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Cambridge Isotope Laboratories, Inc.

50 Frontage Road, Andover, MA 01810-5413 USA
800.322.1174 (N.AMERICA) 978.749.8000 (INTERNATIONAL)
www.isotope.com

CERTIFICATE OF ANALYSIS

Product Name: 40% P-DIOXANE
(Isotopic Label & Enrichment Specification) IN BENZENE-D6

Lot Number: BP-610

Catalog Number: DLM-72-0

Product Information

Chemical Purity Specification: $\geq 98\%$
Labeled CAS Number: See MSDS
Unlabeled CAS Number: See MSDS
Molecular Weight: See MSDS
Chemical Formula: See MSDS
Storage: Store at room temperature away from light and moisture.
Stability: Stable if stored under recommended conditions.

Certification

Cambridge Isotope Laboratories, Inc. guarantees that this material meets or exceeds the specifications stated. Absolute identity as well as chemical and isotopic purities are assured by the use of unambiguous synthetic routes and multiple chemical analyses whenever possible.

Approved by: *Jeffrey O'Neill*

Jeffrey O'Neill, Quality Assurance

Quality Control Tests and Results

¹H NMR for Chemical Purity

Pass

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CAMBRIDGE ISOTOPE LABORATORIES
50 Frontage Road, Andover, Massachusetts 01810

Material Safety Data Sheet

PLEASE NOTE: This product is not radioactive. The data given for this product are those of the corresponding unlabeled compound, unless specifically indicated otherwise. Health and safety data for labeled compounds are generally unavailable, but are assumed to be similar or identical to the corresponding unlabeled compound. While the information contained is believed to be accurate, it does not claim to be all inclusive, and should be used only as a guide. CIL, Inc., extends no warranties with respect hereto and disclaims all liabilities from reliance thereon. Judgments as to the suitability of the data presented with respect to the use of the product are the responsibility of the purchaser and intended user.

Section 1. Chemical Product and Company Identification

**p-Dioxane (40%)
(in Benzene-D6)**

Cambridge Isotope Laboratories, Inc.
50 Frontage Road
Andover, MA 01810
USA.

Emergency Telephone No.
USA: 1-800-424-9300
USA, for Information:
(800) 322-1174

CATALOG NO.
DLM-72

Emergency Telephone No.
INT: 1-202-483-7616
International, for Information:
(978) 749-8000

Date Prepared: 23-Aug-01

Supersedes: All previous.

Section 2. Hazard. Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Names)
Chemical Names
p-Dioxane (40%)
Benzene-D6

RTECS No.:
OSHA PEL
8 H TWA 100 ppm
Not established.

CY1400000 (Benzene-D6)
ACGIH TLV
TWA 20 ppm (skin)
Not established.

Section 3. Hazard Identification.

Appearance: Colorless liquid.
Potential health effects: May cause heritable genetic damage. Cancer hazard. (Benzene-D6)
Routes of Entry: Inhalation, ingestion, skin absorption.
Symptoms of exposure: Nausea, dizziness and headache. Narcotic effect. (Benzene-D6)
Target organs: Blood, bone marrow, eyes and female reproductive system. (Benzene-D6)
Warnings: Flammable. Carcinogen. Toxic. Causes irritation. Mutagen. Danger: Contains benzene. (Benzene-D6)

Section 4. First Aid Measures.

On contact, flush eyes or skin with lots of water for at least 15 minutes. Breathing: If breathing is difficult, give oxygen.
Remove and wash contaminated clothing promptly. Swallowed: Wash out mouth with water if person is conscious.
Eyes: (Separate eyelids with fingers when flushing.) Breathing: If not breathing, give artificial respiration.
Call a physician.

Section 5. Fire-Fighting Measures.

Extinguishing Media: Carbon dioxide, dry chemical powder or appropriate foam. Water may not effect extinguishment.
Methods and cautions: Wear self-contained breathing apparatus and protective clothing.
Prevent contact with skin and eyes. Use water spray to cool fire-exposed containers.
Danger: Extremely flammable. Container explosion may occur under fire conditions.
Vapor may travel considerable distance to source of ignition and flashback.
Flammable LEL: 1.3% (Benzene-D6) Flammable UEL: 8% (Benzene-D6)

Section 6. Accidental Release Measures.

Evacuate area. Shut off all sources of ignition. Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves.
Cover with an activated carbon absorbent, take up and place in closed containers. Transport outdoors.
Ventilate area and wash spill site after material pickup is complete.
Hygiene warning: Wash thoroughly after handling.
Respiratory protection: Wear appropriate NIOSH/MSHA approved respirator.

p-Dioxane (40%) (in Benzene-D6) DLM-72**Section 7. Handling and Storage.**

General warning: Flammable. Carcinogen. Toxic. Causes irritation. Mutagen. Danger: Contains benzene. (Benzene-D6)
 Handling procedures: Avoid contact with eyes, skin, and clothing.
 Storage procedures: Store at room temperature away from light and moisture. Keep tightly closed.
 Hygiene instructions: Wash thoroughly after handling.
 Other: Use only in a chemical fume hood. Use nonsparking tools.

Section 8. Exposure Controls and Personal Protection.

General controls: Do not breathe vapor. Avoid prolonged or repeated exposure.
 Eye/face protection: Chemical safety goggles.
 Skin Protection: Wear suitable protective clothing.
 Respiratory protection: Wear appropriate NIOSH/MSHA approved respirator.

Section 9. Physical/Chemical Characteristics.

Molecular weight:	80.13 (Benzene-D6)	Autoignition temperature:	Not available.
Appearance:	Colorless liquid.	Flash point/Method:	Not available.
Odor:	Not available.	Melting point:	6.8°C (Benzene-D6)
Physical state:	Liquid.	Boiling point:	79.1°C (Benzene-D6)
pH:	Not available..	Freezing point:	Not available..
Vapor pressure:	166 mm Hg (Benzene-D6)		
Vapor density:	2.77 (Benzene-D6)		
Solubility in water:	Not available.		
Specific gravity/density:	0.95 (Benzene-D6)		

Section 10. Stability and Reactivity.

Chemical Stability: Stable if stored under recommended conditions.
 Conditions to Avoid: Heat, sparks, open flame.
 Incompatibilities: Oxidizing agents.
 Hazardous Decomposition: Toxic fumes of carbon dioxide and carbon monoxide.
 Hazardous Polymerization: Not available.

Section 11. Toxicological Information (see Section 3 on first page).

Acute data: Danger: Contains benzene, cancer hazard.
 Harmful if swallowed, inhaled, or absorbed through skin.
 Material is irritating to mucous membranes and upper respiratory tract.
 Causes skin irritation. Causes severe eye irritation. (Benzene-D6)

Chronic data: See Page 3 for additional information.

Section 12. Ecological Information (impact if released into environment).

Data not yet available.

Section 13. Disposal Considerations.

Burn in a chemical incinerator with afterburner and scrubber.
 Exert extra care in igniting as this material is highly flammable.

Section 14. Transport Information.


Follow all Federal, State and Local transportation guidelines.

Section 15. Regulatory Information.

California Proposition 65: This product is or contains chemical(s) known to the state of California to cause cancer. (Benzene-D6)
 This product is subject to SARA Section 313 reporting requirements. (Benzene-D6)
 Listed on the TSCA inventory.

Section 16. Other Information.

Not available.



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FAX: 978.749.2768 URL: <http://www.isotope.com>

Section 11. Toxicological Information (See Section 3 on first page).

Chronic Data: Inhalation of high concentrations of Benzene may have an initial stimulatory effect on the central nervous system characterized by exhilaration, nervous excitation and/or giddiness, depression, drowsiness, or fatigue. The victim may experience tightness in the chest, breathlessness and loss of consciousness. Tremors, convulsions and death due to respiratory paralysis or circulatory collapse can occur in a few minutes to several hours following severe exposures. Aspirations of small amounts of liquid immediately causes pulmonary edema and hemorrhage of pulmonary tissue. Direct skin contact may causes pulmonary edema and hemorrhage of pulmonary tissue. Direct skin contact may cause erythema. Repeated or prolonged skin contact may result in infections. The chief target organ is the hematopoietic system. Bleeding from the nose, gums or mucous membranes and the development of purpuric spots, pancytopenia, leukopenia, thrombocytopenia, aplastic anemia and leukemia may occur as the condition progresses. The bone marrow may appear normal, aplastic or hyper plastic, and may not correlate with peripheral blood-forming tissues. The onset of effects of prolonged benzene exposure may be delayed for many months or years after the actual exposure has ceased.

Causes skin irritation.

Causes severe eye irritation.

Material is irritating to mucous membranes and upper respiratory tract.

Harmful if swallowed, inhaled, or absorbed through the skin.