SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product form</td>
<td>Substance</td>
</tr>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Substance name</td>
<td>5-VINYL-2-NORBORNENE, 95%</td>
</tr>
<tr>
<td>Product code</td>
<td>ENEV4830</td>
</tr>
<tr>
<td>Formula</td>
<td>C9H12</td>
</tr>
<tr>
<td>Synonyms</td>
<td>5-VINYLNORBORN-2-ENE 5-VINYL-2-BICYCLOHEPTENE</td>
</tr>
<tr>
<td>Chemical family</td>
<td>HYDROCARBON</td>
</tr>
</tbody>
</table>

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

1.2.1. Relevant identified uses

Use of the substance/mixture: Chemical intermediate

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

GELEST, INC.
11 East Steel Road
Morrisville, PA 19067
USA
T 215-547-1015 - F 215-547-2484 - (M-F): 8:00 AM - 5:30 PM EST
info@gelest.com - www.gelest.com

GELEST INC.
Fritz-Klatte-Strasse 8
65933 Frankfurt
Germany
T +49 (0) 69 3535106-500 - F +49 (0) 69 3535106-501 - (M-F): 8:00 AM - 4:00 PM
info@gelestde.com - www.gelestde.com

1.4. Emergency telephone number

Emergency number: CHEMTREC: 1-800-424-9300 (USA); +1 703-527-3887 (International)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Flammable liquids, Category 3

Full text of H statements: see section 16

Adverse physicochemical, human health and environmental effects

No additional information available

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP):

- GHS02

Signal word (CLP): Warning

Hazard statements (CLP): H226 - Flammable liquid and vapour.

Precautionary statements (CLP): P280 - Wear protective gloves/protective clothing/eye protection/face protection. P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
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P233 - Keep container tightly closed.
P240 - Ground/bond container and receiving equipment.
P403+P235 - Keep in a cool place
P370+P378 - In case of fire: Use water spray or fog, foam, carbon dioxide, dry chemical to extinguish.

2.3. Other hazards
No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

<table>
<thead>
<tr>
<th>Substance type</th>
<th>Name</th>
<th>CAS-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mono-constituent</td>
<td>5-VINYL-2-NORBORNENE, 95%</td>
<td>3048-64-4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification according to Regulation (EC) No. 1272/2008 [CLP]</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-Vinyl-2-norbornene</td>
<td>(CAS-No.) 3048-64-4 (EC-No.) 221-259-8</td>
<td>&gt; 95</td>
<td>Flam. Liq. 3, H226</td>
</tr>
</tbody>
</table>

Full text of H-statements: see section 16

3.2. Mixtures
Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation: Remove person to fresh air and keep comfortable for breathing. If you feel unwell, seek medical advice.

First-aid measures after skin contact: Wash with plenty of water/…. Get medical advice/attention.

First-aid measures after eye contact: Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.

First-aid measures after ingestion: Never give anything by mouth to an unconscious person. Get medical advice/attention.

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

Symptoms/effects after inhalation: No information available.

Symptoms/effects after skin contact: May cause mild skin irritation.

Symptoms/effects after eye contact: May cause eye irritation.

Symptoms/effects after ingestion: May be harmful if swallowed.

4.3. Indication of any immediate medical attention and special treatment needed
No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media


Unsuitable extinguishing media: Do not use straight streams.

5.2. Special hazards arising from the substance or mixture

Fire hazard: Flammable liquid and vapour. Irritating fumes and organic acid vapors may develop when material is exposed to elevated temperatures or open flame.

Explosion hazard: May form flammable/explosive vapour-air mixture.

5.3. Advice for firefighters

Firefighting instructions: Exercise caution when fighting any chemical fire. Use water spray or fog for cooling exposed containers.

Protection during firefighting: Do not enter fire area without proper protective equipment, including respiratory protection. Avoid all eye and skin contact and do not breathe vapour and mist.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures: Eliminate every possible source of ignition. Use special care to avoid static electric charges.
## 5-VINYL-2-NORBORNENE, 95%

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#### 6.1.1. For non-emergency personnel

| Protective equipment | :| Wear protective equipment as described in Section 8. |
| Emergency procedures | :| Evacuate unnecessary personnel. |

#### 6.1.2. For emergency responders

| Protective equipment | :| Do not attempt to take action without suitable protective equipment. Equip cleanup crew with proper protection. For further information refer to section 8: "Exposure controls/personal protection". |

#### 6.2. Environmental precautions

| Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters. |

#### 6.3. Methods and material for containment and cleaning up

| For containment | :| Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. |
| Methods for cleaning up | :| Clean up any spills as soon as possible, using an absorbent material to collect it. Use only non-sparking tools. |

#### 6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

| Additional hazards when processed | :| Handle empty containers with care because residual vapours are flammable. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. |
| Precautions for safe handling | :| Avoid all eye and skin contact and do not breathe vapour and mist. Provide good ventilation in process area to prevent formation of vapour. Ground/bond container and receiving equipment. Take precautionary measures against static discharge. Use only non-sparking tools. |
| Hygiene measures | :| Wash contaminated clothing before reuse. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. |

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

| Technical measures | :| Proper grounding procedures to avoid static electricity should be followed. Use explosion-proof electrical equipment. |
| Storage conditions | :| Keep container tightly closed. Keep in a cool place. |
| Incompatible materials | :| Oxidizing agent. |
| Storage area | :| Store in a well-ventilated place. Store away from heat. |

#### 7.3. Specific end use(s)

No additional information available

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

No additional information available

#### 8.2. Exposure controls

**Appropriate engineering controls:**

Provide local exhaust or general room ventilation.

**Personal protective equipment:**

Avoid all unnecessary exposure. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

**Hand protection:**

Neoprene or nitrile rubber gloves

**Eye protection:**

Chemical goggles. Contact lenses should not be worn

**Skin and body protection:**

Wear suitable protective clothing

**Respiratory protection:**

Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. NIOSH-certified organic vapor (black cartridge) respirator.
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SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid
Appearance : Clear liquid.
Molecular mass : 120.19 g/mol
Colour : Straw.
Odour : Pungent.
Odour threshold : No data available
Refractive index : 1.481
pH : No data available
Relative evaporation rate (butylacetate=1) : ~ 1
Melting point : No data available
Freezing point : < -80 °C
Boiling point : 141 °C
Flash point : 28 °C
Auto-ignition temperature : No data available
Decomposition temperature : No data available
Flammability (solid, gas) : Flammable liquid and vapour.
Vapour pressure : ~ 10 mm Hg @ 20°C
Relative vapour density at 20 °C : 4.1
Relative density : 0.841
% Volatiles : 100 %
Solubility : Insoluble in water.
Log Pow : No data available
Log Kow : No data available
Viscosity, kinematic : No data available
Viscosity, dynamic : No data available
Explosive properties : No data available
Oxidising properties : No data available
Explosive limits : No data available

9.2. Other information
No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity
No additional information available

10.2. Chemical stability
Stable.

10.3. Possibility of hazardous reactions
Hazardous polymerization may occur if stored at elevated temperature (>50°C).

10.4. Conditions to avoid
Heat. Open flame. Sparks.

10.5. Incompatible materials
Oxidizing agent.

10.6. Hazardous decomposition products
Organic acid vapors.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute toxicity : Not classified

5-Vinyl-2-norbornene (3048-64-4)

LD50 oral rat : 5190 µl/kg
LC50 inhalation rat (ppm) : 2231 ppm/4h
ATE CLP (gases) : 2231 ppmv/4h
Skin corrosion/irritation : Not classified
Serious eye damage/irritation : Not classified
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Respiratory or skin sensitisation: Not classified
Germ cell mutagenicity: Not classified
Ames test (histidine reversion) is negative, i.e not a mutagen.
Carcinogenicity: Not classified
None of the components in this product at concentrations >0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.
Reproductive toxicity: Not classified
STOT-single exposure: Not classified
STOT-repeated exposure: Not classified
Aspiration hazard: Not classified
Symptoms/effects after inhalation: No information available.
Symptoms/effects after skin contact: May cause mild skin irritation.
Symptoms/effects after eye contact: May cause eye irritation.
Symptoms/effects after ingestion: May be harmful if swallowed.

SECTION 12: Ecological information

12.1. Toxicity
Acute aquatic toxicity: Not classified
Chronic aquatic toxicity: Not classified

12.2. Persistence and degradability
No additional information available

12.3. Bioaccumulative potential
No additional information available

12.4. Mobility in soil
No additional information available

12.5. Results of PBT and vPvB assessment
No additional information available

12.6. Other adverse effects
Other adverse effects: This substance may be hazardous to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Sewage disposal recommendations: Do not dispose of waste into sewer.
Product/Packaging disposal recommendations: Incinerate. Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to licensed waste disposal facility.
Additional information: Handle empty containers with care because residual vapours are flammable.
Ecology - waste materials: Avoid release to the environment.

SECTION 14: Transport information

14.1. UN number
In accordance with ADR / RID / IMDG / IATA / ADN

14.1. UN number
UN-No. (ADR) : 1993
UN-No. (IMDG) : 1993
UN-No. (IATA) : 1993
UN-No. (ADN) : 1993
UN-No. (RID) : 1993

14.2. UN proper shipping name
Proper Shipping Name (ADR) : FLAMMABLE LIQUID, N.O.S.
Proper Shipping Name (IMDG) : FLAMMABLE LIQUID, N.O.S.
Proper Shipping Name (IATA) : Flammable liquid, n.o.s.
Proper Shipping Name (ADN) : FLAMMABLE LIQUID, N.O.S.
Proper Shipping Name (RID) : FLAMMABLE LIQUID, N.O.S.
# 5-VINYL-2-NORBORNENE, 95%

## Safety Data Sheet

<table>
<thead>
<tr>
<th>Transport document description (IATA)</th>
<th>UN 1993 Flammable liquid, n.o.s. (5-VINYL-2-NORBORNENE), 3, III</th>
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<tbody>
<tr>
<td>Transport document description (ADN)</td>
<td>UN 1993 FLAMMABLE LIQUID, N.O.S. (5-VINYL-2-NORBORNENE), 3, III</td>
</tr>
<tr>
<td>Transport document description (RID)</td>
<td>UN 1993 FLAMMABLE LIQUID, N.O.S. (5-VINYL-2-NORBORNENE), 3, III</td>
</tr>
</tbody>
</table>

### 14.3. Transport hazard class(es)

**ADR**

Transport hazard class(es) (ADR): 3

Danger labels (ADR): 3

**IMDG**

Transport hazard class(es) (IMDG): 3

Danger labels (IMDG): 3

**IATA**

Transport hazard class(es) (IATA): 3

Hazard labels (IATA): 3

**ADN**

Transport hazard class(es) (ADN): 3

Danger labels (ADN): 3

**RID**

Transport hazard class(es) (RID): 3

Danger labels (RID): 3

### 14.4. Packing group

Packing group (ADR): III

Packing group (IMDG): III

Packing group (IATA): III

Packing group (ADN): III

Packing group (RID): III
## 14.5. Environmental hazards

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Dangerous for the environment</td>
<td>No</td>
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<tr>
<td>Marine pollutant</td>
<td>No</td>
</tr>
<tr>
<td>Other information</td>
<td>No supplementary information available</td>
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## 14.6. Special precautions for user

### - Overland transport

<table>
<thead>
<tr>
<th>Classification code (ADR)</th>
<th>F1</th>
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</thead>
<tbody>
<tr>
<td>Special provisions (ADR)</td>
<td>274, 601, 640E</td>
</tr>
<tr>
<td>Limited quantities (ADR)</td>
<td>5l</td>
</tr>
<tr>
<td>Excepted quantities (ADR)</td>
<td>E1</td>
</tr>
<tr>
<td>Packing instructions (ADR)</td>
<td>P001, IBC03, LP01, R001</td>
</tr>
<tr>
<td>Mixed packing provisions (ADR)</td>
<td>MP19</td>
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<tr>
<td>Portable tank and bulk container instructions (ADR)</td>
<td>T4</td>
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</table>

### - Transport by sea

<table>
<thead>
<tr>
<th>Special provisions (IMDG)</th>
<th>223, 274, 955</th>
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</thead>
<tbody>
<tr>
<td>Limited quantities (IMDG)</td>
<td>5 L</td>
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<tr>
<td>Excepted quantities (IMDG)</td>
<td>E1</td>
</tr>
<tr>
<td>Packing instructions (IMDG)</td>
<td>P001, LP01</td>
</tr>
<tr>
<td>IBC packing instructions (IMDG)</td>
<td>IBC03</td>
</tr>
<tr>
<td>Tank instructions (IMDG)</td>
<td>T4</td>
</tr>
<tr>
<td>Tank special provisions (IMDG)</td>
<td>TP1, TP29</td>
</tr>
<tr>
<td>EmS-No. (Fire)</td>
<td>F-E</td>
</tr>
<tr>
<td>EmS-No. (Spillage)</td>
<td>S-E</td>
</tr>
<tr>
<td>Stowage category (IMDG)</td>
<td>A</td>
</tr>
</tbody>
</table>

### - Air transport

| PCA Excepted quantities (IATA) | E1       |
| PCA Limited quantities (IATA)  | Y344     |
| PCA limited quantity max net quantity (IATA) | 10L |
| PCA packing instructions (IATA) | 355      |
| PCA max net quantity (IATA)    | 60L       |
| CAO packing instructions (IATA) | 366      |
| CAO max net quantity (IATA)    | 220L      |
| Special provisions (IATA)      | A3        |
| ERG code (IATA)                | 3L        |

### - Inland waterway transport

| Classification code (ADN)       | F1       |
| Special provisions (ADN)        | 274, 601, 640E |
| Limited quantities (ADN)        | 5 L       |
| Excepted quantities (ADN)       | E1        |
5-VINYL-2-NORBORNENE, 95%
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<table>
<thead>
<tr>
<th>Carriage permitted (ADN)</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment required (ADN)</td>
<td>PP, EX, A</td>
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<tr>
<td>Ventilation (ADN)</td>
<td>VE01</td>
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<tr>
<td>Number of blue cones/lights (ADN)</td>
<td>0</td>
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</tbody>
</table>

- Rail transport

<table>
<thead>
<tr>
<th>Classification code (RID)</th>
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</thead>
<tbody>
<tr>
<td>Special provisions (RID)</td>
<td>274, 601, 640E</td>
</tr>
<tr>
<td>Limited quantities (RID)</td>
<td>5L</td>
</tr>
<tr>
<td>Excepted quantities (RID)</td>
<td>E1</td>
</tr>
<tr>
<td>Packing instructions (RID)</td>
<td>P001, IBC03, LP01, R001</td>
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<tr>
<td>Mixed packing provisions (RID)</td>
<td>MP19</td>
</tr>
<tr>
<td>Portable tank and bulk container instructions (RID)</td>
<td>T4</td>
</tr>
<tr>
<td>Portable tank and bulk container special provisions (RID)</td>
<td>TP1, TP29</td>
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<tr>
<td>Tank codes for RID tanks (RID)</td>
<td>LGBF</td>
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<tr>
<td>Special provisions for carriage – Packages (RID)</td>
<td>W12</td>
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<tr>
<td>Colis express (express parcels) (RID)</td>
<td>CE4</td>
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<tr>
<td>Hazard identification number (RID)</td>
<td>30</td>
</tr>
</tbody>
</table>

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code
Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

No REACH Annex XVII restrictions
5-VINYL-2-NORBORNENE, 95% is not on the REACH Candidate List
5-VINYL-2-NORBORNENE, 95% is not on the REACH Annex XIV List
5-VINYL-2-NORBORNENE, 95% is not subject to REGULATION (EU) No 649/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 concerning the export and import of hazardous chemicals.

% Volatiles | 100 %

15.1.2. National regulations

Germany

Netherlands
SZW-lijst van kankerverwekkende stoffen | The substance is not listed
SZW-lijst van mutagene stoffen | The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding | The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid | The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling | The substance is not listed

Denmark
Class for fire hazard | Class II-1
Store unit | 5 liter
Classification remarks | R10 <H226>; Emergency management guidelines for the storage of flammable liquids must be followed

15.2. Chemical safety assessment

No additional information available
5-VINYL-2-NORBORNENE, 95%
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SECTION 16: Other information

Abbreviations and acronyms:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ND:</td>
<td>Not Determined, No Data</td>
</tr>
<tr>
<td>NA:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>LD:</td>
<td>Lethal Dose</td>
</tr>
<tr>
<td>LC:</td>
<td>Lethal Concentration</td>
</tr>
<tr>
<td>ATE:</td>
<td>Acute Toxicity Estimates</td>
</tr>
<tr>
<td>H:</td>
<td>hour</td>
</tr>
<tr>
<td>°:</td>
<td>°C unless otherwise stated</td>
</tr>
<tr>
<td>mm:</td>
<td>millimeters Hg, torr</td>
</tr>
<tr>
<td>PEL:</td>
<td>permissible exposure level</td>
</tr>
<tr>
<td>TWA:</td>
<td>time weighted average</td>
</tr>
<tr>
<td>TLV:</td>
<td>threshold limit value</td>
</tr>
<tr>
<td>TG:</td>
<td>Test Guideline</td>
</tr>
<tr>
<td>NIOSH:</td>
<td>National Institute for Occupational Safety and Health</td>
</tr>
<tr>
<td>IARC:</td>
<td>International Agency for Research on Cancer</td>
</tr>
<tr>
<td>NTP:</td>
<td>National Toxicology Program</td>
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<td>HMIS:</td>
<td>Hazardous Material Information System</td>
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<td>CAS No.:</td>
<td>Chemical Abstract Service Registration Number</td>
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<td>EC No.:</td>
<td>European Commission Registration Number</td>
</tr>
<tr>
<td>EC Index No.:</td>
<td>European Commission Index Number</td>
</tr>
<tr>
<td>OECD:</td>
<td>The Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>GHS:</td>
<td>The Globally Harmonized System of Classification and Labelling</td>
</tr>
<tr>
<td>APF:</td>
<td>Assigned Protection Factor</td>
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</table>

Other information: Prepared by safety and environmental affairs.

Full text of H- and EUH-statements:

<table>
<thead>
<tr>
<th>Flammable liquids, Category 3</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Flammable liquid and vapour.</th>
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SDS EU (REACH Annex II) - Custom

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