

MATERIAL SAFETY DATA SHEET**NAF S® 1230 superpressurized with Nitrogen**

(In accordance with Regulation EC no. 1907/2006, no. 1272/2008 and further amendments)

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

Product name: **NAF S 1230 super-pressurized with N₂ @ 25/42/60 bar**
IUPAC Nomenclature: n.a.
Synonyms: 3M™ Novec™1230
CAS No.: n.a.
CE (EINECS) No.: n.a.

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

Relevant identified uses: Extinguishing agent

1.3 Details of the supplier of the safety data sheet

Supplier: **Safety Hi-Tech S.r.l.**
Address: Via Cavour, 96 – ZI, 67051 Avezzano (AQ) – Italia
Telephone: 0863 1828930
Website: www.safetyhitech.com
E-mail person responsible for MSDS: reach@safetyhitech.com

1.4 Emergency telephone number

Emergency information service: +39 0863 1828930
Hours of operation: Monday-Thursday, from 8.00 a.m. to 17.15 p.m.
Friday, from 8.00 a.m. to 12.45 p.m.

SECTION 2:	HAZARDS IDENTIFICATION
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2.1 Classification of the substance or mixture

Directive 67/548/CEE, Annex I and further modifications: Not classified
Regulation EC no. 1272/2008, Annex 6 - Table. 3.1 and further modifications: Index no. 606-108-00-X
Aquatic Chronic 3,
H412, ATP 01

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2.2 Label elements

Classification	Reg. CE 1272/2008
Hazard pictogram	 GHS04 – Gas under pressure
Hazard classification	Aquatic Chronic 3
Hazard statements	H280: Contains gas under pressure: may explode if heated H412: Harmful to aquatic life with long-lasting effects
Precautionary statements	P251: Do not pierce or burn, even after use P273: Avoid release to the environment P501: Dispose of contents/container in accordance with national regulations

2.3 Other hazards

Reg. CE n. 1907/2006, Annex XIII - *Criteria for the identification of persistent, bioaccumulative and toxic substances, and very persistent and very bioaccumulative substances (vPvB)*

PBT Criterion not fulfilled, the product doesn't result persistent, bioaccumulative or toxic
vPvB Criterion not fulfilled, the product doesn't result very persistent, or very bioaccumulative

Overall hazards of the mixture

Hazard category: Aquatic Chronic 3, Hazardous to the aquatic environment- Chronic, category 3

Environmental Effects

In case of thermal decomposition reaction, formation of Hydrofluoric acid (HF).

ODP (*Ozone Depletion Potential*) = 0

GWP (*Global Warming Potential*) = < 1 (100 years, IPCC Fourth Assessment Report - 2007)

ALT (*Atmospheric Lifetime*) = 0.014 years (IPCC Fourth Assessment Report - 2007)

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SECTION 3:	COMPOSITION/INFORMATION ON INGREDIENTS
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FK-5-1-12

UPAC Nomenclature: 1,1,1,2,2,4,5,5,5-nonafluoro-4-(trifluoromethyl)-3-pentanone
CAS No.: 756-13-8
CE (EINECS) No.: 436-710-6
Composition: 95.8 – 99.8 % by weight
Hazard symbols and statements: **Reg. EC n. 1272/2008:** H412
Registration no., REACH - ACTIVE: 01-0000018239-65-0000, 01-0000018239-65-0001

NITROGEN

UPAC Nomenclature: Nitrogen
CAS No.: 7727-37-9
Composition : 1.1 – 4.2% by weight
Simboli e Frasi di Pericolo: **Reg. EC n. 1272/2008:** H280
Registration no., REACH - ACTIVE: Not Applicable

SECTION 4:	FIRST AID MEASURES
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4.1 Description of necessary first-aid measures

Not applicable. No relevant information about specific first aid measures to be applied immediately.

4.2 Most important symptoms and effects, both acute and delayed, and**4.3 Indication of any immediate medical attention and special treatment needed**

Inhalation	Exposure not probable with intended use, liquid product.
Skin contact	Wash with soap and water; if signs/symptoms develop, get medical attention.
Eyes contact	Wash eyes with plenty of water; remove contact lenses if easy to do. If signs/symptoms develop, get medical attention.
Ingestion	Rinse mouth. If signs/symptoms develop, get medical attention.

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SECTION 5:	FIREFIGHTING MEASURES
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5.1 Extinguishing media

Suitable extinguishing media: The product is not flammable. The product itself is an extinguishing agent. Use fire-extinguishing media appropriate for surrounding materials

Unsuitable extinguishing media: None

5.2 Special hazards arising from the substance or mixture

In case of fire, the product releases the following hazardous thermal decomposition by-products (CO, CO₂, HF, toxic vapours, gas, particulate).

5.3 Advice for firefighters

In case of fire wear self-contained breathing apparatus and a full protective clothing.

It is suggested to adopt general precautions in case of fire: ventilate and clean the rooms before re-entry.

SECTION 6:	ACCIDENTAL RELEASE MEASURES
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6.1 Personal precautions, protective equipment and emergency procedures

Wear suitable personal protection equipment, that is self-contained breathing apparatus, gloves resistant to chemical agents, safety glasses with face shield, protective clothing and waterproof rubber boots (See also SEC. 8).

6.2 Environmental precautions

Prevent discharges of the product into the environment.

In case of large spills, cover drains and build dikes to prevent entry into sewer systems or bodies of water.

6.3 Methods and material for containment and cleaning up

Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material Mix in sufficient absorbent until it appears dry. Collect as much of the spilled material as possible in compliance with local waste regulations. Contact an authorized company for waste treatment.

Ventilate area.

6.4 Reference to other sections

See also SEC. 13.

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SECTION 7:	HANDLING AND STORAGE
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7.1 Precautions for safe handling

In compliance with general rules referring to safety of workers as per art. 5, Directive 89/391/EEC, during handling, production, storage, transportation or disposal, wear proper personal protective equipment (see SEC. 8).

Follow general occupational hygiene procedures, as:

- Do not eat, drink and smoke in work areas;
- Wash hands after use;
- Remove contaminated clothing and protective equipment before entering eating areas;
- Prevent discharges of the product into the environment.

Avoid contact with naked flames and hot surfaces, as hazardous thermal decomposition by-products can be formed, as hydrofluoric acid (HF) and carbon monoxide (CO).

Store in a well-ventilated place.

7.2 Conditions for safe storage, including any incompatibilities

Keep product containers in a well-ventilated and cool place. Keep away from direct sunlight.

Keep product containers away from other chemical substances (see also SEC.10).

7.3 Specific end uses(s)

For any particular use different respect those in clause 1.2, consult the supplier.

SECTION 8:	ESPOSURE CONTROLS/PERSONAL PROTECTION
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8.1 Control parameters

TWA (3M): 150 ppm (1940 mg/m³), 8 h

8.2 Exposure controls**8.2.1 Technical control:**

- Ensure adequate ventilation.
- Apply technical measures to comply with the occupational exposure limits.

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8.2.2 Personal Protective Equipment:

Personal Protective Equipment (PPE) should be compliant to requirements of the relevant national legislation.

EYES/FACE PROTECTION: During usual handling activities, chemical resistant goggles must be worn; if splashes are likely to occur, wear face-shield.

SKIN/BODY PROTECTION: Wear suitable protective clothing.

HAND PROTECTION: Wear suitable protective gloves resistant to chemical agents; *Suggested Material:* natural rubber; *Breakthrough times:* Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).

RESPIRATORY PROTECTION: Minimum need if the local exhaust ventilation is adequate; on the contrary, in case of insufficient ventilation, wear a face mask/cartridge (for example, A-P3) or an approved self-contained breathing apparatus.

8.2.3 Environmental exposure controls:

Working areas shall be properly equipped with safety showers and safety eye wash stations in compliance with requirements under Community environmental protection legislation (Italy: government decree issued under parliamentary delegation no. 81/2008, modified by the government decree issued under parliamentary delegation no. 106/2009).

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SECTION 9:	PHYSICAL AND CHEMICAL PROPERTIES
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9.1 Information about physical and chemical properties

Appearance	Organic Liquid, under pressure; colorless
Odour	Odourless
Odour threshold	n.a.
pH	n.a.
Melting point/freezing point	n.a.
Boiling point	n.a.
Flash point	n.a.
Evaporation rate	n.a.
Flammability	No flammability limit in air
Upper/lower flammability	The product hasn't got upper/lower flammability limits in air
Pressure	25 bar or 42 bar or 60 bar @ 21°C
Density (vapour, air = 1)	n.a.
Relative Density (liquid, water = 1)	n.a.
Solubility in water	n.a.
Solubility organic solvents/fats	n.a.
Partition coefficient (n-octanol/water)	n.a.
Auto-ignition temperature	n.a.
Decomposition temperature	n.a.
Viscosity	n.a.
Explosive properties	n.a.
Oxidizing properties	n.a.

9.2 Other information

Surface Tension 71.2 mN/m @ 20°C and 1.065 g/l
Fast hydrolysis and short life in water; the product reacts with water to form pentafluoropropionic acid (PFPA) and heptafluoropropane (HFC-227ea); as a consequence, the surface tension value is that of a PFPA solution. In other words, the product can't be considered surface active.

The source of data in Sec. 9 is ECHA database at the following link:
<https://echa.europa.eu/it/information-on-chemicals/registered-substances>

The chemical properties of registered substances are available at *eChemPortal*:
http://www.echemportal.org/echemportal/propertysearch/treeselect_input.action?queryID=PROQ1x6o

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SECTION 10:	STABILITY AND REACTIVITY
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10.1 Reactivity

The product can react with some substances in particular conditions (see the following paragraphs within this section).

10.2 Chemical stability

The product doesn't react under normal use conditions and at temperatures/pressures suggested during storage and handling.

10.3 Possibility of hazardous reactions

No dangerous reactions known.

10.4 Conditions to avoid

Direct sunlight and heat sources.

10.5 Incompatible materials

Strong alkalis, Amines, Alcohols.

10.6 Hazardous decomposition products

Hydrofluoric acid (HF), Carbon monoxide (CO), Carbon Dioxide (CO₂), Toxic Vapours.

SECTION 11:	TOXICOLOGICAL INFORMATION
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11.1 Informations on toxicological effects**Acute Toxicity**

Oral, rat (Wistar, male/female), LC50 > 2000 mg/kg body weight

Non-toxic compound.

Source: ECHA; Testing Protocol in compliance with Directive 96/54/CE, Part B.1ter and OECD guideline no. 423 "Acute Oral Toxicity - Acute Toxic Class Method" T-7479.

Inhalation, rat (Sprague-Dawley, male/female), LC50, 4 h, > 98658 ppm

Source: ECHA; Testing Protocol in compliance with OECD guideline no. 403 "Acute Inhalation Toxicity."

Skin corrosion/Irritation

Rabbit (New Zealand white, male): not irritant

Source: ECHA; Testing Protocol in compliance with Directive 92/69/EEC, Part B.4 and OECD guideline no. 404 "Acute Dermal Irritation/Corrosion".

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Serious eye damage/irritation

Rabbit (New Zealand white, male): not irritant

Source: ECHA; Testing Protocol in compliance with OECD guideline no. 405 "Acute Eye Irritation/Corrosion".

Respiratory or skin sensitization

Rat (Dunkin-Hartley, female): No sensitizing effect known

Source: ECHA; Testing Protocol in compliance with OECD guideline no. 406 "Skin Sensitization".

Germ cell mutagenicityGenetic toxicity – in vitro

Salmonella typhimurium (TA 1535, TA1537, TA 98, TA 100), 48 h, 37±1°C: non mutageno

Escherichia coli (WP2uvrA), 48 h, 37±1°C: not mutagenic

Source: ECHA; Testing Protocol in compliance with OECD guideline no. 471 "Bacterial Reverse Mutation Assay".

Genetic toxicity – in vivo

Rat (NMRI, male), in vivo mammalian somatic cell study: cytogenicity/erythrocyte micronucleus, 24-48 h, 1000 mg/kg: Not clastogenic under the conditions of this assay

Source: ECHA; Testing Protocol in compliance with OECD guideline no. 474 "Mammalian Erythrocyte Micronucleous Test".

Carcinogenicity

Rat (Sprague-Dawley, pregnant female), Duration of treatment/exposure: 6 h/day from gestation days 6 through 19, NOAEL ≥ 3000 ppm

No effects on maternal animals.

Source: ECHA; Testing Protocol in compliance with OECD guideline no. 414 "Prenatal developmental Toxicity Study".

Reproductive toxicity

Rat (Wistar, male/female), inhalation, NOAEL ≥ 3000 ppm

Source: ECHA; Testing Protocol in compliance with OECD guideline no. 421 "Reproduction/Developmental Toxicity Screening Test".

Specific Target Organ Toxicity (STOT) — chronic exposure

Inhalation, dog (Beagle, male), cardiac sensitization EC50 > 15.48%

Result: cardiac sensitization potential.

Source: ECHA; Reinhardt Protocol 1971.

Aspiration hazard

n.a.

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SECTION 12:	ECOLOGICAL INFORMATION
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12.1 Ecotoxicity – Aquatic toxicity

PNEC: Fresh water = 0.008 mg/l
Marine water: 0.001 mg/l
Fresh water sediments = 0.006 mg/kg dry sediment
Marine water sediments = 0.001 mg/kg dry sediment
PNEC STP: Waste water treatment plant = 1 mg/l
Source: ECHA, database of registered substance (> 1000 tonnes per annum)

Short-term aquatic toxicity:

Pimephales promelas (Fathead minnow), 96 h, LC50 ≥ 1070 mg/l – no mortality.

Source: ECHA Testing Protocol in compliance with OECD guideline no. 203 "Fish, Acute Toxicity Test".

Daphnia magna, 48 h, LC50/EC50 > 1080 mg/l; NOEC not determined

Source: ECHA Testing Protocol in compliance with OECD guideline no. 202 "Daphnia sp., Immobilisation Test".

Pseudokirchnerella subcapitata (previous name: *Selenastrum capricornutum*), 96 h:

EC50 (growth rate inhibition) = 10.6 mg/l (95% confidence interval, 9.63-11.6 mg/L)

NOEC = 3.71 mg/l

Source: ECHA Testing Protocol in compliance with OECD guideline no. 201 "Alga, Growth Inhibition Test".

Microorganisms (activated sludge of a predominantly domestic sewage), 3 h: NOEC = 10000 mg/l

EC50 > 10000 mg/l

Source: ECHA Testing Protocol in compliance with OECD guideline no. 209 "Activated Sludge, Respiration Inhibition Test".

12.2 Persistence and degradability

Air, Phototransformation: Photolysis, $t_{1/2}$ (DT50) = 2.9 – 5.8 days

Hydrolysis: Because of the very high rate of reaction, a precise value for the hydrolysis of this product could not be determined; k_{min} , was estimated to be $> 0.28 s^{-1}$; the corresponding maximum half-life, $t_{1/2}$, was calculated to be < 2.5 min.

12.3 Bioaccumulation potential

Bioaccumulation, fish: *Cyprinus carpio*, 28 d, BCF (Bioaccumulation Factor) ≥ 1.2 and ≤ 4.8

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12.4 Mobility in soil

Data not available.

12.5 Results of PBT and vPvB assessment

This substance/mixture does not meet the PBT/vPvB criteria of REACH, annex XIII.

12.6 Others adverse effects

No further information.

SECTION 13:	DISPOSAL CONSIDERATIONS
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13.1 Waste treatment methods

For the EC Member States the reference standards are the following:

- Directive 2008/98/CE;
- Regulation no. 1357/2014/EU, replacing Annex III, Directive 2008/98/CE
- Decision 2014/955/EU.

Generally speaking, shall be adopted all measures to recycle and recover/reclaim of waste substance and only as last process its disposal throughout proper and approved destruction plants.

For the EC Member States, the following E.W.C. codes from the Hazardous Waste List shall be used:

140602* other halogenated solvents and solvent mixtures

(1406 – waste organic solvent, refrigerants and foam/aerosol propellants)

Or:

160305* organic wastes containing hazardous substances

(1603 – off-specification batches and unused products)

For containers containing residues of hazardous substances, the relevant E.W.C. code is:

150110* packaging containing residues of or contaminated by hazardous substances.

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SECTION 14:	TRANSPORT INFORMATION
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UN, IMDG, IATA No **UN 3500**
UN, IMDG, IATA proper shipping name Chemical under pressure, N.O.S. (Nitrogen), 2.2(C/E)



Label:
Transport hazard class 2 (Class 8A)
Packing group -
Packing instructions P206
Environmental hazards
Special precautions for user Kemler No.: 20 (Asphyxiant Gas)
EMS number: F-C, S-V

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

SECTION 15:	REGULATORY INFORMATION
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15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

- ✓ Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) and next amendments
- ✓ Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP), amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006
- ✓ ADR Code, European Agreement concerning the International Carriage of Dangerous Goods by Road
- ✓ IMDG Code (International Maritime Code for Dangerous Goods)
- ✓ IATA code (International Air Transport Association)
- ✓ Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work
- ✓ Directive 2008/68/EC - inland transport of dangerous goods

15.2 Chemical safety assessment

A chemical safety assessment has not been carried out yet.

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SECTION 16:	OTHER INFORMATION
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This information is based on our present knowledge and experience about the product, so it isn't exhaustive. In no case the product downstream user is allowed to not observe European Community regulations and national laws, always having respect of safety, hygiene, and protection of human health and environment.

Glossary

PNEC	Predicted no-effect concentration, concentration below which exposure to a substance is not expected to cause adverse effects
PNEC STP	PNEC referring to sewage treatment plant
Kemler number	Hazard identification code, analogous to the ADR hazard Identification no. (HIN)
IBC code	It provides an international standard for the safe carriage by sea of dangerous and noxious liquid chemicals in bulk
TWA	"Time Weighted Averages", is the average exposure over a specified period of time, usually at nominal eight hours. This means that, for limited periods, a worker may be exposed to concentrations higher than the PEL, so long as the average concentration over eight hours remains lower.
OEL	Occupational exposure limit, is an upper limit on the acceptable concentration of a hazardous substance in workplace air for a particular material or class of materials; the exposure time is determined at 8 hours (TWA) and 15 minutes (short term exposure, STEL). It is typically set by competent national authorities and enforced by legislation to protect occupational safety and health.
DNEL	The "Derived No-Effect Level" (DNEL) is the level of exposure to a substance above which humans should not be exposed. According to REACH (REGULATION (EC) No 1907/2006, Annex 1 manufacturers and importers of chemical substances are required to calculate DNELs as part of their Chemical Safety Assessment (CSA) for any chemicals used in quantities of 10 tons or more per year. The DNEL is to be published in the manufacturer's Chemical Safety Report (CSR) and, for hazard communication, in an extended Safety Data Sheet.