



New England Biolabs  
240 Country Road  
Ipswich, MA 01938

## MATERIAL SAFETY DATA SHEET

Telephone: (978)927-5054  
Toll free: (800)632-5227  
Fax: (978)921-1350  
e-mail: info@neb.com  
Revision Date: 10/07

**Competent  
Cells  
#C2984**

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### SECTION 1—CHEMICAL INFORMATION

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**Product Name:** NEB Turbo Competent *E. coli*

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### SECTION 2—COMPOSITION/INFORMATION ON INGREDIENT

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**Substance Name:**

The hazards identified with this product are those associated with the following component (s):

Dimethyl Sulfoxide      0–10%      Cas. #67-68-5      SARA 313: No

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### SECTION 3—HAZARDOUS IDENTIFICATION

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**Emergency Overview:** The hazards identified with this product are those associated with the following component(s):

Dimethyl Sulfoxide.

HMIS Rating  
Health: 0\*  
Flammability: 0  
Reactivity: 0

NFPA Rating  
Health: 0  
Flammability: 0  
Reactivity: 0

For additional information on toxicity, please refer to Sec. 11.

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### SECTION 4—FIRST AID MEASURES

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**Oral Exposure:** If swallowed, wash out mouth with water provided person is conscious. Call a physician.

**Inhalation Exposure:** If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**Dermal Exposure:** In case of contact, immediately wash skin with soap and copious amounts of water.

**Eye Exposure:** In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

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### SECTION 5—FIRE FIGHTING MEASURES

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**Extinguishing Media:** Suitable: Water spray. Carbon Dioxide, dry chemical powder or appropriate foam.

**Special Firefighting Procedures:** Wear self contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

**Specific Hazard(s):** Combustible liquid. Emits toxic fumes under fire conditions.

**Flash point:** 188.6°F, 87°C Method closed cup.

**Flammability:** N/A

**Autoignition Temp:** 301°C

**Explosin Limits:** Lower 3.5%, Upper: 42%

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## SECTION 6—ACCIDENTAL RELEASE MEASURES

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**Procedure(s) Of Personal Precaution(s):** Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves and Chemical safety goggles.

**Methods For Cleaning Up:** Cover with dry lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

**Environmental Precaution(s):** Avoid contaminating water supply. Avoid contaminating sewers and waterways with this material.

**Procedure To Be Followed in Case Of Leak or Spill:** Evacuate area.

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## SECTION 7—HANDLING AND STORAGE

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**Handling:** Avoid prolonged or repeated exposure.

**User Exposure: Avoid Inhalation.** Avoid contact with DMSO solutions containing toxic materials or material with unknown toxicological properties. Dimethyl sulfoxide is readily absorbed through skin and may carry such materials into the body. Avoid prolonged or repeated exposure.

**Storage:** Keep tightly closed, away from sparks and open flames. Store in a cool dry place.

**Special Requirements:** Store under inert gas. Hygroscopic.

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## SECTION 8—EXPOSURE CONTROLS/PPE

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**Engineering Controls:** Safety shower and eye bath. Mechanical exhaust required.

**Personal Protective Equipment:** Government approved respirator.

**Hand:** Compatible chemical-resistant gloves.

**Eye:** Chemical safety goggles.

**Skin Specific:** Chemical resistant

**General Hygiene Measures:** Wash hands thoroughly after handling. Wash contaminated clothing before use.

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## SECTION 9—PHYSICAL AND CHEMICAL PROPERTIES

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<b>Appearance:</b>	<b>Physical State: Clear Liquid</b>	<b>Color: Colorless</b>
<b>Property</b>	<b>Value</b>	<b>At temperature or Pressure</b>
<b>Molecular Weight:</b>	78.13 AMU	
<b>pH:</b>	N/A	
<b>BP/BP Range:</b>		89°C
<b>MP/MP Range:</b>		18.4°C
<b>Freezing Point:</b>	N/A	
<b>Vapor Pressure:</b>	0.42 mmHg	20°C
<b>Vapor Density:</b>	2.7 g/l	
<b>Saturated Vapor:</b>	N/A	
<b>SG/Density:</b>	.1 g/cm <sup>3</sup>	
<b>Bulk Density:</b>	N/A	
<b>Odor Threshold:</b>	N/A	
<b>Volatile %:</b>	N/A	
<b>Voc Content:</b>	N/A	
<b>Water Content:</b>	N/A	
<b>Solvent Content:</b>	N/A	
<b>Evaporation Rate:</b>	N/A	
<b>Viscosity:</b>	0.002 Pas	20°C
<b>Surface Tension:</b>	N/A	
<b>Partition Coefficient:</b>	Log Kow: -2.03	
<b>Decomposition Temp:</b>	> 190°C	
<b>Flash Point:</b>		88.6°F, 87°C Method: Closed cup.
<b>Explosion Limits:</b>		Lower: 3.5%, Upper: 42%
<b>Flammability:</b>	N/A	
<b>Autoignition Temp:</b>	01°C	
<b>Refraction Index:</b>	1.479	
<b>Optical Rotation:</b>	N/A	
<b>Miscellaneous Data:</b>	N/A	
<b>Sollubility in Water:</b>	<b>Soluble</b>	

N/A = not available

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## SECTION 10–STABILITY AND REACTIVITY

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**Stability:** Stable

**Conditions to Avoid:** Moisture.

**Materials to Avoid:** Acid chlorides, Phosphorus halides, strong oxidizing agents, strong acids, strong reducing agents.

**Hazardous Decomposition Products:** Carbon monoxide, Carbon dioxide, Sulfur dioxides.

**Hazardous Polymerization:** Will not occur.

**Hazardous Exothermic Reactions:** Hazardous Exothermic Reactions: Methyl sulfoxide (DMSO) undergoes a violent exothermic reaction on mixing with copper wool and trichloroacetic acid. On mixing with potassium permanganate it will flash instantaneously. It reacts violently with: acid halides, cyanuric chloride, silicon tetrachloride, phosphorus trichloride and trioxide, thionyl chloride, magnesium perchlorate, silver fluoride, methyl bromide, iodine pentafluoride, nitrogen periodate, diborane, sodium hydride and perchloric and periodic acids. When heated above its boiling point methyl sulfoxide degrades giving off formaldehyde, methyl mercaptan and sulfur dioxide.

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## SECTION 11- TOXICOLOGICAL INFORMATION

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**Route of Exposure:**

**Skin Absorption:** May be harmful if absorbed.

**Contact:** May cause skin irritation.

**Eye Contact:** May cause eye irritation.

**Inhalation:** May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.

**Ingestion:** May be harmful if swallowed.

**Conditions Aggravated By Exposure:** Avoid contact with DMSO solutions containing toxic materials or material with unknown toxicological properties. Dimethyl sulfoxide is readily absorbed through skin and may carry such materials into the body. Avoid prolonged or repeated exposure.

**Target Organ (s) or System (s):** Eyes and Skin

### Toxicity Data

Inhalation	Subcutaneous
Rat	Rat
40,250 ppm	12 gg/kg
LC50	LD50
Oral	Remarks: Behavioral: Change in motor activity (specific assay), Lungs, Thorax, or Respiration:Dyspnea.
Rat	Intravenous
3,300 mg/kg	Rat
LD50	5,360 mg /kg
Skin	LD50
Rabbit	Remarks: Behavioral: Tremor, Muscle weakness. Lungs, Thorax or Respiration:Dyspnea.
> 5,000 mg/kg	Oral
LD50	Mouse
Oral	7,920 mg /kg
Rat	LD50
14,500 mg/kg	Skin
LD50	Mouse
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear and Taste): Eye: Hemorrhage. Sense Organs and Special Senses (Nose, Eye, Ear and Taste): Eye: Conjunctive irritation.	50,000 mg /kg
Skin	LD50
Rat	Intraperitoneal
40,000 mg/kg	Mouse
LD50	2,500 mg /kg
Intraperitoneal	LD50
Rat	Subcutaneous
8,200 mg/kg	Mouse
LD50	14 gm/kg
	LD50
	Remarks: Behavioral: Change in motor activity (specific assay), Lungs, Thorax, or Respiration: Other changes. Kidney, Ureter, Bladder: Hematuria.

### **Irritation Data**

Skin

Rabbit

4 Hours

Remarks: No irritation effect

Eyes

Rabbit

Remarks: Mild irritation effect

Skin

Rabbit

10 mg

24H

Remarks: Open irritation test

Skin

Rabbit

500 mg

24H

Remarks: Mild irritation effect

Eyes

Rabbit

100 mg

Eyes

Rabbit

500 mg

24H

Remarks: Mild irritation effect

### **Chronic Exposure - Carcinogen**

Species: Rat

Route of Application: Oral

Dose: 59 gm/kg

Exposure Time: 81W

Frequency: I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria, Skin and Appendages: Other: Tumors.

Species: Rat

Route of Application: Subcutaneous

Dose: 220 gm/kg

Exposure Time: 82W

Frequency I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria, Skin and Appendages: Other: Tumors.

Species: Mouse

Route of Application: Oral

Dose: 65,340 mg/kg

Exposure Time: 66W

Frequency I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Blood: Leukemia Skin and Appendages: Other: Tumors.

Species: Mouse

Route of Application: Subcutaneous

Dose: 66 gm/kg

Exposure Time: 66W

Frequency I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria, Lungs Thorax or Appendages: Other: Tumors. Skin and Appendages: Other: Tumors.

### **Chronic Exposure - Teratogen**

Species: Mouse

Route of Application: Intraperitoneal

Dose: 210 mg/kg

Exposure Time: (6–12D PREG)

Result: Specific development Abnormalities: Central nervous system. Specific development Abnormalities: Musculoskeletal system.

Species: Mouse

Route of Application: Intraperitoneal

Dose: 5,500 mg/kg

Exposure Time: (10D PREG)

Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Hamster

Route of Application: Oral

Dose: 11 gm/kg

Exposure Time: (7D PREG)

Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Hamster

Route of Application: Intraperitoneal

Dose: 5,500 mg/kg

Exposure Time: (8D PREG)

Result: Specific development Abnormalities: Central nervous system. Specific development Abnormalities: Musculoskeletal system. Specific development Abnormalities: Craniofacial (including nose and tongue).

Species: Mouse

Route of Application: Intraperitoneal

Dose: 4,400 mg/kg

Exposure Time: (8D PREG)

Result: Effects on Embryo or Fetus: Fetus: death. Specific Developmental Abnormalities: Central nervous system.

Species: Hamster

Route of Application: Intervenous

Dose: 2,500 mg/kg

Exposure Time: (8D PREG)

Result: Specific development Abnormalities: Central nervous system. Specific development Abnormalities: Musculoskeletal system. Specific development Abnormalities: Craniofacial (including nose and tongue).

Species: Hamster

Route of Application: Intervenous

Dose: 2,500 mg/kg

Exposure Time: (8D PREG)

Result: Specific development Abnormalities: Other developmental abnormalities.

### **Chronic Exposure - Mutagen**

Species: Human  
Dose: 140 MMOL/L  
Cell Type: lymphocyte  
Mutation Test: Other mutation test system.

Species: Rat  
Route: Intraperitoneal  
Dose: 25 gm/kg  
Exposure Time: 5D  
Mutation Test: Cytogenetic analysis.

Species: Mouse  
Route: Intraperitoneal  
Dose: 75 mmol/kg  
Mutation Test: DNA damage.

Species: Mouse  
Route: Intraperitoneal  
Dose: 93 gm/l  
Cell Type: lymphocyte  
Mutation Test: Cytogenetic analysis.

Species: Mouse  
Dose: 1 mol/l  
Cell Type: lymphocyte  
Mutation Test: Mutation in mammalian somatic cells.

Species: Hamster  
Dose: 19 pph  
Cell Type: ovary  
Mutation Test: Cytogenetic analysis.

Species: Hamster  
Dose: 1 pph  
Cell Type: lung  
Mutation Test: Cytogenetic analysis.

### **Chronic Exposure - Reproductive Hazard**

Species: Rat  
Dose: 56 gm/kg  
Route of Application: Intraperitoneal  
Exposure Time: (6–12D PREG)  
Result: Effects on Fertility: Abortion

Species: Rat  
Dose: 6,600 mg/kg  
Route of Application: Intraperitoneal  
Exposure Time: (7–15D PREG)  
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species : Rat  
Dose: 30,750 mg/kg  
Route of Application: Subcutaneous  
Exposure Time: (8–10D PREG)  
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).  
Effects on Fertility:Litter size (e.g., # fetuses per litter; measured before birth).

Species: Mouse  
Dose: 16 mg/kg  
Route of Application: Oral  
Exposure Time: (5–9D PREG)  
Result: Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.

Species : Mouse  
Dose: 82,50 mg/kg  
Route of Application: Intraperitoneal  
Exposure Time: (10D PREG)  
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species : Mouse  
Dose: 240 gm/kg  
Route of Application: Intravenous  
Exposure Time: (1–20D PREG)  
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Hamster  
Route of Application: Intervenous  
Dose: 2,500 mg/kg  
Exposure Time: (8D PREG)  
Result: Specific development Annormalities: Central nervous system, Musculoskeletal system and Craniofacial (including nose and tongue).

Species: Hamster  
Route of Application: Intervenous  
Dose: 2,500 mg/kg  
Exposure Time: (8D PREG)  
Result: Specific development Annormalities:Other developmental abnormalities.

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## SECTION 12–ECOLOGICAL INFORMATION

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### Acute Ecotoxicity Tests

Test Type: LC50 Fish  
Species : Onchorhynchus mykiss (Rainbow trout)  
Time: 96h  
Value: 35,000 mg/1

Test Type: EC50 Daphnia  
Species : Daphnia pulex  
Value: 27,500 mg/1

Test Type: EC50 Algae  
Species: Lepomis macrochirus (Bluegill)  
Time: 96 h  
Value: > 400,000 mg/1

Test Type: LC50 Fish  
Species: Pimephales promelas (Fathead minnow)  
Time: 96 h  
Value: 34,000 mg/1

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## SECTION 13–DISPOSAL CONSIDERATIONS

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### Appropriate Method of Disposal of Substance or Preparation

Contact a licensed professional waste disposal service to dispose of this material. This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state and local environmental regulations.

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## SECTION 14–TRANSPORT INFORMATION

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### DOT

Proper Shipping Name: Combustible Liquid n.o.s.  
UN # NA1993  
Class: Combustible Liquid  
Packing Group: Packing Group III  
Hazard Label: None  
PIH: Not PIH

### IATA

Non-Hazardous for Air Transport: non-hazardous for air transport.

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## SECTION 15–REGULATORY INFORMATION

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### US Classification and Label Text

US Statements: Combustible. Readily absorbed through skin. Target Organ (s): Eyes, Skin.

### United States Regulatory Information:

**Sara Listed:** No  
TSCA Inventory Item: Yes

**Canada Regulatory Information** WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

**DSL:** Yes

**NDSL:** No

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## SECTION 16–OTHER INFORMATION

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### DISCLAIMER

For R&D use only. Not for drug, household or other uses.

**The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide.**

**New England Biolabs shall not be held liable for any damage resulting from handling or from contact with the above product.**