

# SAFETY DATA SHEET

Version 8.3  
Revision Date 09/07/2024  
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## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1 Product identifiers

Product name : Aluminum Etchant Type D

Product Number : 901545  
Brand : Aldrich

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

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

### 1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.  
3050 SPRUCE ST  
ST. LOUIS MO 63103  
UNITED STATES

Telephone : +1 314 771-5765  
Fax : +1 800 325-5052

### 1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

## SECTION 2: Hazards identification

### 2.1 Classification of the substance or mixture

#### GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226  
Corrosive to Metals (Category 1), H290  
Acute toxicity, Oral (Category 4), H302  
Skin corrosion (Category 1B), H314  
Serious eye damage (Category 1), H318

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Skin sensitization (Category 1), H317

For the full text of the H-Statements mentioned in this Section, see Section 16.

## 2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word

Danger

Hazard Statements

H226	Flammable liquid and vapor.
H290	May be corrosive to metals.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.

Precautionary Statements

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P234	Keep only in original container.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P272	Contaminated work clothing must not be allowed out of the workplace.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P390	Absorb spillage to prevent material damage.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P406	Store in corrosive resistant container with a resistant inner liner.
P501	Dispose of contents/ container to an approved waste disposal

plant.

### 2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

## SECTION 3: Composition/information on ingredients

### 3.2 Mixtures

Synonyms : Aluminum etching solution for use on gallium arsenide and gallium phosphide devices

Component	Classification	Concentration
<b>phosphoric acid</b>		
CAS-No. 7664-38-2 EC-No. 231-633-2 Index-No. 015-011-00-6 Registration number 01-2119485924-24-XXXX	Met. Corr. 1; Acute Tox. 4; Skin Corr. 1B; Eye Dam. 1; H290, H302, H314, H318 Concentration limits: >= 1 %: Met. Corr. 1, H290; >= 25 %: Skin Corr. 1B, H314; 10 - < 25 %: Skin Irrit. 2, H315; 10 - < 25 %: Eye Irrit. 2, H319;	>= 50 - < 70 %
<b>sodium 3-nitrobenzenesulphonate</b>		
CAS-No. 127-68-4 EC-No. 204-857-3 Index-No. 609-048-00-2	Eye Irrit. 2A; Skin Sens. 1; H319, H317	>= 10 - < 20 %
<b>acetic acid</b>		
CAS-No. 64-19-7 EC-No. 200-580-7 Index-No. 607-002-00-6 Registration number 01-2119475328-30-XXXX	Flam. Liq. 3; Skin Corr. 1A; Eye Dam. 1; H226, H314, H318 Concentration limits: >= 90 %: Skin Corr. 1A, H314; 25 - < 90 %: Skin Corr. 1B, H314; 10 - < 25 %: Skin Irrit. 2, H315; 10 - < 25 %: Eye Irrit. 2, H319;	>= 5 - < 10 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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## SECTION 4: First aid measures

### 4.1 Description of first-aid measures

#### General advice

First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

#### If inhaled

After inhalation: fresh air. Call in physician.

#### In case of skin contact

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

#### In case of eye contact

After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

#### If swallowed

After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. Do not attempt to neutralise.

### 4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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

No data available

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## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

#### Suitable extinguishing media

Water Foam Carbon dioxide (CO<sub>2</sub>) Dry powder

#### Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

### 5.2 Special hazards arising from the substance or mixture

Carbon oxides

Nitrogen oxides (NO<sub>x</sub>)

Sulfur oxides

Oxides of phosphorus

Sodium oxides

Mixture with combustible ingredients.

Forms explosive mixtures with air at elevated temperatures.

Development of hazardous combustion gases or vapours possible in the event of fire.

### 5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

#### 5.4 Further information

Remove container from danger zone and cool with water. Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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### SECTION 6: Accidental release measures

#### 6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert. For personal protection see section 8.

#### 6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

#### 6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemisorb®). Dispose of properly. Clean up affected area.

#### 6.4 Reference to other sections

For disposal see section 13.

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### SECTION 7: Handling and storage

#### 7.1 Precautions for safe handling

##### Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

##### Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

For precautions see section 2.2.

#### 7.2 Conditions for safe storage, including any incompatibilities

##### Storage conditions

No metal containers.

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

##### Storage class

Storage class (TRGS 510): 3: Flammable liquids

#### 7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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**SECTION 8: Exposure controls/personal protection****8.1 Control parameters****Ingredients with workplace control parameters**

Component	CAS-No.	Value	Control parameters	Basis
phosphoric acid	7664-38-2	TWA	1 mg/m <sup>3</sup>	USA. ACGIH Threshold Limit Values (TLV)
		STEL	3 mg/m <sup>3</sup>	USA. ACGIH Threshold Limit Values (TLV)
		TWA	1 mg/m <sup>3</sup>	USA. NIOSH Recommended Exposure Limits
		ST	3 mg/m <sup>3</sup>	USA. NIOSH Recommended Exposure Limits
		TWA	1 mg/m <sup>3</sup>	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	1 mg/m <sup>3</sup>	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		STEL	3 mg/m <sup>3</sup>	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		acetic acid	64-19-7	TWA
STEL	15 ppm	USA. ACGIH Threshold Limit Values (TLV)		
TWA	10 ppm 25 mg/m <sup>3</sup>	USA. NIOSH Recommended Exposure Limits		
ST	15 ppm 37 mg/m <sup>3</sup>	USA. NIOSH Recommended Exposure Limits		
TWA	10 ppm 25 mg/m <sup>3</sup>	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants		
PEL	10 ppm 25 mg/m <sup>3</sup>	California permissible exposure limits for chemical contaminants (Title 8, Article 107)		
C	40 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)		
STEL	15 ppm 37 mg/m <sup>3</sup>	California permissible exposure limits for chemical contaminants (Title 8, Article 107)		

## 8.2 Exposure controls

### Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

## Personal protective equipment

### Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

### Skin protection

required

### Body Protection

Flame retardant antistatic protective clothing.

### Respiratory protection

Recommended Filter type: Filter type ABEK

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.

These measures have to be properly documented.

required when vapours/aerosols are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

### Control of environmental exposure

Do not let product enter drains. Risk of explosion.

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## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

a) Appearance	Form: liquid
b) Odor	No data available
c) Odor Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	No data available
f) Initial boiling point and boiling range	No data available
g) Flash point	No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapor pressure	No data available
l) Vapor density	No data available



m) Density	1.534 g/cm <sup>3</sup>
Relative density	No data available
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Autoignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	Not classified as explosive.
t) Oxidizing properties	none

## 9.2 Other safety information

No data available

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## SECTION 10: Stability and reactivity

### 10.1 Reactivity

Vapor/air-mixtures are explosive at intense warming.

### 10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

### 10.3 Possibility of hazardous reactions

No data available

### 10.4 Conditions to avoid

Heating.

### 10.5 Incompatible materials

Strong oxidizing agentsMetals

### 10.6 Hazardous decomposition products

In the event of fire: see section 5

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## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

#### Mixture

#### Acute toxicity

Oral: No data available

Acute toxicity estimate Oral - 1,869 mg/kg  
(Calculation method)

Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.

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Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract

Dermal: No data available

**Skin corrosion/irritation**

Remarks: Mixture causes burns.

**Serious eye damage/eye irritation**

Remarks: Mixture causes serious eye damage.

Risk of blindness!

**Respiratory or skin sensitization**

Mixture may cause an allergic skin reaction.

**Germ cell mutagenicity**

No data available

**Carcinogenicity**

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

NTP: No ingredient 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 on OSHA's list of regulated carcinogens.

**Reproductive toxicity**

No data available

**Specific target organ toxicity - single exposure**

No data available

**Specific target organ toxicity - repeated exposure**

No data available

**Aspiration hazard**

No data available

**11.2 Additional Information**

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

Stomach - Irregularities - Based on Human Evidence

**Components**

**phosphoric acid**

**Acute toxicity**

LD50 Oral - Rat - 1,250 mg/kg

Remarks: Lungs, Thorax, or Respiration:Acute pulmonary edema.

Liver:Changes in liver weight.

(RTECS)

Inhalation: No data available

Dermal: No data available

**Skin corrosion/irritation**

Skin - Rabbit

Result: Causes burns. - 24 h

Remarks: (ECHA)

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

**Serious eye damage/eye irritation**

Remarks: Causes serious eye damage.

Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

**Respiratory or skin sensitization**

No data available

**Germ cell mutagenicity**

Test Type: Ames test

Test system: Escherichia coli/Salmonella typhimurium

Result: negative

Test Type: Mutagenicity (mammal cell test): chromosome aberration.

Test system: Human lymphocytes

Result: negative

Test Type: In vitro mammalian cell gene mutation test

Test system: mouse lymphoma cells

Result: negative

**Carcinogenicity**

No data available

**Reproductive toxicity**

No data available

**Specific target organ toxicity - single exposure**

No data available

**Specific target organ toxicity - repeated exposure****Aspiration hazard**

No data available

**sodium 3-nitrobenzenesulphonate****Acute toxicity**

LD50 Oral - Rat - 11,000 mg/kg

LC50 Inhalation - Rat - 4 h - > 5,100 mg/m<sup>3</sup>

Dermal: No data available

No data available

**Skin corrosion/irritation**

Skin - Rabbit

**Serious eye damage/eye irritation**

Eyes - Rabbit

**Respiratory or skin sensitization**

No data available

**Germ cell mutagenicity**

No data available

**Carcinogenicity**

No data available

**Reproductive toxicity**

No data available

No data available

**Specific target organ toxicity - single exposure**

No data available

**Specific target organ toxicity - repeated exposure**

No data available

**Aspiration hazard**

No data available

**acetic acid****Acute toxicity**

LD50 Oral - Rat - 3,310 mg/kg

Remarks: (RTECS)

LC50 Inhalation - Mouse - 4 h - 2,819 mg/l - vapor

Remarks: (RTECS)

Dermal: No data available

**Skin corrosion/irritation**

Skin - Rabbit

Result: Causes burns. - 4 h

(OECD Test Guideline 404)

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

**Serious eye damage/eye irritation**

Eyes - Rabbit

Result: Causes burns. - 4 h

(OECD Test Guideline 405)

Remarks: (IUCLID)

Remarks: Causes serious eye damage.

**Respiratory or skin sensitization**

No data available

**Germ cell mutagenicity**

Test Type: Ames test

Test system: Salmonella typhimurium

Result: negative

Test Type: Mutagenicity (mammal cell test): chromosome aberration.

Test system: Chinese hamster ovary cells

Result: negative

Method: Mutagenicity (micronucleus test)

Species: Rat - male and female - Bone marrow

Result: negative

**Carcinogenicity**

No data available

**Reproductive toxicity**

No data available

**Specific target organ toxicity - single exposure**

No data available

**Specific target organ toxicity - repeated exposure**

No data available

**Aspiration hazard**

No data available

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**SECTION 12: Ecological information**

**12.1 Toxicity**

**Mixture**

No data available

**12.2 Persistence and degradability**

No data available

**12.3 Bioaccumulative potential**

No data available

**12.4 Mobility in soil**

No data available

**12.5 Results of PBT and vPvB assessment**

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

**12.6 Endocrine disrupting properties**

No data available

**12.7 Other adverse effects**

No data available

**Components**

**phosphoric acid**

Toxicity to daphnia  
and other aquatic  
invertebrates

static test EC50 - Daphnia magna (Water flea) - > 100 mg/l -  
48 h  
(OECD Test Guideline 202)

Toxicity to algae

static test ErC50 - Desmodesmus subspicatus (green algae) - >  
100 mg/l - 72 h  
(OECD Test Guideline 201)

static test NOEC - Desmodesmus subspicatus (green algae) -  
100 mg/l - 72 h  
(OECD Test Guideline 201)

Toxicity to bacteria static test EC50 - activated sludge - > 1,000 mg/l - 3 h  
(OECD Test Guideline 209)

### **sodium 3-nitrobenzenesulphonate**

Toxicity to fish LC50 - Leuciscus idus (Golden orfe) - > 500 mg/l - 96 h

Toxicity to algae EC50 - Desmodesmus subspicatus (green algae) - > 500 mg/l  
- 72 h

### **acetic acid**

Toxicity to fish semi-static test LC50 - Oncorhynchus mykiss (rainbow trout) -  
> 1,000 mg/l - 96 h  
(OECD Test Guideline 203)

Toxicity to daphnia static test EC50 - Daphnia magna (Water flea) - > 1,000 mg/l  
and other aquatic - 48 h  
invertebrates (OECD Test Guideline 202)

Toxicity to algae static test EC50 - Skeletonema costatum - > 1,000 mg/l - 72 h  
(ISO 10253)

Toxicity to bacteria EC5 - Pseudomonas putida - 2,850 mg/l - 16 h

Remarks: neutral  
(maximum permissible toxic concentration)  
(Lit.)

microtox test EC50 - Photobacterium phosphoreum - 11 mg/l -  
15 min  
Remarks: (IUCLID)

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## **SECTION 13: Disposal considerations**

### **13.1 Waste treatment methods**

#### **Product**

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

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## **SECTION 14: Transport information**

### **DOT (US)**

UN number: 1760 Class: 8

Packing group: II

Proper shipping name: Corrosive liquids, n.o.s. (phosphoric acid, acetic acid)

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Reportable Quantity (RQ):  
Poison Inhalation Hazard: No

**IMDG**

UN number: 1760 Class: 8 Packing group: II EMS-No: F-A, S-B  
Proper shipping name: CORROSIVE LIQUID, N.O.S. (phosphoric acid, acetic acid)

**IATA**

UN number: 1760 Class: 8 Packing group: II  
Proper shipping name: Corrosive liquid, n.o.s. (phosphoric acid, acetic acid)

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**SECTION 15: Regulatory information**

**CERCLA Reportable Quantity**

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
phosphoric acid	7664-38-2	5000	

**SARA 304 Extremely Hazardous Substances Reportable Quantity**

This material does not contain any components with a section 304 EHS RQ.

**SARA 302 Extremely Hazardous Substances Threshold Planning Quantity**

This material does not contain any components with a section 302 EHS TPQ.

**SARA 311/312 Hazards** : Acute Health Hazard  
Chronic Health Hazard

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

**US State Regulations**

**Massachusetts Right To Know**

phosphoric acid 7664-38-2  
water 7732-18-5  
acetic acid 64-19-7

**Pennsylvania Right To Know**

phosphoric acid 7664-38-2  
acetic acid 64-19-7

**Maine Chemicals of High Concern**

water 7732-18-5

**Vermont Chemicals of High Concern**

water 7732-18-5

**Washington Chemicals of High Concern**

water 7732-18-5

**The ingredients of this product are reported in the following inventories:**

TSCA : All substances listed as active on the TSCA inventory

### **TSCA list**

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

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## **SECTION 16: Other information**

### **Further information**

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See [www.sigma-aldrich.com](http://www.sigma-aldrich.com) and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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