Elegant Processes.
Sustainable Products.

SAFETY DATA SHEET

1. Product and Company Identification

Chemical Name: Nonanal

Synonyms: BioNonanal™

CAS#: 124-19-6

Version#02: 02/26/2019

Supplier:
P2 Science Inc.
4 Research Drive
Woodbridge, CT 06525
USA
Phone: +1 (203) 821-7457
www.p2science.com

Relevant identified uses of the substance or mixture: R&D purpose

24-Hour Emergency Assistance:
CHEMTREC: +1-800-424-9300

2. Hazards Identification

Emergency Overview: Material may be irritating to eyes, respiratory tract, and non-intact skin. If exposed immediately flush affected area with copious amounts of water.

Delivery State:
State: Liquid
Odor: N/A
Color(s): Clear, colorless

2.1 GHS Label elements, including precautionary statements and classifications of the substance or mixture

Potential Physical Hazards: Not a hazardous substance or mixture.

Potential Health Hazards:	Not a hazardous substance or mixture.
Potential Environment Hazards:	Flammable liquids, Category 4 Acute aquatic toxicity, Category 2 Chronic aquatic toxicity, Category 3
Pictogram	None
Signal word	Warning

Hazard statement(s) ***based on similar chemical class data***

H227	Combustible liquid.
H401	Toxic to aquatic life.
H412	Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P73	Avoid release to the environment.
P280	Wear protective gloves/eye protection/ face protection.

Response

P370+P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403+P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/container to an approved waste disposal plant.

3. Composition/Information on Ingredients

Substance(s)
Formula $C_9H_{18}O$
Molecular Weight: 142.24 g/mol

Component Concentration: > 90% Nonanal

4. First Aid Measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. Fire Fighting Measures

Conditions of flammability
Flash Point: ND (Not Determined)
Auto ignition Temperature: ND (Not Determined)

Suitable extinguishing media
For fires, use dry chemical, carbon dioxide, water spray, fog or foam.

Special protective equipment for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

6. Accidental Release Measures

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Avoid breathing dust.

Environmental precautions
Do not let product enter drains.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal..

7. Handling and Storage

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.
Keep in a dry place.

8. Exposure Controls/Personal Protection

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) 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).

Hand 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.

Eye protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN(EU).

Skin and body protection
Complete suit protection against chemicals. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. Physical and Chemical Properties

Appearance

Form:	Clear, liquid
Colour:	Colorless
Odour:	N/A

Safety data

pH:	No data available
Melting point/freezing point:	-18.8ºC (-1.8ºF)- OECD Test Guideline 102
Boiling point and range:	93ºC (199ºF)- at 31 hPa (23 mmHg)
Flash point:	64ºC (147ºF)- closed cup
Ignition temperature:	No data available
Auto-ignition temperature:	195ºC (383ºF) at 1,016 hPa (762 mmHg)
Lower explosion limit:	No data available
Upper explosion limit:	No data available
Vapour pressure:	0.35 hPa (0.26 mmHg) at 25ºC (77ºF)
Density:	0.825 g/cm3
Water solubility:	0.101 g/l at 20ºC (68ºF)- OECD Test Guidline 105- slightly soluble
Partition coefficient:	low Pow: 3.4 at 35ºC (95ºC)
Relative vapour density:	No data available
Odour Threshold:	No data available
Evaporation rate:	No data available

10. Stability and Reactivity

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
No data available

Conditions to avoid
No data available

Materials to avoid
Strong oxidizing agents, Strong reducing agents, Strong bases

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

11. Toxicological Information

Acute toxicity

Oral LD_{50} - Rat	> 5,000 mg/kg Remarks: Behavioral: Somnolence (general depressed activity). Kidney, Ureter, Bladder: Urine volume increased.
Inhalation LC_{50}	No data available
Dermal LD_{50}	No data available

Other information on acute toxicity No data available

Skin corrosion/irritation

Skin-Rabbit	Rabbit Results: Mild skin irritation

Serious eye damage/eye irritation

Eyes- Rabbit	Rabbit Results: No eye irritation

Respiratory or skin sensitization No data available

Germ cell mutagenicity Reverse mutation assay
Salmnoella typhimurium
Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity No data available

Teratogenicity No data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
No data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
No data available

Aspiration hazard No data available

Potential health effects

Inhalation May be harmful if inhaled. Causes respiratory tract irritation.

Ingestion May be harmful if swallowed.

Skin May be harmful if absorbed through skin. Causes skin irritation.

Eyes Causes eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects No data available

12. Ecological Information

Toxicity No data available

Toxicity to daphnia and other aquatic invertebrates
Flow-through test EC_{50}- Daphnia magna (water flea)- 1.54 mg/l – 48h
(OECD Test Guideline 202)

Toxicity to algae
Static test EC_{50}- Pseudokirchnerielle subcapitata – 4.5 mg/l – 72h
(OECD Test Guideline 201)
Static test NOEC- Pseudokirchnerielle subcapitata – 0.759 mg/l – 72h

(OECD Test Guideline 201)

Toxicity to bacteria EC_{50} – Pseudomonas putida – 70 mg/l – 3h
(OECD Test Guideline 209)

Persistence and degradability

Biodegradability: Aerobic - Exposure time 28d
Result: 83% - Readily biodegradable.
(OECD Test Guideline 301F)

Bioaccumulative potential No data available

Mobility in soil No data available

PBT and vPvB assessment No data available

Other adverse effects No data available

13. Disposal Considerations

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. Transport Information

DOT (US)

NA-Number: 1993 Class: NONE Packing group: III
Proper shipping name: Combustible liquid, n.o.s. (Nonanal)
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG Non-regulated

IATA Non-regulated

15. Regulatory Information

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimus) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard

Massachusetts Right to Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right to Know Components

Nonanal	CAS-No.	Revision Date
	124-19-6	

New Jersey Right to Know Components

Nonanal	CAS-No.	Revision Date
	124-19-6	

California Proposition 65 Components
This material does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

16. Other Information

HIMS Rating

Health Hazard:	2
Chronic Health Hazard:	
Flammability:	2
Physical Hazard:	0

NFPA Rating

Health Hazard:	2
Fire Hazard:	2
Reactivity Hazard:	0

The above information is believed to be correct but does not purport to be all- inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. P2 Science, Inc, shall not be held liable for any damage resulting from handling or from contact with the above product. It is the user's responsibility to determine the safety, toxicity, and suitability for their own use of the product described herein.