This kit contains the following components. The required Safety Data Sheets for identified hazardous components are appended.

- **Label IT® Labeling Reagent**
- **Reconstitution Solution**
- **10X Labeling Buffer A**
- **Denaturation Reagent D1**
- **Neutralization Buffer N1**
- **Spin Columns**

**Disclaimer:** Mirus Bio LLC believes that the information on this SDS was obtained from reliable sources. However, the information is provided without any warranty, expressed or implied, regarding its correctness. Some information presented and conclusions drawn herein are from sources other than direct test data on the substance itself. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, Mirus Bio LLC does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with handling and disposal of this product.

This product is sold to the Buyer with a limited license to use this product for research only. This product, or parts from this product, may not be re-packaged or re-sold without written permission from Mirus Bio LLC. A license from Mirus Bio LLC is required for commercial application of this product. For obtaining a license to use this product for commercial application, contact Mirus Bio LLC, 545 Science Drive, Madison, WI 53711. Email: license@mirusbio.com

©1996-2019 All rights reserved. Mirus Bio LLC. All trademarks are the property of their respective owners.
1. PRODUCT AND COMPANY IDENTIFICATION

1.1. Product Name: *Label IT®* Labeling Reagent

1.2. Product Numbers: Part of MIR 3100, 3125, 3200, 3225, 3300, 3325, 3400, 3425, 3600, 3625, 3700, 3725, 3800, 3825, 3900, 3925, 4100, 4125, 4250, 4512, 4513, 4514, 4522, 4523, 4524, 47020, 47021, 47022, 47023, 47024, 47025, 47100, 47125, 47212, 47213, 47214, 47215, 47216, 47217, 48010, 48050, 48105, 48125, 48205, 48225, 48710, 48750, 48810, 48850, 49305, 49325, 49405, 49450, 49510, 49550, 49610, 49650

1.3. Identified Product Use: For research use only

1.4. Supplier Details:
   1.4.1. Company: Mirus Bio LLC, 545 Science Drive, Madison, WI 53711, USA
   1.4.2. Telephone: 888.530.0801 (Toll Free within the U.S.) or +1.608.441.2852
   1.4.3. Fax: +1.608.441.2849
   1.4.4. Emergency Phone No.: US and Canada: 1.800.633.8253; International: +1.801.629.0667

1.5. Precautionary Labeling: The components of *Label IT®* Labeling Reagent (100% by weight) are potentially harmful, although the chemical, physical, and toxicological properties have not been thoroughly investigated by Mirus Bio LLC. For proper usage, *Label IT®* Labeling Reagent is dissolved in Reconstitution Solution; this Safety Data Sheet is intended to provide general guidelines about its use when reconstituted. Handle with care, and practice safe laboratory techniques.

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture:

   GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
   Flammable liquids (Category 4), H227
   For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2. GHS label elements, including precautionary statements:

   Pictogram
   None

   Signal word
   Warning

   Hazard statement(s)
   H227
   Combustible liquid.

   Precautionary statement(s)
   P210
   Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

   P280
   Wear protective gloves.

   P370 + P378
   In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

   P403 + P235
   Store in a well-ventilated place. Keep cool.

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

2.3. Other Hazards which do not result in the classification or are not covered by GHS: None

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>EINECS-No</th>
<th>Common Name(s)</th>
<th>Volume%</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMSO</td>
<td>67-68-5</td>
<td>200-664-3</td>
<td>Methyl sulfoxide</td>
<td>100</td>
</tr>
</tbody>
</table>
4. FIRST AID MEASURES

4.1. Description of first aid measures:

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

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2. Most important symptoms/effects, acute and delayed
See sections 2 and 11 (hazard and toxicological information) for the most important symptoms and effects.

4.3. Indication of immediate medical attention and special treatment needed, if necessary
No data available

5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media

5.1.1. Suitable Extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide

5.1.2. Unsuitable extinguishing media
None

5.2. Specific hazards arising from the substance or mixture
Carbon oxides, Sulphur oxides

5.3. Special protective equipment and precautions for firefighters
Wear self-contained breathing apparatus for firefighting if necessary

5.4. Further information: Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapors, mist or gas. Remove all sources of ignition. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. Ensure adequate ventilation. Evacuate personnel to safe areas. For personal protection, refer to section 8.

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

6.3. Methods and Materials for Containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations. Keep in suitable, closed containers for disposal.

6.4. References to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1. Precautions for safe handling

Avoid inhalation of vapor or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build-up of electrostatic charge. Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. For precautions see section 2.2.

7.2. Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Store under inert gas. Hydroscopic. Storage class (TRGS 510): Combustible liquids

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters e.g. occupational exposure limit values or biological limit values.

Contains no substances with occupational exposure limit values.

8.2. Appropriate engineering controls.

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical / ventilating / lighting / equipment.

8.3. Individual protection measures, such as personal protective equipment.

Personal protective equipment: Avoid all unnecessary exposure.
Materials for protective clothing: Wear nitrile rubber gloves with a minimal layer thickness of 0.2 mm.
Hand protection: Always wear gloves.
Eye protection: Safety glasses with side shields.
Skin and body protection: Protective clothing.
Respiratory protection: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Other information: Do not allow product to enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Appearance (physical state, color etc.): Form: liquid

Color: colorless

9.2. Odor: sulfurous

9.3. Odor threshold: No data available

9.4. pH: No data available

9.5. Melting point/freezing point: Melting point/range: 16 - 19 °C (61 - 66 °F)

9.6. Initial boiling point and boiling range: 189 °C (372 °F)
9.7. Flash point: 87 °C (189 °F) - closed cup - ASTM D 93
9.8. Evaporation rate: No data available
9.9. Flammability (solid, gas): No data available
9.10. Upper/lower flammability or explosive limits: 
   Upper explosion limit: 42 %(V)
   Lower explosion limit: 3.5 %(V)
9.11. Vapor pressure: 0.55 hPa (0.41 mmHg) at 20 °C (68 °F)
   4 hPa (3 mmHg) at 50 °C (122 °F)
9.12. Vapor density: 2.70 - (Air = 1.0)
9.13. Relative density: 1.1 g/mL
9.14. Solubility(ies): completely miscible; alcohol soluble; Diethylether soluble
9.15. Partition coefficient: n-octanol/water log Pow: -1.349
9.17. Decomposition temperature: > 190 °C (> 374 °F)
9.18. Viscosity: No data available
9.19. Other information:
   Surface tension 43.5 mN/m at 20 °C (68 °F)
   Relative vapor density 2.70 - (Air = 1.0)

10. STABILITY AND REACTIVITY
10.1. Reactivity: No data available
10.2. Chemical stability: Stable under recommended storage conditions.
10.3. Possibility of hazardous reactions: No data available
10.4. Conditions to avoid (e.g. static discharge, shock or vibration): Heat, flames and sparks.
10.5. Incompatible materials: Acid chlorides, Phosphorus halides, Strong acids, Strong oxidizing agents, Strong reducing agents
10.6. Hazardous decomposition products: Carbon monoxide (CO), Carbon dioxide (CO2), Sulfur oxides, Sulfides, Formaldehyde. In the event of a fire: see section 5

11. TOXICOLOGICAL INFORMATION
11.1. Information on toxicological effects:
   Acute toxicity
   LD50 Oral - Rat - 14,500 mg/kg
   LC50 Inhalation - Rat - 4 h - 40250 ppm
   LD50 Dermal - Rabbit - > 5,000 mg/kg

   Skin corrosion/irritation
   No data available

   Serious eye damage/eye irritation
   No data available

   Respiratory or skin sensitization
   No data available

   Germ cell mutagenicity
   Mutagenic effects have occurred in experimental animals.

   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.
   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**
Experiments have shown reproductive toxicity effects on laboratory animals.
Developmental effects have occurred in experimental animals.
Teratogenic effects have occurred in experimental animals.

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
No data available

12. ECOLOGICAL INFORMATION

12.1. Ecotoxicity (aquatic and terrestrial, where available): Do not empty into drains

Toxicity to fish
- LC50 - Pimephales promelas (fathead minnow) - 34,000 mg/l - 96 h
- LC50 - Oncorhynchus mykiss (rainbow trout) - 35,000 mg/l - 96 h

Toxicity to daphnia and other aquatic invertebrates
- EC50 - Daphnia magna (Water flea) - 24,600 mg/l - 48 h
  (OECD Test Guideline 202)

Toxicity to algae
- EC50 - Pseudokirchneriella subcapitata (green algae) - 17,000 mg/l - 72 h
  (OECD Test Guideline 201)

12.2. Persistence and degradability:

Biodegradability
Result: 31 % - According to the results of tests of biodegradability this product is not readily biodegradable. (OECD Test Guideline 301D)

12.3. Bioaccumulative potential: No data available

12.4. Mobility in the soil: No data available

12.5. Other adverse effects: No data available

13. DISPOSAL CONSIDERATIONS

13.1. Waste Treatment Recommendations:

Remove waste in accordance with local and/or national regulations. Hazardous waste should not be mixed with other waste or different types of hazardous waste if mixing leads to pollution or increased difficulty in properly disposing of the waste. All entities that store, transport or handle hazardous waste should take the necessary measures to prevent risks of pollution or damage to people or animals.

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.
14. TRANSPORT INFORMATION

14.1. UN number: none
14.2. UN proper shipping name: Combustible liquid, n.o.s. (Dimethyl sulfoxide) (Dimethyl sulfoxide)
14.3. Transport hazard class(es): none
14.4. Packing group, if applicable: none

Special precautions which a user needs to be aware of, or needs to comply with, in connection with the transport or conveyance within or outside their premises: This product is not classified as hazardous according to DOT, IMDG, and IATA regulations.

15. REGULATORY INFORMATION

15.1. Safety, health and environmental regulations specific for the product in question:

SARA 302/313 Components
SARA 302: This material is not subject to the reporting requirements of SARA Title III, Section 302.
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire hazard, Chronic Health Hazard

California Prop. 65 Components: This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Flam. Liq.: Flammable liquids
H227: Combustible liquid.

HMIS Rating
Health hazard: 0
Chronic Health Hazard: *
Flammability: 2
Physical Hazard 0

NFPA Rating
Health hazard: 0
Fire Hazard: 2
Reactivity Hazard: 0

Disclaimer: Mirus Bio LLC believes that the information on this MSDS was obtained from reliable sources. However, the information is provided without any warranty, expressed or implied, regarding its correctness. Some information presented and conclusions drawn herein are from sources other than direct test data on the substance itself. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, Mirus Bio LLC does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with handling.
1. PRODUCT AND COMPANY IDENTIFICATION

1.1. Product Name: Reconstitution Solution

1.2. Product Numbers: Part of MIR 3100, 3125, 3200, 3225, 3300, 3325, 3400, 3425, 3600, 3625, 3700, 3725, 3800, 3825, 3900, 39254100, 4125, , 6510, 6512, 6513, 6514, 6520, 6522, 6523, 6524, 7020, 7021, 7022, 7023, 7024, 7025, 7212, 7213, 7214, 7215, 7216, 7217, 8010, 8050, 8105, 8125, 8205, 8225, 8710, 8810, 8750, 8850, 9305, 9325, 9410, 9450, 9510, 9550, 9610, 9650

1.3. Identified Product Use: For research use only

1.4. Supplier Details:

1.4.1. Company: Mirus Bio LLC, 545 Science Drive, Madison, WI 53711, USA
1.4.2. Telephone: 888.530.0801 (Toll Free within the U.S.) or +1.608.441.2852
1.4.3. Fax: +1.608.441.2849
1.4.4. Emergency Phone No.: US and Canada: 1.800.633.8253; International: +1.801.629.0667

1.5. Precautionary Labeling: The components of Reconstitution Solution (100% by volume) are potentially harmful, although the chemical, physical, and toxicological properties have not been thoroughly investigated by Mirus Bio LLC. Handle with care, and practice safe laboratory techniques.

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture:

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 4), H227
For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2. GHS label elements, including precautionary statements:

<table>
<thead>
<tr>
<th>Pictogram</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal word</td>
<td>Warning</td>
</tr>
<tr>
<td>Hazard statement(s)</td>
<td>H227</td>
</tr>
</tbody>
</table>

Combustible liquid.

<table>
<thead>
<tr>
<th>Precautionary statement(s)</th>
<th>Keep away from heat/sparks/open flames/hot surfaces. - No smoking.</th>
</tr>
</thead>
<tbody>
<tr>
<td>P210</td>
<td>Wear protective gloves.</td>
</tr>
<tr>
<td>P280</td>
<td>In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.</td>
</tr>
<tr>
<td>P403 + P235</td>
<td>Store in a well-ventilated place. Keep cool.</td>
</tr>
<tr>
<td>P501</td>
<td>Dispose of contents/container to an approved waste disposal plant.</td>
</tr>
</tbody>
</table>

2.3. Other Hazards which do not result in the classification or are not covered by GHS: None

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>EINECS-No</th>
<th>Common Name(s)</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMSO</td>
<td>67-68-5</td>
<td>200-664-3</td>
<td>Methyl sulfoxide</td>
<td>100</td>
</tr>
</tbody>
</table>
Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance: None

4. FIRST AID MEASURES

4.1. Description of first aid measures:

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

**If inhaled**
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

**In case of skin contact**
Wash off with soap and plenty of water. Consult a physician.

**In case of eye contact**
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

**If swallowed**
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2. Most important symptoms/effects, acute and delayed
See sections 2 and 11 (hazard and toxicological information) for the most important symptoms and effects.

4.3. Indication of immediate medical attention and special treatment needed, if necessary
No data available

5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media

5.1.1. Suitable Extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide

5.1.2. Unsuitable extinguishing media
None

5.2. Specific hazards arising from the substance or mixture
Carbon oxides, Sulphur oxides

5.3. Special protective equipment and precautions for firefighters
Wear self-contained breathing apparatus for firefighting if necessary

5.4. Further information: Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapors, mist or gas. Remove all sources of ignition. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. Ensure adequate ventilation. Evacuate personnel to safe areas. For personal protection, refer to section 8.

6.2. Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.
6.3. **Methods and Materials for Containment and cleaning up**

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations. Keep in suitable, closed containers for disposal.

6.4. **References to other sections**

For disposal see section 13.

7. **HANDLING AND STORAGE**

7.1. **Precautions for safe handling**

Avoid inhalation of vapor or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build-up of electrostatic charge. Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. For precautions see section 2.2.

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

Keep container tightly closed in a dry and well-ventilated place. Store under inert gas. Hygroscopic. Storage class (TRGS 510): Combustible liquids

8. **EXPOSURE CONTROLS/PERSONAL PROTECTION**

8.1. **Control parameters e.g. occupational exposure limit values or biological limit values.**

Contains no substances with occupational exposure limit values.

8.2. **Appropriate engineering controls.**

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical / ventilating / lighting / equipment.

8.3. **Individual protection measures, such as personal protective equipment.**

<table>
<thead>
<tr>
<th>Personal protective equipment:</th>
<th>Avoid all unnecessary exposure.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials for protective clothing:</td>
<td>Wear nitrile rubber gloves with a minimal layer thickness of 0.2 mm.</td>
</tr>
<tr>
<td>Hand protection:</td>
<td>Always wear gloves.</td>
</tr>
<tr>
<td>Eye protection:</td>
<td>Safety glasses with side shields.</td>
</tr>
<tr>
<td>Skin and body protection:</td>
<td>Protective clothing.</td>
</tr>
<tr>
<td>Respiratory protection:</td>
<td>Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.</td>
</tr>
</tbody>
</table>

Other information:

Do not allow product to enter drains.

9. **PHYSICAL AND CHEMICAL PROPERTIES**

9.1. **Appearance (physical state, color etc.):**

Form: liquid

Color: colorless

9.2. **Odor:**

Sulfurous

9.3. **Odor threshold:**

No data available

9.4. **pH:**

No data available

9.5. **Melting point/freezing point:**

Melting point/range: 16 - 19 °C (61 - 66 °F)

9.6. **Initial boiling point and boiling range:**

189 °C (372 °F)

9.7. **Flash point:**

87 °C (189 °F) - closed cup - ASTM D 93
9.8. Evaporation rate: No data available
9.9. Flammability (solid, gas): No data available
9.10. Upper/lower flammability or explosive limits: Upper explosion limit: 42 % (V)
       Lower explosion limit: 3.5 % (V)
9.11. Vapor pressure: 0.55 hPa (0.41 mmHg) at 20 °C (68 °F)
       4 hPa (3 mmHg) at 50 °C (122 °F)
9.12. Vapor density: 2.70 - (Air = 1.0)
9.13. Relative density: 1.1 g/mL
9.14. Solubility(ies): completely miscible; alcohol soluble; Diethylether soluble
9.15. Partition coefficient: n-octanol/water log Pow: -1.349
9.17. Decomposition temperature: > 190 °C (> 374 °F)
9.18. Viscosity: No data available
9.19. Other information:
       Surface tension 43.5 mN/m at 20 °C (68 °F)
       Relative vapor density 2.70 - (Air = 1.0)

10. STABILITY AND REACTIVITY
10.1. Reactivity: No data available
10.2. Chemical stability: Stable under recommended storage conditions.
10.3. Possibility of hazardous reactions: No data available
10.4. Conditions to avoid (e.g. static discharge, shock or vibration): Heat, flames and sparks.
10.5. Incompatible materials: Acid chlorides, Phosphorus halides, Strong acids, Strong oxidizing agents, Strong reducing agents
10.6. Hazardous decomposition products: Carbon monoxide (CO), Carbon dioxide (CO2), Sulfur oxides, Sulfides, Formaldehyde. In the event of a fire: see section 5

11. TOXICOLOGICAL INFORMATION
11.1. Information on toxicological effects:
       Acute toxicity
       LD50 Oral - Rat - 14,500 mg/kg
       LC50 Inhalation - Rat - 4 h - 40250 ppm
       LD50 Dermal - Rabbit - > 5,000 mg/kg
       Skin corrosion/irritation
       No data available
       Serious eye damage/eye irritation
       No data available
       Respiratory or skin sensitization
       No data available
       Germ cell mutagenicity
       Mutagenic effects have occurred in experimental animals.
       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.
       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**
Experiments have shown reproductive toxicity effects on laboratory animals.
Developmental effects have occurred in experimental animals.
Teratogenic effects have occurred in experimental animals.

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
No data available

### 12. ECOLOGICAL INFORMATION

12.1. Ecotoxicity (aquatic and terrestrial, where available):

- **Toxicity to fish**
  - LC50 - Pimephales promelas (fathead minnow) - 34,000 mg/l - 96 h
  - LC50 - Oncorhynchus mykiss (rainbow trout) - 35,000 mg/l - 96 h

- **Toxicity to daphnia and other aquatic invertebrates**
  - EC50 - Daphnia magna (Water flea) - 24,600 mg/l - 48 h
  (OECD Test Guideline 202)

- **Toxicity to algae**
  - EC50 - Pseudokirchneriella subcapitata (green algae) - 17,000 mg/l - 72 h
  (OECD Test Guideline 201)

12.2. Persistence and degradability:

- **Biodegradability**
  - Result: 31% - According to the results of tests of biodegradability this product is not readily biodegradable. (OECD Test Guideline 301D)

12.3. Bioaccumulative potential: No data available

12.4. Mobility in the soil: No data available

12.5. Other adverse effects: No data available

### 13. DISPOSAL CONSIDERATIONS

13.1. Waste Treatment Recommendations:

Remove waste in accordance with local and/or national regulations. Hazardous waste should not be mixed with other waste or different types of hazardous waste if mixing leads to pollution or increased difficulty in properly disposing of the waste. All entities that store, transport or handle hazardous waste should take the necessary measures to prevent risks of pollution or damage to people or animals.

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.
14. TRANSPORT INFORMATION

14.1. UN number: none
14.2. UN proper shipping name: Combustible liquid, n.o.s. (Dimethyl sulfoxide) (Dimethyl sulfoxide)
14.3. Transport hazard class(es): none
14.4. Packing group, if applicable: none

Special precautions which a user needs to be aware of, or needs to comply with, in connection with the transport or conveyance within or outside their premises: This product is not classified as hazardous according to DOT, IMDG, and IATA regulations.

15. REGULATORY INFORMATION

15.1. Safety, health and environmental regulations specific for the product in question:

SARA 302/313 Components
SARA 302: This material is not subject to the reporting requirements of SARA Title III, Section 302.
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire hazard, Chronic Health Hazard

California Prop. 65 Components: This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Flam. Liq. Flammable liquids
H227 Combustible liquid.

HMIS Rating
Health hazard: 0
Chronic Health Hazard: *
Flammability: 2
Physical Hazard 0

NFPA Rating
Health hazard: 0
Fire Hazard: 2
Reactivity Hazard: 0

Disclaimer: Mirus Bio LLC believes that the information on this MSDS was obtained from reliable sources. However, the information is provided without any warranty, expressed or implied, regarding its correctness. Some information presented and conclusions drawn herein are from sources other than direct test data on the substance itself. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, Mirus Bio LLC does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with handling.
1. PRODUCT AND COMPANY IDENTIFICATION

1.1. Product Name: 10X Labeling Buffer A

1.2. Product Numbers: Part of MIR 3100, 3125, 3200, 3225, 3300, 3325, 3400, 3425, 3600, 3625, 3700, 3725, 3800, 3825, 3900, 3925, 4100, 4125, 6510, 6512, 6513, 6514, 6520, 6522, 6523, 6524, 7020, 7021, 7022, 7023, 7024, 7025, 7212, 7213, 7214, 7215, 7216, 7217

1.3. Identified Product Use: For research use only

1.4. Supplier Details:

1.4.1. Company: Mirus Bio LLC, 545 Science Drive, Madison, WI 53711, USA

1.4.2. Telephone: 888.530.0801 (Toll Free within the U.S.) or +1.608.441.2852

1.4.3. Fax: +1.608.441.2849

1.4.4. Emergency Phone No.: US and Canada: 1.800.633.8253; International: +1.801.629.0667

1.5. Precautionary Labeling: The components of 10X Labeling Buffer A (< 5.5% by weight) are potentially harmful, although the chemical, physical, and toxicological properties have not been thoroughly investigated by Mirus Bio LLC. Handle with care, and practice safe laboratory techniques.

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture:

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
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

Warning

Hazard statement(s)

H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

Precautionary statement(s)

P261 Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ eye protection/ face protection.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTER or doctor/ physician if you feel unwell.
P321 Specific treatment (see supplemental first aid instructions for MOPS).
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
If eye irritation persists: Get medical advice/attention.
Take off contaminated clothing and wash before reuse.
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Dispose of contents/container to an approved waste disposal plant.

2.3. Other Hazards which do not result in the classification or are not covered by GHS: None

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>EINECS-No</th>
<th>Common Name(s)</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOPS</td>
<td>1132-61-2</td>
<td>214-478-5</td>
<td>3-(N-Morpholino)propanesulfonic acid</td>
<td>5.5% w/v</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>231-791-2</td>
<td>n/a</td>
<td>100% v/v</td>
</tr>
</tbody>
</table>

Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance: None

4. FIRST AID MEASURES

4.1. Description of first aid measures:

- **General advice**
  Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.
- **If inhaled**
  If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.
- **In case of skin contact**
  Wash off with soap and plenty of water. Consult a physician.
- **In case of eye contact**
  Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
- **If swallowed**
  Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2. Most important symptoms/effects, acute and delayed
See sections 2 and 11 (hazard and toxicological information) for the most important symptoms and effects.

4.3. Indication of immediate medical attention and special treatment needed, if necessary
No data available

5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media

5.1.1. Suitable Extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide

5.1.2. Unsuitable extinguishing media: None

5.2. Specific hazards arising from the substance or mixture
Carbon oxides, nitrogen oxides (NOx), Sulphur oxides

5.3. Special protective equipment and precautions 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 procedures
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. For personal protection, refer to section 8.

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

6.3. Methods and Materials for Containment and cleaning up
Contain spillage, and then collect and place in container for disposal according to local regulations. Keep in suitable, closed containers for disposal.

6.4. References to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1. Precautions for safe handling
Avoid inhalation of vapor or mist. Avoid contact with skin and eyes. For precautions see section 2.2.

7.2. Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters e.g. occupational exposure limit values or biological limit values.
Contains no substances with occupational exposure limit values.

8.2. Appropriate engineering controls.
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

8.3. Individual protection measures, such as personal protective equipment.
Personal protective equipment: Avoid all unnecessary exposure.
Materials for protective clothing: Wear appropriate protective gloves to prevent skin exposure
Hand protection: Always wear gloves.
Eye protection: Tightly fitting safety glasses with side shields.
Skin and body protection: Protective clothing.
Respiratory protection: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
Other information: Do not allow product to enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Appearance (physical state, color etc.): Form: liquid
9.2. Odor: No data available
9.3. Odor threshold: No data available
9.4. pH: No data available
9.5. Melting point/freezing point: No data available
9.6. Initial boiling point and boiling range: No data available
9.7. Flash point: No data available
9.8. Evaporation rate: No data available
9.9. Flammability (solid, gas): No data available
9.10. Upper/lower flammability or explosive limits: No data available
9.11. Vapor pressure: No data available
9.12. Vapor density: No data available
9.13. Relative density: No data available
9.15. Partition coefficient: n-octanol/water No data available
9.16. Auto-ignition temperature: No data available
9.17. Decomposition temperature: No data available
9.18. Viscosity: No data available
9.19. Other information: No data available

10. STABILITY AND REACTIVITY
10.1. Reactivity: No data available
10.2. Chemical stability: Stable under recommended storage conditions.
10.3. Possibility of hazardous reactions: No data available
10.4. Conditions to avoid (e.g. static discharge, shock or vibration): No data available
10.5. Incompatible materials: Strong oxidizing agents, Strong bases
10.6. Hazardous decomposition products: No data available. In the event of a fire: see section 5

11. TOXICOLOGICAL INFORMATION
11.1. Information on toxicological effects:
   Acute toxicity
   LD50 Oral - Rat - >2,000 mg/kg
   LC50 Inhalation – no data available
   LD50 Dermal – no data available

   Skin corrosion/irritation: No data available

   Serious eye damage/eye irritation: No data available

   Respiratory or skin sensitization: No data available

   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.
   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: Inhalation - May cause respiratory irritation.

   Specific target organ toxicity - repeated exposure: No data available

   Aspiration hazard: No data available

12. ECOLOGICAL INFORMATION
12.1. Ecotoxicity (aquatic and terrestrial, where available): Do not empty into drains
   Toxicity to daphnia and other aquatic invertebrates: EC50 - Daphnia magna (Water flea) - >100 mg/l - 48 h
   Toxicity to fish: No data available
Toxicity to algae: No data available

12.2. Persistence and degradability: Biodegradability – No data available

12.3. Bioaccumulative potential: No data available

12.4. Mobility in the soil: No data available

12.5. Other adverse effects: No data available

13. DISPOSAL CONSIDERATIONS

13.1. Waste Treatment Recommendations:

Remove waste in accordance with local and/or national regulations. Hazardous waste should not be mixed with other waste or different types of hazardous waste if mixing leads to pollution or increased difficulty in properly disposing of the waste. All entities that store, transport or handle hazardous waste should take the necessary measures to prevent risks of pollution or damage to people or animals.

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

14. TRANSPORT INFORMATION

14.1. UN number: not a dangerous good

14.2. UN proper shipping name: not a dangerous good

14.3. Transport hazard class(es): not a dangerous good

14.4. Packing group, if applicable: not a dangerous good

Special precautions which a user needs to be aware of, or needs to comply with, in connection with the transport or conveyance within or outside their premises: This product is not classified as hazardous according to DOT, IMDG, and IATA regulations.

15. REGULATORY INFORMATION

15.1. Safety, health and environmental regulations specific for the product in question:

SARA 302/313 Components
SARA 302: This material is not subject to the reporting requirements of SARA Title III, Section 302.
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard
California Prop. 65 Components: This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Eye Irrit.     Eye irritation
H315      Causes skin irritation.
H319      Causes serious eye irritation.
H335     May cause respiratory irritation.
Skin Irrit.   Skin irritation
STOT SE     Specific target organ toxicity - single exposure
**HMIS Rating**

Health hazard: 2
Chronic Health Hazard: *
Flammability: 0
Physical Hazard: 0

**NFPA Rating**

Health hazard: 2
Fire Hazard: 0
Reactivity Hazard: 0

**Disclaimer:** Mirus Bio LLC believes that the information on this MSDS was obtained from reliable sources. However, the information is provided without any warranty, expressed or implied, regarding its correctness. Some information presented and conclusions drawn herein are from sources other than direct test data on the substance itself. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, Mirus Bio LLC does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with handling.
1. PRODUCT AND COMPANY IDENTIFICATION

1.1. Product Name: Denaturation Buffer D1

1.2. Product Numbers: Part of MIR 3100, 3125, 3200, 3225, 3300, 3400, 3425, 3600, 3625, 3700, 3725, 3800, 3825, 3900, 3925, 4100, 4125, 6510, 6512, 6513, 6514, 6520, 6522, 6523, 6524, 8010, 8050, 8105, 8125, 8205, 8225, 8710, 8750, 8810, 8850

1.3. Identified Product Use: For research use only

1.4. Supplier Details:

1.4.1. Company: Mirus Bio LLC, 545 Science Drive, Madison, WI 53711, USA
1.4.2. Telephone: 888.530.0801 (Toll Free within the U.S.) or +1.608.441.2852
1.4.3. Fax: +1.608.441.2849
1.4.4. Emergency Phone No.: US and Canada: 1.800.633.8253; International: +1.801.629.0667

1.5. Precautionary Labeling: The components of Denaturation Buffer D1(< 12% by weight) are potentially harmful, although the chemical, physical, and toxicological properties have not been thoroughly investigated by Mirus Bio LLC. Handle with care, and practice safe laboratory techniques.

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture:

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
- Corrosive to metals (Category 1), H290
- Skin corrosion (Category 1A), H314
- Serious eye damage (Category 1), H318
- Acute aquatic toxicity (Category 3), H402

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 statement(s)

H290 May be corrosive to metals.
H314 + H318 Causes severe skin burns and eye damage.
H402 Harmful to aquatic life.

Precautionary statement(s)

P234 Keep only in original container.
P264 Wash skin thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P310 Immediately call a POISON CENTER or doctor/physician.

P321 Specific treatment (see first aid instructions for NaOH).

P363 Wash contaminated clothing before reuse.

P390 Absorb spillage to prevent material damage.

P405 Store locked up.

P406 Store in corrosive resistant stainless steel container with a resistant inner liner.

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

2.3. Other Hazards which do not result in the classification or are not covered by GHS: None

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances (Mixtures)

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>EINECS-No</th>
<th>Common Name(s)</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Hydroxide</td>
<td>1310-73-2</td>
<td>215-185-5</td>
<td>NaOH</td>
<td>12% w/v</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>231-791-2</td>
<td>n/a</td>
<td>88% v/v</td>
</tr>
</tbody>
</table>

Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance: None

4. FIRST AID MEASURES

4.1. Description of first aid measures:

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

**If inhaled**
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

**In case of skin contact**
Take off contaminated clothing immediately. Wash off with soap and plenty of water. Consult a physician.

**In case of eye contact**
Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

**If swallowed**
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2. Most important symptoms/effects, acute and delayed
See sections 2 and 11 (hazard and toxicological information) for the most important symptoms and effects.

4.3. Indication of immediate medical attention and special treatment needed, if necessary
No data available

5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media

5.1.1. Suitable Extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide

5.1.2. Unsuitable extinguishing media: None

5.2. Specific hazards arising from the substance or mixture
Sodium oxides
5.3. Special protective equipment and precautions for firefighters
   Wear self-contained breathing apparatus for firefighting if necessary

5.4. Further information: None

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures
   Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. For personal protection, refer to section 8.

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

6.3. Methods and Materials for Containment and cleaning up
   Soak up with inert absorbent material (e.g. vermiculite, sand or earth), and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4. References to other sections
   For disposal see section 13.

7. HANDLING AND STORAGE

7.1. Precautions for safe handling
   Avoid inhalation of vapor or mist. Avoid contact with skin and eyes. For precautions see section 2.2.

7.2. Conditions for safe storage, including any incompatibilities
   Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters e.g. occupational exposure limit values or biological limit values.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH (Threshold limit)</th>
<th>NIOSH (Recommended exposure limits)</th>
<th>OSHA (Occupational exposure limits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium hydroxide</td>
<td>2 mg/m^3</td>
<td>2 mg/m^3</td>
<td>2 mg/m^3</td>
</tr>
<tr>
<td>Water</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
</tbody>
</table>

8.2. Appropriate engineering controls.
   Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of the workday. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

8.3. Individual protection measures, such as personal protective equipment.

   Personal protective equipment: Avoid all unnecessary exposure.
   Materials for protective clothing: Wear appropriate protective gloves to prevent skin exposure
   Hand protection: Always wear gloves.
   Eye protection: Tightly fitting safety glasses with side shields.
   Skin and body protection: Protective clothing.
Respiratory protection: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Other information: Do not allow product to enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES
9.1. Appearance (physical state, color etc.): Form: liquid
   Color: colorless
9.2. Odor: No data available
9.3. Odor threshold: No data available
9.4. pH: No data available
9.5. Melting point/freezing point: No data available
9.6. Initial boiling point and boiling range: No data available
9.7. Flash point: No data available
9.8. Evaporation rate: No data available
9.9. Flammability (solid, gas): No data available
9.10. Upper/lower flammability or explosive limits: No data available
9.11. Vapor pressure: No data available
9.12. Vapor density: No data available
9.13. Relative density: No data available
9.15. Partition coefficient: No data available
9.16. Auto-ignition temperature: No data available
9.17. Decomposition temperature: No data available
9.18. Viscosity: No data available
9.19. Other information: No data available

10. STABILITY AND REACTIVITY
10.1. Reactivity: No data available
10.2. Chemical stability: Stable under recommended storage conditions.
10.3. Possibility of hazardous reactions: No data available
10.4. Conditions to avoid (e.g. static discharge, shock or vibration): Heat, flames and sparks.
10.5. Incompatible materials: Strong oxidizing agents, Strong acids, Organic materials
10.6. Hazardous decomposition products: Carbon monoxide, carbon dioxide, toxic fumes of sodium oxide, sodium peroxide fumes. In the event of a fire: see section 5

11. TOXICOLOGICAL INFORMATION
11.1. Information on toxicological effects:
   Acute toxicity
   No data available

   Skin corrosion/irritation
   Draize test, rabbit, skin: 500 mg/24H Severe;

   Serious eye damage/eye irritation
   Draize test, rabbit, eye: 400 ug Mild
   Draize test, rabbit, eye: 1% Severe
   Draize test, rabbit, eye: 50 ug/24H Severe
   Draize test, rabbit, eye: 1 mg/24H Severe
Respiratory or skin sensitization
No data available

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.
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

Additional Information: Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

12. ECOLOGICAL INFORMATION

12.1. Ecotoxicity (aquatic and terrestrial, where available): Do not empty into drains
   Fish: Carp: 180ppm (LC100); 24H

12.2. Persistence and degradability: No data available

12.3. Bioaccumulative potential: No data available

12.4. Mobility in the soil: No data available

12.5. Other adverse effects: No data available

13. DISPOSAL CONSIDERATIONS

13.1. Waste Treatment Recommendations:
Remove waste in accordance with local and/or national regulations. Hazardous waste should not be mixed with other waste or different types of hazardous waste if mixing leads to pollution or increased difficulty in properly disposing of the waste. All entities that store, transport or handle hazardous waste should take the necessary measures to prevent risks of pollution or damage to people or animals.

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.
14. TRANSPORT INFORMATION

14.1. UN number: 1824
14.2. UN proper shipping name: Sodium hydroxide solution
14.3. Transport hazard class(es): 8
14.4. Packing group, if applicable: III

Covers specifications required for DOT(US), IMDG, and IATA.

15. REGULATORY INFORMATION

15.1. Safety, health and environmental regulations specific for the product in question:

SARA 302/313 Components
SARA 302: This material is not subject to the reporting requirements of SARA Title III, Section 302.
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute health hazards

California Prop. 65 Components: This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Met. Corr. Corrosive to metals
Skin Corr. Skin corrosion

HMIS Rating
Health hazard: 3
Chronic Health Hazard: *
Flammability: 0
Physical Hazard: 0

NFPA Rating
Health hazard: 3
Fire Hazard: 0
Reactivity Hazard: 0

Disclaimer: Mirus Bio LLC believes that the information on this MSDS was obtained from reliable sources. However, the information is provided without any warranty, expressed or implied, regarding its correctness. Some information presented and conclusions drawn herein are from sources other than direct test data on the substance itself. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, Mirus Bio LLC does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with handling.
1. PRODUCT AND COMPANY IDENTIFICATION

1.1. Product Name: Neutralization Buffer N1

1.2. Product Numbers: Part of MIR 3100, 3125, 3200, 3225, 3300, 3325, 3400, 3425, 3600, 3625, 3700, 3725, 3800, 3825, 3900, 3925, 4100, 4125, MIR 6510, 6512, 6513, 6514, 6520, 6522, 6523, 6524, MIR 8010, 8050, 8105, 8125, 8205, 8225, 8710, 8750, 8810, 8850

1.3. Identified Product Use: For research use only

1.4. Supplier Details:

1.4.1. Company: Mirus Bio LLC, 545 Science Drive, Madison, WI 53711, USA

1.4.2. Telephone: 888.530.0801 (Toll Free within the U.S.) or +1.608.441.2852

1.4.3. Fax: +1.608.441.2849

1.4.4. Emergency Phone No.: US and Canada: 1.800.633.8253; International: +1.801.629.0667

1.5. Precautionary Labeling: The components of Neutralization Buffer N1 (< 33% by weight) are potentially harmful, although the chemical, physical, and toxicological properties have not been thoroughly investigated by Mirus Bio LLC. Handle with care, and practice safe laboratory techniques.

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>EINECS-No</th>
<th>Common Name(s)</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrochloric acid</td>
<td>7647-01-0</td>
<td>231-595-7</td>
<td>HCl</td>
<td>11% v/v</td>
</tr>
<tr>
<td>Tris(hydroxymethyl)-aminomethane</td>
<td>77-86-1</td>
<td>201-064-4</td>
<td>Tris</td>
<td>12% w/v</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>231-791-2</td>
<td>n/a</td>
<td>77% v/v</td>
</tr>
</tbody>
</table>

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

CAS-No. 7647-01-0:
Corrosive to metals (Category 1), H290
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

CAS-No. 77-86-1:
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319

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

2.2. GHS label elements, including precautionary statements:

CAS-No. 7647-01-0:

Pictogram

Signal word Danger

Hazard statement(s)
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.

Precautionary statement(s)
P234 Keep only in original container.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303+P361+P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER or doctor/ physician.
P363 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P406 Store in corrosive resistant stainless steel container with a resistant inner liner.
P501 Dispose of contents/ container to an approved waste disposal plant.

CAS-No. 77-86-1:

Pictogram
Signal word
Warning
Hazard statement(s)
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statement(s)
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/ eye protection/ face protection.
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332+P313 If skin irritation occurs: Get medical advice/ attention.
P337+P313 If eye irritation persists: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.

2.3. Other Hazards which do not result in the classification or are not covered by GHS: None
3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances (Mixtures)

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>EINECS-No</th>
<th>Common Name(s)</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrochloric acid</td>
<td>7647-01-0</td>
<td>231-595-7</td>
<td>HCl</td>
<td>11% v/v</td>
</tr>
<tr>
<td>Tris(hydroxymethyl)-aminomethane</td>
<td>77-86-1</td>
<td>201-064-4</td>
<td>Tris</td>
<td>12% w/v</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>231-791-2</td>
<td>n/a</td>
<td>77% v/v</td>
</tr>
</tbody>
</table>

Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance: None

4. FIRST AID MEASURES

4.1. Description of first aid measures:

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

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2. Most important symptoms/effects, acute and delayed
See sections 2 and 11 (hazard and toxicological information) for the most important symptoms and effects.

4.3. Indication of immediate medical attention and special treatment needed, if necessary
No data available

5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media

5.1.1. Suitable Extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide

5.1.2. Unsuitable extinguishing media: None

5.2. Specific hazards arising from the substance or mixture

CAS-No. 7647-01-0: Hydrogen chloride gas
CAS-No. 77-86-1: Carbon oxides, nitrogen oxides (NOx), Hydrogen chloride gas

5.3. Special protective equipment and precautions for firefighters
Wear self-contained breathing apparatus for firefighting if necessary

5.4. Further information: None
6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. For personal protection, refer to section 8.

6.2. Environmental precautions

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

6.3. Methods and Materials for Containment and cleaning up

Soak up with inert absorbent material (e.g. vermiculite, sand or earth), and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4. References to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1. Precautions for safe handling

Avoid inhalation of vapor or mist. Avoid contact with skin and eyes. For precautions see section 2.2.

7.2. Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters e.g. occupational exposure limit values or biological limit values.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH (Threshold limit)</th>
<th>NIOSH (Recommended exposure limits)</th>
<th>OSHA (Occupational exposure limits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrochloric Acid</td>
<td>2 ppm</td>
<td>5 ppm (7mg/m^3)</td>
<td>5 ppm (7mg/m^3)</td>
</tr>
<tr>
<td>Tris(hydroxymethyl)-aminomethane</td>
<td>No data available</td>
<td>No data available</td>
<td>No data available</td>
</tr>
</tbody>
</table>

8.2. Appropriate engineering controls.

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

8.3. Individual protection measures, such as personal protective equipment.

- Personal protective equipment: Avoid all unnecessary exposure.
- Materials for protective clothing: Wear appropriate protective gloves to prevent skin exposure.
- Hand protection: Always wear gloves.
- Eye protection: Tightly fitting safety glasses with side shields.
- Skin and body protection: Protective clothing.
- Respiratory protection: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Other information: Do not allow product to enter drains.
### 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th></th>
<th>Hydrochloric acid</th>
<th>Tris(hydroxymethyl)-aminomethane</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAS No</strong></td>
<td>7647-01-0</td>
<td>77-86-1</td>
</tr>
<tr>
<td><strong>Appearance (form):</strong></td>
<td>Liquid</td>
<td>Liquid</td>
</tr>
<tr>
<td><strong>Appearance (color):</strong></td>
<td>Light yellow</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Odor:</strong></td>
<td>Pungent</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Odor threshold:</strong></td>
<td>No data available</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>pH:</strong></td>
<td>No data available</td>
<td>7.5</td>
</tr>
<tr>
<td><strong>Melting point/freezing point:</strong></td>
<td>-30 °C (-22 °F)</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Initial boiling pt. and boiling range:</strong></td>
<td>&gt; 100 °C (&gt; 212 °F)</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Flash point:</strong></td>
<td>Not applicable</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Evaporation rate:</strong></td>
<td>No data available</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Flammability (solid, gas):</strong></td>
<td>No data available</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Upper/lower flammability or explosive limits:</strong></td>
<td>No data available</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Vapor pressure:</strong></td>
<td>227 hPa (170 mmHg) at 21.1 °C (70.0 °F)</td>
<td>547 hPa (410 mmHg) at 37.7 °C (99.9 °F)</td>
</tr>
<tr>
<td><strong>Vapor density:</strong></td>
<td>No data available</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Relative density:</strong></td>
<td>1.2 g/cm³ at 25 °C (77 °F)</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Solubility(ies):</strong></td>
<td>Water soluble</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Partition coefficient:</strong></td>
<td>No data available</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Auto-ignition temperature:</strong></td>
<td>No data available</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Decomposition temperature:</strong></td>
<td>No data available</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Viscosity:</strong></td>
<td>No data available</td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Other information:</strong></td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

### 10. STABILITY AND REACTIVITY

10.1. Reactivity: No data available
10.2. Chemical stability: Stable under recommended storage conditions.
10.3. Possibility of hazardous reactions: No data available
10.4. Conditions to avoid (e.g. static discharge, shock or vibration): No data available
10.5. Incompatible materials:
   - **CAS-No. 7647-01-0**: Bases, Amines, Alkali metals, Metals, permanganates, e.g. potassium permanganate, Fluorine, metal acetyliides, hexalithium disilicide
   - **CAS-No. 77-86-1**: Bases, Oxidizing agents, Strong oxidizing agents
10.6. Hazardous decomposition products: No data available. In the event of a fire: see section 5
11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects:

<table>
<thead>
<tr>
<th>Component</th>
<th>LD50 Oral</th>
<th>LD50 Dermal</th>
<th>LD50 Inhalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrochloric acid</td>
<td>238 - 277 mg/kg</td>
<td>5010 mg/kg</td>
<td>1.68 mg/L</td>
</tr>
<tr>
<td>(Rat)</td>
<td>(Rabbit)</td>
<td></td>
<td>(Rat) 1h</td>
</tr>
<tr>
<td>Tris(hydroxymethyl)-aminomethane</td>
<td>no data available</td>
<td>no data available</td>
<td>no data available</td>
</tr>
</tbody>
</table>

**Respiratory or skin sensitization:** No data available

**Acute toxicity:** No data available

**Skin corrosion/irritation:** Corrosive and irritating to skin

**Serious eye damage/eye irritation:** Irritating and damaging to eyes

**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.

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**

Experiments have shown reproductive toxicity effects on laboratory animals. (Hydrochloric acid)

**Specific target organ toxicity - single exposure**

The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation. (Hydrochloric acid)

**Specific target organ toxicity - repeated exposure:** No data available

**Aspiration hazard:** No data available

**Additional Information:** Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin (Hydrochloric acid)

12. ECOLOGICAL INFORMATION

12.1. Ecotoxicity (aquatic and terrestrial, where available): Do not empty into drains

Freshwater fish: LC50-> 282 mg/L - 96 h (Hydrochloric acid)

12.2. Persistence and degradability: No data available

12.3. Bioaccumulative potential: No data available

12.4. Mobility in the soil: No data available

12.5. Other adverse effects: No data available

13. DISPOSAL CONSIDERATIONS

13.1. Waste Treatment Recommendations:

Remove waste in accordance with local and/or national regulations. Hazardous waste should not be mixed with other waste or different types of hazardous waste if mixing leads to pollution or increased difficulty in properly disposing of the waste. All entities that store, transport or handle hazardous waste should take the necessary measures to prevent risks of pollution or damage to people or animals.

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.
14. TRANSPORT INFORMATION

14.1. UN number: 1789
14.2. UN proper shipping name: Hydrochloric acid
14.3. Transport hazard class(es): 8
14.4. Packing group, if applicable: II

Covers specifications required for DOT(US), IMDG, and IATA.

15. REGULATORY INFORMATION

15.1. Safety, health and environmental regulations specific for the product in question:

SARA 302/313 Components
SARA 302: This material is not subject to the reporting requirements of SARA Title III, Section 302.
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute health hazards

California Prop. 65 Components: This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.
16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

CAS-No. 7647-01-0 (Hydrochloric acid):

| Eye Dam. | Serious eye damage |
| H290     | May be corrosive to metals. |
| H314     | Causes severe skin burns and eye damage. |
| H318     | Causes serious eye damage. |
| H335     | May cause respiratory irritation. |

Met. Corr. Corrosive to metals
Skin Corr. Skin corrosion
STOT SE Specific target organ toxicity - single exposure

<table>
<thead>
<tr>
<th>HMIS Rating</th>
<th>NFPA Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health hazard:</td>
<td>3</td>
</tr>
<tr>
<td>Chronic Health Hazard:</td>
<td>*</td>
</tr>
<tr>
<td>Flammability:</td>
<td>0</td>
</tr>
<tr>
<td>Physical Hazard</td>
<td>0</td>
</tr>
</tbody>
</table>

CAS-No. 77-86-1 (Tris(hydroxymethyl)-aminomethane):

| H315 | Causes skin irritation. |
| H319 | Causes serious eye irritation. |

<table>
<thead>
<tr>
<th>HMIS Rating</th>
<th>NFPA Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health hazard:</td>
<td>2</td>
</tr>
<tr>
<td>Chronic Health Hazard:</td>
<td>*</td>
</tr>
<tr>
<td>Flammability:</td>
<td>0</td>
</tr>
<tr>
<td>Physical Hazard</td>
<td>0</td>
</tr>
</tbody>
</table>

Disclaimer: Mirus Bio LLC believes that the information on this MSDS was obtained from reliable sources. However, the information is provided without any warranty, expressed or implied, regarding its correctness. Some information presented and conclusions drawn herein are from sources other than direct test data on the substance itself. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, Mirus Bio LLC does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with handling.