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ACTIVE FIRE PROTECTION-EQUIPMENT LISTING SCHEME
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PRODUCT LISTING DATA SHEET
(Active Fire Protection Equipment)

Product designation

Pyrogen™, MAG Series, pyrotechnically-generated, fine aerosol-powder type fire-extinguishing system

(Refer to the Technical Specification section of this document for further specific detail)

Supplier

Pyrogen Technologies (Aust) Pty Ltd
18 Barry Avenue, MORTDALE, NSW, AUSTRALIA, 2223

Manufacturer

Pyrogen Technologies Sdn Bhd
No. 17, Jalan Pemberita U1/49, Temasaya Industrial Park, SELANGER DARUL ESHAN, KUALA LUMUR, MALAYSIA, 40105 Shah Alam

Supplier's description

The Pyrogen™, MAG Series, Pyrotechnically-generated, Fine Aerosol-powder Type Fire-Extinguishing System is a pre-engineered compact, non-stored pressure, electrically- or thermally-actuated fixed fire protection system which extinguishes fire by using an extremely fine low settling-rate chemical dry-powder plus inert gases. The powder particles are induced into the fire and quickly cause complete chemical inhibition of the fire's radicle-forming chain-reactions. This, together with the oxygen dilution and cooling produced by the inert gases, rapidly extinguishes the flaming combustion of most fuels. The chemical dry-powder and inert gases are produced by a rapid but non-explosive exothermic reaction, of a patented "aerosol-forming substance", which commences within the shell of each Pyrogen™ "generator" immediately after electric or thermal initiation. During the reaction, the inert gases and "micron-sized" particles of powdered chemical extinguishant are forcefully ejected from the nozzle holes of the generator and thereby thoroughly mixed with most of the atmosphere within the protected area. The inert gases emitted by the generator are predominantly nitrogen, carbon dioxide, and water vapour, with lesser amounts of carbon monoxide and gaseous compounds of nitrogen. At more than 0.5 metres beyond the nozzle openings, with no fire, the temperature within the discharge jet of a MAG Series generator is unlikely to exceed 75°C. The external surfaces of the generator casing will usually not exceed 250°C.

The electrical ignition of the MAG Series generators is by means of a "match-head squib" located inside the generator. Any extinguishing system control panel capable of energising a small solenoid valve is likely to be capable of igniting one or several MAG generators simultaneously. A suitable panel should be chosen by reference to the Pyrogen System Manual, or with the help of an authorised Pyrogen equipment supplier.

The supplied equipment of a Pyrogen™, MAG Series, Pyrotechnically-generated, Fine Aerosol-powder Type Fire-Extinguishing System includes listed mounting bands/yokes, mounting brackets, and all necessary fasteners to attach these to the generator. A military-type weather- and vibration-resistant electrical connector plug is also furnished with all generators. A pyrotechnic-type "fire-conducting cord", complete with coupling gland-nut to suit the thermal igniter socket tapping of the generator, is also supplied when specifically ordered. This cord is installed near, or within, items of equipment to be protected, such that flames from the burning equipment will impinge on the "cord", causing it to ignite and transmit flame to its associated MAG generator.

The Pyrogen™, MAG Series, Pyrotechnically-generated, Fine Aerosol-powder Type Fire-Extinguishing System is suitable for use in marine or tropical environments, as evidenced by results of its testing for resistance to vibration,

This product listing data sheet should be read in conjunction with the general requirements of the terms and conditions of listing under the ActivFire Scheme.

Executive Officer

† Listing may be subject to amendment, suspension or withdrawal at any time. Always verify current status.

salt-spray corrosion, and moisture ingress. Accidental and deliberate releases of Pyrogen™ aerosol do not contribute to global atmospheric warming or ozone depletion.

Conformance criteria and evaluation

The Pyrogen™, MAG Series, pyrotechnically-generated, fine aerosol-powder type fire-extinguishing system has been evaluated and verified as conforming with the relevant requirements of the following criteria.

1. SSL Appraisal Specification FAS-116, 'Pyrotechnically-generated Fine Aerosol Powder Type Fire-extinguishing Units'.
2. Australian/New Zealand Standard AS/NZS 4487:1997, 'Pyrogen fire extinguishing aerosol systems'.

Listing is subject to ActivFire Scheme terms and conditions as applicable to the designated registrant and supplier.

Limitations/conditions of conformance

Limitations/conditions of conformance, where identified on this Product Listing Data Sheet, are derived from qualifications within the report of the testing agency and/or other related technical documentation. It is recommended that all details with respect to design, assembly and installation restrictions should be checked against the designated supplier's/manufacturer's current technical manual/data sheets and the requirements of the Authority having Jurisdiction.

Specified limitations/conditions, determined from the evaluation for conformity, include the following.

i. For use only where the ambient temperature of the MAG generators will be between -50°C and +60°C. System design and installation shall be done strictly in accordance with the Design, Operation & Maintenance Manual, Pyrogen™ Industrial Fixed aerosol Fire Suppression System, Revision No. 1.6, Issued 10 August 1999 (Pyrogen™ Part No. D98-0010).

Evaluated only for the following protected enclosure height limitations.

Generator	Max enclosure height	Generator	Max enclosure height	Generator	Max enclosure height
MAG-1	1 m	MAG-5	3.5 m	MAG-14	4 m
MAG-2	1.25 m	MAG-11	3.5 m	MAG-15	4.5 m
MAG-3	2.5 m	MAG-12	3.5 m	MAG-16	4.5 m
MAG-4	3.5 m	MAG-13	4 m	MAG-17	5 m

Due to a potential hazard of high temperatures (250° to 600°C) of the Pyrogen aerosol at the end-plate nozzle, the following minimum clearances from the discharge nozzle for each type of MAG generator should be observed during installation.

Generator	Clearance	Generator	Clearance
MAG-1	300 mm	MAG-4 for each end nozzle	1300 mm
MAG-2	400 mm	MAG-5	700 mm
MAG-3	1000 mm	MAG-11 to MAG-17	1500 to 2000 mm

Pyrogen™ aerosol is not suitable for use in occupiable areas because the recommended extinguishing concentrations result in an atmosphere within the protected enclosure which can not safely be breathed for a prolonged period. This is due to the resulting level of carbon monoxide, even without the occurrence of fire. Enclosure venting shall be provided, and designed to ensure that when the system is discharged, the resulting temporary increase in pressure within the enclosure can not unacceptably damage it, or harm any occupants.

Generators shall always be mounted by using appropriate mounting accessories chosen from those listed on this Data Sheet. Use of improvised or non-listed mounting accessories can cause heat damage of supporting structure, damage to the generator, or premature failure of the installation where vibration is present.

Technical specification

The following details are a representative extract of the technical specification for the Pyrogen™, MAG Series, Pyrotechnically-generated, Fine Aerosol-powder Type Fire-Extinguishing System and may be subject to change. Complete and current details should be determined from the designated supplier's/manufacturer's technical manual/data sheets.

Parameter	Mass of generator (g)	Mass of aerosol forming composition (g)	Max protected volume, m^3 @100g/m^3	Nozzle outlet	Length, (mm)	Diameter, (mm)	Discharge time (s)
MAG-02	110	20	0.2	bi	120	25	< 2.0
MAG-1	400	60	0.6	mono	80	75	< 3.0
MAG-2	500	100	1	mono	95	75	< 5.0
MAG-3	700	200	2	mono	145	75	< 7.0
MAG-4	4,500	1,000	10	bi	350	95	< 10.0
MAG-5	1,830	500	5	mono	190	95	< 8.0
MAG-11	12,000	1,500	121	mono	180	247	< 12.0
MAG-12	14,500	2,200	17	mono	247	247	< 12.0
MAG-13	21,000	3,500	27	mono	235	306	< 15.0
MAG-14	28,000	6,000	46	mono	260	402	< 15.0
MAG-15	38,000	6,500	50	mono	175	492	< 15.0
MAG-16	46,000	8,400	65	mono	227	492	< 15.0
MAG-17	53,000	11,000	85	mono	285	492	< 15.0

Classifications:

Suitable for fire:
Class A - combustible solids
Class B - flammable liquids
Class C - flammable gases
Class E - electrically energised fires
Class F - fats & cooking oils

Handling and transport: In accordance with the requirements for Goods classification as U.N. No. 1325

Dangerous Goods Class 4.1
Hazchem Code 2[Y]E

Minimum design factor - Class A combustibles:
Enclosures of less than 13 m^3 volume - 100 g/m^3
Enclosures larger than 13 m^3 volume - 110 g/m^3

Canister characteristics:

Material: Marine grade aluminium
Surface treatment: Alloy powder coated (red)
Temperature range: -50° to +60°C
Maximum ambient humidity: ≤ 96%
Shock: Tested at 10g for >13,000 impacts
Vibration: 5g @ 50 - 250Hz
Corrosion Resistance: Exceeds UL 1058 requirements

Aerosol characteristics: (at maximum design concentration)

Potassium Carbonates, solid: ~ 7g/m^3
Nitrogen Gas: ~ 70% by vol.
Carbon Dioxide Gas: ~1.2% by vol.
Carbon Monoxide Gas: ~ 0.4% by vol.
Nitrogen Oxides, Gas: 40 - 100 ppm
Ammonia Gas: ~0.075% by vol.
Temp. at nozzle + 500mm: ≤ 75°C
Oxygen level: 17% to 20% (typical)
Holding time: ≤ 60 mins.

Electrical (thermal) characteristics:

Supervision/Monitoring circuit:	≤ 1 mA
Activation (electrical):	≥ 400 mA @ 6/12/24 V for 10 mS
Activation (thermal):	≥ 175°C
Connector:	4 pin Military Type Analog MIL-C-5015

Supplementary information

The components of the Pyrogen™, MAG Series, Pyrotechnically-generated, Fine Aerosol-powder Type Fire-Extinguishing System that have been appraised by SSL and form part of this SSL listed system include the following:

Pyrogen™ part num.	**Description**
77079	"Soyuz" Model MAG-02M Aerosol Generator
77135	"Soyuz" Model MAG-1M Aerosol Generator
77136	"Soyuz" Model MAG-2M Aerosol Generator
77137	"Soyuz" Model MAG-3M Aerosol Generator
77131	"Soyuz" Model MAG-4M Aerosol Generator
77132	"Soyuz" Model MAG-5M Aerosol Generator
77141	"Soyuz" Model MAG-5/2M Aerosol Generator
77164-00000	"Soyuz" Model MAG-11 Aerosol Generator
77164-00000-01	"Soyuz" Model MAG-12 Aerosol Generator
77164-00000-02	"Soyuz" Model MAG-13 Aerosol Generator
77165-00000	"Soyuz" Model MAG-14 Aerosol Generator
77166-00000	"Soyuz" Model MAG-15 Aerosol Generator
77166-00000-01	"Soyuz" Model MAG-16 Aerosol Generator
77166-00000-02	"Soyuz" Model MAG-17 Aerosol Generator
77079	Mounting Band, MAG-02 Generator
77148-00301	Mounting Band, MAG-1, MAG-2 and MAG-3 Generators
77153-00301	Mounting Yoke, MAG-5 Generator
77144-00201	Mounting Yoke, MAG-4 Generator
77141-00301	Mounting Band, MAG-5/2 Generator
77148-00302	Mounting Bracket, MAG-1, MAG-2, MAG-3 and MAG-5 Generators
77131-00501	Mounting Bracket, R.H., MAG-4 and MAG-5/2 Generators
77131-00402	Mounting Bracket, L.H., MAG-4 and MAG-5/2 Generators
77131-00100	Electrical Ignition Element Assembly, MAG-4 (spare part)
77131-00101-01	Electrical Ignition Element Assembly, MAG-5 (spare part)
9102PC4TB	Wiring Connector Plug, Type 2PC4TB (suits MAG-02)
2RMDT18	Wiring Connector Plug, Type 2RMDT (suits MAGs -4, -5, and -11 to -17)
2PMT14	Wiring Connector Plug, Type 2PMT (suits MAGs -1, -2, -3, & -5/2)
77131-00600	Thermal Ignition Element (fire-conducting cord assembly)
D98-0010	Design, Operation & Maintenance Manual, "PyroGen™" Industrial Fixed Aerosol Fire Suppression System, Revision No. 1.6, Issued 10 August 1999.