# MATERIAL SAFETY DATA SHEET

<table>
<thead>
<tr>
<th>Product</th>
<th>Item #</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TP-MP-GCE-Reactions</td>
<td>Multiplex Master Mix with GC Enhancer</td>
</tr>
<tr>
<td><strong>Components</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GCE-10-Reactions-PC</td>
<td>10X GC Enhancer</td>
</tr>
<tr>
<td></td>
<td>TP-MP-Reactions-PC</td>
<td>5X Multiplex Master Mix</td>
</tr>
</tbody>
</table>
MATERIAL SAFETY DATA SHEET

Product Title: 10X GC Enhancer

SECTION 1 — CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Title: 10X GC Enhancer
Item number: GCE-10-Reactions-PC
Document Number: PC-MSDS-014 Version 002
Relevant identified uses of the substance or mixture and uses advised against = No further relevant information available.
Application of the substance / the mixture Laboratory Chemicals
Details of the supplier of the safety data sheet
Manufacturer/Supplier:
Empirical Bioscience
2007 Eastcastle Dr. SE
Grand Rapids, MI 49508 U.S.A.
1-877.479.9949
MSDS author; customer.service@empiricalbioscience.com

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Hazardous Ingredients (specific)</th>
<th>%</th>
<th>CAS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proprietary Reagent 1</td>
<td>63</td>
<td></td>
</tr>
</tbody>
</table>

SECTION 3 — HAZARDS IDENTIFICATION

Classification of the substance or mixture Classification according to the Hazard Communication Standard (HCS).
The product is not classified as hazardous according to the HCS regulation.
Labelling according to Regulation (EC) No 1272/2008 Void
Hazard pictograms Void Signal word Void
Hazard statements Void
Classification system: NFPA ratings (scale 0 - 4)
Health = 0
Fire = 1
Reactivity = 0
HMIS-ratings (scale 0 - 4)
Health = 0
Fire = 1
Reactivity = 0
OSHA Hazard Overview (Criteria according to 29CFR1910.1200): Not applicable
Target Organ(s): Not applicable or unknown
Other hazards This mixture has not been tested to determine the overall health hazard; therefore in accordance with 29CFR1910.1200, the data reported above pertains to the hazardous ingredients of this mixture.
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable
MATERIAL SAFETY DATA SHEET

Product Title: 10X GC Enhancer

SECTION 4 — FIRST AID MEASURES

Description of first aid measures
General information: No special measures required.  
After inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician. 
After skin contact: Wash Skin with soap and copious amounts of water  
After eye contact: Rinse opened eye for several minutes under running water. 
After swallowing: If the person is conscious, wash out mouth with water. Call a physician. 
Information for doctor: 
Most important symptoms and effects, both acute and delayed None  
Indication of any immediate medical attention and special treatment needed No further relevant information available

SECTION 5 — FIRE FIGHTING MEASURES

Extinguishing media
Suitable extinguishing agents: CO₂, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam. 
Special hazards arising from the substance or mixture None known
Advice for firefighters No special advice 
Protective equipment: Wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. 
Environmental precautions: Dilute with plenty of water. Do not allow to enter sewers/ surface or ground water, 
Methods and material for containment and cleaning up: Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Reference to other sections No dangerous substances are released. 
See Section 7 for information on safe handling. 
See Section 13 for disposal information

SECTION 7 — HANDLING AND STORAGE

Handling:
Precautions for safe handling Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. 
Information about protection against explosions and fires: The product is not flammable.  
Conditions for safe storage, including any incompatibilities Keep container tightly closed in a dry and well-ventilated place. Hygroscopic. 
Light sensitive. 
Storage:
Requirements to be met by storerooms and receptacles: No special requirements. 
Information about storage in one common storage facility: Not required. 
Further information about storage conditions: None. 
Specific end use(s) No further relevant information available.
SECTION 8 — EXPOSURE CONTROL / PERSONAL PROTECTION

Control parameters
Components with limit values that require monitoring at the workplace:
Proprietary Reagent 1
   Value: TWA
   Control parameters: 10mg/m3
   Basis: USA. Workplace Environmental Exposure Levels (WEEL)
Additional information:
Exposure controls
Personal protective equipment: General protective and hygienic measures: The usual precautionary measures for handling chemicals should be followed.
Breathing equipment: Not required.
Protection of hands:
Protective gloves Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
Material of gloves The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
Eye protection: Goggles recommended during refilling.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties
General Information
Appearance: Form: Liquid
Color: Colorless
Odor: Characteristic
Odour threshold: No data available
pH-value at 20 °C (68 °F): No data available
Change in condition
Melting point/Melting range: -60°C (-76 °F)
Boiling point/Boiling range: 187 °C (369 °F)
Flash point: 103 °C (217 °F) – closed cup
Flammability (solid, gaseous): No data available
Ignition temperature: No data available
Decomposition temperature: No data available
Auto igniting: No data available
Danger of explosion: No data available
Explosion limits: No data available
Lower: 2.6% (V)
Upper: 12.5% (V)
Vapor pressure at 20 °C (68 °F): 0.11 hPa (0.08 mmHg)
Density at 20 °C (68 °F): No data available
Relative density. 1.036 g/mL at 25 °C (77 °F)
Vapour density 2.63 - (Air = 1.0)
Evaporation rate No data available
Solubility in / Miscibility with Water: No data available
Partition coefficient (n-octanol/water): No data available
Viscosity: No data available
Dynamic: No data available
Kinematic: No data available
Solvent content: No data available
Organic Solvents: No data available
Water: No data available
Solids content: No data available
Other information No data available
MATERIAL SAFETY DATA SHEET

Product Title: 10X GC Enhancer

SECTION 10 — STABILITY AND REACTIVITY

Reactivity
Chemical stability
Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
Possibility of hazardous reactions No dangerous reactions known.
Conditions to avoid Exposure to moisture.
Incompatible materials: Acid chlorides, Acid anhydrides, Oxidizing agents, Chloroformates, Reducing agents.
Hazardous decomposition products: No dangerous decomposition products known.

SECTION 11 — TOXICOLOGICAL INFORMATION

Information on toxicological effects
Acute toxicity: LD50 Oral - rat - 20,000 mg/kg
LD/LC50 values that are relevant for classification:
LD50 Dermal - rabbit - 20,800 mg/kg
LD50 Intramuscular - rat - 14 g/kg
LD50 Intravenous - dog - 26 g/kg
LD50 Intraperitoneal - rat - 6,660 mg/kg
LD50 Subcutaneous - rat - 22,500 mg/kg
LD50 Intravenous - rat - 6,423 mg/kg
LD50 Subcutaneous - mouse - 17,370 mg/kg Remarks: Behavioral:Change in motor activity (specific assay). Behavioral:Muscle contraction or spasticity, Cyanosis
LD50 Intravenous - mouse - 6,630 mg/kg
LD50 Intravenous - rabbit - 6,500 mg/kg

Primary irritant effect:
On the skin: Mild irritation On
the eye: Mild irritation
Sensitization: No data available
Additional toxicological information: RTECS: TY2000000 Gastrointestinal disturbance, Nausea, Headache, Vomiting, Central nervous system depression.
Carcinogenic categories IARC (International Agency for Research on Cancer)
None of the ingredients are listed
NTP (National Toxicology Program)
None of the ingredients are listed.
Product Title: 10X GC Enhancer

SECTION 12 — ECOLOGICAL INFORMATION

Toxicity
Aquatic toxicity:
Toxicity to fish mortality NOEC - Pimephales promelas (fathead minnow) - 52.930 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates mortality NOEC - Daphnia - 13.020 mg/l - 48 h
EC50 - Daphnia magna (Water flea) - > 10,000 mg/l - 48 h
Persistence and degradability: No data available
Behavior in environmental systems: No data available
Bioaccumulative potential: No data available
Mobility in soil: No data available
Ecotoxicological effects: Remark: No data available
Additional ecological information: No data available
General notes:
Results of PBT and vPvB assessment
PBT: No data available
vPvB: No data available
Other adverse effects: No further relevant information available.

SECTION 13 — DISPOSAL CONSIDERATIONS

Waste treatment methods
Recommendation: Disposal should be in accordance with applicable regional, national and local laws and regulations. Refer to Section 7: Handling and Storage and Section 8: Exposure Control/Personal Protection for additional handling information and protection of employees.
Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.
Recommended cleansing agent: Water, if necessary with cleansing agents.

SECTION 14 — TRANSPORT INFORMATION

UN-Number: None
DOT, ADR, ADN, IMDG, IATA: Void
UN proper shipping name: None
DOT, ADR, ADN, IMDG, IATA: Void
Transport hazard class(es): None
DOT, ADR, ADN, IMDG, IATA Class: Void
Packing group: None
DOT, ADR, IMDG, IATA: Void
Environmental hazards:
Marine pollutant: No
Special precautions for user: Not applicable
Transport in bulk according to Annex II of MARPOL73/78 and the IBC: Not applicable
UN “Model Regulation”: -
SECTION 15 — REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture Sara
Section 355 (extremely hazardous substances): None of the ingredients are listed.
Section 313 (Specific toxic chemical listings): None of the ingredients are listed.
TSCA (Toxic Substances Control Act): All of the ingredients are listed.
Proposition 65
Chemicals known to cause cancer: None of the ingredients are listed.
Chemicals known to cause reproductive toxicity for females: None of the ingredients are listed.
Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.
Chemicals known to cause developmental toxicity: None of the ingredients are listed.
Cancerogenuity categories
EPA (Environmental Protection Agency) None of the ingredients are listed.
TLV (Threshold Limit Value established by ACGIH) None of the ingredients are listed.
MAK (German Maximum Workplace Concentration) None of the ingredients are listed.
NIOSH-Ca (National Institute for Occupational Safety and Health) None of the ingredients are listed.
OSHA-Ca (Occupational Safety & Health Administration) None of the ingredients are listed.
National regulations:
Water hazard class: Water hazard class 1 (Self-assessment): slightly hazardous for water.
Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

SECTION 16 — OTHER INFORMATION

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.
Department issuing MSDS
Empirical Bioscience
2007 Eastcastle Dr. SE
Grand Rapids, MI 49508 U.S.A.
1-877.479.9949

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50
* Data compared to the previous version altered.
MATERIAL SAFETY DATA SHEET

Product Title: 5X Multiplex Master Mix

SECTION 1 — CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Title: 5X Multiplex Master Mix
Item number: TP-MP-Reactions-PC
Document Number: PC-MSDS-015 Version 002
Relevant identified uses of the substance or mixture and uses advised against
Application of the substance / the mixture
Details of the supplier of the safety data sheet
Manufacturer/Supplier:
Empirical Bioscience
2007 Eastcastle Dr. SE
Grand Rapids, MI 49508 U.S.A.
1-877.479.9949
MSDS author; customer.service@empiricalbioscience.com

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Hazardous Ingredients (specific)</th>
<th>%</th>
<th>CAS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycerol</td>
<td>16</td>
<td>56-81-5</td>
</tr>
<tr>
<td>Tris HCl</td>
<td>10</td>
<td>1185-53-1</td>
</tr>
<tr>
<td>NH4Cl</td>
<td>10</td>
<td>12125-02-9</td>
</tr>
<tr>
<td>KCl</td>
<td>8.3</td>
<td>7447-40-7</td>
</tr>
</tbody>
</table>

SECTION 3 — HAZARDS IDENTIFICATION

Classification of the substance or mixture Classification according to the Hazard Communication Standard (HCS).
The product is not classified as hazardous according to the HCS regulation.
Labelling according to Regulation (EC) No 1272/2008 Void

Hazard pictograms Void Signal word Void
Hazard statements Void
Classification system: NFPA ratings (scale 0 - 4)
Health = 2
Fire = 1
Reactivity = 0
HMIS-ratings (scale 0 - 4)
Health = 2
Fire = 1
Reactivity = 0

OSHA Hazard Overview (Criteria according to 29CFR1910.1200): Not applicable
Target Organ(s): Not applicable or unknown
Other hazards: This mixture has not been tested to determine the overall health hazard; therefore in accordance with 29CFR1910.1200, the
data reported above pertains to the hazardous ingredients of this mixture.
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable
Product Title: 5X Multiplex Master Mix

SECTION 4 — FIRST AID MEASURES

Description of first aid measures
General information: No special measures required.
After inhalation: Supply fresh air; consult doctor in case of complaints.
After skin contact: Generally the product does not irritate the skin.
After eye contact: Rinse opened eye for several minutes under running water.
After swallowing: If symptoms persist consult doctor.
Information for doctor:
Most important symptoms and effects, both acute and delayed None
Indication of any immediate medical attention and special treatment needed No further relevant information available

SECTION 5 — FIRE FIGHTING MEASURES

Extinguishing media
Suitable extinguishing agents: CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
Special hazards arising from the substance or mixture None known
Advice for firefighters No special advice
Protective equipment: No special measures required.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures Not required.
Environmental precautions: Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
Methods and material for containment and cleaning up: Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Reference to other sections No dangerous substances are released.
See Section 7 for information on safe handling.
See Section 13 for disposal information.

SECTION 7 — HANDLING AND STORAGE

Handling:
Precautions for safe handling No special measures required.
Information about protection against explosions and fires: The product is not flammable.
Conditions for safe storage, including any incompatibilities
Storage:
Requirements to be met by storerooms and receptacles: No special requirements.
Information about storage in one common storage facility: Not required.
Further information about storage conditions: None.
Specific end use(s) No further relevant information available.
SECTION 8 — EXPOSURE CONTROL / PERSONAL PROTECTION

Control parameters
Components with limit values that require monitoring at the workplace:
56-81-5 glycerol
   PEL () Long-term value: 15 * 5 mg/m³
   *total dust **respirable fraction
   TLV () TLV withdrawn-insufficient data human occup. exp

Additional information:
Exposure controls
Personal protective equipment: General protective and hygienic measures: The usual precautionary measures for handling chemicals should be followed.
Breathing equipment: Not required.
Protection of hands: Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
Material of gloves: The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
Eye protection: Goggles recommended during refilling.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties
General Information
Appearance:
Form: Fluid
Color: Colorless
Odor: Characteristic
Odour threshold: Not Determined
pH-value at 20 °C (68 °F): 8.4

Change in condition
Melting point/Melting range: Undetermined
Boiling point/Boiling range: Undetermined

Flash point: Not applicable
Flammability (solid, gaseous): Not applicable

Ignition temperature:
Decomposition temperature: Not determined

Auto igniting: Product is not self-igniting

Danger of explosion: Product does not present an explosion hazard

Explosion limits:
Lower: Not determined
Upper: Not determined

Vapor pressure at 20 °C (68 °F): Not determined
Density at 20 °C (68 °F): Not determined

Relative density: Not determined
Vapour density Not determined

Evaporation rate Not determined

Solubility in / Miscibility with Water: Fully miscible
Partition coefficient (n-octanol/water): Not determined

Viscosity:
Dynamic: Not determined
Kinematic: Not determined

Solvent content:
Organic Solvents: 9.0%
Water: 18.0%
Solids content: 36.0%

Other information: No further relevant information available.
Product Title: 5X Multiplex Master Mix

SECTION 10 — STABILITY AND REACTIVITY

Reactivity
Chemical stability
Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
Possibility of hazardous reactions No dangerous reactions known.
Conditions to avoid No further relevant information available.
Incompatible materials: No further relevant information available.
Hazardous decomposition products: No dangerous decomposition products known.

SECTION 11 — TOXICOLOGICAL INFORMATION

Information on toxicological effects
Acute toxicity:
LD/LC50 values that are relevant for classification: No data available
Primary irritant effect:
on the skin: May cause skin irritation.
on the eye: May cause eye irritation.
Sensitization: Maybe harmful if inhaled.
Additional toxicological information: The product is not subject to classification according to internally approved calculation methods for preparations:
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.
Carcinogenic categories IARC (International Agency for Research on Cancer)
None of the ingredients are listed
NTP (National Toxicology Program)
None of the ingredients are listed.

SECTION 12 — ECOLOGICAL INFORMATION

Toxicity
Aquatic toxicity: Not Determined
Persistence and degradability: Not available
Behavior in environmental systems:
Bioaccumulative potential: Not known
Mobility in soil: No further relevant information available.
Ecotoxic effects: Remark: Not available
Additional ecological information:
General notes: Water hazard class 1 (Self-assessment): slightly hazardous for water Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.
Other adverse effects: No further relevant information available.
SECTION 13 — DISPOSAL CONSIDERATIONS

Waste treatment methods
Recommendation: Disposal should be in accordance with applicable regional, national and local laws and regulations. Refer to Section 7: Handling and Storage and Section 8: Exposure Control/Personal Protection for additional handling information and protection of employees.

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.
Recommended cleansing agent: Water, if necessary with cleansing agents.

SECTION 14 — TRANSPORT INFORMATION

UN-Number None
DOT, ADR, ADN, IMDG, IATA Void
UN proper shipping name None
DOT, ADR, ADN, IMDG, IATA Void
Transport hazard class(es) None
DOT, ADR, ADN, IMDG, IATA Class Void
Packing group None
DOT, ADR, IMDG, IATA Void
Environmental hazards:
Marine pollutant: No
Special precautions for user Not applicable
Transport in bulk according to Annex II of MARPOL73/78 and the IBC code Not applicable
UN "Model Regulation": -

SECTION 15 — REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture Sara
Section 355 (extremely hazardous substances): None of the ingredients are listed.
Section 313 (Specific toxic chemical listings): None of the ingredients are listed.
TSCA (Toxic Substances Control Act): All of the ingredients are listed.
Proposition 65
Chemicals known to cause cancer: None of the ingredients are listed.
Chemicals known to cause reproductive toxicity for females: None of the ingredients are listed.
Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.
Chemicals known to cause developmental toxicity: None of the ingredients are listed.
Cancerogenity categories
EPA (Environmental Protection Agency) None of the ingredients are listed.
TLV (Threshold Limit Value established by ACGIH) None of the ingredients are listed.
MAK (German Maximum Workplace Concentration) None of the ingredients are listed.
NIOSH-Ca (National Institute for Occupational Safety and Health) None of the ingredients are listed.
OSHA-Ca (Occupational Safety & Health Administration) None of the ingredients are listed.
National regulations:
Water hazard class: Water hazard class 1 (Self-assessment): slightly hazardous for water.
Chemical safety assessment: A Chemical Safety Assessment has not been carried out.
Product Title: 5X Multiplex Master Mix

SECTION 16 — OTHER INFORMATION

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Department issuing MSDS
Empirical Bioscience
2007 Eastcastle Dr. SE
Grand Rapids, MI 49508 U.S.A.
1-877.478.9949

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50
* Data compared to the previous version altered.