SECTION 1: Identification of the substance / mixture and of the company /

1.1– Product name:

Product name:	Extinguishing agent of the aerosol generator **Fire Kloud®**
Chemical name:	FKC solid compound
UFI Code	R98K-J9GU-NV1D-S8N8

R98K-J9GU-NV1D-S8N8

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

FKC Solid compound which generates extinguishing aerosol, containing potassium salts.

1.3 - Details of the supplier of the safety data sheet:

Name:	**FIR.EX. S.r.l.**
Registered Office:	Via Bruxelles, 34 – 00198 Roma IT
Headquarter	Via delle Centurie, 3/5 – 03100 Frosinone IT
Telephone:	+39 0775 1530692
Website:	www.firekloud.it
E-mail customer service:	info@firekloud.it

1.4 - Emergency Phone:

Poison Center Milan	02 66101029 (CAV Niguarda Ca' Granda Hospital - Milan) (24h)
Poison Center Pavia	0382 24444 (CAV IRCCS Fondazione Maugeri - Pavia)
Poison Center Bergamo	800 883300 (CAV Ospedali Riuniti - Bergamo)
Poison Center Verona	800 011858 (CAV AOUI – Verona)
Poison Center Florence	055 7947819 (CAV Careggi Hospital - Florence)
Poison Center Rome	06 3054343 (CAV Policlinico Gemelli - Rome)
Poison Center Rome	06 49978000 (CAV Policlinico Umberto I - Rome)
Poison Center Rome	06 68593726 (CAV Pediatric Hospital Bambino Gesù - Rome)
Poison Center Foggia	0881 732326, (CAV Ospedali Riuniti – Foggia)
Poison Center Naples	081 7472870 (CAV Cardarelli Hospital - Naples)
For severe emergencies call:	+39 0775 1530692

SECTION 2: Hazards identification

2.1 – Classification of the substance or mixture

The solid mixture is classified according to the (EC) Regulation n. 1272/2008 as dangerous for physical hazards: self-reactive substance D.

2.2 – Label elements

Warning	Precautionary statement - -Reg. CE 1272/2008	Hazard statements Reg. CE 1272/2008	Danger labels
Hazard	P210, P220, P280	H242 Self-reactive substance type D	

Precautionary statements - Prevention

P210 - Keep away from heat sources, hot surfaces sparks, open flames, or other ignition sources. No smoking.

P220 – Keep/store away from clothing/combustible materials.

P280 - Wear protective gloves/protective clothing/eye protection/face protection.

Precautionary statement-Reaction

P370 + P378 - IN CASE OF FIRE: Use an alcohol resistant foam fire extinguisher or water.

Precautionary statements (disposal)

P501 - Dispose of the product / container to collection points for hazardous or special waste.

2.3 – Other Hazards

This product doesn't result as PBT or vPvB according to the identification criteria Reg. EC 1907/2006.

At the current state of knowledge, no serious pathology resulting from prolonged exposure is known.

SECTION 3: Composition/information on ingredients

3.1 - Substances:

Not rellevant

3.2 - Substances classified as dangerous contained in the mixture under Reg. EC 1272/2008.

Chemical Name	Maximum Quantity	n° CAS	Danger identification based on the hazard classification Reg. CE 1272/2008	Label danger symbol
Potassium nitrate	85 % p/p	7757-79-1	H272 Oxidizing solid Cat. 2	

SECTION 4: First aid measures

4.1 - Description of first aid measures

There are no known cases of health damage due to the contact with the compound. Use good hygiene rules.

In case of eye contact: First rinse with plenty of water for a few minutes (remove contact lenses if you can do this easily), then contact a doctor. Do not rub with cloths, handkerchiefs, etc.

In case of skin contact: In case of accidental contact with the skin, wash immediately and abundantly with water.

Change contaminated clothes and shoes.

In case of skin irritation or allergic reactions consult a qualified doctor.

If swallowed: Rinse your mouth.

In case of ingestion, and the onset of discomfort or intestinal disorders immediately consult a doctor and show him the label of the product.

If inhaled: Move immediately into open spaces. If breathing continues to be frantic, consult immediately a specialist doctor.

4.2 Most important symptoms and effects, both acute and delayed

No data available.

Indications for the doctor: Show this safety data sheet to the attending physician.

4.3 Indication of any immediate medical attention and special treatment needed:

No data available.

SECTION 5: Firefighting measures

As with any fire, wear a self-contained pressure demand breathing apparatus approved by MSHA / NIOSH (or equivalent), and complete protective equipment.

5.1 Extinguishing media

The product is an extinguishing medium, when activated it produces an extinguishing aerosol based on potassium salts.

5.2 Special hazards arising from the substance or mixture

When the compound is activated it could release: Ammonia (NH3), Nitrogen Oxides (NOx), Carbon Monoxide (CO), fine particles.

5.3 Advice for firefighters

Specific protective means: Do not inhale gas emerging from fire and combustion.

Other indications: Cool the risky containers with a jet of water.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures



Ensure adequate ventilation**.** Remove sources of ignition.

Wear protective equipment. Remove unmanned persons.

Use personal protective equipment.

In case of vapors adopt respiratory protection.

Quickly collect the product with inert absorbent materials, preventing it from entering sewers, surface waters or groundwater.

After collection, wash the affected surfaces with soap and water.

6.2 Environmental precautions

Contain leaks with earth or sand, use in case of need mechanical instruments.

6.3 Methods and materials for containment and cleaning up

Use earth or inert material. Collect most of the material and remove residues with water jets.

6.4 Reference to other sections

For information on safe handling, see chapter 7.

For information on personal protective equipment see Chapter 8.

For information on disposal, see Chapter 13.

SECTION 7: Handling and storage

7.1 Precautions of safe handling

Handle the product only after reading all the sections of this safety data sheet. Do not eat, drink or smoke during use.

Avoid the formation of dust and the dispersion of the product in the air. Adopt adequate ventilation of the rooms where dust is produced.

Indications to prevent fire and explosions: Keep away from heat sources, do not smoke. Take measures against electrostatic charges.

7.2 Conditions for safe storage, including any incompatibilities

Storage: Requirements for warehouses and containers: keep in a cool place.

Information on mixed storage: no particular incompatibilities are known.

Further information on storage conditions: Store in a cool, dry place in tightly closed drums.

7.3 Specific end use(s)

No other available information.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

There are no professional limit values for the sold mixture, neither for the single substances that make the compound up.
Instead they have been proposed DNEL (derived no effect level) and PNEC (predicted no effect concentration) for the potassium nitrate.

Values related to human health

Endpoint	Threshold level	Protection objective, ways of exposure	Destinate to	Time exposure
DNEL	20.8 mg/Kg	Human, dermal	Workers (industrial)	Chronic systematic effects
DNEL	36.7 mg/m^3	human, inahalation	Workers (industrial)	Chronic systematic effects

Values relating to environmental protection

Endpoint	Threshold level	Environmental sector	Time exposure
PNEC	0.45 mg/L	Fresh water	Short term (isolated case)
PNEC	0.045 mg/L	Marine waters	Short term (isolated case)
PNEC	18 mg/L	Waste water treatment plant	Short term (isolated case)
PNEC	4.5 mg/L	water	continuous

8.2 – Exposure controls

Aerosol system is used exclusively for extinguishing fires and it is necessary to prevent false activation of the system in non-hazardous conditions. In order to avoid unwanted exposure, after a discharge of the aerosol extinguishing agent, ventilate the room before entering it.

Personal protective equipment

General protective and work hygiene rules:

Protective mask: Unnecessary.

Skin protection: Use protective gloves during the working process.

Skin protection:



The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.

The choice of the gloves material is taken taking in consideration the time of passing, the rates of permeation and degradation.

Material: Nitrile rubber;

Minimum layer thickness: 0,11 mm;

Break through time: 480 min.

Eye protection:



Eye and face protection is recommended during production, if direct contact with the product exists.

Precautionary measures: There is no special caution procedure, in addition to what is defined in the other sections.

Other protections: Not required.

SECTION 9: Physical and chemical properties

9.1. - Information on basic physical and chemical properties

Physical state:	solid
Organoleptic characters:	odorless, white colour
Odour Threshold:	unknown
pH:	5 - 8
Freezing point:	not applicable
Boiling point:	not applicable
Temperature of sublimation:	> 1000 °C
Temperature of self-ignification:	≥ 315 °C
Explosive limits:	not applicable
Vapour tensions:	not applicable
Solubility:	Insolubile
Density:	1,55-1,61 g/cm^3
Viscosity	irrilevant (solid mixture)
Explosive properties	none
Oxidizing properties	none

9.2. – Other information

No other information are available.

SECTION 10: Stability e Reactivity

10.1 - Reactivity: oxidizing;

10.2 - Chemical Stability: stable under normal conditions;

10.3 - Possibility of hazardous reactions: no known dangers;

10.4 - Conditions to avoid: not known;

10.5 – Incompatible materials: not known;

10.6 - Hazardous decomposition products: when activated emits ammonia, nitrogen oxides, carbon monoxide and fine powders.

SECTION 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008:

Relative to the single components:

Data relative to (ref. ECHA- European Chemicals Agency) potassium nitrate (main component of the mixture, >80%), the data representing the acute toxicity is available below:

Way of exposure	endpoint	Value	species
oral	DL50	>2000mg/Kg	rat
dermal	DL50	>5000mg/Kg	rat

Regarding the aerosol after igntion:

Exposure to the extinguishing product in the aerosol phase is completely accidental, only in the event of a fire and for a short period.
When the product is used in the correct proportions, in the event of a fire, within the first 15 minutes of its ignition, the aerosol contains:

Exhaust	Danger symbol	Hazard statement	Precautionary statement	Detected quantity (mg/m^3)	T.L.V.	
					T.W.A (ppm)	STEL/C (ppm)
Oxygen – O_2		H270, H280	P202, P220, P244, P370+376, P403	20,9 %	—	—
Carbon Oxide – CO		H220, H280, H331, H360, H372, CGA-HG04, CGA-HG10	P202, P210, P260, P271+P403, P280, P377, P381	< 20	25	—
Carbon Dioxide – CO_2	-	H280	P403	0,8%	5000	30000

Nitrogen Oxide – NO, NO_2 NOx		H270, H331, H314, H318	P202, P220, P260, P262, P271+P403, P280+P284, P370+376	< 300 < 15 <315	—	—
Sulfur Dioxide – SO_2		H280, H314, H331, CGA-HG22	P202, P261, P262, P271+P403, P280+P284, P405, P501	< 1	—	0,25
Ammonia – NH_3		H221, H280, H331, H314, H400, CGA-HG22	P202, P210, P260, P262, P271+P403, P273, P280, P377, P381, P501	< 30	25	35
Fine powders: PM 2.5, PM 1.0, PM 0.5 e PM 0.25		H332	P261	< 5	3	—
Hydrogen Ion Concentration – pH	—	—	—	9	—	—

Relatively to the compound:

Any toxicological risk known from short or continuous exposure to the compound.

Corrosion/skin irritation

It's not classified as corrosive or irritating to the skin.

Severe eye damage/eye irritation

It can cause a light eye irritation.

Respiratory or skin sensitition

No it doesn't.

Summary of property evaluation CMR

It is not classified as mutagenic, carcinogenic or toxic for reproduction.

Specific target organ toxicity in case of single exposure

It is not classified as target organ toxic for single exposure.

Target organ toxicity, repeated exposure

It is not classified as organ toxic for repeated exposure.

Aspiration hazard

It is not classified as dangerous for aspiration.

Symptoms related to the chemical-physical and toxicological characteristics

In case of digestion: diarrhoea, vomit, nausea.

In case of inhalation: headache, dyspnoea, slight irritation of the upper tract areas.

In case of skin contact: no symptoms.

11.2. – Information on other hazards

Endocrine Disrupting Properties:
From the literature, no data can be deduced to support these properties for the substances contained in the mixture, in accordance with the criteria established by EU Reg. 1907/2006, EU Reg. 2017/2100, EU Reg. 2018/605.

SECTION 12: Ecological information

12.1 – Environmental toxicity

Product not classified as dangerous for the aquatic environment according to Reg. CE 1272/2008. For the potassium nitrate (most relevant component in the mixture, >80%) the environmental toxicity values (font ECHA) are reported below.

Acute aquatic toxicity

Endpoint	Value	Species	Exposition time
LC50	1.378 mg/L	fish	96 h.
EC50	490 mg/L	aquatic invertebrates	48 h.

Chronic aquatic toxicity

Endpoint	Value	Species	Exposition time
EC50	490 mg/L	aquatic invertebrates	24 h.
ErC50	>1700 mg/L	seaweed	10 days

12.2 - Persistence and degradability

The methods determining the biodegradability are not appliable to inorganic substances.

12.3 - Bioaccumulative potential

It is not concentrated in particular organisms.

12.4 - Mobility in soil

Data unavailable.

12.5 - Results of PBT and vPvB assesment

Data unavailable.

12.6 - Endocrine disrupting properties

The mixture does not contain any components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0, 1% or higher.

12.7 - Other adverse effects

Data unavailable.

SECTION 13: Disposal consideration

13.1 - Waste treatment methods:

Tips

Do not dispose of the product together with household waste. Do not enter into drains. Recycle if possible otherwise contact an authorized company for industrial waste disposal.

Waste of unused products

Waste disposal must be in accordance with state and international regulations. This product, if unaltered from use, can be disposed of after treatment in an authorized facility or as indicated by the current regulations on hazardous waste.

SECTION 14: Transport information

The compound complies with the following transport regulations:

14.1 - UN number or ID number:

	Aerosol Generator (Fka 20 - Fka 50 - Fka 100 Series)	Aerosol Generator (Fka 200 - Fka 400 - Fka 800 - Fka 1000 - Fka 2000 - Fka 3000 series)
N° ONU:	3559	0514

14.2 – UN proper shipping name

	Aerosol Generator (Fka 20 - Fka 50 - Fka 100 Series)	Aerosol Generator (Fka 200 - Fka 400 - Fka 800 - Fka 1000 - Fka 2000 - Fka 3000 series)
Denomination	Fire suppressant dispersing devices	Fire suppressant dispersing devices

14.3 - Transport hazard classes / 14.4 - Packing group

	Aerosol Generator (Fka 20 - Fka 50 - Fka 100 Series)	Aerosol Generator (Fka 200 - Fka 400 - Fka 800 - Fka 1000 - Fka 2000 - Fka 3000 series)
Transport of dangerous goods by road, rail or inland waterway (ADR/RID/ADN)		
Class and Code:	9, M5	1, 1.4S
Packing group:	N.A.	N.A.
Tunnel restriction code:	(E)	(E)
Special provisions:	407	407
Exempt Quantities (QE):	E0	E0
Limited Quantities (LQ):	0	0
Special transport provisions:	-	CV1-CV2-CV3
Labeling:		

	Aerosol Generator (Fka 20 - Fka 50 - Fka 100 Series)	Aerosol Generator (Fka 200 - Fka 400 - Fka 800 - Fka 1000 - Fka 2000 - Fka 3000 series)
Air Transport (ICAO/IATA)		
Class and Code:	9	1, 1.4S
Packing group:	N.A.	N.A.
Passenger Aircraft*:*		
IATA Pkg Inst:	961	135
Exempt Quantities (QE):	E0	E0
Limited Quantities (LQ):	forbidden	forbidden
Maximum quantity	25 kg	25 kg
Cargo Aircraft*:*		
IATA Pkg Inst:	961	135
Maximum quantity	100 kg	100 kg
Special Provision	A232	A232
Labeling:		
International Maritime Dangerous Goods Code (IMDG)		
Class:	9	1.4S
Packing group:	N.A.	N.A.
Special Provisions (DS):	407	407
Exempt Quantities (QE):	E0	E0
Limited Quantities (LQ):	0	0
EmS:	FB, SX	FB, SX
Stowage category (Stowage category):	A	Category 1 –SW 1
Labeling:		

14.5 Environmental hazards

None (not dangerous according to the dangerous transportation criteria).

14.6 Special precautions for users

Provisions concerning dangerous materials that must be adhered to in the company.

14.7 Maritime transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:

This subsection applies only if the carriage of goods in bulk is intended to be carried out in accordance with the acts of the International Maritime Organization (IMO):

It is not intended to carry out bulk transport.

Regulatory Information

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

Italian national provisions

When applicable, refer to the following regulations and their subsequent additions:

- D.Lgs. 475/92 e ss.mm.ii. (personal protection);
- D.Lgs. 81/2008 e ss.mm.ii. (safety and health of workers in the workplace);
- D.Lgs. 152/06 (emissions into the atmosphere, liquid waste, waste).

Regulation "Seveso III" (2012/18/UE) relative to companies with high risks.

Table extracted from legislation requirements

n.	Dangerous substance/category of hazard	Limited quantity(tons) for applying lower and upper threshold requirements	note
05	Potassium nitrate	5.000 / 10.000	-

European arrangement:

Restrictions according to REACH, Reg. CE 1907/2006

Annex XVII

Any component is mentioned.

Annex XIV- authorized substances

Any component is mentioned.

15.2 - Chemical safety assessment

No chemical safety assessment has been conducted for this substance because it is not foreseen.

SECTION 16: Other Information

Bibliographic references

ECDIN (Environmental Chem. Data and Information Network)

IUCLID (International Uniform Chemical Information Database)

NIOSH - Registry of Toxic Effects of Chemical Substances

Roth - Wassergefährdende Stoffe

Verschueren - Handbook of Environmental Data on Organic Chemicals

ChemDAT - Safety Data Sheets from E.Merck on CD-ROM

Merian - Metals and their compounds in the environment

Abbreviations and acronyms

Abbreviations	Description of the used abbreviations
ADN	Accord relatif au transport international des marchandises dangereuses par voies de navigation interieures (European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways)
ADR	Accord relatif au transport international des marchandises dangereuses par route (International Agreement Concerning the International Carriage of Dangerous Goods by Road)
CAS	Chemical abstract service
CLP	Reg. CE1272/2008
CMR	Carcinogenic, mutagenic, toxic for reproduction
DNEL	Derived no effect level
EmS	Emergency schedule
GHS	Globally Harmonized system of classification labelling and packaging of chemicals
IMDG	International Maritime dangerous good code
IATA/ICAO	International Air Transport Association/ International Civil Aviation Organisation
MARPOL	International convention for the prevention of naval pollution
PBT	Persistent, Bioaccumulative, toxic
PNEC	Predicted no effect concentration
REACH	Reg. CE 1907/2006
RID	Reglement concernant le transport international des marchandises dangereuses
vPvB	Very Persistent and very bioaccumulative

Sources

Reg. (CE) N° 1907/2006 of the European Parliament and Council of the 18 december 2006, REACH.

Reg. (CE) N° 1272/2008, of the European Parliament and Council of the 16 december 2008, CLP, and elder modifications.

Globally Harmonized System, GHS

ADR/RID/IATA-ICAO 2025

IATA DGR 66

ICAO 2025-2026

IMDG 42-24

D.Lgs. 81/2008 and elder modifications

Relevant phrases mentioned in this safety data sheet

Code	Text
H242	**Fire hazard risk due to heating**
P210	**Keep away from heat sources, hot surfaces, sparks or open flames. Don't smoke.**
P220	**Keep away from clothing and other combustible materials.**
P280	**Wear protective gloves/protective clothing/eye protection/face protection.**

The data are shown on the basis of our current knowledge, but do not represent any guarantee of the characteristics of the product and do not justify any contractual legal relationship.
The user is required to ensure the suitability and completeness of this information in relation to the specific use that he must make.
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