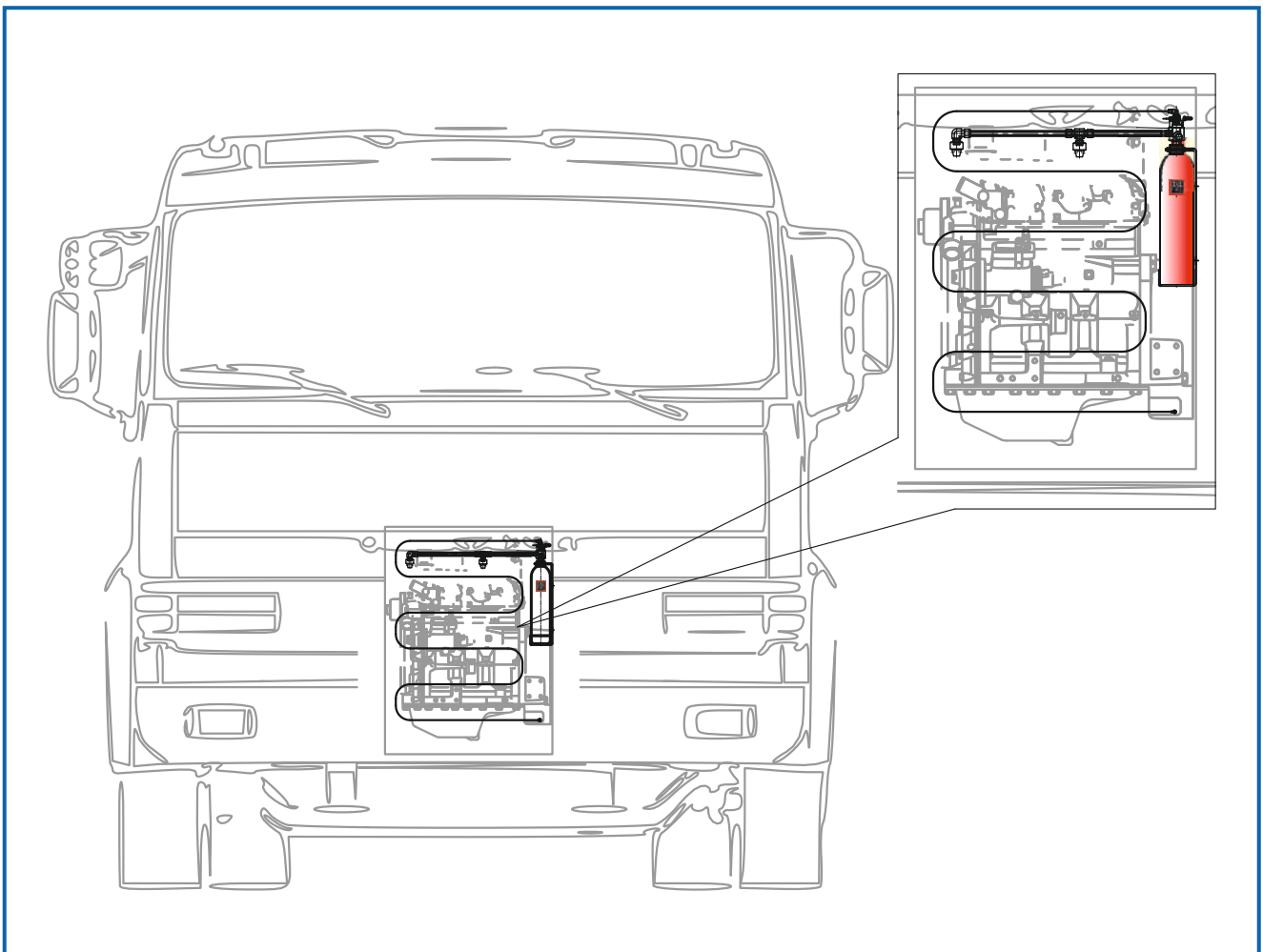


Wear and Tear



**Ceasefire Recommends**

System Variants		Agents
In-panel Tube Based Direct System	Low Pressure	ABC Powder MAP 90
In-panel Tube Based Indirect System	Low Pressure	Foam (Fluorine Free)
	Low Pressure	ABC Powder MAP 90



# FIRE FACTS

## Did You Know?

“An average of 12,000 vehicle fires reported in India each year from 2018 to 2020. Of these, an average of 2,000 fires were caused by engine problems.

- National Crime Records Bureau (NCRB)

“The leading cause of vehicle fires in India is electrical faults, accounting for 39% of all vehicle fires.

NCRB, 2020

“Other major causes of vehicle fires include engine malfunctions (22%), fuel leaks (17%), and overheating (12%).

- NCRB, 2020

“NFPA data indicates that the fire service responds to a vehicle fire every 2½ minutes.

“In 2020, there were 1,042 deaths and 1,366 injuries caused by vehicle fires.

- NCRB



# GENSETS

## The Fire Risk

Generators convert mechanical or chemical energy into electricity by capturing the power of motion. With high speed moving engine parts combined with fuel, alternators, wiring and exhaust system there is an ever-present risk of overheating leading to fires. The very design of the canopy of these modern-day generators makes detection of fire an even bigger challenge as the canopy completely keeps the generator enclosed and away from our visual sight.

This is the reason generators need an exclusive fire suppression system that is one, automatic in nature and two, is designed exclusively to address the unique risk of generator fires.

## Common Causes Of Fire In Gensets



Technical Defect



Operator Error



Short circuit in  
electrical wirings



Machine  
Malfunctioning



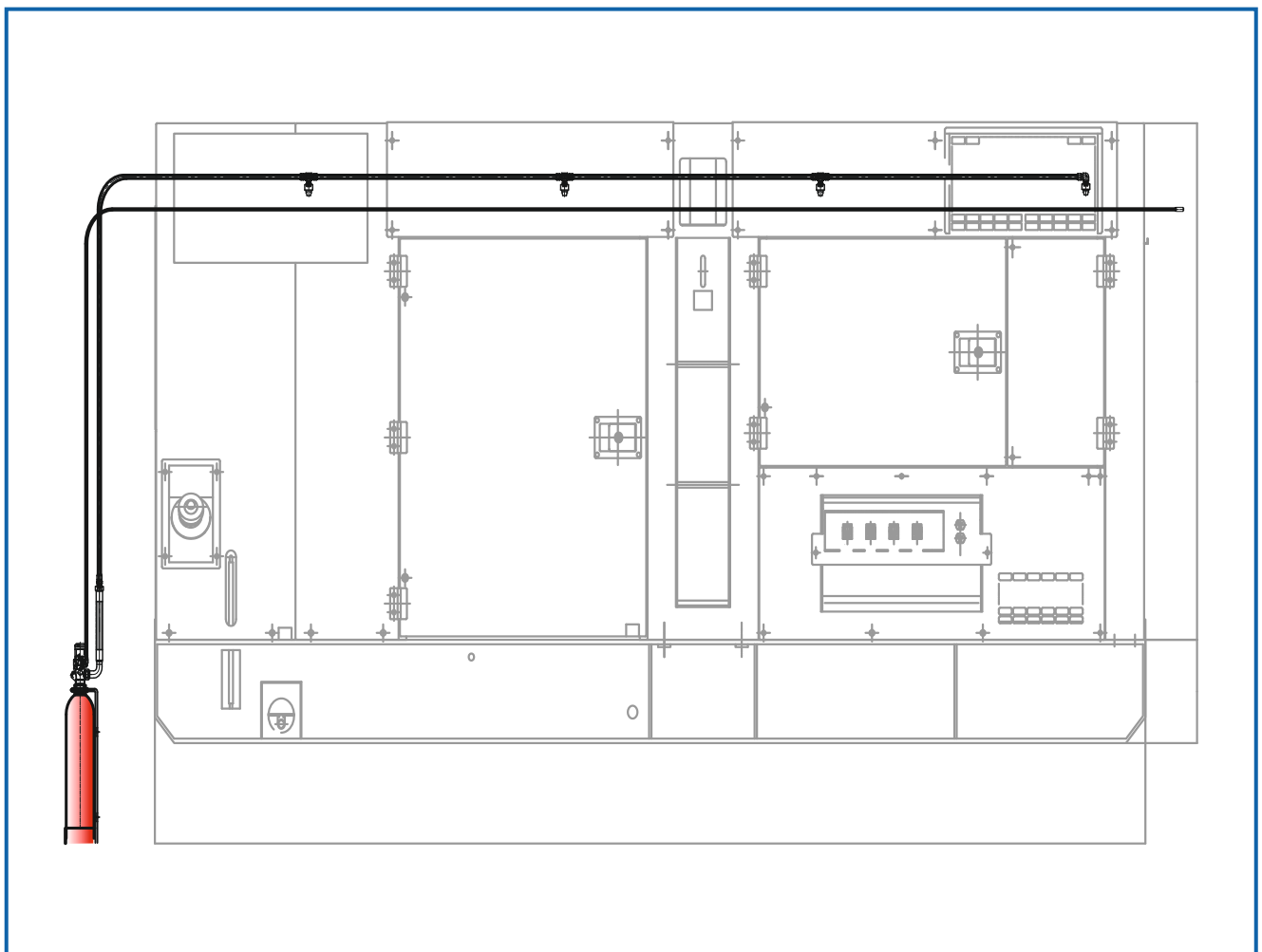
Overheating due to  
broken components





Ceasefire Recommends

System Variants		Agents
In-panel Tube Based Direct System	Low Pressure	ABC Powder MAP 90
In-panel Tube Based Indirect System	Low Pressure	Foam (Fluorine Free)
	Low Pressure	ABC Powder MAP 90
	Low Pressure	Clean Agent Gases
	High Pressure	CO <sub>2</sub>



# FIRE FACTS

## Did You Know?

“10,000 generator fires were reported in India in 2021, resulting in over 1,000 deaths and 2,000 injuries.

- *The Times of India*

“The State Fire Service Acts include provisions for the licensing of generators and the inspection of generator installations.

“Overloading is the most common cause of generator fires.

“Two generators rented for the occasion is known to be the leading cause of Dabwali Fire Tragedy, in Rajiv Marriage Place, Dabwali in Haryana in December 1995 here close to 446 people lost their lives and over 200 were injured.

- *Fires in India, NIDM, Ministry of Home Affairs, India 2020*



# FUME CABINETS

## The Fire Risk

Fume cabinets play a crucial role in the functioning of laboratories, shielding researchers from unsafe fumes and risky substances. While their main purpose is to provide a shield against harmful elements, they paradoxically possess a susceptibility to catching fire.

The primary factor is the accumulation of flammable chemicals and vapours within them. When subjected to heat, sparks, or other ignition sources, these concentrations can swiftly combust, resulting in a fire outbreak. Moreover, fires that initiate externally to the cabinet, perhaps due to a nearby chemical spill or explosion, can also contribute to fires in fume cabinets.

## Common Causes Of Fire In Fume Cabinets



Chemical Spills and Leaks



Electrical Malfunctions



Overloading Cabinets



Accumulation of Flammable Substances

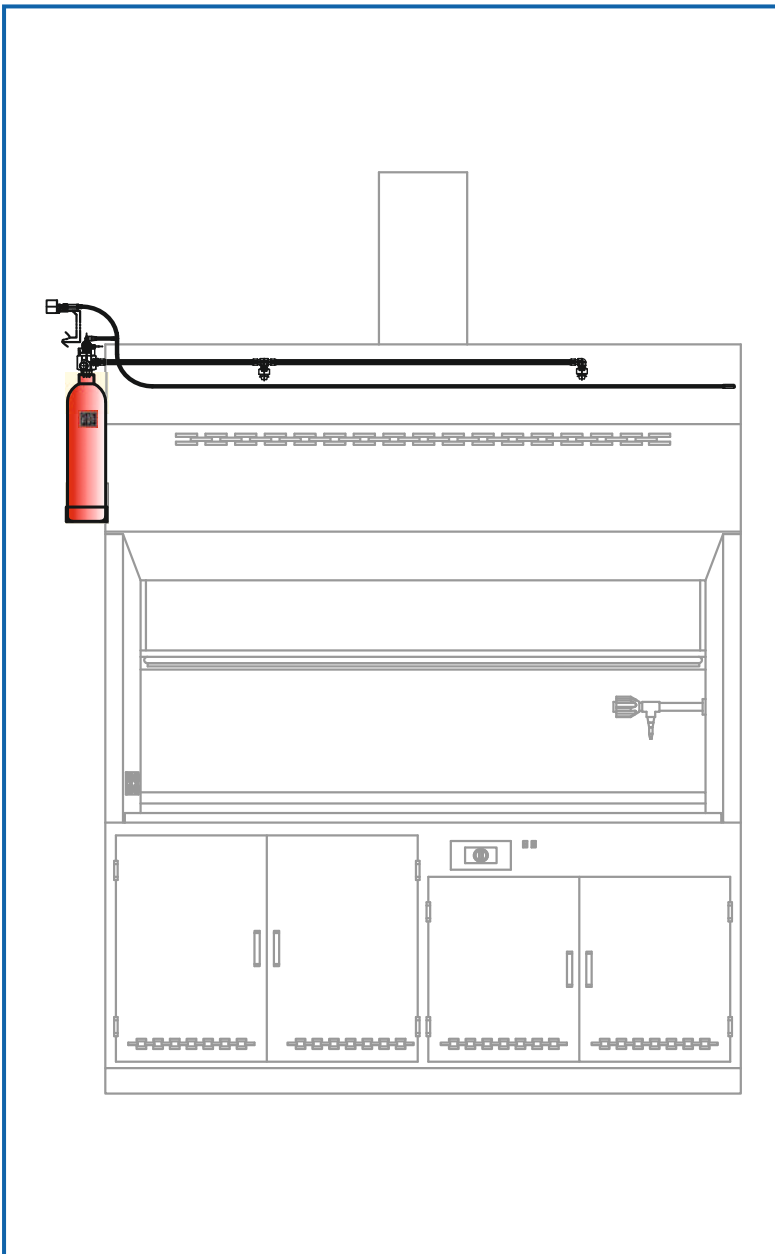


Blocked Airflow



## Ceasefire Recommends

System Variants		Agents
In-panel Tube Based Direct System	Low Pressure	ABC Powder MAP 90
In-panel Tube Based Indirect System	Low Pressure	Clean Agent Gases
	High Pressure	CO <sub>2</sub>





# FIRE FACTS

## Did You Know?

“Over 1,200 fire incidents involving fume cabinets were reported in India in the year 2021 alone causing an estimated INR 100 million in damage.

- International Association Of Fire Chiefs (IAFC)

“According to the National Fire Protection Association (NFPA), there are an average of 1.2 fires per million hours of use in fume cabinets.

“Data losses in storage devices used in the laboratories due to fires in a fume cabinet can be significant, with some estimates putting the cost at \$1,000 per hour.

- International Association Of Fire Chiefs (IAFC)



# TRANSFORMERS

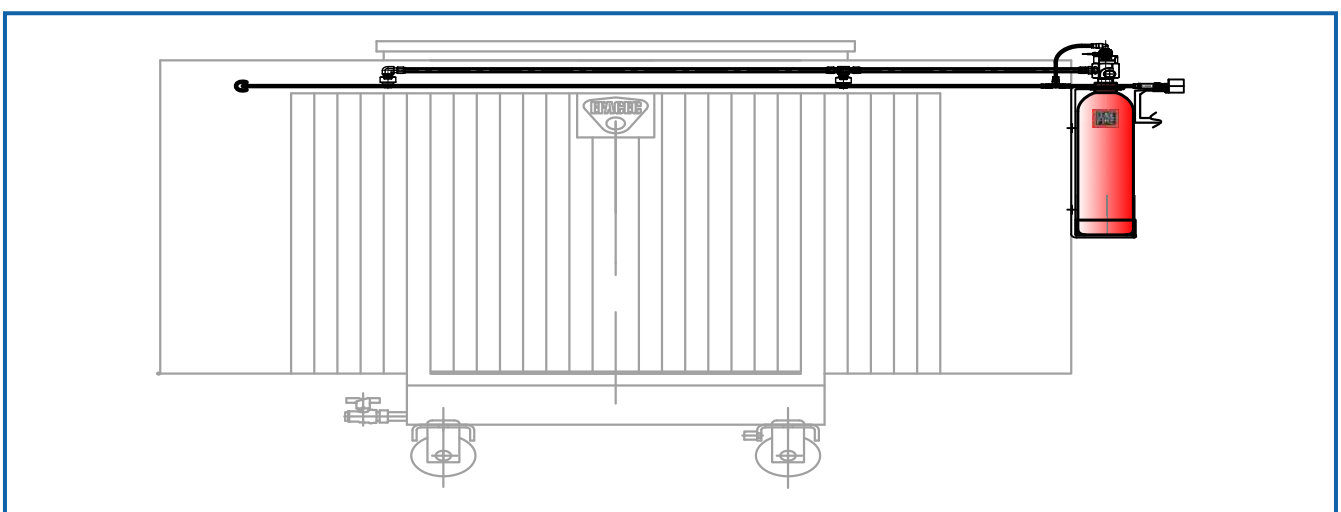
## The Fire Risk

Transformers are electrical devices that are designed to transfer energy from one circuit to another through electromagnetic induction. However, they generate heat during operation, which can cause insulation materials to degrade over time, leading to a breakdown of the transformer and the possibility of fire. They are also vulnerable to external factors such as lightning strikes, power surges, and overloading, which can increase the risk of fire.

Environmental conditions, such as high temperatures, moisture, and corrosive substances, can also affect transformer performance and increase the likelihood of fire.

## Ceasefire Recommends

System Variants		Agents
In-panel Tube Based Direct System	Low Pressure	ABC Powder MAP 90
In-panel Tube Based Indirect System	Low Pressure	Clean Agent Gases
	High Pressure	CO <sub>2</sub>



*In 2021, there were a total of 12,000 fire incidents involving transformers in India.*

*- Central Electricity Authority (CEA)*

# MOTOR BOATS

## The Fire Risk

Boats have several potential ignition sources that can increase the risk of fire, including engines, fuel systems, electrical systems, and cooking equipment. Older boats may be more prone to electrical issues, which can lead to fires, while boats with gasoline-powered engines may be more susceptible to fuel leaks and fires.

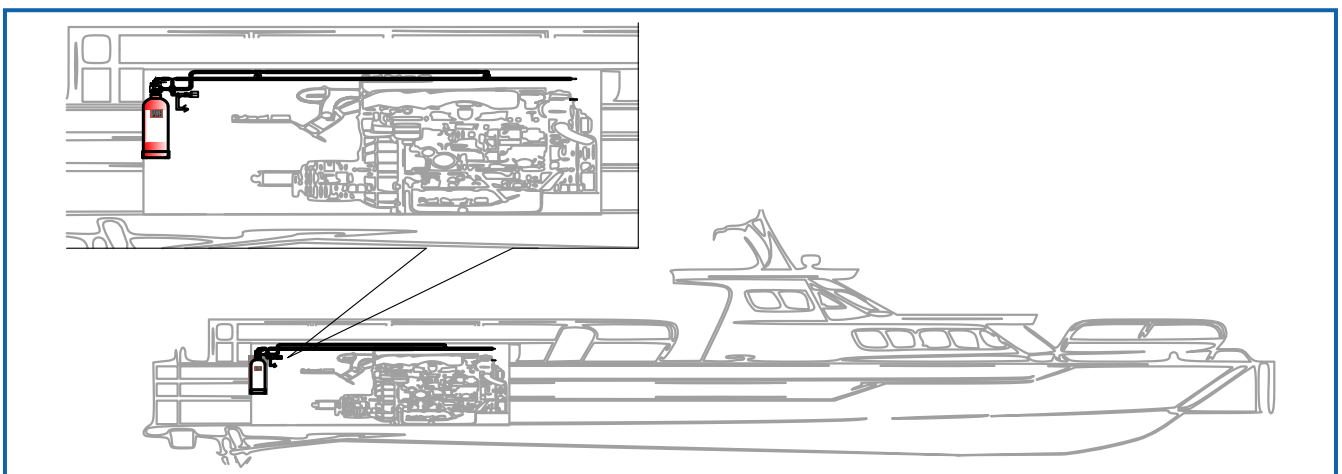
## Ceasefire Recommends

System Variants		Agents
In-panel Tube Based Direct System	Low Pressure	ABC Powder MAP 90
In-panel Tube Based Indirect System	Low Pressure	Foam (Fluorine Free)
	Low Pressure	ABC Powder MAP 90
	Low Pressure	Clean Agent Gases



*The average cost of a fire on a commercial vessel is \$1.5 million.*

*- National Fire Protection Association (NFPA) Report 2020*



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