

(According to Directive 2001/58/EEC & 1999/45/EEC)

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY

1.1 Identification of the substance or preparation

Product name NAF S III®
Chemical name N/A - This is a mixture/preparation
Synonym(s) HCFC Blend A
Formula N/A - This is a mixture/preparation
Molecular Weight 92,90
EC Number (EINECS) N/A - This is a mixture/preparation

1.2 Use of the substance/preparation

Recommended uses Fire extinguisher

1.3 Company/undertaking identification

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Phone ++39 06 90 77 51

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1.4 Emergency telephone

Phone ++39 06 90 77 51

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Concentration (m/m)	Symbols	R Phrases	EINECS Number
Dichlorotrifluoroethane (HCFC-123)	306-83-2	4,75	N	59	206-190-3
Chlorodifluoromethane (HCFC-22)	75-45-6	82,0	N	59	200-871-9
Chlorotetrafluoroethane (HCFC-124)	2837-89-0	9,50	N	59	220-629-6
Isopropenyl-metyl-ciclohexene (D-Limonene)	5989-27-5	3,75	N, Xi	10-38-43-50/53	227-813-5

3. HAZARDS IDENTIFICATION

- Gas (liquefied)
- Substance classified as dangerous according to Directive 1999/45/EEC
- Hazardous product for the environment and sensitisation by skin contact
- Limited hazard for aquatic environment due to its low persistence
- Product is persistent in air and contributes to the ozone-layer depletion process
- Risk of liver effects
- In case of decomposition, releases hydrogen fluoride and chloride

4. FIRST-AID MEASURES

4.1 Inhalation

- Remove the subject from the contaminated area
- Oxygen or cardiopulmonary resuscitation if necessary

(According to Directive 2001/58/EEC & 1999/45/EEC)

- Consult with a physician in case of respiratory and nervous symptoms

4.2 Eyes contact

- Keep eyelids open to allow evaporation of product
- Flush eyes with running water for several minutes, while keeping the eyelids wide open: consult with a doctor
- Consult with an ophthalmologist in case of persistent pain

4.3 Skin contact

- Allow product to evaporate
- Rinse with lukewarm running water
- Consult with a physician in case of persistent pain or redness

4.4 Ingestion

- Contact with a physician for advice
- Rinse mouth with fresh water

5. FIRE-FIGHTING MEASURES

5.1 Suitable extinguishing media

- In case of fire in close proximity, all means of extinguishing are acceptable

5.2 Unsuitable extinguishing media

- No restriction

5.3 Special exposure hazards

- Non-flammable (see section 9)
- Formation of dangerous gas/vapours in case of decomposition (see section 10)
- Gas/vapours combustion possible in presence of air in very particular conditions (see section 9 and/or consult the producer)

5.4 Protective measures in case of intervention

- Evacuate all non-essential personnel
- Wear self contained breathing apparatus when in close proximity or in confined spaces
- When intervention in close proximity, wear full protective acid resistant suit
- After intervention, proceed to clean the equipment (take a shower, remove clothing carefully, clean and check)

5.5 Other precautions

- Approach from upwind
- Stay at safe distance in a protected location sheltered from possible projections
- Never approach containers which have been exposed to fire, without cooling them sufficiently
- After the fire, proceed rapidly to clean the surfaces exposed to the fumes in order to limit the damage to the equipment
- If safe to do so, remove the exposed containers, or cool with large quantities of water
- As for any fire, ventilate and clean the rooms before re-entry

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions

- Follow the protective measures given in section 8
- If safe to do so, without over exposing anyone, try to stop the leak
- Keep away materials and products which are incompatible with the product (see section 10)
- In case of leaking container, try to reposition it to get the leak in gaseous phase
- Gas/vapours heavier than air may accumulate in confined spaces, causing possible oxygen depletion
- Ventilate the room

(According to Directive 2001/58/EEC & 1999/45/EEC)

6.2 Environmental precautions

- Prevent discharges into the environment (atmosphere,...)

6.3 Methods for cleaning up

- Let the product evaporate
- Prevent the product from entering sewers or confined places
- Clean the area with large quantities of water
- If possible, dam large quantities of liquid with sand or earth

7. HANDLING AND STORAGE

7.1 Handling

- Carry out all operations in closed piping circuits and equipment
- Operate in a well-ventilated area
- Prevent product vapours decomposition from contacting hot spots
- Use only equipment and materials which are compatible with the product
- Keep away from heat sources
- Keep away from reactive products (see section 10)

7.2 Storage

- In a ventilated, cool area
- Keep away from heat sources
- Keep away from reactive products (see section 10)

7.3 Specific use(s)

- For any particular use, please contact the supplier

7.4 Packaging

- Ordinary steel

7.5 Other precautions

- Follow the protective measures given in section 8

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Exposure limit values

Dichlorotrifluoroethane (HCFC-123)

- Result: Negligible

Chlorodifluoromethane (HCFC-22)

TVL-TWA = 1,000 ppm = 3540 mg/m³ [ACGIH-USA, 2002]

Chlorotetrafluoroethane (HCFC-124)

- Result: Negligible

Isopropenylmethylcyclohexene (D-LIMONENE)

TWA = 165,6 mg/m³ [AIHA, 1993]

8.2 Exposure control

- Provide local ventilation suitable for the product decomposition risk (see section 10)
- Follow the protective measures given in section 7
- Maintain employee exposures to levels be low the applicable exposure limits [TLV]

8.2.1 Occupational exposure control

8.2.1.1 Respiratory protection

- Minimum need if the local exhaust ventilation is adequate
- Follow the protective measures given in section 7
- Self-contained breathing apparatus in medium confinement/insufficient oxygen/in case of large uncontrolled emissions/in all circumstances when the mask and cartridge do not give adequate

(According to Directive 2001/58/EEC & 1999/45/EEC)

- protection
- Use only respiratory protection that conforms to international/national standards

8.2.1.2 Hand protection

- Protective gloves - chemical resistant
- Recommended materials: Polyvinyl alcohol

8.2.1.3. Eye protection

- Wear protective goggles for all industrial operations
- If risk of splashing, chemical proof goggles/face shield

8.2.1.4. Skin protection

- Apron/boots of neoprene if risk of splashing

8.2.1.5. Other precautions

- Shower and eye wash stations
- Gloves, overalls and boots have to be double layered (protection against cold temperature)
- Consult the industrial hygienist or the safety manager for the selection of personal protective equipment suitable for the working conditions

8.2.2. Environmental exposure control

- Respect local/federal and national regulations for aqueous emissions (see section 15)

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. General informations

Appearance	Pressurized liquefied gas
Color	Colorless
Odor	Lemon

9.2. Important health safety and environmental informations

pH	Not applicable
Critical temperature	125°C
Boiling point	- 38.3°C
Flash point	Negligible
Flammability	No flammability limit in air Note: No flammable gas
Explosive properties	No data Note: See also section 10
Oxidising properties	Non oxidizer
Vapor/vapour pressure	8.25 bar @ 20°C 17.87 bar @ 50°C 27.81 bar @ 70°C
Liquid Density	1200 Kg/m ³ @ 25°C 1108.6 Kg/m ³ @ 50°C
Solubility Water	0.84% by weight @ 25°C
Other	No data
Partition coefficient P	log P O/W
P [n-octanol/water]	No data
Viscosity	Dynamic Viscosity (liquid) 0.21 centipoise @ 25°C
Vapor/vapour density @ 20°C (air=1)	3,27

9.3. Other information

Freezing point	- 107°C
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(According to Directive 2001/58/EEC & 1999/45/EEC)

10. STABILITY AND REACTIVITY

10.1. Conditions to avoid

- Heat/sources of heat

10.2. Materials to avoid

- Metallic powders
- Alkaline-earth metals
- Alkaline metals and their alloys
- Strong alkaline desiccatives
- Ferric chloride
- Some molecular sieves
- Strong oxidizer acids and agent

10.3. Hazardous decomposition products

- Hydrogen fluoride
- Hydrochloric acid
- Phosgene
- Fluorophosgene

10.4. Other informations

- Contact with strong bases and alkaline compounds may provoke violent reactions or explosions
- The vapor is heavier than air, disperses at ground level

11. TOXICOLOGICAL INFORMATION

11.1. Toxicological data

Acute toxicity

Dichlorotrifluoroethane (HCFC 123)

- Oral route, LD 50, rat, > 2,000 mg/kg
- Inhalation, LC 50, 4 h, rat, = 200 mg/l
- Dermal route, LD 50, rat, > 2,000 mg/kg

Irritation

- Rabbit, slightly irritant (skin)
- Rabbit, slightly irritant (eyes)

Sensitization

- Guinea Pig, Non sensitizing (skin)

Chlorodifluoromethane (HCFC 22)

- Inhalation, LC 50, 4 h, rat, = 21.9 %

Irritation

- Rabbit, slightly irritant (skin)
- Rabbit, slightly irritant (eyes)

Sensitization

- Guinea Pig, Non sensitizing (skin)

Chlorotetrafluoroethane (HCFC 124)

- Inhalation, LC 50, 4 h, rat, > 23 %

Irritation

- rabbit, non irritant (skin)
- rabbit, non irritant (eyes)

Isopropenylmethylcyclohexene (D-Limonene)

- Oral route, LD 50, rat, > 4,400 mg/kg

(According to Directive 2001/58/EEC & 1999/45/EEC)

- Dermal route, LD 50, rabbit, > 5,000 mg/kg

Irritation

- Because of the moderate presence of Limonene the preparation could show moderate irritation effects

Sensitization

- Because of the moderate presence of Limonene the preparation could show moderate sensitization effects

Chronic toxicity**Dichlorotrifluoroethane (HCFC 123)**

- Dog, > 1% v/v air, cardiac sensitization after adrenergic stimulation
- Inhalation, after prolonged exposure, rat, Target organ: liver, 30 ppm, observed effect
- Inhalation, after repeated exposure, guinea pig, Target organ: liver/metabolism (lipids)/Endocrine system, 0.94% v/v air, observed effect
- Inhalation, after repeated exposure, monkey, Target organ: liver, 0.1% v/v air, observed effect
- Inhalation, after repeated exposure, rabbit, Target organ: testes / pancreas / liver, Remark: Leydig cells/benign tumours
- No mutagenic, teratogenic effects

Comments

- Risk of liver effect
- Benign tumours probably non applicable to human

Chlorodifluoromethane (HCFC 22)

- Inhalation, after a single exposure, dog, \geq 5% v/v air, cardiac sensitization following adrenergic stimulation
- Inhalation, after prolonged exposure, rat, Target organ: salivary glands, 5% v/v air, carcinogenic effect
- No mutagenic effect
- Inhalation, rat, Target organ: eyes, 5% v/v air, teratogenic effect, Remark: High dose
- Inhalation, after prolonged exposure, mouse, no carcinogenic effect
- Inhalation, after prolonged exposure, rat, no carcinogenic effect

Comments

- No appreciable toxic effect

Chlorotetrafluoroethane (HCFC 124)

- Inhalation, after a single exposure, dog, \geq 2.6%, cardiac sensitization following adrenergic stimulation
- Inhalation, after repeated exposure, rat/mouse, Target organ: central nervous system, > 5%, observed effect
- No mutagenic, carcinogenic, teratogenic effects

Comments

- No appreciable toxic effect

Isopropenylmethylcyclohexene (D-Limonene)

- Ingestion, dog, 3.6 ml/kg for body weight, vomiting and nausea
- No mutagenic, carcinogenic and teratogenic effects

11.2. Health effects**Inhalation**

- At high concentrations, feelings of intoxication, restlessness, dizziness and drowsiness
- At high concentrations, risk of cardiac arrhythmia
- At high concentrations, risk of asphyxia by lack of oxygen
- In case of repeated or prolonged exposure: risk of liver effects and irritation to respiratory system

Eyes contact

- (Gas)
Moderate irritation
- (Liquefied gas)

(According to Directive 2001/58/EEC & 1999/45/EEC)

Risk of temporary eye lesions
Severe eye irritation, watering, redness and swelling of the eyelids
Risk of burns (frostbite)

Skin contact

- (Gas)
Negligible
- (Liquefied gas)
Cold sensation followed by redness of the skin
Risk of frostbite
In case of repeated contact: dry and chapped skin, risk of chronic dermatitis
(Residue after evaporation)
Skin irritation because of D-limonene

Ingestion

- Impossible risk (gas) - (Residue after evaporation)
- Ingestion of 20 g of D-Limonene causes diarrhea, painful constrictions and proteinuria

12. ECOLOGICAL INFORMATION**12.1. Ecotoxicity****Acute ecotoxicity****Dichlorotrifluoroethane (HCFC 123)**

- Fishes, *Salmo gairdneri*, LC 50, 96 h, 55.5 mg/l
- Crustaceans, *Daphnia magna*, EC 50, 48 h, 17.3 mg/l
- Algae, *Selenastrum capricornutum*, EC 50, 96 h, 96.6 mg/l

Chlorodifluoromethane (HCFC 22)

- Result: no data

Chlorotetrafluoroethane (HCFC 124)

- Result: no data

Isopropenylmethylcyclohexene (D-Limonene)

- 96 h, LC50 <= 1 mg/l, [fish]
- 72 h, LC50 <= 1 mg/l, [algae]

Chronic ecotoxicity

- Result: no data

12.2. Mobility**Dichlorotrifluoroethane (HCFC 123)**

- Air, Henry's law constant (H) ca. 3,570 Pa.m³/mol
Result: considerable volatility
Conditions: 25 °C
- Water, evaporation, t 1/2 ca. 23hour(s)
Conditions: 25 °C / calculated value
- Soil/sediments, adsorption, log KOC from 1.8 - 2.6

Chlorodifluoromethane (HCFC 22)

- Air, Henry's law constant (H) ca. 26kPa.m³/mol
Result: considerable volatility
Conditions: 20 °C / calculated value
- Water, evaporation, t (100%) = 3 day(s)
Conditions: 20 °C / saturated solution
- Soil/sediments, adsorption, log KOC from 1.25 - 1.76
Conditions: calculated value

Chlorotetrafluoroethane (HCFC 124)

(According to Directive 2001/58/EEC & 1999/45/EEC)

- Air, Henry's law constant (H) = 36 kPa.m³/mol
Result: considerable volatility
Conditions: 25 °C / calculated value
- Soil/sediments, adsorption, log KOC from 1.7 - 1.9
Conditions: calculated value

Isopropenylmethylcyclohexene (D-Limonene)

- Result: no data

12.3 Persistence and degradability

Dichlorotrifluoroethane (HCFC 123)

Abiotic degradation

- Air, indirect photo-oxidation, $t_{1/2} = 1.18$ year[s]
Conditions: sensitizer: OH radicals
Degradation products: trifluoroacetic acid / carbon dioxide/ hydrochloric acid/fluorhydric acid
- Air, photolysis, ODP = 0.02
Result: limited effect on stratospheric ozone
Reference value for CFC 11: ODP = 1
- Air, greenhouse effect, GWP = 0.022
Reference value for CFC 11: GWP = 11
- Water/soil Result: non-significant hydrolysis and photolysis

Biotic degradation

- Aerobic, test ready biodegradability/closed bottle, degradation = 24%, 28 day[s]
Result: non-readily biodegradable
- Aerobic, test biodegradation by methane oxidation
Result: non-biodegradable
Conditions: inoculum: Methylosinus trichosporium OB3b

Chlorodifluoromethane (HCFC 22)

Abiotic degradation

- Air, indirect photo-oxidation, $t_{1/2} = 9.6$ year[s]
Conditions: sensitizer: OH radicals
Degradation products: carbon dioxide / hydrochloric acid / fluorhydric acid
- Air, photolysis, ODP = 0.055
Result: limited effect on stratospheric ozone
Reference value for CFC 11: ODP = 1
- Air, greenhouse effect, GWP = 0.36
Reference value for CFC 11: GWP = 11
- Water/soil, hydrolysis, $t_{1/2}$ from 2540 year[s]
Result: non-significant hydrolysis
Conditions: pH 8 / 25 °C

Biotic degradation

- Aerobic, test ready biodegradability/closed bottle, degradation 28 day[s]
Result: non-readily biodegradable

Chlorotetrafluoroethane (HCFC 124)

Abiotic degradation

- Air, indirect photo-oxidation, $t_{1/2}$ ca. 5 year[s]
Conditions: sensitizer: OH radicals
Degradation products: carbon dioxide/hydrochloric acid/fluorhydric acid/trifluoroacetic acid
- Air, photolysis, ODP = 0.0016
Result: limited effect on stratospheric ozone
Reference value for CFC 11: ODP = 1
- Air, greenhouse effect, GWP = 0.1
Reference value for CFC 11: GWP = 11

(According to Directive 2001/58/EEC & 1999/45/EEC)

Biotic degradation

- Aerobic, test ready biodegradability/closed bottle, degradation from 1 - 2 %, 28 day(s)
Result: non-readily biodegradable

Isopropenylmethylcyclohexene [D-Limonene]

- Result: no data

12.4. Bioaccumulative potential**Dichlorotrifluoroethane (HCFC 123)**

- Bioconcentration: $\log P_o/w = < 2.8$
Result: non-bioaccumulable

Chlorodifluoromethane (HCFC 22)

- Bioconcentration: $\log P_o/w = < 1.08$
Result: non-bioaccumulable

Chlorotetrafluoroethane (HCFC 124)

- Bioconcentration: $\log P_o/w$ from 1.9 - 2
Result: weak bioaccumulation potential

Isopropenylmethylcyclohexene [D-Limonene]

- Bioconcentration: $\log P_o/w > 3$
Result: High bioaccumulative potential

12.5. Other adverse effects

- Study in progress

12.6. Comments

- Product is persistent in air (atmospheric lifetime: 12 years)
- Toxic for aquatic organisms
- Product is not significantly hazardous for the aquatic environment as: considerable volatility and no bioaccumulation

13. DISPOSAL CONSIDERATIONS**13.1. Waste treatment**

- Dispose in compliance with local/federal and national regulations
- It is recommended to contact the producer for recycling/recovery

13.2. Packaging treatment

- To avoid treatments, as far as possible, use dedicated containers

14. TRANSPORT INFORMATION

UN Number	3163
IATA Class	2.2 A
Hazard label	NON FLAMABLE GAS
PSN	Liquefied Gas, N.O.S
IMDG class	2.2
Hazard label	COMPRESSED GAS NON FLAMMABLE
Placard	3163
EmS	2-09
IMDG Name	Liquefied Gas, N.O.S
ADR/ADNR Class	2,2 A
Hazard label	2.2
Placard	20/3160
ADR/RID Name	Liquefied Gas N.O.S
RID Class Hazard label	2
Placard	2.2
ADR	20/3163

(According to Directive 2001/58/EEC & 1999/45/EEC)

15. REGULATORY INFORMATION

15.1. EC Labelling

Labelling following Directive 67/548/EEC

Symbols

N	Dangerous for the environment
Xi	Sensitisation

R Phrases

R-43	May cause sensitisation by skin contact
R-51/53	Toxic to aquatic organism, may cause long-term adverse effects in the aquatic environment
R-59	Dangerous for ozone layer

S Phrases

S-24	Avoid contact with skin
S-37	Wear suitable gloves
S-59	Refer to manufacturer/supplier for information on recovery/recycling
S-60	This material and its container must be disposed of as hazardous waste
S-61	Avoid release to the environment

16. OTHER INFORMATION

16.1. Reason for update

- General revision
- Distribute new edition to clients

This MSDS is intended for only the selected countries to which it is applicable. The information given corresponds to the current state of our knowledge and experience of the product, and is not exhaustive. This applies to product which conforms to the specification, unless otherwise stated. In this case of combinations and mixtures one must make sure that no new dangers can arise. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, safety, personal hygiene, and protection of human welfare and the environment.