Safety Data Sheet according to Regulation (EC) No. 1907/2006

AF-X FIREBLOCKER GENERATORS OF THE NANO SERIES

SDS

PRODUCT IMPORTER:

FIRESTORM FIRE PROTECTION Pty Ltd

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The Safety Data Sheet

A format is provided by the Commission but it allows formats defined by the European Community and the International Labour Office. **Any overseas SDS for products supplied in Australia should include the Australian manufacturer or importer contact details.**

- Must be available for each hazardous substance in the workplace (at or before introduction); and
- Must be current and valid (less than 5 years, accurate, unaltered, Australian contact details etc.).

Note: The SDS should also be available for products that produce (or could produce) hazardous substances.

An industrial hygienist or other skilled person may be helpful to assess accuracy and relevance to the workplace.

a. **Validity**

The SDS has to comply with the *National Code of Practice for the Preparation of Safety Data Sheets* [NOHSC:2011(1994)].

A format is provided by the Commission but it allows formats defined by the European Community and the International Labour Office. Any overseas SDS for products supplied in Australia should include the Australian manufacturer or importer contact details.

i. **Reissue requirement**

The National Model Regulations require the SDS to be reviewed and re-issued at intervals not exceeding **5 years**, or when there are **changes** including to the;

- Product name;
- Composition (formulation), particularly if it changes the;
- hazardous properties,
- appearance, or
- physical properties.

- Mode of anticipated application;
- Regulations and codes; or,
- Relevant health and safety information or regulations. b. **Availability**

The National Model Regulations requires the SDS to be;

- Available for all *hazardous substances* (Appendix 4) for *use* in the workplace (see Scope *12.2*). (This includes substances which could **produce** *hazardous substance*s). Manufacturers and importers have the responsibility for identifying *hazardous substances*;
- Provided by *manufacturers or importers*. If the employer manufactures a hazardous substance, an SDS has to be provided if the substance is supplied outside the workplace. The National Code of Practice does not require an SDS for hazardous substances produced and used within the workplace, or for by-products, wastes or fugitive emissions.
- Provided before, or with the first supply of the substance.

If the SDS has been revised, the SDS should be provided before or on the next delivery of the substance.

- Available on request, without difficulty or delay, at the worksite or designated work area to purchasers, prospective purchasers and users including;
- employees who could be exposed,
- medical practitioners treating an employee, and
- supervisors of users (whether or not themselves with potential for exposure).

- Available on printed sheets. The SDS may also be accessible on computer database or microfiche (the most recent/current SDS) providing that;
- the equipment is readily accessible and in good working order;
- users are trained to use equipment; and
- a paper copy can be obtained;

- Unaltered

Safety Data Sheet

AF-X Fireblocker Generators of the Nano Series

0.1 Introduction

Please note that based on Commission Regulation (EU) 2015/830 of 28 May 2015 of the European Parliament, compiling a Safety data Sheet would be required for substances and mixtures, and is not specifically referring to completed products, such as the Aerosol Generator Extinguisher.

Reference in many languages available at:
(https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32015R0830)

0.2. General requirements for compiling a safety data sheet

0.2.1. The safety data sheet shall enable users to take the necessary measures relating to protection of human health and safety at the workplace, and protection of the environment. The writer of the safety data sheet shall consider that a safety data sheet must inform its audience of the hazards of a substance or a mixture and provide information on the safe storage, handling and disposal of the substance or the mixture.

As experience has learned that in the supply-chain (transportation and storage), entities involved frequently show the need to have more detailed technical information, AF-X provides the following user Safety Data Sheet information in the same sequence as required in accordance with Commission Regulation (EU) 2015/830.

For more detailed information relating to the raw materials (extinguishing agent) for the purpose of production and storage, please contact our technical staff at AF-X Systems in Amsterdam.

User Safety Data Sheet for an AF-X Fireblocker Generator of the Nano Series

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

1.1. Product identifier

Product form	:	White extinguishant tablets placed in extinguishing Unit
Trade name	:	**AF-X Fireblocker**
Composition	:	Tablets consisting of a Mixture of predominantly Potassium Nitrate and epoxy resin placed in extinguishing Units
Synonyms	:	**Fire Extinguisher unit**

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

Main use category	:	Industrial use – professional use – consumer use
Use of substance/mixture	:	**Fire Extinguisher**
Remark relevant uses	:	Dry Fire Extinguisher, suitable for confined area's (e.g. engine rooms, technical areas, server rooms for computers, cargo compartments vehicles, storage facilities, etc.)

1.3. Details of the supplier of the safety data sheet

Name	:	AF-X Systems B.V.
Address	:	Grasweg 49
Zip code	:	1031 HX
Place	:	Amsterdam
Country	:	The Netherlands
Phone	:	+31-(0)20-20 50 484
E-mail	:	ralph@af-x.com / info@af-x.com

1.4 Emergency telephone number

Netherlands	:	Contact (English and Dutch) GMT+1 office hours 09.00h-17.00h Mon-Fri Emergency response phone number: (during office hours) +31 -(0)20-20 50 484 (out of office hours) +31 -(0)20-20 50 484 e-mail: ralph@af-x.com / info@af-x.com

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

According to Regulation (EC) No1272/2008
Miscellaneous Dangerous Goods (Category 9)

According to European Directive 67/548/EEC as amended.
Miscellaneous Dangerous Goods

Emergency overview:
The pyrotechnic mixture is **a fire extinguishant**. If heated to temperatures of above 350 degrees Celsius the mixture will create a deflagration with heat radiation only in the immediate vicinity of the materials. The created "smoke" (aerosols) is the intended extinguishing agent.

2.2. Label elements

Signal word:	Danger
Hazard statement(s):	
H228	Flammable solid
Precautionary statement(s):	
P210	Keep away from heat/sparks/open flames/hot surfaces – No smoking
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P370 + P380	In case of fire: Evacuate area.

2.3. Other hazards Extinguishing Agent Mixture and Generator

Risk of burn injuries in case of direct contact with the surface of the generator when heated by activation.

Unconsciousness due to inhaling aerosols when generator has been activated.

Do not handle device shortly after ignition because of heated device.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Provided information based on extinguishing agent tablets contained in the unit (before initiation). Note that the steel generator is constructed in such a way, that it can practically not be opened. Exposure to, and thus contact with the extinguishing agent is highly unlikely.

3.1 Device

The chemical part of the device contains the in this chapter mentioned components. Devices shall only be opened by destroying the whole entity. There is no risk to be exposed to the contents of the generator, except in cases of loss of tightness due to mechanical stress.

3.2 Mixtures

CAS-no.	REACH Registration No.	%	Name	Classification according to Regulation (EC) No 1278/2008 (CLP)
77XX-XX-X	Present	> 60	Oxidant	Ox. Sol. 3 – H272
13XX-XX-X	-	< 10	Metal hydroxide	-
4XX-XX-X	Present	5 - 25	Secondary fuel	-
2XXXX-XX-X	-	< 25	Phenol-formaldehyde resin	H315, H317, H319, H335, H411,

SECTION 4: FIRST AID MEASURES

Provided information based on extinguishing agent tablets contained in the unit (before initiation).

Note that the steel generator is constructed in such a way, that it cannot be opened. Exposure to, and thus contact with, the extinguishing agent in tablet form is highly unlikely. In case however of breaking or opening of a generator, evacuate people from the contaminated area and provide maximum ventilation.

If extinguisher unit is initiated, the generator releases the fire extinguishing aerosol mixture. Although only natural occurring and environmental neutral elements will be produced, the particle sizes in the direct environment will be microscopically small, and for that reason requires protection for the respiratory system.
Inhalation of small particles must be prevented as much as possible.

4.1. Description of first aid measures

In general, in case of doubt or if symptoms persist, always call a physician. Never give anything by mouth to an unconscious person.

In case of breaking or opening of a generator, evacuate people from the contaminated area and provide maximum ventilation.

If inhaled
Inhalation of gas after ignition:
- Bring victim to well ventilated area
- Ventilate area
- Consult a physician

If inhaled
Inhalation of dust:
- Bring victim to well ventilated area
- In case of difficult breathing, apply extra oxygen
- Consult a physician

In case of skin contact with chemical content
- Remove large particles
- Rinse and wash with soap and water

In case of eye contact with chemical content
- Rinse eyes with water for a minimum of 15 minutes
- Consult a physician

If swallowed of chemical content
- Rinse mouth immediately with water, in case the victim is conscious
- Consult a physician, and show this safety sheet

SECTION 5: FIREFIGHTING MEASURES

The unit itself is designed to extinguish fire!

IF MATERIAL IS HEATED TO THE SELF IGNITION TEMPERATURE OF 350 ^{0}C, THE MIXTURE WILL REACT INTO **A FIRE EXTINGUISHING AEROSOL THAT WILL PRESENT ITSELF AS A WHITE CLOUD.** THE AEROSOL CLOUD WILL ITSELF BE AN EXTINGUISHING MEDIA FOR SURROUNDING FIRES.

5.1. Extinguishing media

Suitable extinguishing media:

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Dry powder and dry sand are also suitable.

5.2. Special hazards arising from the substance or mixture inside the aerosol generating fire extinguisher

Fire hazard:

When ignited, fire-fighting extinguishant will be developed. The white aerosol cloud developed, may be confused with smoke but is actually the fire-extinguishing agent. The self-ignition temperature of the material is around 350 ºC.

Explosion hazard:

No direct explosion hazard in vicinity of product in powder and tablet form. The self-ignition temperature of the material is around 350 ºC.

5.3. Advice for firefighters

Precautionary measures:

Exposure to fire/heat: keep upwind, consider evacuation and have neighborhood close doors and windows.

Firefighting instructions:

Cool packages/tanks or loose product with water spray from safe distance (min. 5 Meters), and if possible remove them into safety. Do not move the load if already exposed to excessive heat. Exercise caution when fighting any chemical fire.

Protection during firefighting:

Do not breathe fumes. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

Other information:

Avoid mechanical shocks.
Avoid high temperatures.
Use water spray to cool unopened packages.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Accidental release measures are presented when a generator has not ignited. Only by inappropriate handling the content of the device can be released.

6.1. Personal precautions, protective equipment and emergency procedures

General measures:

Always ensure your own safety first. Ensure adequate air ventilation.
Avoid contact with skin, clothing and eyes. Avoid raising dust.

Ensure a low relative humidity in the room. As the extinguishing particles are microscopically small, they might attract moist. Create a corrosion stop to protect sensitive electronical equipment if present. Also see 'Methods for cleaning up' under 6.3.

6.1.1. For *persons other than* emergency personnel

Evacuate personnel to safe areas.
For personal protection see section 8.

6.1.2. For *emergency responders*

Protective equipment: Wear suitable respiratory equipment in case of insufficient ventilation or in case of prolonged exposure.

6.2. Environmental precautions

Prevent contamination in sewers. Prevent uncontrolled discharges into the environment (rivers, water courses, sewers etc.). Prevent soil and water pollution. Stop leaks if possible.

6.3. Methods and material for containment and clean-up

For containment:
Minimize generation of dust. Stop leaks if safe to do so.

Methods for cleaning up:
First ensure that the relative humidity in the room stays below 30% to ensure a corrosion stop.
Collect spillage (Vacuum clean, sweep up and shovel). Take up mechanically, placing in appropriate containers for recovery or disposal. E.g.: collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).
Keep in suitable, closed containers for disposal (transport/Handling).
Clean contaminated surfaces with an excess of water. Wash clothing and equipment after handling.
Special cleaning advise for the dry or iced cleaning of sensitive electronics can be obtained at the AF-X Systems technical department.

Other information:
Do not wash out with water in a sensitive environment. Dispose the product, depending on the degree and type of contamination in an authorized waste disposal site.

6.4. Reference to other sections

See section 1 for emergency contact information.
See section 8 for information on appropriate personal protective equipment.
See section 13 for additional waste treatment information.

SECTION 7: HANDLING AND STORAGE

The content cannot be released under normal or reasonably foreseeable conditions of use including proper disposal if they are used in accordance with the manufacturer's recommendations.

7.1. Precautions for safe handling

The chemical content within the generator is safely contained in normal condition of use. Do not open, drill, incinerate, crush, immerse, or expose to temperatures above the operating temperature range reported for products. Keep the generator short-circuited when not in use.

Avoid raising dust. Avoid breathing dust. Use sufficient ventilation. Provide appropriate exhaust ventilation at places where dust is formed. In case of inadequate ventilation wear respiratory protection. Avoid contact with skin and eyes. Wear protective gloves/protective clothing/eye protection as advised in section 8. Protect from moisture. Keep away from sources of ignition.

Always wash hands after handling the product. Do not eat, drink or smoke when using this product. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage

Technical measures:	Store in a dry and cool, well ventilated place away from sources of heat, ignition and direct sunlight.
Storage conditions:	Store in a dry, preferably in the original storage/transport packaging. Substance is hygroscopic.
Storage temperature:	between **-**20°C and 50°C, ideally 20°C
Heat and ignition sources:	Keep substance away from: ignition sources. heat sources.
Prohibitions on mixed storage:	Keep substances away from: strong bases, oxidizing agents, combustible materials, organic materials.
Storage area:	Avoid unnecessarily exposure to air to prevent absorption of moisture. Meet the legal requirements. Keep out of direct sunlight. No open flames, no sparks, and no smoking.
Special rules on packaging:	Meet the legal requirements. Keep packaging closed when not in use. Do not store in unlabeled containers.

7.3. Specific end use(s)

Consult the identified uses in the User Manual of this product.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. Control parameters (most critical National and International limits)

Not applicable.

8.2. Exposure controls

8.2.1. Appropriate engineering controls:

Good general ventilation should be sufficient to control worker exposure to airborne contaminants. Ensure that eyewash stations and safety showers are close to the workstation. **Handle in accordance with good industrial hygiene and safety practice.** Wash hands before breaks and at the end of workday.

8.2.2. Personal protective equipment:

Hand protection	:	In case of repeated or prolonged contact wear gloves (tested to EN 374). Take advice to gloves' supplier. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC
Material selection gloves	:	Good resistance gives: rubber, butyl rubber, natural rubber, neoprene. Nitrile rubber (NBR). Permeation time: minimum >480min long term exposure; material / thickness [mm]: Nitrile rubber (NBR) / 0,11 mm. Take advice to gloves' supplier.
Eye protection	:	Safety glasses. In case of dust production: protective goggles. Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
Skin and body protection	:	Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. Normal working clothes are suitable. *Body Protection*: Impervious clothing, the type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection	:	Carry operations in the open/under local exhaust/ ventilation or with respiratory protection to keep airborne levels below recommended exposure levels. Dust production: dust mask with filter type P2. Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
Environmental exposure controls	:	Avoid release to the environment. Emissions from ventilation or work process equipment should be checked to ensure they comply with legislation. In some cases process modifications will be necessary to reduce emissions to acceptable levels.
Other information	:	Keep product away from foodstuffs and beverages. Do not eat, drink or smoke when using this product. Take off contaminated clothing and shoes immediately. After use: wash hands and apply hand or skin care cream. Training staff on good practice. Regular cleaning of equipment. Minimization of manual phases.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Device

Appearance

Form	:	Metal casing containing solid blocks
Colour	:	Metal

9.2. Content

Flammability	:	Content is a flammable solid
Incompatibility	:	See section 10.5
Relative density	:	±1745 kg/m3
Decomposition temperature	:	±350 ^{0}C
Decomposition materials	:	Aerosol and various gasses
Other Properties	:	When activated, the fire extinguishing aerosol appears with some force out of device as a white cloud

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

Stable under recommended storage conditions (section 7) and in correct usage as prescribed in the Users and Installation Manual of the product.

10.2. Chemical stability

Stable under recommended storage conditions (section 7) and in correct usage as prescribed in the Users and Installation Manual of the product.

10.3. Conditions to avoid

High humidity (above 95%), temperatures > 50 ^{0}C

10.3. Materials to avoid

Strong reducing agents, powdered metals, strong acids and bases.

10.4. Hazardous decomposition products

Hazardous decomposition products are formed when device is ignited: carbon dioxide, carbon monoxide, nitrogen monoxide, methane gas, gaseous ammonia, hydrogen cyanide.

10.5. Incompatible materials

Keep substance away from: Strong acids or bases, combustible materials.

SECTION 11: TOXICOLOGICAL INFORMATION
In case of escape/free extinguishing agent

11.1. Information on toxicological effects

Acute toxicity
LD50 Oral – Rat – 3.750 mg/kg (potassium nitrate)
LD50 Oral – Rat – >10000 mg/kg (cyanoguanidine)

Skin corrosion / irritation	:	Not data available
Serious eye damage / eye irritation	:	Not data available
Respiratory or skin sensitization	:	Not data available
Germ cell mutagenicity	:	Not classified
Carcinogenity	:	Not data available
Reproductive toxicity	:	Not data available
STOT – single exposure	:	Not data available
STOT – repeated exposure	:	Not data available
Aspiration hazard	:	Not data available

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Individual components of the content show toxicity to the environment.

12.2 Persistence and degradability

No data available.

12.3 Bio-accumulative potential

No data available.

12.4 Mobility in soil

No data available.

12.5 PBT and vPvB assessment

No data available.

12.6 Other adverse effects

No data available.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Product / packaging disposal	:	Treat product as chemical waste.
Waste treatment-relevant information	:	Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.
Sewage disposal-relevant information	:	Waste should not be disposed of by release to sewers.
Other disposal recommendations	:	Contaminated packaging should be treated and disposed of as an unused product.

SECTION 14: TRANSPORT INFORMATION

In accordance with the UN recommendations on the transport of dangerous goods Test and criteria and thus ADR / RID / ADNR / IMDG / ICAO / IATA

14.1. UN number

UN-No.	:	3268

14.2. UN proper shipping name

Proper Shipping Name	:	SAFETY DEVICES, electrically initiated

14.3. Transport hazard class

Class (UN)	:	9
Hazard labels (UN)	:	Not applicable

14.4. Packing group

Packing group (UN)	:	Not applicable

14.5. Environmental hazards

Other information	:	See section 12

14.6. Special precautions for user

The protective measures listed in section 6, 7 and 8 have to be considered.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

IBC code	:	Not Applicable

SECTION 15: REGULATORY INFORMATION In case of escape/free Extinguishing Agent

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

No data available

15.2 Chemical safety assessment

No data available

SECTION 16: OTHER INFORMATION

Version	:	3.1 USDS 271018
Abbreviations and acronyms	:	bw = body weight
	:	CLP = Classification, labeling and packaging
	:	DNEL= Derivative No Effect Level
	:	PNEC= Predicted No Effect Concentration
	:	REACH= Registration, evaluation and authorization of chemicals
	:	LD50= median Lethal Dose for 50% of subjects
Data sources	:	BIG-database
	:	ECHA website: Information on Registered Substances
	:	Handbook of Chemistry and Physics CRC Press Inc
	:	Information of the suppliers.

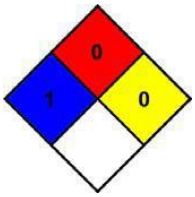
Text of H-code(s), R-phrase(s) and hazard codes mentioned in Section 3:

H228	Flammable solid.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P370+380	In case of fire: Evacuate area.

Training advice	:	Before using/handling the product one must read carefully the MSDS and the User & Installation Manual. Preferably qualified personnel is allowed to work with aerosol fire extinguishing devices.
Adaptations	:	This safety data sheet is a general SDS and replaces all the individual SDSs of the products mentioned in SECTION 1.

Additional NFPA identification (US Federal Regulations):

NFPA health hazard	:	1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.
NFPA fire hazard	:	0 - Materials that will not burn.
NFPA reactivity	:	0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating:

Health	:	1 Slight Hazard - Irritation or minor reversible injury possible
Flammability	:	1 Slight Hazard
Physical	:	1 Slight Hazard
Personal Protection	:	F

The AF-X Fireblocker of the Nano Series is a product of AF-X Systems BV, Amsterdam, The Netherlands.

This Safety Data Sheet is prepared by AF-X Systems BV in close cooperation and based on the data as supplied by Aerospace Propulsion Products BV (part of Ariane Group).
Aerospace Propulsion Products BV produces this fire extinguishing gas generators exclusively for AF-X Systems BV. (Doc. reference: AER-SP-002, issue 2)

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Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

- End SDS -