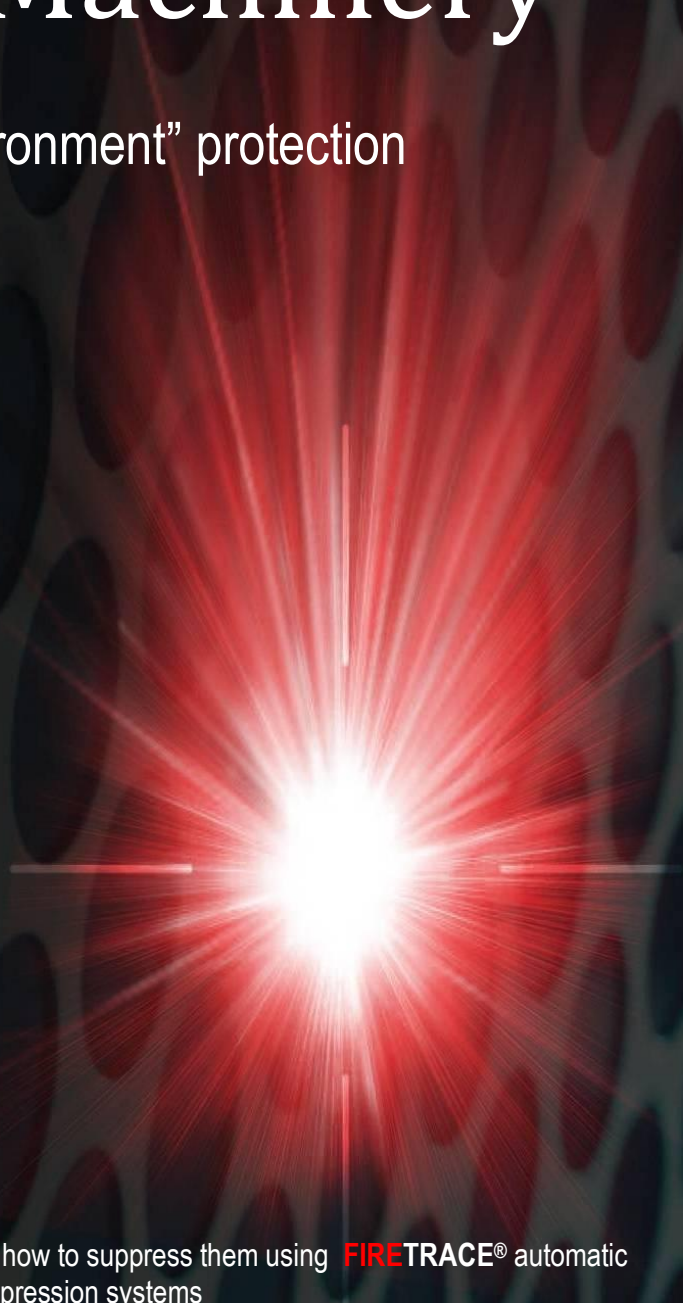




Fire Protection for Heavy Machinery

“Micro environment” protection



Details on fires in Heavy machinery and how to suppress them using **FIRETRACE**® automatic suppression systems

Background Information

Engine Fires are a relatively common and potentially devastating occurrence in the world today, with many fires occurring every day across the globe. Without protection, a vehicle can be completely destroyed by the uncontrolled growth of a small fire in a very short space of time.



Reports by relevant bodies such as the NFPA in the USA, or the Department for Transport in the UK demonstrate that the majority of these fires are non-collision related and are most likely to start in the engine compartment. The most common cause of engine fires is due to electrical faults which arc electricity and ignite combustible material around it, the other cause is due to leaked fluids igniting on hot surfaces. **FIRETRACE®** can offer a system to target both.

FIRETRACE® Systems have been installed in a variety of heavy machinery around the world, protecting not only engine spaces, but also electrical generators, AHU's, cable runs and other similar high-risk areas. By detecting and extinguishing the fire at source, rapidly and before any growth of the fire is experienced, **FIRETRACE®** provides effective fire protection when needed and ensures peace of mind for operators, manufacturers and can help prevent any loss of life and reduce the downtime of a machine after a fire.

FIRETRACE® Indirect low pressure systems are also fully tested and approved by Factory mutual (FM) for use with ABC dry chemical powder.

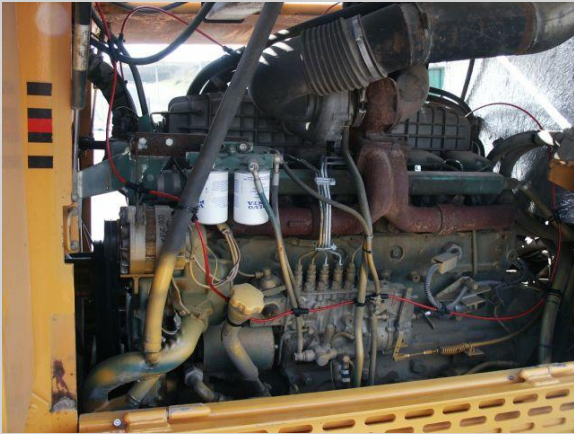


Figure 1: Volvo Dumper truck

Firetrace has been installed in thousands of engines all around the world using our patented Firetrace detection tubing.

Systems require no external power to operate, and very little maintenance

System only activates in the event of a fire, no false alarms

Firetrace systems can be fitted in a matter of hours

Easy to retrofit old vehicles and new builds

Pressure gauges allow for quick and easy checks on the system to make sure they are always operational



Figure 2: container loader

Quick acting so only minimal damage is done to equipment

System can be quickly replaced after a fire has taken place

Minimal loss of production

System Choice

The **FIRETRACE**[®] System recommended for use on heavy machinery is the indirect low pressure system. It consists of a small, pressurized container using ABC Dry Chemical as the extinguishing medium this is connected to a length of Firetrace Detection Tube (FDT) that is appropriately routed all around the engine bay to provide linear, pneumatic detection in a 360 degree environment. Nozzles are placed strategically to deliver the agent directly as needed and knock down the fire quickly.

In the event of a fire, or high temperature rise, the FDT will burst and release the pressure above a piston in the valve. This activates the piston and allows agent to discharge Dry Chemical agent through pre positioned nozzles and discharge pipes. The agent quickly fills the engine bay area and leaves a residue which absorbs flammable liquids and helps avoid re-ignition. The agent is non-toxic, suitable for use on electrical fires and those involving liquid fuels and operate at a low pressure of around 13.4 bar (195psi)

The system is also fitted with a pressure switch that constantly monitors the contents of the container and can be used to sound an alarm in the driver area of the vehicle, in the event of a system discharge following a fire.

Firetrace Detection Tubing is ideal for fire detection in vehicles as it tolerates the vibration, dirt, temperature extremes of the environments in which heavy equipment operate. Also, being pneumatically operated, they require no power from the vehicle to operate and do not place additional strain on the vehicle's electrical system.

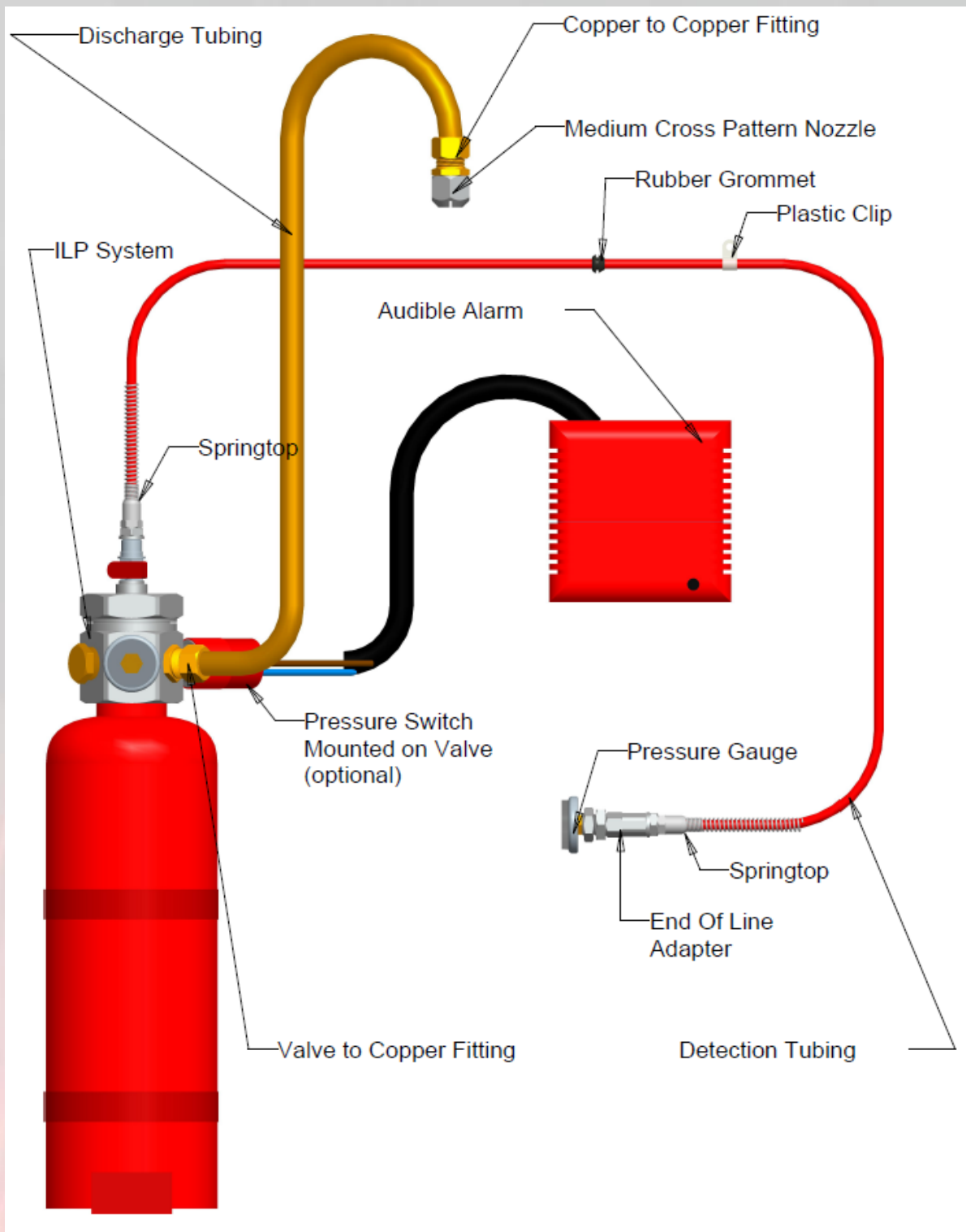
Following a discharge, simple cleaning is required to remove the powder from the surfaces within the engine bay. This is also the case with any water-based system, as they have anti-freeze added to the water for use in cold temperatures, which is corrosive. The particles of powder are too large to penetrate engine air filters and thus only the external engine surfaces will need to be cleaned. ABC Powder can be cleaned up by one of the following methods; wiping, vacuuming, or washing the exposed areas. In some cases the powder will have to be scraped off a surface, if that surface was hot at the time of discharge.

The Department for Transport in the UK recommends Dry Chemical Powder as the most effective extinguishing medium for engine bay fires.

Report S111D/VE states

"...Water based systems work well in the passenger compartment but are not as effective as powder systems in extinguishing engine fires. Automatic systems were found to be ideal for engine compartments but were not suitable for the passenger compartment because there is no control over the extent and direction of the spray. Conversely, manual systems were judged to be effective only if the operating staff were trained in their use."

Typical Indirect Low Pressure System



FIRETRACE® Detection Tubing (FDT)

At the heart of all FIRETRACE® systems is the Firetrace Detection Tubing, or FDT. This flexible, pneumatic tubing is the primary fire detection and unit activation method used in all FIRETRACE® Automatic Suppression Systems. It is flexible enough to be used in the most difficult installations, yet durable enough to withstand harsh conditions and continue to perform as intended.



Firetrace Detection Tubing

The FDT is a linear, pneumatic, fire detection device that responds to a combination of heat and radiant energy generated by a fire. When exposed to these conditions, the properties of the FDT in this localized area change. The material becomes softer and weaker than the surrounding areas. In this weakened state, the gas contained inside of the FDT is able to burst through, releasing the pressure in the entire length of FDT. This rupture and depressurization of the FDT is what activates the rest of the system, which discharges the fire suppression agent.



FDT after Detection

The FM Approved Firetrace Detection Tubing (FDT) is a linear, pneumatic, fire detection device that responds to a combination of the heat and radiant energy from a fire. The FDT is non-porous, so it can contain internal pressure for an extended time. The FDT is also resilient to most common chemicals or substances. The FDT is made of an inert, non-conductive blend of proprietary resins, and then extruded using a special process to ensure that the tubing is non-porous. This unique blend of materials gives the FDT the following attributes:

- Excellent Physical Durability and Flexibility
- High Pressure Performance
- Wide Temperature Range
- Good Chemical Resistance*
- Excellent UV Resistance

*Tests on chemical resistivity performed by Oxford University

System Specification

Dry Chemical Extinguishing Agent

The dry chemical extinguishing agent used in the **FIRETRACE**[®] dry chemical pre-engineered automatic fire suppression units shall be Mono Ammonium Phosphate (NH₄H₂PO₄) also known as ABC or multi-purpose powder.

ABC Powder is included in NFPA-17 and has been evaluated and approved for use in occupied areas, provided the proper safety precautions have been taken.

Dry Chemical is a finely divided powder that has been treated to be water repellent and capable of being fluidized and free flowing so that it can be discharged through hoses and piping under the influence of an expellant gas. When discharged, dry chemical will drift through the air and settle on surrounding surfaces.

Chemical Name: Mono Ammonium Phosphate

Vapor Density	N/A
Specific Gravity	Approximately 0.85
Solubility in Water	Not Soluble
Vapor Pressure	N/A
Melting Point	N/A
Boiling Point	N/A
PH (10% Solution)	Approximately 4-5
Flash Point	N/A
Auto Ignition Temperature	N/A
Appearance and Color	finely divided, yellowish powder

Cylinder and Mounting Bracket

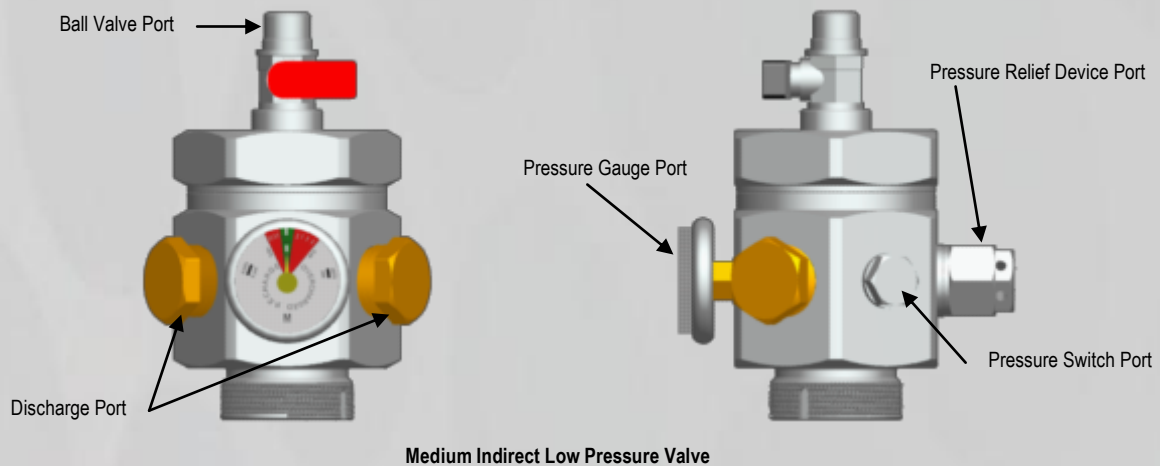
The ABC Dry Chemical Powder uses D.O.T marked cylinders made from steel and is super pressurised with dry nitrogen to 13.4bar/195psi. Each cylinder is finished in red and painted to resist corrosion.

A wall mounted painted steel bracket is used to mount the cylinder/valve assembly in a vertical (upright) position. Each bracket is equipped with two (2) integral quick-clamp straps.

Valve Assembly

Each cylinder is equipped with a nickel plated brass valve, a pressure gauge to monitor cylinder pressure, and a quarter turn ball valve that interfaces with the Firetrace detector tubing. The ball valve must be kept closed at all times when the cylinder is not in service.

In addition, all cylinder valves are equipped with a pressure relief (rupture disc) device in compliance with safety requirements.



Manual Release

All indirect systems come equipped with a manual release device which can be mounted in the drivers cab or placed at a safe distance from the engine bay. This will allow the system to be activated manually in the event of an emergency



Pressure switch

A pressure switch is provided to monitor system pressure, system actuation and/or to energize or de-energize electrically operated equipment. This unit can be connected at the end of the line of the **FIRETRACE**® detector tubing, or on the container valve assembly to provide additional electrical functions as may be required. **FIRETRACE**® recommends that all systems use a pressure switch coupled with some device to alert personnel in the event of a system discharge.

Typical systems

Engine bays



Figure 3: material handler

To protect the main engine bay Firetrace currently recommends the use of either 10 or 20lbs of ABC dry chemical powder to properly suppress a fire within an engine bay depending on the volume and airflow, this powder is extremely effective and considerations have been made regarding losses due to large fans or open bottomed engine bays. 2 Nozzles will be placed throughout the engine to totally flood the space and an alarm sounder is activated by a low pressure switch so inform the driver of the fire.

A typical systems is below

10lb indirect low pressure system

Quantity	Part No.	Description
1	895133	1 x L10lb ABC Dry Chemical powder - Indirect Low Pressure System D.O.T
1	854602	2 Nozzles- Discharge Kit inc Pipe/Fittings/Nozzle(s)
1	821615	1 x 15 meters 4/6 Firetrace Detection Tube Kit (FT Tube + Fittings)
1	600090	1 x Lithium Battery Operated Alarm Sounder w Flashing LED
5	843568	Kopex flexible conduit mtr - Tube Protection

20lb indirect low pressure system

Quantity	Part No.	Description
1	895037	1 x XL 20lb ABC Dry Chemical powder - Indirect Low Pressure System D.O.T
1	854602	2 Nozzles- Discharge Kit inc Pipe/Fittings/Nozzle(s)
1	821615	1 x 15 meters 4/6 Firetrace Detection Tube Kit (FT Tube + Fittings)
1	600090	1 x Lithium Battery Operated Alarm Sounder w Flashing LED
5	843568	Kopex flexible conduit mtr - Tube Protection

Note: these system scan also be used to protect the fuel tanks either separately or simultaneously if required

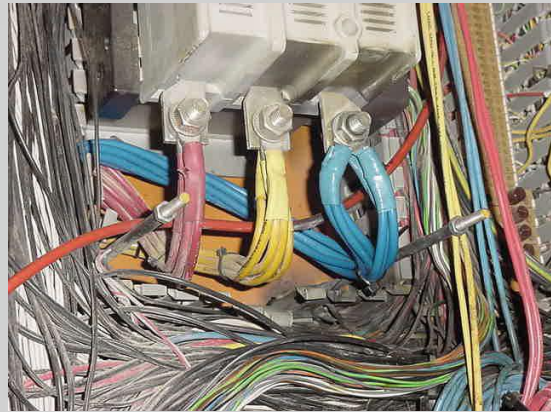
Electrical panels, fuse box, drivers dash

Firetrace Systems have been installed on thousands of electrical control cabinets all over the world, from pumping stations in Qatar to Airport Control Cabinets in Delhi. Whether they are high or low-voltage, Firetrace Systems are ideal for the early detection and protection against fire in these environments, being automatic, clean and safe for use on electrical equipment and with a choice of system sizes available, able to protect many different types of application.

The Firetrace Systems used on electrical control cabinets consist of a small, pressurized container using either FM200 or 3M™ Novec™ 1230 as the extinguishing medium. This is connected to a length of Firetrace Detection Tube (FDT) that is appropriately routed all around the compartment(s) to provide linear, pneumatic detection in a 360 degree environment.

In the event of a fire, or high temperature rise, the FDT will burst and discharge the extinguishing agent directly on to the fire at its source, rapidly knocking down any fire.

The agent quickly fills the compartment, rapidly knocking down the flame and suppressing the fire within a matter of seconds. Suppression is by means of cooling, with some chemical reaction with the flame and both types of agent are clean, non-toxic and confirmed as suitable for use on electrical fires.



Unlike some other technologies there is no delay in the build-up of an extinguishing concentration or a delay caused because the extinguishing gas must find a way into the cabinet and to the source of the fire from the outside. Firetrace systems localise the fire and prevent fire damage to the cabinet components.

Systems that discharge through pipe work and nozzles have the difficulty in delivering the extinguishing agent rapidly onto the fire source. Electrical Cabinet manufacturers are hesitant about maintaining warranty and type test certificates on Electrical / Machinery Control Columns that might be installed with electrically conductive (metal) pipe work.

Firetrace Detection Tubing is ideal for fire detection in electrical control cabinets, as it is treated just like another cable. It is electrically non conductive, flexible, easy to install and will not affect any rating of the cabinets and their compartments. It is also suitable for use in all environments, be they clean or dusty and is not affected by high air-flow or low temperatures.

Following a system discharge, no clean-up of the agent is required, as they are clean, non-toxic gases when discharged in a fire situation.

Should you be unlucky enough to experience a fire in your equipment, you'll find you can be operational in only a short space of time. By only having to maybe repair a small part of your unit and with the simple re-charging or replacement of your Firetrace system, you can be up and running, with full protection in no time, ensuring any business interruption is kept to a minimum.

System Specifications

3M™ Novec™ 1230 Extinguishing Agent

One choice of extinguishing agent used in **FIRETRACE**® pre-engineered automatic direct fire suppression units for electrical enclosures is Dodecafluoro-2-methylpentan-3-one, more commonly known as 3M™ Novec™ 1230.

3M™ Novec™ 1230 (1,1,1,2,2,4,5,5,5-NONAFLUORO-4-(TRIFLUOROMETHYL)-3-PENTANONE) is a colourless low odour fluid, low in toxicity, electrically non-conductive, leaves no residue, and is an extremely effective fire suppression agent.

3M™ Novec™ 1230 is included in NFPA-2001, under the generic name FK-5-1-12, and has been evaluated and approved for use in occupied areas as a Total Flooding agent.

3M™ Novec™ 1230 is clean and leaves no residue, thereby minimizing after fire clean up along with keeping expensive downtime to a minimum. Most materials such as steel, aluminium, stainless steel, brass, as well as plastics, rubber and electronic components are not affected by exposure to 3M™ Novec™ 1230. This agent is also environmentally friendly, having ozone depletion potential (ODP) of 0.00 and an atmospheric lifetime of 5 days (the closest halocarbon alternative is 33 years).

For hazard information, decomposition information, and physical properties of 3M™ Novec™ 1230 please refer to the Material Safety Data sheet located in the System Manual, or contact Firetrace International Ltd.

HFC-227ea Extinguishing Agent

An alternative extinguishing agent used in **FIRETRACE**® pre-engineered automatic direct fire suppression units for electrical enclosures is Heptafluoropropane, more commonly known as HFC-227ea, or FM200. HFC-227ea (1,1,1,2,3,3,3-heptafluoropropane, $\text{CF}_3\text{CHFCF}_3$) is a colourless odourless gas, low in toxicity, electrically non-conductive, leaves no residue, and is an extremely effective fire suppression agent.

HFC-227ea is included in NFPA-2001 and has been evaluated and approved for use in occupied areas as a Total Flooding agent.

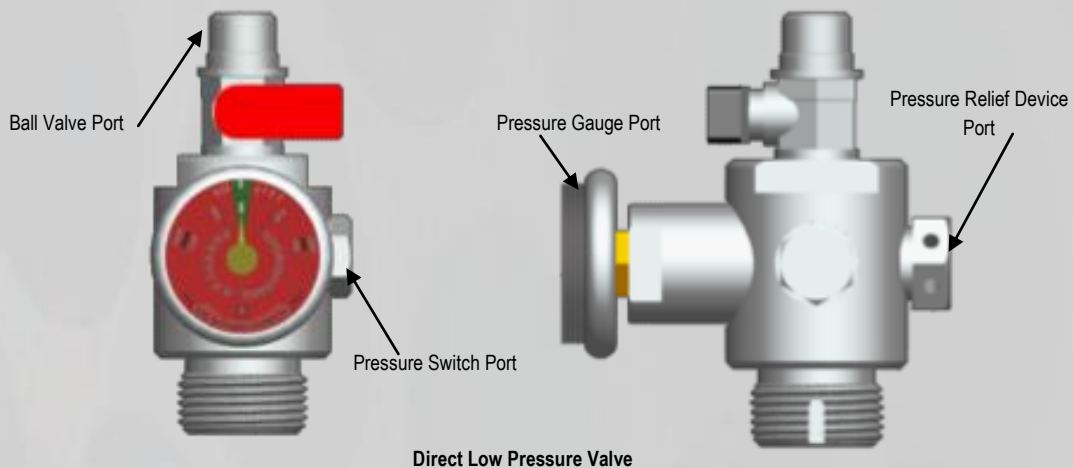
HFC-227ea is clean and leaves no residue, thereby minimizing after fire clean up along with keeping expensive downtime to a minimum. Most materials such as steel, aluminium, stainless steel, brass, as well as plastics, rubber, and electronic components are not affected by exposure to HFC-227ea. This agent is also environmentally friendly, having an ozone depletion potential (ODP) of 0.00.

For hazard information, decomposition information, and physical properties of FM200 please refer to the Material Safety Data sheet located in the System Manual, or contact Firetrace International Ltd.

Valve Assembly

Each cylinder is equipped with a nickel plated brass valve, a pressure gauge to monitor cylinder pressure, and a quarter turn ball valve that interfaces with the Firetrace detector tubing. The ball valve must be kept closed at all times when the cylinder is not in service.

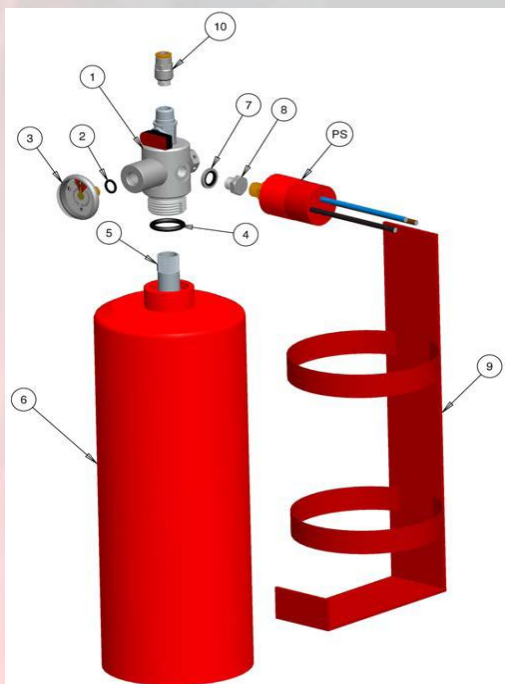
In addition, all DOT cylinder valves are equipped with a pressure relief (rupture disc) device in compliance with safety requirements



Cylinder Mounting Bracket

The ABC Dry Chemical Powder can utilise both TPED and D.O.T cylinders made from either aluminium or steel. Each cylinder is finished in red and painted to resist corrosion.

A wall mounted painted steel bracket is used to mount the cylinder/valve assembly in a vertical (upright) position. Each bracket is equipped with two (2) integral quick-clamp straps.



ITEM DESCRIPTION

- 1 DLP Valve
- 2 O-Ring, Pressure Switch/Pressure Gauge
- 3 System Gauge
- 4 Collar O-ring DLP
- 5 Siphon Tube
- 6 Low Pressure Cylinder
- 7 Bonded seal (pressure switch on valve)
- 8 Plug, pressure switch port on valve
- 9 Low Pressure System Bracket
- 10 HP Slip-on union

System Design



Direct System Example

Electrical equipment such as fuse boxes can be protected using our direct low pressure system filled with a clean agent such as Novec 1230 or FM-200. Using the same cylinder and detection tube the Direct **FIRETRACE**[®] system discharges the suppression agent directly from the burst hole in the tube, this will be the closest point to the fire, and will allow the fastest extinguishing time and minimum spread of the fire

A small 1kg (2.5lb) cylinder will apply the agent directly to the fires source while it is still a small fire, this means that there is minimal damage to the component in the panel and can reduce the downtime of the whole machine, you can also use one system to cover multiple cabinets or enclosures. Again this system can be integrated with a pressure switch to signal an alarm or shut down power.

Novec 1230 is a clean agent meaning that it leaves no residue, and is electrically non conductive. This means it will not cause any damage to electrical components and it is also safe for people, this will be important as it could be located near the driver. Novec 1230 has a global warming potential of 1 which is the lowest possible, this makes it the greenest clean agent available.

Quantity	Part No.	Description
1	890001	1 x 1kg Direct low pressure Novec System CE
		OR
1	895001	1 x Small 2.5Lb Novec Direct Low Pressure System D.O.T
		WITH
1	821605	1 x 5 meters 4/6 Firetrace Detection Tube Kit (FT Tube + Fittings)

FIRETRACE® *Detection Tube Testing*

Leakage rate:

The FDT passed the Underwriters Laboratories and Factory Mutual Research long term leakage tests. Twelve sample systems, each with 52 feet of FDT were weighed and then placed in a secure storage area. The maximum allowable leakage rate was 0.0075 ounces leakage over a period of one year. Each quarter of a year, 4 random samples were selected and weighed. At the end of the full year, all twelve samples were weighed. There was no measurable leakage. The FDT passed the test.



Exposure to UV radiation:

Samples of FDT, each 12 inches in length, were subjected to the UV Light and Water Test in accordance with ASTM 154 utilizing the UVB 313 Lamp. Test duration was 1000 hours. Following this test, the samples were examined for cracking or deterioration. None was found. These same samples were then subjected to a hydrostatic test of six times the normal operating pressure ($150 \times 6 = 900$ psi) of the tubing for a period of one minute. There was no burst or leakage as a result of this test. Pressure was then raised to 1000 psi for a period of one minute with no burst. Each sample was then raised to burst pressure. Average burst pressure of the twelve samples was 1200 psi.

Aging Test:

A total of twelve samples of FDT, each twelve inches in length, were subjected to an air-oven aging test for 180 days at 212°F (100°C). Following this test, the samples were examined for cracking or deterioration. None was found. These same samples were then subjected to a hydrostatic test of six times the normal operating pressure ($150 \times 6 = 900$ psi) of the tubing for a period of one minute. There was no burst or leakage as a result of this test. Pressure was then raised to 1000 psi for a period of one minute with no burst. Each sample was then raised to burst pressure. Average burst pressure of the twelve samples was 1200 psi.

30 Day Extreme Temperature Leakage Test:

A total of twelve fully charged FIRETRACE® Indirect systems, charged with FM-200™ Clean Extinguishing Agent and super pressurized with nitrogen to 150 psi and including 24 inches of detection tubing (also charged to 150 psi) were exposed to the temperature extremes, 0°C (32°F) to 54.44°C (130°F), for a period of 30 days. A total of six charged systems were exposed to 0°F and six charged systems were exposed to 130°F. Weight (in grams) was recorded before and after the test. There was no loss of weight noted of any of the samples at the end of the test. Following this test the systems were discharged with a standard propane torch impinging on the FDT. System actuation was within two seconds and in each case, discharged as intended.

Approvals & Listings



FIRETRACE® International's systems carry several internationally recognised approvals and listings and have been independently tested by third parties for exposure to many types of chemicals, solvents and UV radiation. As an **ISO 9001** accredited company you can be sure of the fact that all systems are manufactured and tested in a quality environment.

Australia – SSL Listing No. AFP 1368 Scientific Services Laboratory, Victoria, Australia

Austria – Prüfstelle für Brandschutztechnik

Bahrain – State of Bahrain Ministry of the Interior, Protection and Prevention Section

Belgium – ANPI/NVBB Rapport D'essai no. SPT/ME 020/1987.12.08

China – CNAACL No. China National Accreditation of Laboratories

Czech Rep – Strojirensky Zkusebni Ustav S.P Engineering Test Institute

Denmark – Danish Institute of Fire Technology

France – CNPP GC01 0017 CNPP IE 99 5585

Germany – BAM/TUEV Approval

Greece – Approval Report 44672 701.6

Hungary – Belugyminiszterium Tuezoltosag Orszagos Parancnokszag Szum 188/31/1999

Israel – The Standards Institution of Israel Test Certificate 8013107171

Italy – TESI No. 094/B Tecnologie Sviluppo Industriale

Netherlands – TNO Netherlands Project Ref 006.10329.01.02

Romania – SC Instal Somet SA Act de Omologare No. 7/2000

Qatar – Civil Defence

Sweden – SBF 128:1 Swedish Bus Approval

United States - Factory Mutual Approval / UL & ULC Listing

FM approval certificates



Certificate of Compliance

FIXED EXTINGUISHING SYSTEMS, DRY CHEMICAL EXTINGUISHING SYSTEMS

This certificate is issued for the following product:

System Designation:	Model ILP ABC Automatic Indirect Fire Detection and Extinguishing Systems
System Type:	Pre-Engineered for the Protection of Class B Hazards
Agent Identification:	Multi-Purpose Dry Chemical (Monoammonium Phosphate)
Design, Installation, Operation, and Maintenance Manual:	<i>Design, Installation, Operation, and Maintenance Manual for Pre-Engineered Automatic Indirect Dry Chemical Extinguisher Unit</i> , P/N 800010, October 2008, Rev 1

Approved for: FIRETRACE INTERNATIONAL
15690 N. 83RD WAY, SUITE B
SCOTTSDALE, AZ
85260

Alternate Manufacturing / Filling Site: FIRETRACE INTERNAIONAL
12, FAIRLAWN ENTERPRISE PARK, BONEHURST RD.
SALFORDS, REDHILL, SURREY RH1 5GH
UNITED KINGDOM

FM Approvals confirms that the system has been found to comply with the following standard:

UL 1254 – Pre-Engineered Dry Chemical Extinguishing System Units, February 4, 2005

Project Identifier: 3034274

Date of Approval: July 1, 2009

7/20/09

Richard B. Dunne
Manager – Hydraulics Group, FM Approvals

Date



Member of the FM Global Group



Certificate of Compliance

FIXED EXTINGUISHING SYSTEMS, CLEAN AGENT EXTINGUISHERS, AUTOMATIC OR MANUAL-AUTOMATIC

This certificate is issued for the following product:

System Designation:	Model DLP Automatic Direct Fire Detection and Extinguishing Systems
System Type:	Pre-Engineered for the Protection of Class B Hazards
Agent Identification:	Dupont TM FM-200 [®] or FE-227 TM
Design, Installation, Operation, and Maintenance Manual:	<i>Design, Installation, Operation, and Maintenance Manual for HFC-227ea Clean Agent Pre-Engineered Automatic Direct Fire Detection and Suppression System</i> , P/N 800023, Rev 01, May 08, 2009

Approved for: FIRETRACE INTERNATIONAL
15690 N. 83RD WAY, SUITE B
SCOTTSDALE, AZ
85260

Alternate Manufacturing / Filling Site: FIRETRACE INTERNAIONAL
12, FAIRLAWN ENTERPRISE PARK, BONEHURST RD.
SALFORDS, REDHILL, SURREY RH1 5GH
UNITED KINGDOM

FM Approvals confirms that the system has been found to comply with the following standard:

FM Approvals Class 5600 – Approval Standard for Clean Agent Extinguishing Systems, November 2006 Draft Edition

Project Identifier: 3034274

Date of Approval: July 1, 2009

7/20/09

Richard B. Dunne
Manager – Hydraulics Group, FM Approvals

Date



Member of the FM Global Group

Frequently Asked Questions

What pressure is the system working to?

The **FIRETRACE**[®] dry chemical system is super pressurized with Nitrogen to a pressure of 195psi, around 13.4bar.

What happens if I have more than one fire simultaneously?

Because the system is design is based on the volume of the engine bay, there is sufficient agent within the container to “total flood” the whole space. Should there be more than one fire, the Fire Detection Tube will burst at the hottest point first and all of the agent will be dispersed from that point. The whole Engine bay area, however, will rapidly fill with a cloud of dry chemical agent which will quickly suppress any other fires that there may be.

If the system puts out the fire, why does the operator need to know there has been a problem?

Often the source of a fire in an engine is electrical, or down to a mechanical fault with parts such as the starter-motor, fuel pump or turbo unit. If it to continue to operate after a system had extinguished a fire, then the faulty unit could re-ignite a fire situation and you would then have a situation of a fire with no-further protection. By stopping the vehicle, the fuel supply to the engine would cease and any electrical fault eliminated by removing the power.

If the system is activated, do I need to replace the whole system?

No. Should you have the unfortunate incident of a fire, the system will operate as intended and some works will obviously need to be carried out to bring the system back into operation again. This involves re-charging the contents of the container via an approved agent, or for speed purposes, replacing the container with an identical one that is already filled. The Fire Detection Tube will not normally need to be replaced, as the burst point can be cut from the tube and the tube can then be re-connected with a straight adapter. The system can then be pressurized and reset for use.

In theory, your system could be operational again within only a few minutes and at minimal cost.

Will the dry chemical powder cause any damage to the engine?

No. However, as with any chemical agent discharge following a fire scenario, some clean-up will be required. This is the same for water-based extinguishing systems too, as they will have had chemicals added to prevent freezing. This will involve some wiping, vacuuming, or washing of the exposed areas and in some cases the powder will have to be scraped off a surface, if that surface was hot at the time of discharge. However, the powder itself will not penetrate through air-filtration units and get into the internal workings of the engine.