



1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name: 1H,1H,4H,4H-PERFLUORO-1,4-BUTANEDIOL
Synonyms: 2,2,3,3-Tetrafluoro-1,4-butanediol
Product number: C4DIOL
CAS-No. 425-61-6

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

Identified uses: For R&D use only.

1.3 Details of the supplier of the safety data sheet

Company: Exflur Research Corporation
2350 Double Creek Drive
ROUND ROCK, TEXAS 78664
USA

Telephone: +1 512-310-9044

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

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

Acute toxicity, oral (Category 4) H302

2.2 GHS Label Elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H302 Harmful if swallowed.

Precautionary statement(s)

P264 Wash hands thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P301 + P 312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

P330 Rinse mouth.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

None

3. COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

Formula $C_4H_6F_4O_2$
Molecular Weight 162.09 g/mol

No ingredients are hazardous according to OSHA criteria.
No components need to be disclosed according to the applicable regulations.

4. FIRST-AID MEASURES

4.1 Description of first-aid measures

General advice

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

If inhaled

Remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

In case of skin contact

Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes.

In case of eye contact

Immediately flush eyes with plenty of water for at least 15 minutes. Ensure adequate flushing of the eyes by separating the eyelids with fingers.

If swallowed

Do not induce vomiting. Never give anything by mouth to an unconscious person. Allow victim to rinse his mouth with water. Allow victim to drink 2 – 4 cupfuls of water.

4.2 Most important symptoms and effects, both acute and delayed

See § 2.2 and § 11.

4.3 Indication of any immediate medical attention and special treatment needed

Note to physician: Treat symptomatically and supportively.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Water spray, carbon dioxide, dry chemical powder, or polymer foam.

5.2 Special hazards arising from the substance or mixture

Releases toxic fumes of carbon oxides and hydrogen fluoride.

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment, and emergency measures

Use personal protective equipment. Avoid breathing vapors, mist, or gas. Ensure adequate ventilation. Keep people away from and upwind of spill/ leak. Restrict access to area until completion of clean-up.

6.2 Environmental precautions

Do not allow material to enter drains. If necessary, dike ahead of spill to prevent runoff into drains, sewers, or any natural waterway or drinking supply.

6.3 Methods and materials for containment and cleaning up

Prevent further leakage or spillage if safe to do so. Soak up the spill with an inert absorbent material. Contaminated absorbent material may pose the same hazards as the spilled product. Place in container for disposal according to local regulations.

6.4 Reference to other sections

Refer to protective measures listed in § 7 and § 8.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Do not handle until all safety precautions have been read and understood. Wear protective gloves and eye/face protection. Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection. Avoid inhalation of vapor or mist. Avoid contact with skin, eyes, and clothing. Keep away from heat and open flames. Do not eat, drink, or smoke when using this product. Wash thoroughly after handling.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed. Store in cool, dry, well-ventilated place. Empty containers retain residue (powder and/or vapor) and can be dangerous. Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances (see § 10.5).

7.3 Specific use(s)

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

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Use only in well-ventilated areas. Provide local exhaust or a process enclosure ventilation system. Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Wear safety glasses or chemical safety goggles and face shield. Provide an emergency eye wash station and quick drench shower in the immediate work area.

Skin protection

Handle with appropriate chemical-resistant 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.

Body protection

The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Respirator protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

General hygiene considerations

Do not breathe vapors. Avoid contact with skin, eyes, and clothing. Do not eat, drink, or smoke when using this product. Wash thoroughly after handling. Remove and wash contaminated clothing before re-use. Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	white, crystalline solid
b)	Odor	no data available
c)	Odor threshold	no data available
d)	pH	no data available
e)	Melting/freezing point	85-87 °C
f)	Initial boiling point/range	110-112 °C (230-234 °F) at 17 hPa (13 mmHg)
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)	Relative density	no data available
n)	Solubility	Soluble in water
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No unusual reactivity. See § 10.5.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reaction

Hazardous polymerization does not occur.

10.4 Conditions to avoid

Extreme heat

10.5 Incompatible materials

Strong oxidizing agents, Strong reducing agents, strong acids, strong bases

10.6 Hazardous decomposition products

Releases toxic fumes of carbon oxides and hydrogen fluoride.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

May cause irritation of the respiratory tract, eyes, and skin.

Skin corrosion/ irritation

Irritant effect.

Serious eye damage/ irritation

Irritant effect.

Respiratory or skin sensitization

Irritant effect.

Germ cell mutagenicity

No data available

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

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

RTECS: Not available

To the best of our knowledge, the acute and chronic toxicity of this substance is not fully known.

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

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 Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Refer to protective measure listed in § 7 and § 8.

Dispose of in accordance with all applicable federal, state, and local regulations.

Place in a chemical secured landfill or incinerate at 1200°C with a 2 second dwell time or at 1600°C with a 1.5 second dwell time. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Empty containers retain residue and can be dangerous. Disposal must be made according to official regulations.

14. TRANSPORTATION INFORMATION

DOT (US) / IMDG / IATA

Not classified as hazardous for transport.

15. REGULATORY INFORMATION

US federal information

This product is not listed on the TSCA Inventory. For R&D use only.

16. OTHER INFORMATION

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. Exfluor Research Corporation shall not be held liable for any damage resulting from handling or from contact with the above product.