SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
IMMERSION OIL TYPE NF

COMPANY IDENTIFICATION
NIKON CORPORATION
Quality Assurance Section,
Microscope Solutions Business Unit
471, Nagaodai-cho, Sakae-ku, Yokohama 244-8533 (JAPAN)
TEL : +81-45-853-8608
FAX : +81-45-853-8485
e-mail: Msqa.Manager@nikon.com

FOR EMERGENCIES
(JAPAN)+81-45-853-8608

RECOMMENDED USE
Immersion oil to use for microscope objective lenses.

2. HAZARDS IDENTIFICATION

GHS CLASSIFICATION

PHYSICAL HAZARDS
All items Not classified

HEALTH HAZARDS
Acute toxicity (Oral) Not classified
Acute toxicity (Dermal) Not classified
Acute toxicity, inhalation (Gas) Not classified
Acute toxicity, inhalation (Dust and mist) Category 4
Skin corrosion/irritation Not classified
Serious eye damage/eye irritation/ CLP Category 2
Serious eye damage/eye irritation/ OSHA HCS Category 2B
Respiratory or skin sensitization Not classified
Germ cell mutagenicity Category 2
Carcinogenicity Not classified
Reproductive toxicity Not classified
Specific target organ toxicity · Single exposure Category 2
Specific target organ toxicity · Repeated exposure Category 1
Aspiration hazard Category 1

ENVIRONMENTAL HAZARDS
Hazardous to the aquatic environment · Acute toxicity Category 2
Hazardous to the aquatic environment · Chronic toxicity Category 2

The hazards item without a mention is the not classified or cannot classify it.
GHS LABEL ELEMENTS
Hazard Pictograms

Signal word  Danger

HAZARD STATEMENT(S)
H303   May be harmful if swallowed
H304   May be fatal if swallowed and enters airways
H316   Causes mild skin irritation
H320   Causes eye irritation
H332   Harmful if inhaled
H334   Suspected of causing genetic defects
H371   May cause damage to organs
H372   Causes damage to organs through prolonged or repeated exposure
H401   Toxic to aquatic life
H411   Toxic to aquatic life with long lasting effects

PRECAUTIONARY STATEMENT(S)
PREVENTION:
P235+P410  Keep cool.  Protect from sunlight.
P261     Avoid breathing dust/fume/mist/vapors/spray.
P271     Use in a well-ventilated area.
P280     Wear protective gloves/protective clothing/eye protection/face protection.
P264     Wash hands after handing.
RESPONSE:  See section 4 of GENERAL ADVICE.
STORAGE
P240 Ground/Bond container and receiving equipment.
P235+P410 Keep cool.  Protect from sunlight.
P404 Store in a closed container.
P405 Store locked up.
DISPOSAL
P501 Dispose of contents/ in according with local / regional / national / international regulation
P273 Avoid release to the environment.

3. COMPOSITION/INFORMATION ON INGREDIENTS
SUBSTANCE OR MIXTURE
Mixture

GENERAL PRODUCT DESCRIPTION
Immersion oil

<table>
<thead>
<tr>
<th>Chemical identity</th>
<th>composition (%)</th>
<th>FORMULA</th>
<th>TSCA inventory</th>
<th>RTECS #</th>
<th>CAS#</th>
<th>UN#</th>
<th>ICSC#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diphenyl ether</td>
<td>55~65%</td>
<td>C12H10O</td>
<td>Listed</td>
<td>KN8970000</td>
<td>101-84-8</td>
<td>3077</td>
<td>0791</td>
</tr>
<tr>
<td>Polybutene</td>
<td>25~35%</td>
<td>(C4H8)x</td>
<td>Listed</td>
<td>Not listed</td>
<td>9003-27-4</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
<tr>
<td>Paraffin oils</td>
<td>5~15%</td>
<td>CmHn</td>
<td>Listed</td>
<td>PY8047000</td>
<td>8012-95-1 (8042-47-5)</td>
<td>Not listed</td>
<td>1597</td>
</tr>
</tbody>
</table>

4. GENERAL ADVICE
INHALATION
P304+P340  Remove person to fresh air and keep comfortable for breath.
P312     Call a POISON CENTER or doctor/physician if you feel unwell..
SKIN CONTACT
P332+P313  If skin irritation occurs: Get medical advice/attention.
Discontinued product

**EYE CONTACT**

P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do. Continue rinsing.

P337+P313 If eye irritation persists: Get medical advice/attention.
Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids.
Get medical aid.

**INGESTION**

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P331 Do NOT induce vomiting.

5. **FIRE - FIGHTING MEASURES**

**SPECIFIC METHODS**
Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used.
For initial fire, use dry powder, carbon dioxide, etc.
For large fire, it is effective to use fire foam, etc. to shut off air supply.
Discharging cylinder shape water from fire hose may lead to spread fire to the surroundings.
Cool surrounding facilities, etc. with water spray.
Remove movable containers if safe to do so.
Take action from upwind.
Wear air respirators, chemical protective clothing during firefighting.

**SUITABLE EXTINGUISHING MEDIA**
Dry chemical, foam, water spray, carbon dioxide

6. **ACCIDENTAL RELEASE MEASURES**

**PERSONAL PRECAUTIONS**
Keep people away from and upwind of spill/leak.
Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.
Use personal protective equipment.
Avoid contact with skin and eyes.
No flares, smoking or flame in area.

**ENVIRONMENTAL PRECAUTIONS**
Do not release to the environment.
Be careful not to let it flow into rivers, etc., since adverse effects on the environment are concerned

**METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP**
For small spills, absorb with dry earth, sawdust, sand, etc. and collect into a closed container then dispose of them.
For large spills, dike with earth and sand, etc. to prevent further spills and cover liquid surface with foam and collect into an empty container as much as possible

7. **HANDLING AND STORAGE**

**HANDLING**

**TECHNICAL MEASURES**
Wear suitable protective equipment.
Keep container tightly closed.

**VENTilation**
Use a local exhaust if dust or aerosol will be generated.

**OTHER**
Keep away from sources of ignition such as open flame, static discharge, electric sparks, etc.
Wash hands and face thoroughly after handling.
Keep away from oxidizing agents.

**STORAGE**

**TECHNICAL MEASURES**
Ground all storage containers and use non-sparking tools, equipment.

**HAZARDOUS DECOMPOSITION PRODUCTS**
Keep away from contact with oxidizing materials
Store in a cool, dry, well-ventilated area away from incompatible substances
Keep container tightly closed

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CONTROL PARAMETERS

EXPOSURE LIMITS

ACGIH (2010)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLV-TWA</td>
<td>1 ppm</td>
</tr>
<tr>
<td>TLV-STE L</td>
<td>2 ppm</td>
</tr>
<tr>
<td>OSHA PEL (TWA)</td>
<td>1 ppm</td>
</tr>
<tr>
<td>NIOSH (TWA)</td>
<td>1 ppm</td>
</tr>
</tbody>
</table>

EXPOSURE LIMITS

ACGIH

<table>
<thead>
<tr>
<th>Parameter</th>
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</tr>
</thead>
<tbody>
<tr>
<td>TLV-TWA (Diphenyl ether: vapor)</td>
<td>1 ppm</td>
</tr>
<tr>
<td>TLV-STE L (Diphenyl ether: vapor)</td>
<td>2 ppm</td>
</tr>
<tr>
<td>OSHA PEL (TWA) (Diphenyl ether: vapor)</td>
<td>1 ppm</td>
</tr>
<tr>
<td>NIOSH (TWA) (Diphenyl ether)</td>
<td>1 ppm</td>
</tr>
</tbody>
</table>

VENTILATION

Handle the product only under conditions where sufficient ventilation is provided and/or in a closed system.
Install eye washer and safety shower near handling and storage area and display where they are.

INDIVIDUAL PROTECTION MEASURES,
RESPIRATORY PROTECTION

Use a NIOSH/MSHA or European Standard EN149 approved respirator if the vapor concentrations exceed regulatory guidelines.

HAND PROTECTION

Wear appropriate protective gloves to prevent skin exposure.

EYE PROTECTION

Wear appropriate protective eyeglasses or chemical safety goggles.

SKIN PROTECTION

Wear appropriate protective clothing to minimize contact with skin.
Protective clothing

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Viscous colorless liquid

ODOR

Aromatic odor

pH

No data available

CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Diphenyl ether</th>
<th>Polybutene</th>
<th>Paraffin oils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting point</td>
<td>28 °C</td>
<td>&lt;0°C</td>
<td>&gt;-10 °C</td>
</tr>
<tr>
<td>Boiling point</td>
<td>259°C</td>
<td>—</td>
<td>&gt;300°C</td>
</tr>
<tr>
<td>Solubility (water)</td>
<td>0.0018% 25°C</td>
<td>insoluble</td>
<td>insoluble</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>0.0202 mmHg 25°C</td>
<td>—</td>
<td>&lt;0.00001 Pa (20 °C)</td>
</tr>
<tr>
<td>Density</td>
<td>1.075 20°C</td>
<td>0.898(15°C)</td>
<td>0.8-0.9</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>5.9</td>
<td>&gt;1</td>
<td>—</td>
</tr>
<tr>
<td>Flash point</td>
<td>115 °C closed cup</td>
<td>228°C open cup</td>
<td>193 °C closed cup</td>
</tr>
<tr>
<td>Auto ignition Temperature</td>
<td>618 °C</td>
<td>—</td>
<td>500-700 °F</td>
</tr>
<tr>
<td>Explosive limits</td>
<td>0.8-1.5 vol%</td>
<td>—</td>
<td>10-20 vol%</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

STABILITY

Stable under normal temperatures and pressures

CONDITIONS TO AVOID

Sunlight, heat, open flames, high temperature sparks, static electrical charge, and other ignition sources

INCOMPATIBLE MATERIALS

Strong oxidizing agents Oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide, Carbon dioxide
11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY (oral/dermal/inhalation)
  Oral, Category 5
  Statistical calculations of the rat oral administration data of (ACGIH (2001), PATTY (5th, 2001), RTECS (2004)) show LD50 value: 2786mg/kg and it is set as Category 5, (Diphenyl ether).
  Based on rat LD50 >5000mg/kg (IUCLID (2000)), it was set as the outside of Category, (Paraffin oils).

Dermal, Not classified
  It was set as the outside of Category from rabbit LD50 value >7940mg/kg (RETCS (2004)), (Diphenyl ether).
  Based on rat LD50 >5000mg/kg (IUCLID (2000)), it was set as the outside of Category, (Paraffin oils).

Inhalation (dust, mist), Category 4
  Category 4 because of "SPECIES: Rat; ENDPOINT: LC50 = 2.18 mg/L." (IUCLID, 2000), (Paraffin oils).

SKIN CORROSION/IRRITATION
  Category 3
  It was classified as Category 3 according to the result of MILD (RTECS (2004)), (Diphenyl ether).

EYE DAMAGE/EYE IRRITATION
  Category 2B
  Since there was information of mild irritation in the data of HSDB (2005), it was set as Category 2B, (Diphenyl ether).

CARCINOGENICITY
  Not classified

GERM CELL MUTAGENICITY
  Category 2
  Based on the increase in the abnormal cells in the cytogenetic study [chromosomal aberration test] (somatic cell in vivo mutagenicity test) using the rat (IUCLID (2000)), and based on the fact that increase was observed in frequency of the chromosomal aberration in the peripheral blood lymphocyte of the human who received occupational exposure (IARC suppl.7 (1987)), and on the fact that there being no information about the productive cell in vivo genotoxicity study. So we classified it as Category 2, (Paraffin oils).

SPECIFIC TARGET ORGANS/SYSTEMIC TOXICITY FOLLOWING SINGLE EXPOSURE
  Category 2
  There is the statement that there is the grossly, histopathological acute changes
  (Details unknown) in dependance to dose (1.51 - 5.05mg/L) in the rat test of inhalation exposure (IUCLID (2000)), it is classified into Category 2 (lung), (Paraffin oils).

SPECIFIC TARGET ORGANS/SYSTEMIC TOXICITY FOLLOWING REPEATED EXPOSURE
  Category 1
  It was classified to as Category 1 (lungs, skin) since that pulmonary fibrosis, lipid pneumonias and lipogranuloma of lungs are reported in humans who received exposure of the mineral oils or the mist over many years (ACGIH (2001) and IARC 33 (1984), EHC 20 (1982)), and generation of the serious folliculitis is reported in the epidemiological study by occupational exposure to cutting oil (IARC 33 (1984)), (Paraffin oils).

ASPIRATION HAZARD
  Category 1
  It was classified into Category 1 based on the reports that ingestion of mineral oil causes the aspiration into the lungs, and as a result it occures the pneumonie huileuses or chemical pneumonia in the human (EHC 20 (1982), IARC 33 (1984), ICSC (2001), ACGIH (2001)), (Paraffin oils).

12. ECOLOGICAL INFORMATION

HAZARDOUS TO THE AQUATIC ENVIRONMENT (ACUTE)
  Category 2
  It was classified into Category 2 from 48-hour LC50=1.7mg/L of Crustacean (Daphnia magna) (IUCLID, 2000), (Diphenyl ether).

HAZARDOUS TO THE AQUATIC ENVIRONMENT (CHRONIC)
  Category 2
Classified into Category 2, since acute toxicity was Category 2, not rapidly degrading (BOD: 6.3% (existing chemical safety inspections data)), and bioaccumulative (BCF=594 (existing chemical safety inspections data)), (Diphenyl ether).

13. DISPOSAL CONSIDERATIONS

WASTE TREATMENT METHODS
Dispose of the remaining product and container in accordance with relevant laws and local regulation.
Wastes should be dealt by a licensed industrial waste trader and fully notify them of the information on hazardous properties and precautions regarding safe handling.
Avoid discharging waste water or cleaning water containing this product directly into rivers, etc.

CONTAMINATED PACKAGING
Used container should be cleaned before disposal or recycled in a suitable manner which shall follow the relevant laws and local regulations.

14. TRANSPORT INFORMATION

UN HAZARD CLASS
UN-No: 3077(Diphenyl ether)
Transport Hazards Class: 9: Miscellaneous dangerous goods. (Diphenyl ether)
Proper shipping name: Environmentally hazardous substance, solid, N.O.S.
Packing group: III (Diphenyl ether)
Marine pollutant Y (Polybutene, Diphenyl ether)

SPECIAL PRECAUTIONS FOR USER
Confirm no damages, corrosion and leakages of containers before transportation. Secure prevention of cargo collapse.
During transportation, avoid exposure to direct sunlight.
If a disaster occurs by accident, etc. during transportation, notify fire station and other relevant agencies of it at first.

INTERNATIONAL TRANSPORT CLASSIFICATION
IATA: Not dangerous goods
IMDG: Not dangerous goods
DOT (US): Not dangerous goods

15. REGULATORY INFORMATION

DIPHENYL ETHER
UN Hazard Class
UN No.3077/CLASS 9
UN Hazard Class: 9
UN Packing Group: III
EINECS No.202-981-2
Regulation (EC) No 1907/2006:
Authorisation and Restriction Not regulated
TSCA listed
OECD listed (HPV Chemicals)
ICCA listed (HPV Chemicals)
ICSC No.791
GHS No.792
Transport Emergency Card TEC(R)-90G02
NFPA Code : H1 ; F1 ; R0
RTECS Number: KN8970000 NOISH
BRN Number 1364620
MLD Number MFCD00003034

POLYBUTENE
OECD listed (Polybutene, Paraffin oils, Diphenyl ether)
TSCA listed
EINECS No.232-455-8
Regulation (EC) No 1907/2006:
Authorisation and Restriction Not regulated
ICSC No.1597
PARAFFIN OILS
EINECS No. 232-384-2
Regulation (EC) No 1907/2006:
Authorisation and Restriction Not regulated
TSCA listed
GHS No.719
EHC No.187
OECD listed
MLD Number MFCD00131611

16. OTHER INFORMATION
Update history
Date of issue 1 April, 1999
Date of revision 11 June, 2015 (6th version)

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