

**Automatic Fire Suppression System
Replacement
MTPV Power Pack Engines Fire Protection
Extinguishing Agent Change
– Engineering Modification
Change to New Fire Pro System**



Avanti Fire Reference:

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1 INTRODUCTION

1.1 Introduction

The existing Mermec Aerosol Canister has been damaged and replacement is required.

Replacement Canister from Europe will take 4 – 6 weeks.

Avanti Fire has come up with a solution to replace this Aerosol Canister with a similar product – Fire Pro – 500 S Aerosol Canister.

Our recommended course of action as existing Fire Suppression System equipment is very hard to source out is to replace the entire Fire Suppression System in Power Pack Engines and associated equipment in at least one vehicle. This will enable Sydney Trains to carry existing stock spare stock on old system.

In addition with a new Fire Pro System all equipment is sourced out locally in NSW and is 100 % available and supported with all spare parts on control equipment and Aerosol Canister Units.

1.2 Product Information

FirePro fire suppression systems are compact, easy to install and not pressurised, making them a unique fire extinguishing solution for vehicles and plant.

FirePro systems are currently protecting critical applications for numerous leading organizations around the world.

The system can be operated manually or automatically, depending on the specific requirements.

Once activated the system will discharge the aerosol generators within the Power Pack bays which will completely suppresses the fire.

This minimises damage to vehicles engine, as well as potential harm to operators and passengers.

The fire suppression system works by flooding a volume of space, such as a vehicle engine compartment, with a patented fire extinguishing agent of condensed aerosol. The system can be easily retrofitted to existing equipment providing a cost effective solution for vehicle engine compartments.

1.3 Applicability – MTPV Power Pack Engines

- Power Pack 1 – Existing Fire Suppression System Aerosol Canister has been damaged and Replacement canister is extremely hard to obtain from Europe and delivery time approx. 6-8 weeks from each order depending on availability from foreign supplier.
- Replace entire Power Pack Systems with new Fire Pro – 500S Fire Suppression System.
- Fire Pro – 500S Fire Suppression System Aerosol Control System and Canister is a fully compliant product it features Activfire , UL , KIWA and BSI Approved.

- Fire Pro – 500S Fire Suppression System Aerosol Control System and Canister Units are locally supported in NSW. Replacement items are readily available and able to be replaced with 24 hours from notification.
- AS5062 – 2016 - Fire protection for mobile and transportable equipment Compliance.
- This will enable Sydney Trains to have 1x Full Set of Aerosol Canisters as spares for one Vehicle.
- Recommend Replacing all 4 x Thermal Probes with new should you change entire System with Control panel.

1.4 Stage 1: Proposed Scope of Works to Confirm System Compatibility and functionality

Supply and Installation of 4 x Small FirePro FP- 20 Aerosol Canister Units in current Power Pack engine in MTPV and connect up to existing System Wiring.

This demonstration will enable Avanti Fire and Sydney Trains to confirm functionality and reliability of similar product installed and utilizing existing control panel.

In addition we highly recommend a witness test to be conducted with Sydney Trains engineering personnel to approve system and sign off on new system modifications with compatible replacement aerosol canisters – Fire Pro.

Our Cost for the above works:

1.5 Stage 2: Proposed Scope of Works to provide temporary fix Power Pack Engines

The following outlines the requirements to get MTPV completely back into service.

Scope of Works:

1. Power Packs Engines in MTPV – Remove all existing Fire Suppression canisters and associated equipment;
 - 4 x 1000g Aerosol Canisters
2. Replace both Power Pack System with new Fire Pro – 500S Fire Suppression System and utilize existing equipment;
 - 8 x Fire Pro Aerosol 500g Canisters
 - Replace existing actuation cabling from control panel to canister with fire rated and shielded cabling.
3. Test, Commission and Witness Test System functionality with Sydney Trains.
4. Provide Commissioning documentation and Installers Statement on Completion.

Our Cost for the above works:

1.6 Full Replacement with New Fire Pro – 500S Fire Suppression System

The following outlines the full replacement of existing Fire Suppression System for Power Pack Engines for each Vehicle.

Scope of Works:

5. Power Packs Engines in MTPV – Remove all Existing Fire Suppression Control System and Canisters and associated equipment;
 - 2 x Control Panel
 - 4 x 1000g Aerosol Canisters

6. Replace both Power Pack Systems with new Fire Pro – 500S Fire Suppression System and associated equipment;
 - 2 x Fire Pro Control Panel
 - 8 x Fire Pro Aerosol 500g Canisters (if not done in stage 2)
 - 2 x Utilize Existing Bell and Warning Sign and provide new Fire Pro Interface Modules and interface to Drivers cabin
 - 2 x Utilize Existing input / Contacts for Fire Alarm and new Fire Pro Interface Modules for interfacing to Drivers cabin VMS System

7. Remove and Rewire the Power Pack Engine System with Fire Pro Wiring Loom cables and utilizing the Deutsch Plugs – DT series IP68 rating that are suitable for harsh environment applications and consisting of Thermoplastic housings offering a wide operating temperature ranges of – 55 degrees to 125 + degrees.

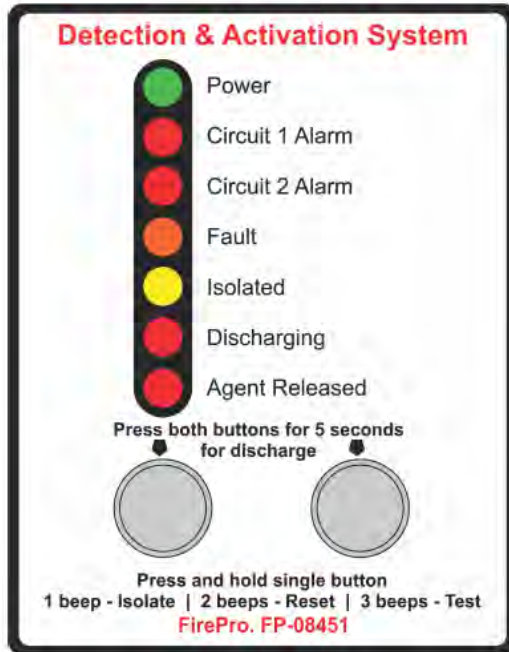
8. Test, Commission and Witness Test System functionality with Sydney Trains.

9. Provide Commissioning documentation and Installers Statement on Completion.

Our Cost for the above works:

2 EQUIPMENT, PROCESS & PROCEDURE

2.1 Fire Detection and Activation System Control Panel



The FirePro FP-08451 Fire Control Panel is a combined detection and extinguishant system, and is compliant for use in both marine (AMSA NSCV) and vehicle installations (AS5062).

The FIP (fire indicator panel) incorporates:

- 2x Detection circuits;
- 1x Extinguishing Discharge circuit;
- 1x Siren/Strobe circuit;
- 1x Agent Release Notification circuit;
- Programmable Activation (automatic and/or manual);
- Fault Monitoring system;
- Isolation Function.

How does it work

All **FirePro** Aerosol Generators use the latest generation FPC solid compound. Upon activation, the solid compound is transformed into a rapidly expanding, highly efficient gas, based on Potassium salts. It does not deplete oxygen levels. **The built-in fail-safe activation system** ensures operation of the generators when required, even if everything else fails. At 300⁰C the FPC block changes to a potassium-based gas to extinguish the fire. Ozone Depletion Potential (O.D.P.) = 0

Atmospheric Life Time (A.L.T.) = 0

Global Warming Potential (G.W.P.) = 0

Non-corrosive & Non- Toxic

2.2 Component Requirements

FP-08451 Control Panel

Control Panel. Features • Manual or Auto operation • Twin power supply available • 2 Detection circuits – works with Thermal ROR, smoke detectors, or LHD • All circuits monitored • Options for delayed or 2nd shot and Shutdown relay • 12-24vDC.

FP-08850 Delayed Discharge Module

Delay Discharge Module allows for the addition of FirePro Generators above the limit of 4 in the standard panel. Also provides for delayed discharge of units should longer agent discharge time is required • All circuits monitored.

FP-08860 Shutdown Module

Shutdown Module – connects via the siren circuit, and will allow for selectable delays for the shutdown of devices. It Provides a volt Free Contact (NO or NC) which can be used with appropriately rated relays.

FP-08800 FirePro Test Simulator

This test unit is used to check wiring connections. Used in commissioning and testing of the systems. Each system has different requirements for this device – check manual for correct selection.

FP-14053 Manual Release Switch

Aluminium Moulded Switch with SS mount. Safety pin to protect against accidental activation.

System Cable Looms

Colour Coded for easy Installation. IP68 and rated to UL94 Flammability test. Supplied to correct lengths.

2.3 Fire Pro Component Listing



FP-08451	2x DP-3000	Deutsch Plug 3 Pin M/F, c/w heatshrink
Fire Control Panel	4x DP-2000	Deutsch Plug 3 Pin M/F, c/w heatshrink
Detection and	2x FP-08950	End-of-line Plug 22k Ω (Detection)
extinguishant control	1x	End-of-line Diode 1N4004 (Siren/Strobe)
system	1x	End-of-Line Resistor 3k3 Ω (Discharge)
	1x	Operator's Manual

Agent Release Circuit

Siren / Strobe Circuit



FP-08825
Thermal Fuse Coupling



FP-08940
Siren/Strobe

Discharge Circuit



FirePro Aerosol Generator
100g – 500g Unit.
Constructed from Stainless Steel.
Comes with installed Deutsch Plug for easy install



FP-6200
Heavy Duty Bracket 316 SS.
Suits FP-100, 200, 500 FirePro Aerosol Generators.



FirePro Aerosol Generator
1200g – 5700g Unit.
Constructed from Stainless Steel.
Comes with installed Deutsch Plug for easy install.



FP-6100
Heavy Duty Bracket 316 SS.
Suits FP-1200, 2000, 3000 5700 FirePro Aerosol Generators.

Detection Circuit (Circuit 1 Alarm & Circuit 2 Alarm)



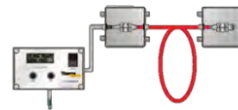
FP-08920
Marine Grade Thermal Detector
60°C Fixed. Other temperatures available on request.



FP-14053
Manual Actuator
Internal OR External



FP-09510
Linear Heat Detection Cable 182° C



FP-09511
Linear Heat Detection Installation kit. Mounting Clips, 2x Junction Boxes with strain relief cable glands and 1x EOL for monitoring.

Installation Components

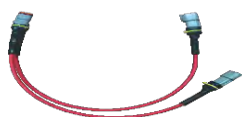


FP-09500
2 Hour Fire Rated Shielded Cable.

Service Components



FP-08960
Signage for the System. A sheet of different size labels.



FP-08919
Wiring loom and Splitter Cable for installation of multiple FirePro generators.



FP-08800
FirePro Simulator – for Testing & Commissioning.

Additional Modules



FP-08850
Discharge Delay Module
Allows additional FirePro generators to be discharged



FP-08860
Shutdown Relay Module
Provides facility for equipment shutdown



FP-08870/8871/8872
Power Control Module
Provides back up power for control panel.

2.4 Installation and Commissioning of System

The installation for stage 1 & 2 works shall utilize all existing fixing plates and brackets to power packs.

The installation works for the full refurbishment will have to be discussed further with relevant parties of Sydney Trains.

All associated work method statements and installation process will be submitted prior to commencement of any works for approval by Sydney Trains

Commissioning shall be performed prior to handover of each works and witness tested with Sydney Trains.

All associated Commissioning documentations and operators training shall be provided to Sydney Trains.

3 SYSTEM FUNCTIONALITY IN FIRE MODE

3.1 Fire Mode Condition

If a fire occurs, equipment operators should do the following:

1. Detection will initiate an alarm condition on the FirePro System
2. **Automatic Activation:** The control panel will automatically begin the activation sequence when fire has been detected on Circuit 1 Alarm.
3. The siren/strobe will operate and an Alarm activated on the Drivers Cabin Display Screen and if shutdown relays have been installed, equipment shutdown will be initiated.
4. Evacuate all personnel from the risk area.
5. Keep the FirePro suppression gas within the risk until the fire is extinguished and not able to re-ignite.
6. Do not start engine until the fire is extinguished. Operating any type of exhaust fans or opening Power Pack Engine Bay will enable the gas to escape the risk area and could allow the fire to re-ignite.
7. Do not enter the Power Pack Engine Bay until it has been rendered safe.
8. Recommended clean up after discharge is with soapy water and a cleaning agent based on citric acid.
9. Following a discharge, replace all installed New FirePro Canister and Thermal Fuse Couplings.

3.2 Manual Operation in Fire Condition

1. **Manual Activation:**
 - a. **From the Control Panel** - Press and hold both mode switches continuously for 5 seconds to activate the system.

b. From Remote Actuation Switches – Remove Safety Pin, and Push Switch. Manual Activation will start all functions of the discharge program; including all shutdowns, delay time for system discharge will still be applied.

2. The siren/strobe will operate and an Alarm activated on the Drivers Cabin Display Screen and if shutdown relays have been installed, equipment shutdown will be initiated.
3. Evacuate all personnel from the risk area.
4. Keep the FirePro suppression gas within the risk until the fire is extinguished and not able to re-ignite.
5. Do not start engine until the fire is extinguished. Operating any type of exhaust fans or opening Power Pack Engine Bay will enable the gas to escape the risk area and could allow the fire to re-ignite.
6. Do not enter the Power Pack Engine Bay until it has been rendered safe.
7. Recommended clean up after discharge is with soapy water and a cleaning agent based on citric acid.
8. Following a discharge, replace all installed New FirePro Canister and Thermal Fuse Couplings.

4 SERVICING AND MAINTENANCE

4.1 Servicing and Maintenance

Inspection and servicing of the installed fire system should occur in accordance with the relevant Australian Standards (AS5062).

Any alterations to the risk area should be recorded and where necessary the risk assessment, design calculation and installed components must be revised to reflect the new operating conditions.

A logbook must be kept, recording all the relevant information on the service undertaken.

4.2 Daily Routine Checks

A daily inspection should be performed by the operator prior to operation of the equipment. If anything does not appear normal, the equipment should not be operated and the fire service provider alerted.

Visual inspection of the control panel and installed components.

These should be accessible and free from debris, rust, or electrical faults.

- Visual inspection of the control panel to ensure normal functioning. When **functioning normally the only indicator illuminated should be the "Power" indicator (green)**.
- Visual inspection of anti-tamper seals and travel pins, to ensure they are in place.

4.3 Semi – Annual / Annual Service Schedule

Semi-annual and Annual servicing and maintenance are to be undertaken only by accredited service technicians. Any misuse of the FIP may result in an accidental discharge of the suppression system and is not covered by warranty.

Service should include a visual inspection of all the installed components to ensure they are in good condition, and that the relevant stream lengths and thermal clearances are observed as per the original design calculation and risk assessment.

4.4 Six Monthly Test Procedure

1. Isolate the control panel (see 7.2 Isolate Function) and disconnect the any installed FirePro aerosol generators. This will generate a fault on the fire control panel.
2. Connect a FP-08800 Test Module to the "Discharge" output to the panel (marked yellow). Turn off the Isolate function. The Test Module should remain installed throughout the test procedure.

3. Control Panel and components

- Clean and remove dirt, grease or foreign material. Replace any parts that appear damaged or are painted.
- Check all indicators are in normal position.

4. FirePro Aerosol Generators

- Inspect FirePro generators to ensure they are in good condition.
- Check mounting brackets are in good condition and secure.
- Check Dust Covers are in good condition – replace as necessary.
- Check FirePro Units are at predetermined aiming points.

5. Electrical system – Inspection

- Check Manual Actuators are secure, clean, undamaged.
- Check that anti-tamper seals/pull pins are in place and secure.
- Check all wiring, connection and supports are in intact, not damaged and in correct position.

6. Labels Check manual release, system warning and instruction labels are securely in place, visible and legible.

7. Test the fault monitoring system by disconnecting and reconnecting all connected detection devices and the siren strobe circuit one at a time. Ensure the “Fault” LED indicator illuminates and the internal sounder is heard each time a circuit is disconnected.

8. Discharge Testing from Control Panel

- Perform a manual discharge test by pressing and holding both mode switches on the panel continuously for 5 seconds.
- Following activation, ensure the Test Module Red LED has operated.
- Isolate the panel to silence alarm. Panel should now display a fault.
- Reset Test Module. Panel should no longer be in fault condition.
- Turn off the Isolate function.

9. Discharge Testing from External Devices:

Each detection and manual actuator device connected to must be tested individually.

- Perform an automatic discharge test by activating the detectors or manual actuators.
- Following the activation sequence ensure the Test Module Red LED has operated.
- Isolate the panel to silence the alarm. The control panel should now display a fault.
- Reset the Test Module.
- Reset the control panel by pressing and holding a single mode switch until 2 beeps are heard. The control panel should no longer be in alarm/fault condition.

10. System control and indicating equipment.

- During discharge test, ensure operation of all installed siren/strobe(s).
- During discharge test, ensure operation of all installed shutdown relays. This must shutdown any equipment specified in the risk assessment.
- Test backup battery capacity. Replace every backup battery every 2 years.

11. Disconnect the FP-08800 Test Module and reconnect all FirePro aerosol generators.

12. Turn off the Isolation function. System is now operational.

4.5 Additional Requirements

Design Survey - check against the baseline data, for alterations, changes in use or operating environment, or other factors that could affect the performance of the fire protection system.(Annual)

Risk Assessment – required to be prepared and reviewed every 5 years or after any incident. Review document to ensure system compliance. Check if document is current.

5 CASE STUDY OF SYSTEM USED ON TRAINS



Location: Australia Application: Track Maintenance Industry: Mining



SPENO INTERNATIONAL SA

SPENO RAIL MAINTENANCE AUSTRALIA Pty. Ltd specialising in rail maintenance, technology, diagnostics and rectification.

These machines are designed and built in Western Australia. This company is accredited by BVQI, complying with ISO9001. In addition, we have 'Rail Access Agreements' with each client. These agreements require us to maintain and operate according to strict Railway Regulations and Rail Safety Acts.



Risks Involved & Consequences

A fire from a hydraulic drive and/or a high pressure hose or electrical source can rapidly destroy all equipment. On heavy equipment which must cope with difficult working conditions, these risks become exaggerated. Fire systems are required to protect and reduce collateral damage across all equipment.

The Task

Design and install a fire suppression system that will protect the engine bay and hydraulic compartments of the track maintenance machines. The enclosures have diverse fire risks and therefore, the technology needed to be effective against multiple classes of fire. It should also require as little maintenance as possible and be in line with Australian Standards, Health & Safety and protection of the Environment (HSE) strategy. Also, the systems needed to monitor and protect the enclosures from various fire scenarios.



Why FirePro ?

Firstly, the FPC Compound found inside the FirePro generators is effective against various classes of fire (A, B, E). Secondly, the compactness and modularity of the system allows fire engineers to customise the design and efficiency according to project mission and space requirements. The size of the FirePro units allows for the units to fit within the tight space requirements of the machine. Furthermore, the FPC poses no active threat to operators and will remain environmentally friendly even after activation which is in line with environmental policy. As a final point, the generators have a 15-year lifetime cycle and no re-filling requirements thus lower maintenance.

Results & Implementation

Detection and extinguishing systems were installed to engine bay and hydraulic compartment of the machine. Looming fires are detected and extinguished while alarms notify the operator and other personnel of the fire hazard. The systems can be easily reached providing a convenient maintenance process. More importantly, there are no Health and Safety issues of concern in regards to the units. Additionally, FirePro's FPC compound 15-year life span and low system maintenance maximises ownership benefits and value for the company.



6 DATA SHEETS FOR COMPONENTS

7 SAFETY DATA SHEETS FIREPRO AEROSOL UNITS

FirePro Aerosol Generators have two safety data sheets as the compound changes chemical state on activation.

FirePro Aerosol Generators- Post Activation

Fire Safety Equipment Pty Ltd

Chemwatch Hazard Alert Code: 0

Chemwatch: 5252-51

Issue Date: 23/06/2017

Version No: 4.1.1.1

Print Date: 15/02/2018

Safety Data Sheet according to WHS and ADG requirements

L.GHS.AUS.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	FirePro Aerosol Generators- Post Activation
Synonyms	Celanova FirePro Post Activation
Proper shipping name	AVIATION REGULATED SOLID, N.O.S. Not subject to this Code (see SP 106)
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Fire extinguishing aerosol released into an indoor burning area.
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Details of the supplier of the safety data sheet

Registered company name	Fire Safety Equipment Pty Ltd
Address	2A Staple Street Seventeen Mile Rocks QLD 4073 Australia
Telephone	+61 7 3715 5644
Fax	+61 7 3715 8450
Website	www.fsequip.com.au
Email	ray@fsequip.com.au

Emergency telephone number

Association / Organisation	Not Available
Emergency telephone numbers	+61 7 3715 5644 Mon-Fri 8am - 5pm
Other emergency telephone numbers	Not Available

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification	Not Applicable

Label elements

Hazard pictogram(s)	Not Applicable
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SIGNAL WORD **NOT APPLICABLE**

Hazard statement(s)

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
		Particulate component
584-08-7	47-49	<u>potassium carbonate</u>
7757-79-1	2-3	<u>potassium nitrate</u>
Not Available	<1	other elements
		Gas component
7727-37-9	21-22	<u>nitrogen</u>
124-38-9	13-14	<u>carbon dioxide</u>
7732-18-5	10-12	<u>water</u>
Not Available	1-2	other gases, as
630-08-0		<u>carbon monoxide</u>
74-82-8		<u>methane</u>
1333-74-0		<u>hydrogen</u>

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	<p>If this product comes in contact with eyes:</p> <ul style="list-style-type: none"> Wash out immediately with water. If irritation continues, seek medical attention. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> Flush skin and hair with running water (and soap if available). Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> If dust is inhaled, remove from contaminated area. Encourage patient to blow nose to ensure clear passage of breathing. If irritation or discomfort persists seek medical attention.
Ingestion	<ul style="list-style-type: none"> Not considered a normal route of entry. If swallowed do NOT induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. Observe the patient carefully. Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. Give water to rinse out mouth; then provide liquid slowly and as much as casualty can comfortably drink. Seek medical advice.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- Generally not applicable.

Special hazards arising from the substrate or mixture

Fire Incompatibility | Generally not applicable.

Advice for firefighters

FirePro Aerosol Generators- Post Activation

Fire Fighting	▶ Generally not applicable.
Fire/Explosion Hazard	▶ Generally not applicable.
HAZCHEM	2Z

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	▶ Generally not applicable.
Major Spills	▶ Generally not applicable.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▶ Generally not applicable.
Other information	▶ Generally not applicable.

Conditions for safe storage, including any incompatibilities

Suitable container	Material is contained in a stainless steel fire fighting container.
Storage incompatibility	▶ Generally not applicable.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	nitrogen	Nitrogen	Not Available	Not Available	Not Available	Asphyxiant
Australia Exposure Standards	carbon dioxide	Carbon dioxide in coal mines	22500 mg/m3 / 12500 ppm	54000 mg/m3 / 30000 ppm	Not Available	Not Available
Australia Exposure Standards	carbon dioxide	Carbon dioxide	9000 mg/m3 / 5000 ppm	54000 mg/m3 / 30000 ppm	Not Available	Not Available
Australia Exposure Standards	carbon monoxide	Carbon monoxide	34 mg/m3 / 30 ppm	Not Available	Not Available	Not Available
Australia Exposure Standards	methane	Methane	Not Available	Not Available	Not Available	Not Available
Australia Exposure Standards	hydrogen	Hydrogen	Not Available	Not Available	Not Available	Asphyxiant

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
potassium carbonate	Potassium carbonate	0.55 mg/m3	6 mg/m3	370 mg/m3
potassium nitrate	Potassium nitrate	9 mg/m3	100 mg/m3	600 mg/m3
nitrogen	Nitrogen	7.96E+05 ppm	8.32E+05 ppm	8.69E+05 ppm
carbon dioxide	Carbon dioxide	30,000 ppm	40,000 ppm	50,000 ppm
carbon monoxide	Carbon monoxide	75 ppm	Not Available	Not Available
methane	Methane	65000 ppm	230000 ppm	400000 ppm
hydrogen	Hydrogen	65000 ppm	230000 ppm	400000 ppm


FirePro Aerosol Generators- Post Activation

Ingredient	Original IDLH	Revised IDLH
potassium carbonate	Not Available	Not Available
potassium nitrate	Not Available	Not Available
other elements	Not Available	Not Available
nitrogen	Not Available	Not Available
carbon dioxide	40000 ppm	Not Available
water	Not Available	Not Available
other gases, as	Not Available	Not Available
carbon monoxide	1200 ppm	Not Available
methane	Not Available	Not Available
hydrogen	Not Available	Not Available

MATERIAL DATA

None assigned. Refer to individual constituents.

Exposure controls

Appropriate engineering controls	Before entering a room with the material in aerosol phase vent properly to avoid unnecessary exposure.
Personal protection	
Eye and face protection	▸ Generally not applicable.
Skin protection	See Hand protection below
Hands/feet protection	▸ Generally not applicable.
Body protection	See Other protection below
Other protection	▸ Generally not applicable.
Thermal hazards	Not Available

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

FirePro Aerosol Generators- Post Activation

Material	CPI
BUTYL	C
NATURAL RUBBER	C
NEOPRENE	C
PVA	C
VITON	C

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory, may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Aerosol white particulate gas.		
Physical state	Manufactured	Relative density (Water = 1)	Not Applicable

FirePro Aerosol Generators- Post Activation

Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Applicable
pH (as supplied)	Not Applicable	Decomposition temperature	Not Applicable
Melting point / freezing point (°C)	Not Applicable	Viscosity (cSt)	Not Applicable
Initial boiling point and boiling range (°C)	Not Applicable	Molecular weight (g/mol)	Not Applicable
Flash point (°C)	Not Applicable	Taste	Not Available
Evaporation rate	Not Applicable	Explosive properties	Not Available
Flammability	Not Applicable	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Applicable	Surface Tension (dyn/cm or mN/m)	Not Applicable
Lower Explosive Limit (%)	Not Applicable	Volatile Component (%vol)	Not Applicable
Vapour pressure (kPa)	Not Applicable	Gas group	Not Available
Solubility in water (g/L)	Not Applicable	pH as a solution (1%)	Not Applicable
Vapour density (Air = 1)	Not Applicable	VOC g/L	Not Applicable

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	▸ Generally not applicable.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	Not normally a hazard due to physical form of product. Inhalation will have harmful effects as the product is released into a smoke filled burning indoor area that should be evacuated. Do not enter without breathing apparatus. Exposure to product will be very short term, the potassium carbonate will dissipate to atmosphere within 20 mins of discharge.
Ingestion	Not normally a hazard due to physical form of product.
Skin Contact	Not normally a hazard due to physical form of product. The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
Eye	Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).
Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.

FirePro Aerosol Generators- Post Activation	TOXICITY	IRRITATION
	Not Available	Not Available
potassium carbonate	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >2000 mg/kg ^[1] Oral (rat) LD50: 1870 mg/kg ^[2]	Not Available
potassium nitrate	TOXICITY	IRRITATION

FirePro Aerosol Generators- Post Activation

	dermal (rat) LD50: >5000 mg/kg ^[1] Oral (rat) LD50: >2000 mg/kg ^[1]	Not Available
nitrogen	TOXICITY	IRRITATION
	Not Available	Not Available
carbon dioxide	TOXICITY	IRRITATION
	Inhalation (mouse) LC50: 180.5 mg/l/2H ^[2]	Not Available
water	TOXICITY	IRRITATION
	Not Available	Not Available
carbon monoxide	TOXICITY	IRRITATION
	Inhalation (rat) LC50: 1.9 mg/l/4H ^[2]	Not Available
methane	TOXICITY	IRRITATION
	Inhalation (rat) LC50: 84.684 mg/l/15 min ^[1]	Not Available
hydrogen	TOXICITY	IRRITATION
	Not Available	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

POTASSIUM CARBONATE	Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucous production.		
CARBON MONOXIDE	- central nervous system effects		
WATER & HYDROGEN	No significant acute toxicological data identified in literature search.		
Acute Toxicity	<input type="checkbox"/>	Carcinogenicity	<input type="checkbox"/>
Skin Irritation/Corrosion	<input type="checkbox"/>	Reproductivity	<input type="checkbox"/>
Serious Eye Damage/Irritation	<input type="checkbox"/>	STOT - Single Exposure	<input type="checkbox"/>
Respiratory or Skin sensitisation	<input type="checkbox"/>	STOT - Repeated Exposure	<input type="checkbox"/>
Mutagenicity	<input type="checkbox"/>	Aspiration Hazard	<input type="checkbox"/>

Legend: - Data available but does not fill the criteria for classification
 - Data available to make classification
 - Data Not Available to make classification

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

FirePro Aerosol Generators- Post Activation	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
potassium carbonate	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	68mg/L	2
	EC50	48	Crustacea	200mg/L	2

FirePro Aerosol Generators- Post Activation

	NOEC	96	Fish	33mg/L	2
potassium nitrate	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	22.5mg/L	4
nitrogen	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
carbon dioxide	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
water	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
carbon monoxide	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
methane	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
hydrogen	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
Legend:	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data				

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
potassium nitrate	LOW	LOW
carbon dioxide	LOW	LOW
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
potassium nitrate	LOW (LogKOW = 0.209)
carbon dioxide	LOW (LogKOW = 0.83)
water	LOW (LogKOW = -1.38)
methane	LOW (LogKOW = 1.09)

Mobility in soil

Ingredient	Mobility
potassium nitrate	LOW (KOC = 14.3)
carbon dioxide	HIGH (KOC = 1.498)
water	LOW (KOC = 14.3)

SECTION 13 DISPOSAL CONSIDERATIONS


Waste treatment methods

FirePro Aerosol Generators- Post Activation

Product / Packaging disposal	► Generally not applicable.
-------------------------------------	-----------------------------

SECTION 14 TRANSPORT INFORMATION

Labels Required

	
Marine Pollutant	NO
HAZCHEM	2Z

Land transport (ADG)

UN number	3335
UN proper shipping name	AVIATION REGULATED SOLID, N.O.S. Not subject to this Code (see SP 106)
Transport hazard class(es)	Class 9 Subrisk Not Applicable
Packing group	Not Applicable
Environmental hazard	Not Applicable
Special precautions for user	Special provisions 106 274 276 Limited quantity 0

Air transport (ICAO-IATA / DGR)

UN number	3335
UN proper shipping name	Aviation regulated solid, n.o.s. *
Transport hazard class(es)	ICAO/IATA Class 9 ICAO / IATA Subrisk Not Applicable ERG Code 9A
Packing group	Not Applicable
Environmental hazard	Not Applicable
Special precautions for user	Special provisions A27 Cargo Only Packing Instructions 956 Cargo Only Maximum Qty / Pack 400 kg Passenger and Cargo Packing Instructions 956 Passenger and Cargo Maximum Qty / Pack 100 kg Passenger and Cargo Limited Quantity Packing Instructions Y956 Passenger and Cargo Limited Maximum Qty / Pack 30 kg G

Sea transport (IMDG-Code / GGVSee)

UN number	3335
UN proper shipping name	AVIATION REGULATED SOLID, N.O.S.
Transport hazard class(es)	IMDG Class 9 IMDG Subrisk Not Applicable
Packing group	Not Applicable
Environmental hazard	Not Applicable
Special precautions for user	EMS Number Not Applicable Special provisions 960

FirePro Aerosol Generators- Post Activation

Limited Quantities : Not Applicable

Transport in bulk according to Annex II of MARPOL and the IBC code
Not Applicable

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

POTASSIUM CARBONATE(584-08-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Hazardous Substances Information System - Consolidated Lists Australia Inventory of Chemical Substances (AICS)

POTASSIUM NITRATE(7757-79-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Inventory of Chemical Substances (AICS)

NITROGEN(7727-37-9.) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards Australia Inventory of Chemical Substances (AICS)

CARBON DIOXIDE(124-38-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards Australia Inventory of Chemical Substances (AICS)
Australia Hazardous Substances Information System - Consolidated Lists

WATER(7732-18-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Inventory of Chemical Substances (AICS)

CARBON MONOXIDE(630-08-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards Australia Inventory of Chemical Substances (AICS)
Australia Hazardous Substances Information System - Consolidated Lists International Air Transport Association (IATA) Dangerous Goods Regulations
- Prohibited List Passenger and Cargo Aircraft

METHANE(74-82-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards Australia Inventory of Chemical Substances (AICS)
Australia Hazardous Substances Information System - Consolidated Lists

HYDROGEN(1333-74-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards Australia Inventory of Chemical Substances (AICS)
Australia Hazardous Substances Information System - Consolidated Lists

National Inventory	Status
Australia - AICS	Y
Canada - DSL	Y
Canada - NDSL	N (hydrogen; nitrogen; potassium carbonate; carbon dioxide; water; carbon monoxide; potassium nitrate; methane)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	N (hydrogen; nitrogen)
Korea - KECI	Y
New Zealand - NZIoC	Y
Philippines - PICCS	N (nitrogen)
USA - TSCA	Y

Legend:
Y = All ingredients are on the inventory
N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)

SECTION 16 OTHER INFORMATION

Other information

Ingredients with multiple cas numbers

Name	CAS No
potassium carbonate	584-08-7, 6381-79-9, 30095-94-4

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC – TWA: Permissible Concentration-Time Weighted Average
PC – STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit,
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

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TEL (+61 3) 9572 4700.

FirePro Aerosol Generators – Pre Activation

Fire Safety Equipment Pty Ltd

Chemwatch Hazard Alert Code: 2

Chemwatch: 4697-26

Issue Date: 22/06/2017

Version No: 4.1.1.1

Print Date: 15/02/2018

Safety Data Sheet according to WHS and ADG requirements

L.GHS.AUS.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	FirePro Aerosol Generators – Pre Activation
Synonyms	FP Generator aerosol generating fire extinguisher
Proper shipping name	AVIATION REGULATED SOLID, N.O.S. Not subject to this Code (see SP 106) (contains potassium nitrate)
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Upon activation the material is transformed into a rapidly expanding fire extinguishing aerosol. Note: The MSDS Hazard statements apply to the ingredients before they react during the products use. The ingredients are contained within a sealed unit and present no hazard unless they leak from a damaged unit.
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Details of the supplier of the safety data sheet

Registered company name	Fire Safety Equipment Pty Ltd
Address	2A Staple Street Seventeen Mile Rocks QLD 4073 Australia
Telephone	+61 7 3715 5644
Fax	+61 7 3715 8450
Website	www.fsequip.com.au
Email	ray@fsequip.com.au

Emergency telephone number


Association / Organisation	Not Available
Emergency telephone numbers	+61 7 3715 5644 Mon-Fri 8am - 5pm
Other emergency telephone numbers	Not Available

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification [1]	Acute Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 2, Eye Irritation Category 2A, Skin Sensitizer Category 1, Acute Aquatic Hazard Category 3, Chronic Aquatic Hazard Category 3
Legend:	1. Classified by Chemwatch; 2. Classification drawn from HSIS; 3. Classification drawn from EC Directive 1272/2008 - Annex VI

Label elements

Hazard pictogram(s)	
SIGNAL WORD	WARNING

Hazard statement(s)

FirePro Aerosol Generators – Pre Activation

H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H317	May cause an allergic skin reaction.
H412	Harmful to aquatic life with long lasting effects.

Precautionary statement(s) Prevention

P280	Wear protective gloves/protective clothing/eye protection/face protection.
P261	Avoid breathing dust/fumes.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P272	Contaminated work clothing should not be allowed out of the workplace.

Precautionary statement(s) Response

P362	Take off contaminated clothing and wash before reuse.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P333+P313	If skin irritation or rash occurs: Get medical advice/attention.
P337+P313	If eye irritation persists: Get medical advice/attention.
P301+P312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P330	Rinse mouth.

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

P501	Dispose of contents/container in accordance with local regulations.
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SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
7757-79-1	77	<u>potassium nitrate</u>
25068-38-6	16	<u>bisphenol A/ diglycidyl ether polymer, high molecular weight</u>
584-08-7	4	<u>potassium carbonate</u>
7439-95-4	1	<u>magnesium</u>

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Wash out immediately with fresh running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	<p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately remove all contaminated clothing, including footwear. ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ If dust is inhaled, remove from contaminated area. ▶ Encourage patient to blow nose to ensure clear passage of breathing. ▶ If irritation or discomfort persists seek medical attention.

FirePro Aerosol Generators – Pre Activation

Ingestion

- ▶ If swallowed do **NOT** induce vomiting.
- ▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- ▶ Observe the patient carefully.
- ▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- ▶ Seek medical advice.

Indication of any immediate medical attention and special treatment needed

Symptoms of vasodilation and reflex tachycardia may present following organic nitrate overdose; most organic nitrates are extensively metabolised by hydrolysis to inorganic nitrites. Organic nitrates and nitrites are readily absorbed through the skin, lungs, mucosa and gastro-intestinal tract.

The toxicity of nitrates and nitrites result from their vasodilating properties and their propensity to form methaemoglobin.

- ▶ Most produce a peak effect within 30 minutes.
- ▶ Clinical signs of cyanosis appear before other symptoms because of the dark pigmentation of methaemoglobin.
- ▶ Initial attention should be directed towards improving oxygen delivery, with assisted ventilation, if necessary. Hyperbaric oxygen has not demonstrated conclusive benefits.
- ▶ Institute cardiac monitoring, especially in patients with coronary artery or pulmonary disease.
- ▶ Hypotension should respond to Trendelenburg's position and intravenous fluids; otherwise dopamine may be needed.
- ▶ Naloxone, glucose and thiamine should be given if a multiple ingestion is suspected.
- ▶ Decontaminate using Ipecac Syrup for alert patients or lavage for obtunded patients who present within 2-4 hours of ingestion.
- ▶ Symptomatic patients with methaemoglobin levels over 30% should receive methylene blue. (Cyanosis alone, is not an indication for treatment). The usual dose is 1-2 mg/kg of a 1% solution (10 mg/ml) IV over 5 minutes, repeat, using the same dose if symptoms of hypoxia fail to subside within 1 hour.

[Ellenhorn and Barceloux: Medical Toxicology]

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker who has been exposed at the Exposure Standard (ES or TLV).

Determinant	Index	Sampling Time	Comments
1. Methaemoglobin in blood	1.5% of haemoglobin	During or end of shift	B,NS,SQ

B: Background levels occur in specimens collected from subjects **NOT** exposed

NS: Non-specific determinant;also observed after exposure to other materials

SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

FOR SMALL FIRE:

- ▶ USE FLOODING QUANTITIES OF WATER.
- ▶ **DO NOT** use dry chemical, CO₂, foam or halogenated-type extinguishers.

FOR LARGE FIRE

- ▶ Flood fire area with water from a protected position
- [Note: In normal use the ingredients react to form a fire extinguishing agent.

Special hazards arising from the substrate or mixture

- | | |
|-----------------------------|--|
| Fire Incompatibility | ▶ Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous |
|-----------------------------|--|

Advice for firefighters

Fire Fighting

- ▶ Alert Fire Brigade and tell them location and nature of hazard.
- ▶ May be violently or explosively reactive.
- ▶ Wear breathing apparatus plus protective gloves.
- ▶ Prevent, by any means available, spillage from entering drains or water course.
- ▶ Fight fire from a safe distance, with adequate cover.
- ▶ Extinguishers should be used only by trained personnel.
- ▶ Use water delivered as a fine spray to control fire and cool adjacent area.
- ▶ Avoid spraying water onto liquid pools.
- ▶ **DO NOT** approach containers suspected to be hot.
- ▶ Cool fire exposed containers with water spray from a protected location.
- ▶ If safe to do so, remove containers from path of fire.
- ▶ If fire gets out of control withdraw personnel and warn against entry.
- ▶ Equipment should be thoroughly decontaminated after use.

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<p>Fire/Explosion Hazard</p>	<ul style="list-style-type: none"> • Combustible solid which burns but propagates flame with difficulty; it is estimated that most organic dusts are combustible (circa 70%) - according to the circumstances under which the combustion process occurs, such materials may cause fires and / or dust explosions. • Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions). • Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust (420 micron or less) may burn rapidly and fiercely if ignited - particles exceeding this limit will generally not form flammable dust clouds; once initiated, however, larger particles up to 1400 microns diameter will contribute to the propagation of an explosion. • In the same way as gases and vapours, dusts in the form of a cloud are only ignitable over a range of concentrations; in principle, the concepts of lower explosive limit (LEL) and upper explosive limit (UEL) are applicable to dust clouds but only the LEL is of practical use; - this is because of the inherent difficulty of achieving homogeneous dust clouds at high temperatures (for dusts the LEL is often called the "Minimum Explosible Concentration", MEC). • When processed with flammable liquids/vapors/mists, ignitable (hybrid) mixtures may be formed with combustible dusts. Ignitable mixtures will increase the rate of explosion pressure rise and the Minimum Ignition Energy (the minimum amount of energy required to ignite dust clouds - MIE) will be lower than the pure dust in air mixture. The Lower Explosive Limit (LEL) of the vapour/dust mixture will be lower than the individual LELs for the vapors/mists or dusts. • A dust explosion may release of large quantities of gaseous products; this in turn creates a subsequent pressure rise of explosive force capable of damaging plant and buildings and injuring people. • Usually the initial or primary explosion takes place in a confined space such as plant or machinery, and can be of sufficient force to damage or rupture the plant. If the shock wave from the primary explosion enters the surrounding area, it will disturb any settled dust layers, forming a second dust cloud, and often initiate a much larger secondary explosion. All large scale explosions have resulted from chain reactions of this type. • Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport. • Build-up of electrostatic charge may be prevented by bonding and grounding. • Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting. • All movable parts coming in contact with this material should have a speed of less than 1-meter/sec. • A sudden release of statically charged materials from storage or process equipment, particularly at elevated temperatures and/ or pressure, may result in ignition especially in the absence of an apparent ignition source. • One important effect of the particulate nature of powders is that the surface area and surface structure (and often moisture content) can vary widely from sample to sample, depending of how the powder was manufactured and handled; this means that it is virtually impossible to use flammability data published in the literature for dusts (in contrast to that published for gases and vapours). • Autoignition temperatures are often quoted for dust clouds (minimum ignition temperature (MIT)) and dust layers (layer ignition temperature (LIT)); LIT generally falls as the thickness of the layer increases. <p>Combustion products include:</p> <ul style="list-style-type: none"> • carbon monoxide (CO) • carbon dioxide (CO₂) • aldehydes • nitrogen oxides (NO_x) • other pyrolysis products typical of burning organic material.
<p>HAZCHEM</p>	<p>22</p>

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

<p>Minor Spills</p>	<ul style="list-style-type: none"> • Clean up all spills immediately. • No smoking, naked lights, ignition sources. • Avoid all contact with any organic matter including fuel, solvents, sawdust, paper or cloth and other incompatible materials, as ignition may result. • Avoid breathing dust or vapours and all contact with skin and eyes. • Control personal contact with the substance, by using protective equipment. • Contain and absorb spill with dry sand, earth, inert material or vermiculite. • DO NOT use sawdust as fire may result. • Scoop up solid residues and seal in labelled drums for disposal.
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FirePro Aerosol Generators – Pre Activation

Major Spills

- Neutralise/decontaminate area.
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear breathing apparatus and protective gloves.
- Prevent, by any means available, spillage from entering drains or water courses.
- No smoking, flames or ignition sources.
- Increase ventilation.
- Contain spill with sand, earth or other clean, inert materials.
- **NEVER USE organic absorbents such as sawdust, paper or cloth.**
- Use spark-free and explosion-proof equipment.
- Collect any recoverable product into labelled containers for possible recycling.
- Avoid contamination with organic matter to prevent subsequent fire and explosion.
- **DO NOT mix fresh with recovered material.**
- Collect residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- Decontaminate equipment and launder protective clothing before storage and re-use.
- If contamination of drains or waterways occurs advise emergency services.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling

- Avoid personal contact and inhalation of dust, mist or vapours.
- Provide adequate ventilation.
- Always wear protective equipment and wash off any spillage from clothing.
- Keep material away from light, heat, flammables or combustibles.
- Keep cool, dry and away from incompatible materials.
- Avoid physical damage to containers.
- **DO NOT** repack or return unused portions to original containers. Withdraw only sufficient amounts for immediate use.
- Use only minimum quantity required.
- Avoid using solutions of peroxides in volatile solvents. Solvent evaporation should be controlled to avoid dangerous concentration of the peroxide.
- Do NOT allow peroxides to contact iron or compounds of iron, cobalt, or copper, metal oxide salts, acids or bases.
- Do NOT use metal spatulas to handle peroxides
- Do NOT use glass containers with screw cap lids or glass stoppers.
- Store peroxides at the lowest possible temperature, consistent with their solubility and freezing point.
- CAUTION: Do NOT store liquids or solutions of peroxides at a temperature below that at which the peroxide freezes or precipitates. Peroxides in this form are extremely shock and heat-sensitive. Refrigerated storage of peroxides must ONLY be in explosion-proof units.
- The hazards and consequences of fires and explosions during synthesis and use of peroxides is widely recognised: spontaneous or induced decomposition may culminate in a variety of ways, ranging from moderate gassing to spontaneous ignition or explosion. The heat released from spontaneous decomposition of an energy-rich compound causes a rise in the surrounding temperature; the temperature will rise until thermal balance is established or until the material heats to decomposition.
- The most effective means for minimising the consequences of an accident is to limit quantities to a practical minimum. Even gram-scale explosions can be serious. Once ignited the burning of peroxides cannot be controlled and the area should be evacuated.
- Unless there is compelling reason to do otherwise, peroxide concentration should be limited to 10% (or less with vigorous reactants). Peroxide concentration is rarely as high as 1% in the reaction mixture of polymerisation or other free-radical reactions.
- Peroxides should be added slowly and cautiously to the reaction medium. This should be completed prior to heating and with good agitation.
- Addition of peroxide to the hot monomer is extremely dangerous. A violent reaction (e.g., fire or explosion) can result from inadvertent mixing of promoters (frequently used with peroxides in polymerisation systems) with full-strength peroxide
- Organic peroxides are very sensitive to contamination (especially heavy-metal compounds, metal oxide salts, alkaline materials including amines, strong acids, and many varieties of dust and dirt). This can initiate rapid, uncontrolled decomposition of peroxides and possible generation of intense heat, fire or explosion. The consequences of accidental contamination from returning withdrawn material to the storage container can be disastrous.
- When handling **NEVER** smoke, eat or drink.
- Always wash hands with soap and water after handling.
- Use only good occupational work practice.
- Observe manufacturer's storage and handling recommendations contained within this SDS.
- Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions)
- Minimise airborne dust and eliminate all ignition sources. Keep away from heat, hot surfaces, sparks, and flame.
- Establish good housekeeping practices.

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	<ul style="list-style-type: none"> ▶ Remove dust accumulations on a regular basis by vacuuming or gentle sweeping to avoid creating dust clouds. ▶ Use continuous suction at points of dust generation to capture and minimise the accumulation of dusts. Particular attention should be given to overhead and hidden horizontal surfaces to minimise the probability of a “secondary” explosion. According to NFPA Standard 654, dust layers 1/32 in (.0.8 mm) thick can be sufficient to warrant immediate cleaning of the area. ▶ Do not use air hoses for cleaning. ▶ Minimise dry sweeping to avoid generation of dust clouds. Vacuum dust-accumulating surfaces and remove to a chemical disposal area. Vacuums with explosion-proof motors should be used. ▶ Control sources of static electricity. Dusts or their packages may accumulate static charges, and static discharge can be a source of ignition. ▶ Solids handling systems must be designed in accordance with applicable standards (e.g. NFPA including 654 and 77) and other national guidance. ▶ Do not empty directly into flammable solvents or in the presence of flammable vapors. ▶ The operator, the packaging container and all equipment must be grounded with electrical bonding and grounding systems. Plastic bags and plastics cannot be grounded, and antistatic bags do not completely protect against development of static charges. <p>Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.</p> <ul style="list-style-type: none"> ▶ Do NOT cut, drill, grind or weld such containers. ▶ In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.
<p>Other information</p>	<ul style="list-style-type: none"> ▶ Store in original containers. ▶ Keep containers securely sealed as supplied. ▶ Store in a cool, well ventilated area. ▶ Keep dry. ▶ Store under cover and away from sunlight. ▶ Store away from flammable or combustible materials, debris and waste. Contact may cause fire or violent reaction. ▶ Store away from incompatible materials and foodstuff containers. ▶ DO NOT stack on wooden floors or pallets. ▶ Protect containers from physical damage. ▶ Check regularly for leaks. ▶ Observe manufacturer’s storage and handling recommendations contained within this SDS.

Conditions for safe storage, including any incompatibilities

<p>Suitable container</p>	<p>Material is contained in special fire fighting unit.</p>
<p>Storage incompatibility</p>	<p>▶ Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous</p>

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
potassium nitrate	Potassium nitrate	9 mg/m3	100 mg/m3	600 mg/m3
bisphenol A/ diglycidyl ether polymer, high molecular weight	Epoxy resin includes EPON 1001, 1007, B20, ERL-2795	90 mg/m3	990 mg/m3	5,900 mg/m3
potassium carbonate	Potassium carbonate	0.55 mg/m3	6 mg/m3	370 mg/m3
magnesium	Magnesium	18 mg/m3	200 mg/m3	1,200 mg/m3





Ingredient	Original IDLH	Revised IDLH
potassium nitrate	Not Available	Not Available
bisphenol A/ diglycidyl ether polymer, high molecular weight	Not Available	Not Available
potassium carbonate	Not Available	Not Available
magnesium	Not Available	Not Available

MATERIAL DATA

None assigned. Refer to individual constituents.

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Exposure controls

Appropriate engineering controls	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.</p> <p>Employers may need to use multiple types of controls to prevent employee overexposure.</p> <p>General exhaust is adequate under normal operating conditions. If risk of overexposure exists, wear SAA approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.</p> <table border="1"> <thead> <tr> <th>Type of Contaminant:</th> <th>Air Speed:</th> </tr> </thead> <tbody> <tr> <td>solvent, vapours, degreasing etc., evaporating from tank (in still air)</td> <td>0.25-0.5 m/s (50-100 f/min)</td> </tr> <tr> <td>aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)</td> <td>0.5-1 m/s (100-200 f/min.)</td> </tr> <tr> <td>direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)</td> <td>1-2.5 m/s (200-500 f/min)</td> </tr> <tr> <td>grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion),</td> <td>2.5-10 m/s (500-2000 f/min.)</td> </tr> </tbody> </table> <p>Within each range the appropriate value depends on:</p> <table border="1"> <thead> <tr> <th>Lower end of the range</th> <th>Upper end of the range</th> </tr> </thead> <tbody> <tr> <td>1: Room air currents minimal or favourable to capture</td> <td>1: Disturbing room air currents</td> </tr> <tr> <td>2: Contaminants of low toxicity or of nuisance value only</td> <td>2: Contaminants of high toxicity</td> </tr> <tr> <td>3: Intermittent, low production.</td> <td>3: High production, heavy use</td> </tr> <tr> <td>4: Large hood or large air mass in motion</td> <td>4: Small hood - local control only</td> </tr> </tbody> </table> <p>Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min.) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.</p> <p>[Before entering a room with the material in aerosol phase vent properly to avoid unnecessary exposure.</p>	Type of Contaminant:	Air Speed:	solvent, vapours, degreasing etc., evaporating from tank (in still air)	0.25-0.5 m/s (50-100 f/min)	aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)	direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min)	grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion),	2.5-10 m/s (500-2000 f/min.)	Lower end of the range	Upper end of the range	1: Room air currents minimal or favourable to capture	1: Disturbing room air currents	2: Contaminants of low toxicity or of nuisance value only	2: Contaminants of high toxicity	3: Intermittent, low production.	3: High production, heavy use	4: Large hood or large air mass in motion	4: Small hood - local control only
	Type of Contaminant:	Air Speed:																			
solvent, vapours, degreasing etc., evaporating from tank (in still air)	0.25-0.5 m/s (50-100 f/min)																				
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)																				
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min)																				
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion),	2.5-10 m/s (500-2000 f/min.)																				
Lower end of the range	Upper end of the range																				
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents																				
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3: Intermittent, low production.	3: High production, heavy use																				
4: Large hood or large air mass in motion	4: Small hood - local control only																				
Personal protection	   																				
Eye and face protection	None under normal operating conditions.																				
Skin protection	See Hand protection below																				
Hands/feet protection	None under normal operating conditions.																				
Body protection	See Other protection below																				
Other protection	None under normal operating conditions.																				
Thermal hazards	Not Available																				

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Off-white odourless powder, insoluble in water.		
Physical state	Manufactured	Relative density (Water =	Not Applicable

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Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Applicable
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Applicable
Initial boiling point and boiling range (°C)	Not Applicable	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Applicable	Taste	Not Available
Evaporation rate	Not Applicable	Explosive properties	Not Available
Flammability	Not Applicable	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Applicable	Surface Tension (dyn/cm or mN/m)	Not Applicable
Lower Explosive Limit (%)	Not Applicable	Volatile Component (%vol)	Not Applicable
Vapour pressure (kPa)	Not Applicable	Gas group	Not Available
Solubility in water (g/L)	Immiscible	pH as a solution (1%)	Not Applicable
Vapour density (Air = 1)	Not Applicable	VOC g/L	Not Applicable

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> Unstable in the presence of incompatible materials. Product is considered stable under normal handling conditions. Prolonged exposure to heat. Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	<p>Not normally a hazard due to physical form of product.</p> <p>Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs. Respiratory tract irritation often results in an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular system.</p> <p>Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.</p> <p>If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.</p>
Ingestion	<p>Not normally a hazard due to physical form of product.</p> <p>Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.</p> <p>The substance and/or its metabolites may bind to haemoglobin inhibiting normal uptake of oxygen. This condition, known as "methaemoglobinemia", is a form of oxygen starvation (anoxia).</p> <p>Symptoms include cyanosis (a bluish discolouration skin and mucous membranes) and breathing difficulties. Symptoms may not be evident until several hours after exposure.</p> <p>At about 15% concentration of blood methaemoglobin there is observable cyanosis of the lips, nose and earlobes. Symptoms may be absent although euphoria, flushed face and headache are commonly experienced. At 25-40%,</p>

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	<p>cyanosis is marked but little disability occurs other than that produced on physical exertion. At 40-60%, symptoms include weakness, dizziness, lightheadedness, increasingly severe headache, ataxia, rapid shallow respiration, drowsiness, nausea, vomiting, confusion, lethargy and stupor. Above 60% symptoms include dyspnea, respiratory depression, tachycardia or bradycardia, and convulsions. Levels exceeding 70% may be fatal.</p>
Skin Contact	<p>Not normally a hazard due to physical form of product. The material produces moderate skin irritation; evidence exists, or practical experience predicts, that the material either</p> <ul style="list-style-type: none"> ▸ produces moderate inflammation of the skin in a substantial number of individuals following direct contact, and/or ▸ produces significant, but moderate, inflammation when applied to the healthy intact skin of animals (for up to four hours), such inflammation being present twenty-four hours or more after the end of the exposure period. <p>Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis. The material may accentuate any pre-existing dermatitis condition Open cuts, abraded or irritated skin should not be exposed to this material</p>
Eye	<p>Not normally a hazard due to physical form of product. Evidence exists, or practical experience predicts, that the material may cause severe eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Eye contact may cause significant inflammation with pain. Corneal injury may occur; permanent impairment of vision may result unless treatment is prompt and adequate. Repeated or prolonged exposure to irritants may cause inflammation characterised by a temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.</p>
Chronic	<p>Practical experience shows that skin contact with the material is capable either of inducing a sensitisation reaction in a substantial number of individuals, and/or of producing a positive response in experimental animals. Limited evidence shows that inhalation of the material is capable of inducing a sensitisation reaction in a significant number of individuals at a greater frequency than would be expected from the response of a normal population. Pulmonary sensitisation, resulting in hyperactive airway dysfunction and pulmonary allergy may be accompanied by fatigue, malaise and aching. Significant symptoms of exposure may persist for extended periods, even after exposure ceases. Symptoms can be activated by a variety of nonspecific environmental stimuli such as automobile exhaust, perfumes and passive smoking. Exposure to the material may cause concerns for human fertility, on the basis that similar materials provide some evidence of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects, but which are not a secondary non-specific consequence of other toxic effects.</p> <p>Long term exposure to high dust concentrations may cause changes in lung function (i.e. pneumoconiosis) caused by particles less than 0.5 micron penetrating and remaining in the lung. A prime symptom is breathlessness. Lung shadows show on X-ray.</p>

FirePro Aerosol Generators – Pre Activation	TOXICITY	IRRITATION
	Not Available	Not Available
potassium nitrate	<p>dermal (rat) LD50: >5000 mg/kg^[1] Oral (rat) LD50: >2000 mg/kg^[1]</p>	Not Available
bisphenol A/ diglycidyl ether polymer, high molecular weight	<p>dermal (rat) LD50: >1200 mg/kg^[2] Oral (rat) LD50: >1000 mg/kg^[2]</p>	Eye (rabbit): 100 mg - mild
potassium carbonate	<p>Dermal (rabbit) LD50: >2000 mg/kg^[1] Oral (rat) LD50: 1870 mg/kg^[2]</p>	Not Available
magnesium	Oral (rat) LD50: >2000 mg/kg ^[1]	Not Available
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS- Register of Toxic Effect of chemical Substances	

BISPHENOL A/ DIGLYCIDYL ETHER POLYMER, HIGH MOLECULAR WEIGHT	<p>The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for</p>
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contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested. The chemical structure of hydroxylated diphenylalkanes or bisphenols consists of two phenolic rings joined together through a bridging carbon. This class of endocrine disruptors that mimic oestrogens is widely used in industry, particularly in plastics. Bisphenol A (BPA) and some related compounds exhibit oestrogenic activity in human breast cancer cell line MCF-7, but there were remarkable differences in activity. Several derivatives of BPA exhibited significant thyroid hormonal activity towards rat pituitary cell line GH3, which releases growth hormone in a thyroid hormone-dependent manner. However, BPA and several other derivatives did not show such activity. Results suggest that the 4-hydroxyl group of the A-phenyl ring and the B-phenyl ring of BPA derivatives are required for these hormonal activities, and substituents at the 3,5-positions of the phenyl rings and the bridging alkyl moiety markedly influence the activities. Bisphenols promoted cell proliferation and increased the synthesis and secretion of cell type-specific proteins. When ranked by proliferative potency, the longer the alkyl substituent at the bridging carbon, the lower the concentration needed for maximal cell yield; the most active compound contained two propyl chains at the bridging carbon. Bisphenols with two hydroxyl groups in the para position and an angular configuration are suitable for appropriate hydrogen bonding to the acceptor site of the oestrogen receptor.

The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.

In mice, dermal application of bisphenol A diglycidyl ether (BADGE) (1, 10, or 100 mg/kg) for 13 weeks produced mild to moderate chronic active dermatitis. At the high dose, spongiosis and epidermal micro abscess formation were observed. In rats, dermal application of BADGE (10, 100, or 1000 mg/kg) for 13 weeks resulted in a decrease in body weight at the high dose. The no-observable effect level (NOEL) for dermal exposure was 100 mg/kg for both sexes. In a separate study, application of BADGE (same doses) five times per week for ~13 weeks not only caused a decrease in body weight but also produced chronic dermatitis at all dose levels in males and at >100 mg/kg in females (as well as in a satellite group of females given 1000 mg/kg).

Reproductive and Developmental Toxicity: BADGE (50, 540, or 750 mg/kg) administered to rats via gavage for 14 weeks (P1) or 12 weeks (P2) produced decreased body weight in all males at the mid dose and in both males and females at the high dose, but had no reproductive effects. The NOEL for reproductive effects was 750 mg/kg.

Carcinogenicity: IARC concluded that "there is limited evidence for the carcinogenicity of bisphenol A diglycidyl ether in experimental animals." Its overall evaluation was "Bisphenol A diglycidyl ether is not classifiable as to its carcinogenicity to humans (Group 3).

In a lifetime tumourigenicity study in which 90-day-old C3H mice received three dermal applications per week of BADGE (undiluted dose) for 23 months, only one out of 32 animals developed a papilloma after 16 months. A retest, in which skin paintings were done for 27 months, however, produced no tumours (Weil et al., 1963). In another lifetime skin-painting study, BADGE (dose n.p.) was also reported to be noncarcinogenic to the skin of C3H mice, it was, however, weakly carcinogenic to the skin of C57BL/6 mice (Holland et al., 1979, cited by Canter et al., 1986). In a two-year bioassay, female Fisher 344 rats dermally exposed to BADGE (1, 100, or 1000 mg/kg) showed no evidence of dermal carcinogenicity but did have low incidences of tumours in the oral cavity (U.S. EPA, 1997).

Genotoxicity: In *S. typhimurium* strains TA100 and TA1535, BADGE (10-10,000 ug/plate) was mutagenic with and without S9; negative results were obtained in TA98 and TA1537 (Canter et al., 1986; Pullin, 1977). In a spot test, BADGE (0.05 or 10.00 mg) failed to show mutagenicity in strains TA98 and TA100 (Wade et al., 1979). Negative results were also obtained in the body fluid test using urine of female BDF and ICR mice (1000 mg/kg BADGE), the mouse host-mediated assay (1000 mg/kg), micronucleus test (1000 mg/kg), and dominant lethal assay (~3000 mg/kg).

Immunotoxicity: Intracutaneous injection of diluted BADGE (0.1 mL) three times per week on alternate days (total of 8 injections) followed by a three-week incubation period and a challenge dose produced sensitisation in 19 of 20 guinea pigs.

Consumer exposure to BADGE is almost exclusively from migration of BADGE from can coatings into food. Using a worst-case scenario that assumes BADGE migrates at the same level into all types of food, the estimated per capita daily intake for a 60-kg individual is approximately 0.16 ug/kg body weight/day. A review of one- and two-generation reproduction studies and developmental investigations found no evidence of reproductive or endocrine toxicity, the upper ranges of dosing being determined by maternal toxicity. The lack of endocrine toxicity in the reproductive and developmental toxicological tests is supported by negative results from both in vivo and in vitro assays designed specifically to detect oestrogenic and androgenic properties of BADGE. An examination of data from sub-chronic and chronic toxicological studies support a NOAEL of 50 mg/ kg/body weight day from the 90-day study, and a NOAEL of 15 mg/kg body weight/day (male rats) from the 2-year carcinogenicity study. Both NOAELs are considered appropriate for risk assessment. Comparing the estimated daily human intake of 0.16 ug/kg body weight/day with the NOAELs of 50 and 15 mg/kg body weight/day shows human exposure to BADGE from can coatings is between 250,000 and 100,000-fold lower than the NOAELs from the most sensitive toxicology tests. These large margins of safety together with lack of reproductive, developmental, endocrine and carcinogenic effects supports the continued use of BADGE for use in articles intended to come into contact with foodstuffs.

for RTECS No: SL 6475000: (liquid grade) Equivocal tumourigen by RTECS criteria Somnolence, dyspnea, peritonitis

POTASSIUM CARBONATE

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to

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hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

Acute Toxicity	✓	Carcinogenicity	⊗
Skin Irritation/Corrosion	✓	Reproductivity	⊗
Serious Eye Damage/Irritation	✓	STOT - Single Exposure	⊗
Respiratory or Skin sensitisation	✓	STOT - Repeated Exposure	⊗
Mutagenicity	⊗	Aspiration Hazard	⊗

Legend: **X** – Data available but does not fill the criteria for classification
✓ – Data available to make classification
⊗ – Data Not Available to make classification

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

FirePro Aerosol Generators – Pre Activation	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available

potassium nitrate	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	22.5mg/L	4

bisphenol A/ diglycidyl ether polymer, high molecular weight	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	1.2mg/L	2
	EC50	72	Algae or other aquatic plants	9.4mg/L	2
	NOEC	72	Algae or other aquatic plants	2.4mg/L	2

potassium carbonate	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	68mg/L	2
	EC50	48	Crustacea	200mg/L	2
	NOEC	96	Fish	33mg/L	2

magnesium	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	541mg/L	2
	EC50	72	Algae or other aquatic plants	>20mg/L	2
	NOEC	72	Algae or other aquatic plants	>25.5mg/L	2

Legend: Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
potassium nitrate	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
potassium nitrate	LOW (LogKOW = 0.209)

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Mobility in soil

Ingredient	Mobility
potassium nitrate	LOW (KOC = 14.3)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	
	<ul style="list-style-type: none"> Recycle wherever possible or consult manufacturer for recycling options. Consult State Land Waste Management Authority for disposal. Bury residue in an authorised landfill. Recycle containers if possible, or dispose of in an authorised landfill.

SECTION 14 TRANSPORT INFORMATION

Labels Required

	
Marine Pollutant	NO
HAZCHEM	2Z

Land transport (ADG)

UN number	3335
UN proper shipping name	AVIATION REGULATED SOLID, N.O.S. Not subject to this Code (see SP 106) (contains potassium nitrate)
Transport hazard class(es)	Class : 9 Subrisk : Not Applicable
Packing group	Not Applicable
Environmental hazard	Not Applicable
Special precautions for user	Special provisions : 106 274 276 Limited quantity : 0

Air transport (ICAO-IATA / DGR)

UN number	3335
UN proper shipping name	Aviation regulated solid, n.o.s. * (contains potassium nitrate)
Transport hazard class(es)	ICAO/IATA Class : 9 ICAO / IATA Subrisk : Not Applicable ERG Code : 9A
Packing group	Not Applicable
Environmental hazard	Not Applicable
Special precautions for user	Special provisions : A27 Cargo Only Packing Instructions : 956 Cargo Only Maximum Qty / Pack : 400 kg Passenger and Cargo Packing Instructions : 956 Passenger and Cargo Maximum Qty / Pack : 100 kg Passenger and Cargo Limited Quantity Packing Instructions : Y956 Passenger and Cargo Limited Maximum Qty / Pack : 30 kg G

Sea transport (IMDG-Code / GGVSee)

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UN number	3335	
UN proper shipping name	AVIATION REGULATED SOLID, N.O.S. (contains potassium nitrate)	
Transport hazard class(es)	IMDG Class	9
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	Not Applicable
	Special provisions	960
	Limited Quantities	Not Applicable

Transport in bulk according to Annex II of MARPOL and the IBC code
Not Applicable

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

POTASSIUM NITRATE(7757-79-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Inventory of Chemical Substances (AICS)

BISPHENOL A/ DIGLYCIDYL ETHER POLYMER, HIGH MOLECULAR WEIGHT(25068-38-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Hazardous Substances Information System - Consolidated Lists Australia Inventory of Chemical Substances (AICS)

POTASSIUM CARBONATE(584-08-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Hazardous Substances Information System - Consolidated Lists Australia Inventory of Chemical Substances (AICS)

MAGNESIUM(7439-95-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Hazardous Substances Information System - Consolidated Lists Australia Inventory of Chemical Substances (AICS)

National Inventory	Status
Australia - AICS	Y
Canada - DSL	Y
Canada - NDSL	N (potassium carbonate, bisphenol A/ diglycidyl ether polymer, high molecular weight, magnesium, potassium nitrate)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	N (bisphenol A/ diglycidyl ether polymer, high molecular weight; magnesium)
Korea - KECI	Y
New Zealand - NZIoC	Y
Philippines - PICCS	Y
USA - TSCA	Y

Legend:
Y = All ingredients are on the inventory
N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)

SECTION 16 OTHER INFORMATION

Other information

Ingredients with multiple cas numbers

Name	CAS No
potassium carbonate	584-08-7, 6381-79-9, 30095-94-4

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are

Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC – TWA: Permissible Concentration-Time Weighted Average
PC – STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit.
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

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TEL (+61 3) 9572 4700.

8 APPENDIX AND TECHNICAL DATA

8.1 Fire Protection – Extinguisher Agent Change Drawings and Data Sheet information



FirePro.

INDUSTRIES:

- National Electricity Authorities
- Petrochemical Oil & Gas
- Manufacturing Industries
- Telecommunications
- Marine Industry
- Mining Industry
- Railway Industry
- And more ...

APPLICATIONS:

- Data Centres
- Control Rooms
- Server Rooms
- Plant Rooms
- Electrical Panels & Substations
- Engine rooms
- Mining Vehicles
- Wind Turbines
- Warehouses & Archives
- And more ...

ADVANTAGES:

- No distribution piping, manifold or nozzles required
- Space and weight saving.
- Easy installation and retrofitting.
- Easy to transport.
- Offers local total flooding protection capability, which combats and restricts the fire at its source.
- Easily connected to existing conventional fire detection and activation systems.
- Negligible maintenance costs during their life time compared to other conventional systems.
- No special handling or licenses for compressed gas cylinders.
- No system pressurization or room integrity tests.
- Operating temperatures ranging from -50°C to +150°C with humidity of up to 98%.



Suspended Ceiling

Main Room

Raised Floor

Classes of Fire



System Design

The FIREPRO Fire Extinguishing Aerosol Systems are designed for total flooding protection in compliance with all the relevant Standards: ISO 15779, UL 2775, NFPA 2010, CEN/TR 15276, AS5062 and AS4487. The Systems' electrical and electronic control units and accessories are engineered and fully certified for their compatibility and provide circuit monitoring. FirePro Aerosol Generators and FirePro Control Panels are listed independently and certified as an integrated system.

FP-1200S

Gross Weight(g): 10900
Net Weight(g): 1200
Dimension(mm): 216 x 300 x 167



FP-2000S

Gross Weight(g): 15900
Net Weight(g): 2000
Dimension(mm): 300 x 300 x 185



FP-3000S

Gross Weight(g): 16700
Net Weight(g): 3000
Dimension(mm): 300 x 300 x 185



FP-5700S

Gross Weight(g): 26800
Net Weight(g): 5700
Dimension(mm): 300 x 300 x 300



FP-0500S

Gross Weight(g): 3340
Net Weight(g): 500
Dimension(mm): 260 x 84



FP-0200S

Gross Weight(g): 1840
Net Weight(g): 200
Dimension(mm): 130 x 84



FP-0080S

Gross Weight(g): 870
Net Weight(g): 80
Dimension(mm): 185 x 51



FP-0020SE

Gross Weight(g): 310
Net Weight(g): 20
Dimension(mm): 165 x 32



FP-0100S

Gross Weight(g): 1370
Net Weight(g): 100
Dimension(mm): 120 x 84



FP-0040S

Gross Weight(g): 610
Net Weight(g): 40
Dimension(mm): 140 x 51



The FirePro Principle



Condensed Aerosol, extinguishes fire by inhibiting the chain chemical reaction present in the fire on a molecular level removing the flame free radicals without depleting the oxygen.

The environment friendly materials used are the result of many years of research and development

Environment Friendly




Environment Considerations

- Atmospheric Lifetime = Negligible
- Ozone Depletion Potential = 0
- Global Warming Potential = 0
- No Oxygen Depletion
- ISO 14001 Certified
- Non-Toxic
- HFC Free
- CFC Free






Distribution Network

- | | |
|----------------|-------------------------------|
| Europe | Middle East & Gulf |
| Albania | Bahrain |
| Belgium | Iran |
| Bulgaria | Iraq |
| Croatia | Israel |
| Cyprus | Jordan |
| Czech Republic | Kingdom of Saudi Arabia |
| Denmark | Lebanon |
| Estonia | Oman |
| Finland | Qatar |
| France | Syria |
| Greece | UAE |
| Hungary | |
| Iceland | Asia & Australasia |
| Ireland | Australia |
| Italy | Bangladesh |
| Kosovo | Georgia |
| Luxembourg | Hong Kong |
| Malta | India |
| Netherlands | Indonesia |
| Norway | Malaysia |
| Poland | New Zealand |
| Portugal | Philippines |
| Romania | Singapore |
| Serbia | South Korea |
| Spain | Sri Lanka |
| Sweden | Taiwan |
| Switzerland | Thailand |
| United Kingdom | Turkey |
| | Vietnam |
| America | Africa |
| Argentina | Egypt |
| Brazil | Kenya |
| Canada | Morocco |
| Chile | Nigeria |
| Uruguay | South Africa |
| U.S.A | Sudan |
| | Tunisia |

Certified, Listed, Approved by:



And more ...

Available Australia wide

For more information, please contact:



Fire Safety Equipment Pty Ltd
www.fsequip.com.com.au | sales@fsequip.com.au

<p>NSW Office and Warehouse Unit 2, 110 Bonds Road, Berrwood, NSW 2203 PO Box 340, Caringbah, NSW, 2223</p> <p>Ph: (02) 91537578 Int Ph: +612 91 53 7578 Fax: (02) 9521 7159 Int Fax: +612 9533 7159</p>	<p>QLD Office and Warehouse 2A Staple Street, Seventeen Mile Rocks QLD 4073 PO Box 250, Mt Ommanney, QLD, 4074</p> <p>Ph: (07) 3715 5044 Int Ph: +617 37 15 5044 Fax: (07) 3715 8450 Int Fax: +617 37 15 8450</p>
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Intervening
Fire Suppression

Wiring Looms Splitter Cables

Rev 1.3

WIRING LOOMS

Systems are prepared using wiring Looms. These looms use 0.75mm stranded class 5 shielded fire Rated Cables. These are coloured red in accordance with Australian Standards for fire systems. The cables are colour coded using coloured cable ties:

The connections are made using Deutsch Plugs(DT Series) and these are provided in the kit for each system



SPLITTER CABLE

Where multiple FirePro generators are used, the activation splitter cables can be used. These are fitted in the cable assembly – this is important for the monitoring and activation circuits.



DEUTSCH PLUGS – DT Series

Deutsch Plugs (DT Series) environmentally sealed connectors are designed specifically for cable to cable applications. The connectors are suitable for harsh environment applications where even a small degradation in connection may be critical. Thermoplastic housings offer a wide operating temperature range -55°C to 125°C and silicone rear wire and interface seals allow the connectors to withstand dust and moisture rated to **IP68**. Suitable for up to 13 amps continuous. Contacts: Copper Alloy, Nickel Plated

DT series have been successfully tested to the 20 mm Flammability Test per Standard UL-94.



For crimping the connector pins we recommend using the correct Deutsch Crimping tool as shown.



FirePro Simulator Model 08800

Rev1.1

1 GENERAL OPERATIONS

FirePro Simulator used with the following Panels

- FP-08100
- FP-08350
- FP-08450
- FP-08451
- FP-C2

- Battery Power Supply & Indicators** - The simulator has a single indicator light. The unit has a latching indicator – will stay illuminated until reset.
- Pressing the Test/Reset button** will reset the simulator, and will illuminate the light to show that the unit and internal battery is operating properly. The simulator should be reset after each test is performed.
- Replacing the battery** – The simulator is operated by a standard 9V alkaline battery. To replace the battery remove the back plate.





RAMFireCRO-F3 - Fire Resistant Cable, low smoke, Halogen Free

Application

Suitable for the connection between the sensors and the control of fire detection systems are required when special features such as: fire resistance, reduced emission of opaque smoke, the reduced emission of toxic and corrosive gases and halogen-free.

Technical Data & Standard References

Fire Performance	EN 50200 PH120 IEC 60331-21
Test on Single Cable	IEC 60332-1
Test on Bunched Cables	IEC 60332-3
Limiting Oxygen Prefix	Min 37%
Smoke Density	IEC 61034
Amount of halogen acid gas	IEC 60754-1 Max 0.5%
Acidity (PH value) and conductivity	IEC 60754-2

Construction

Formation	2 Core
Conductor Cross Section	0.75mm ²
Conductor	Plain Annealed copper wire, multistrand
Insulation	Special mix Silicon Rubber
Colour Code	Black, Red
Wrapping	I layer plastic tape 0.023mm
Collective screen	0.026mm Aluminium / PETP tape over tinned copper drain wire
Outer Sheath	THERMOPLASTIC Low Smoke, Halogen Free – LSZH - Red
Outer Diameter (nominal)	6.3mm

Electrical & Mechanical Data

DC Resistance per Core at 20°C	Max 27.1 Ω/km
Insulation Resistance at 20°C	Min 200 MΩ*km
Mutual Capacitance	Max 115 nF/km
Inductance	Max MH/km 1
Test Voltage Core / Core /Screen	2000 V
L/R Ratio	Max 25 μH/Ω
Operating Voltage	300 V
Temperature Range	-40°C to +75°C
Minimum Bend Radius	50mm
Weight Approx	61kg / km



■ **FP-500S**
Product Code: 10145
Product Description: FirePro
Fire Extinguishing Generator FP-500S.

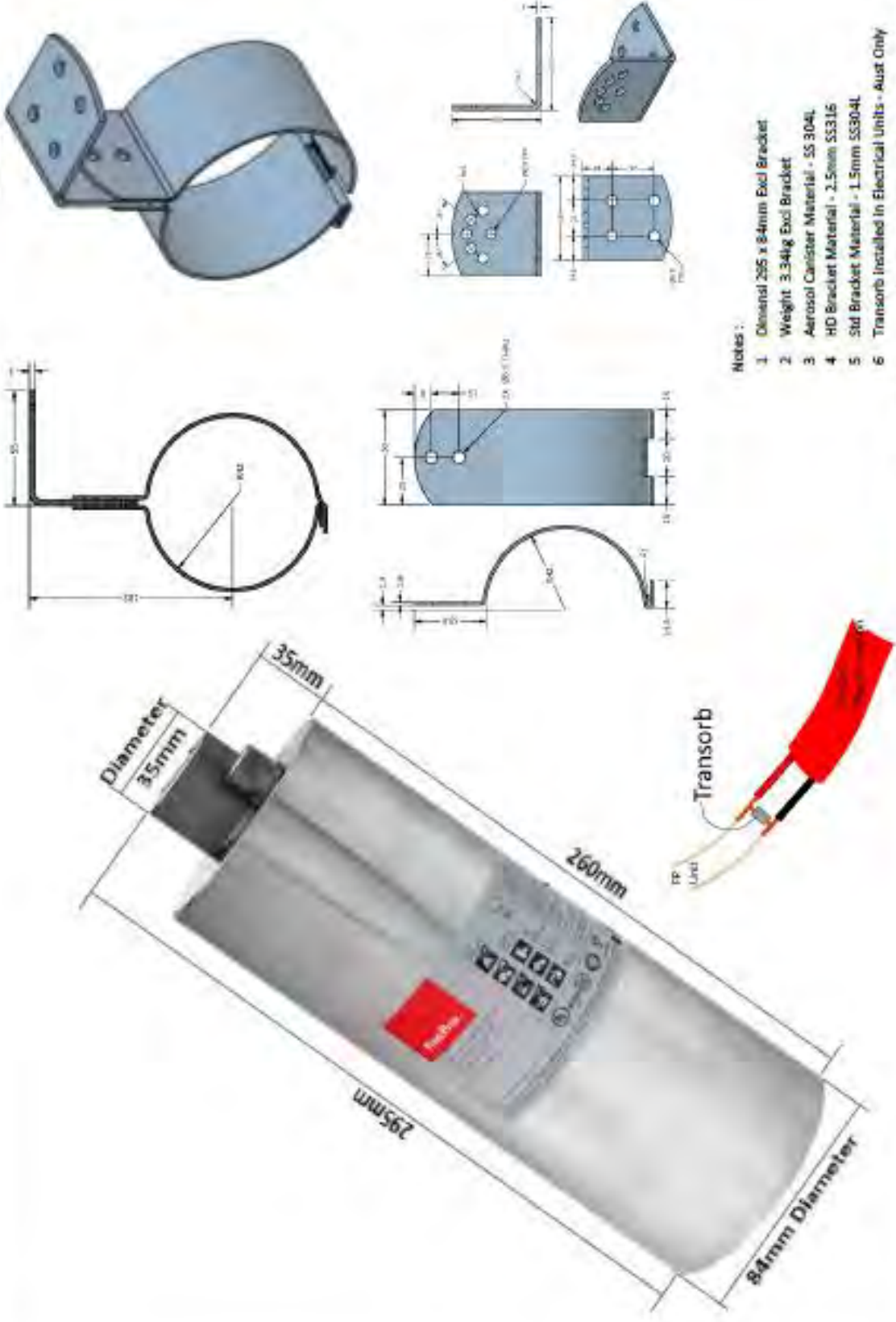
Features:
 - 100% Halon Free
 - 3000psi

TECHNICAL INFORMATION

Model	FP-500S
Activation mechanism	Thermal Electrical (min 1.5V DC, 0.8A in 3-4 sec)
Activator type	Heating element with 2.3 ohms resistance
Current intensity to be tested	Maximum 5 mA
Weight (gross)	3340 g (excluding bracket)
Mass of PFC compound	500 g
Operational discharge time	5 - 30 seconds
Discharge length	3 m
Dimensions (height - diameter)	295 mm - 84 mm (incl. connector housing)
Fire class	A, B, C, F

Operating temperatures: -54°C to +34°C | Generators are provided complete with brackets

FirePro.

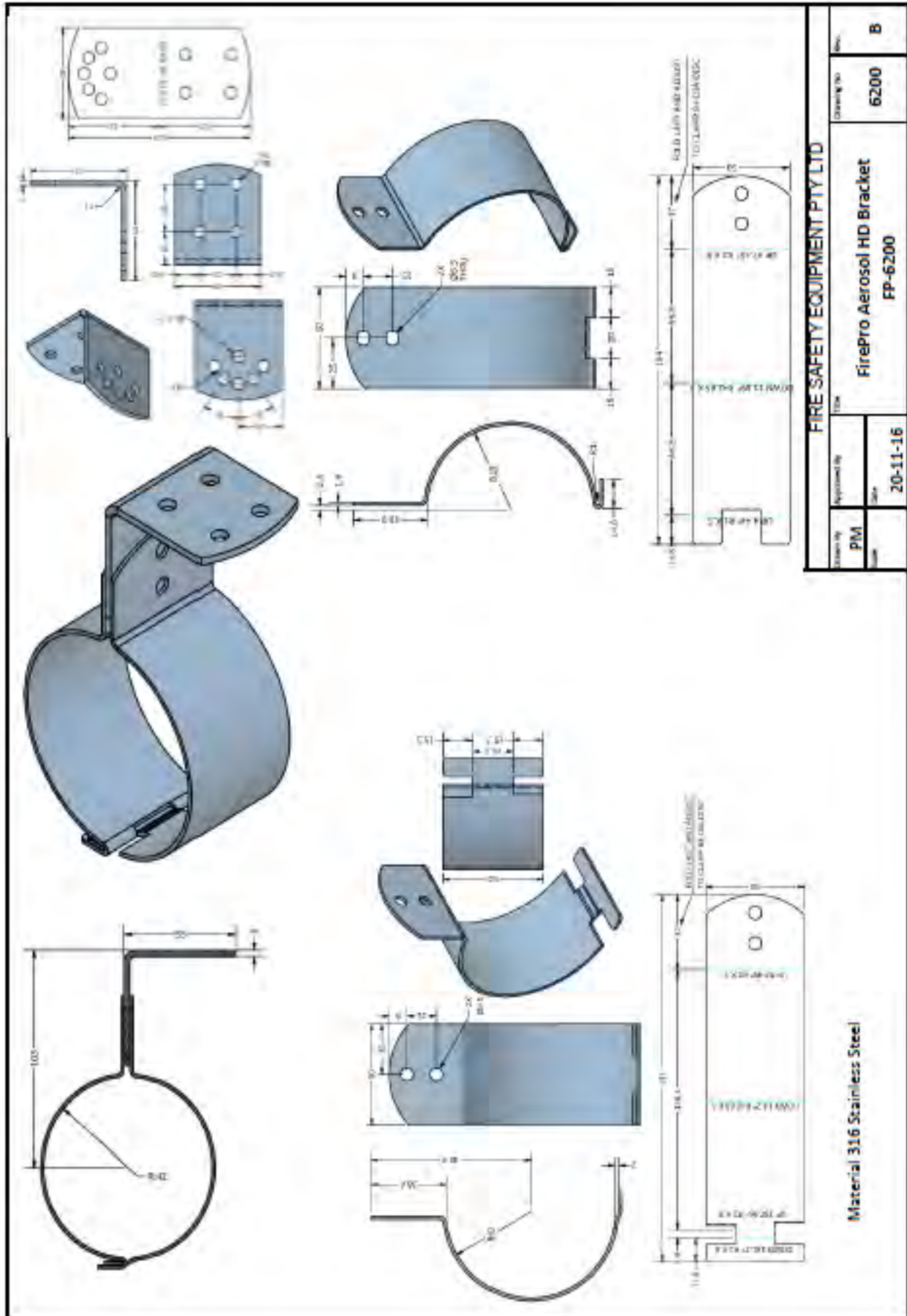


HD Bracket - 142x125mm

Notes :

1. General 255 x 84mm Excl Bracket
2. Weight 3.34kg Excl Bracket
3. Aerosol Cartridge Material - SS 304L
4. HD Bracket Material - 2.5mm SS316
5. Std Bracket Material - 1.5mm SS304L
6. Transorb Installed in Electrical Units - Aust Only

FOR SAFETY EQUIPMENT PTY LTD	
PROJECT	Fire Pro Aerosol Generator
DATE	2011/08
REV	01
REV	02
REV	03
REV	04
REV	05
REV	06
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REV	09
REV	10
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REV	98
REV	99
REV	100



Actuation Switch Assembly P/N: S-14053

Data Sheet

- For use with Suppression Systems
- Suitable for high vibration environments such as in vehicles and marine vessels
- Comes with safety pin and anti-tamper tie to prevent accidental discharge
- Moulded aluminium assembly with water proof switch mechanism
- Stainless Steel (316SS) switch guard available for external applications
- Made In the USA

Description:

S-14053 Actuation Switch
for internal use or
recessed mounting



Description:

S-14053 Actuation Switch
with External Switch Guard

MODEL		S-14053
Finish		Aluminium
Contact Rating		50vDC 10A
Contact Configuration		Normally Open
Switch Operation		Momentary
Dimensions		
Normal	mm	51Lx51Wx38D
With Switch Guard	mm	100Lx80Wx64D