# MATERIAL SAFETY DATA SHEET

**TEMED**

## SECTION 1 - MATERIAL IDENTIFICATION AND INFORMATION


**MANUFACTURER'S NAME:** **GENOMIC SOLUTIONS, INC.**
**ADDRESS:** **4355 VARSITY DR.**
**ANN ARBOR, MI 48108**

**TELEPHONE NUMBER:** **(734) 975-4800**
**US EMERGENCY PHONE:** **(800) 535-5053**
**INTERNATIONAL EMERGENCY PHONE:** **1(352) 323-3500 (Call Collect)**


**CAS NUMBER:** 110-18-9
**RTECS NUMBER:** KV7195000

**SUBSTANCE:** N,N,N',N'-TETRAMETHYLETHYLENEDIAMINE (TEMED)

**TRADE NAMES/SYNONYMS:**
80-0088, TEMED, 10ML; 80-0174, TEMED, 100ML; N,N,N',N'-TETRAMETHYL-1,2-ETHANEDIAMINE; ETHYLENEDIAMINE, N,N,N',N'-TETRAMETHYL-; 1,2-BIS (DIMETHYLAMINO) ETHANE; PROPAMINE D; N,N,N',N'-TETRAMETHYLDIAMINOETHANE; N,N,N',N'-TETRAMETHYLETHANEDIAMINE; 1,2-ETHANEDIAMINE, N,N,N',N'-TETRAMETHYL-; TMEDA; TEMEDA; TEMED; C6H16N2.

**CHEMICAL FAMILY:** AMINE, ALIPHATIC

**CREATION DATE:** 6/2/95
**REVISED:** 2/20/98

## SECTION 2 - PHYSICAL / CHEMICAL CHARACTERISTICS

**COMPONENT:** N,N,N',N'-TETRAMETHYLETHYLENEDIAMINE
**CAS NUMBER:** 110-18-9
**PERCENTAGE:** 100.00
**OTHER CONTAMINANTS:** NONE

### PHYSICAL AND CHEMICAL PROPERTIES

**DESCRIPTION:** COLORLESS To pale yellow liquid with an amine odor
**MOLECULAR WEIGHT:** 116.22
**MOLECULAR FORMULA:** C6-H16-N2
**MELTING POINT:** 248-252 F (120-122 C)
**BOILING POINT:** 67 F (-55 C)
**VAPOR PRESSURE:** 3 mmHg @ 20 C
**VAPOR DENSITY:** 4.0
**SPECIFIC GRAVITY:** 0.7765
**WATER SOLUBILITY:** soluble
**VOLATILITY:** 100%
**pH:** no data available
**ODOR THRESHOLD:** no data available
**EVAPORATION RATE:** (ether = 1) >1
**SOLVENT SOLUBILITY:** Soluble in most organic solvents

## SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

**CERCLA RATINGS (SCALE 0-3)**: **HEALTH** = 2 **FIRE** = 3 **REACTIVITY** = 0 **PERSISTENCE** = 1
**NFPA RATINGS (SCALE 0-4)**: **HEALTH** = 3 **FIRE** = 3 **REACTIVITY** = 0

**EMERGENCY OVERVIEW:**
Colorless to pale yellow liquid with an amine odor. Causes eye irritation, possibly severe. Causes respiratory tract and skin irritation. Flammable liquid and vapor. May cause flash fire. Do not get in eyes, on skin, or on clothing. Keep away from all ignition sources. Avoid breathing vapor or mist. Keep container tightly closed. Wash thoroughly after handling. Use only with adequate ventilation.

### POTENTIAL HEALTH EFFECTS

**INHALATION:**
*Short Term Effects:* May cause irritation.
*Long Term Effects:* No information is available.

**SKIN CONTACT:**
*Short Term Effects:* May cause irritation. Additional effects may include burns.
*Long Term Effects:* Same effects as short term exposure.

**EYE CONTACT:**
*Short Term Effects:* May cause irritation, possibly severe.
*Long Term Effects:* Same effects as short term exposure.

**INGESTION:**
*Short Term Effects:* No information available on significant adverse effects.
*Long Term Effects:* No information is available.

**CARCINOGEN STATUS:**
**OSHA:** N
**NTP:** N
**IARC:** N

### FIRE FIGHTING MEASURES

**FIRE AND EXPLOSION HAZARD:**
Dangerous fire hazard when exposed to heat or flame. Vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back. Vapor-air mixtures are explosive.

**EXTINGUISHING MEDIA:**
Dry chemical, carbon dioxide, water spray or alcohol-resistant foam (1993 Emergency Response Guidebook, RSPA P 5800.6).

For larger fires, use water spray, fog or alcohol-resistant foam (1993 Emergency Response Guidebook, RSPA P 5800.6).

**FIREFIGHTING:**
Move container from fire area if you can do it without risk. Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks. For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.

Isolate for 1/2 mile in all directions if tank, rail car or tank truck is involved in fire (1993 Emergency Response Guidebook, RSPA P 5800.6, Guide Page 26).

Extinguish only if flow can be stopped; use water in flooding amounts as fog, solid streams may not be effective. Cool containers with flooding amounts of water, apply from as far a distance as possible. Avoid breathing vapors, keep upwind.

FLASH POINT: 50 F (10 C)
LOWER FLAMMABLE LIMIT: no data available
UPPER FLAMMABLE LIMIT: no data available
AUTOIGNITION: no data available
FLAMMABILITY CLASS(OSHA): IB

**HAZARDOUS COMBUSTION PRODUCTS:**
Thermal decomposition products may include toxic oxides of nitrogen.

## SECTION 4 - REACTIVITY HAZARD DATA

### STABILITY AND REACTIVITY

**REACTIVITY:**
Stable under normal temperatures and pressures.

**CONDITIONS TO AVOID:**
Avoid contact with heat, sparks, flames, or other sources of ignition. Vapors may be explosive and poisonous; do not allow unnecessary personnel in area. Do not overheat containers; containers may violently rupture and travel a considerable distance in heat of fire.

**INCOMPATIBILITIES:**
N,N,N',N'-TETRAMETHYLETHYLENEDIAMINE:
MERCURY: Explosion hazard
OXIDIZING MATERIALS: May react

**HAZARDOUS DECOMPOSITION:**
Thermal decomposition products may include toxic oxides of nitrogen.

**POLYMERIZATION:**
Hazardous polymerization has not been reported to occur under normal temperatures and pressures.

## SECTION 5 - HEALTH HAZARD DATA

### EMERGENCY FIRST AID

**INHALATION:**
*First Aid* - Remove from exposure area to fresh air immediately. Perform artificial respiration if necessary. Keep person warm and at rest. Treat symptomatically and supportively. Get medical attention immediately.

**SKIN CONTACT:**
*First Aid* - Remove contaminated clothing and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). If burns occur, proceed with the following: Cover affected area securely with sterile, dry, loose-fitting dressing. Treat symptomatically and supportively. Get medical attention immediately.

**EYE CONTACT:**
*First Aid* - Wash eyes immediately with large amounts of water, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Continue irrigating with normal saline until the pH has returned to normal (30-60 minutes). Cover with sterile bandages. Get medical attention immediately.

**INGESTION:**
*First Aid* - If vomiting occurs, keep head lower than hips to help prevent aspiration. Treat symptomatically and supportively. Get medical attention if needed.

NOTE TO PHYSICIAN
ANTIDOTE: No specific antidote. Treat symptomatically and supportively.

## TOXICOLOGY INFORMATION

N,N,N',N'-TETRAMETHYLETHYLENEDIAMINE:
**IRRITATION DATA:**
10 MG/24 HOURS open skin-rabbit 750 µg eye-rabbit severe

**TOXICITY DATA:**
5390 MG/KG Skin-rabbit LD50 1580 mg/kg oral-rat LD50

**CARCINOGEN STATUS:** None.
**LOCAL EFFECTS:** Corrosive- eye; irritant- inhalation, skin.
**ACUTE TOXICITY LEVEL:** Moderately toxic by ingestion; slightly toxic by dermal absorption
**TARGET EFFECTS:** No data available.

## HEALTH EFFECTS

**INHALATION:**
N,N,N',N'-TETRAMETHYLETHYLENEDIAMINE:
IRRITANT.
*Acute Exposure:* Vapors may cause irritation of the respiratory tract.
*Chronic Exposure:* No data available.

**SKIN CONTACT:**
N,N,N',N'-TETRAMETHYLETHYLENEDIAMINE:
IRRITANT.
*Acute Exposure:* May cause irritation and possibly burns. Animal studies indicate skin absorption may occur.
*Chronic Exposure:* Repeated and prolonged contact may dermatitis.

**EYE CONTACT:**
N,N,N',N'-TETRAMETHYLETHYLENEDIAMINE:
CORROSIVE.
*Acute Exposure:* May cause severe irritation and possibly burns. Instillation into the eyes of rabbits attacked the cornea and caused haziness, irregularities, and sloughing of the surface associated with violent desiccation.
*Chronic Exposure:* Effects depend on concentration and duration of exposure. Repeated or prolonged contact may result in conjunctivitis or effects as in acute exposure.

**INGESTION:**
N,N,N',N'-TETRAMETHYLETHYLENEDIAMINE:
*Acute Exposure:* The lethal dose reported in rats was 1580 mg/kg. The symptoms were not reported.

*Chronic Exposure:* No data available.

## SECTION 6 - CONTROL AND PROTECTIVE MEASURES

**EXPOSURE LIMITS:**
No occupational exposure limits established by OSHA, ACGIH, or NIOSH.

**VENTILATION:**
Provide local exhaust or general dilution ventilation. Ventilation equipment should be explosion-proof if explosive concentrations of dust, vapor or fume are present.

**EYE PROTECTION:**
Employee must wear splash-proof or dust-resistant safety goggles and a faceshield to prevent contact with this substance.

**EMERGENCY WASH FACILITIES:**
Where there is any possibility that an employee's eyes and/or skin may be exposed to this substance, the employer should provide an eye wash fountain and quick drench shower within the immediate work area for emergency use.

**CLOTHING:**
Employee must wear appropriate protective (impervious) clothing and equipment to prevent repeated or prolonged skin contact with this substance.

**GLOVES:**
Employee must wear appropriate protective gloves to prevent contact with this substance.

**RESPIRATOR:**
The following respirators are recommended based on information found in the physical data, toxicity and health effects sections. They are ranked in order from minimum to maximum respiratory protection. The specific respirator selected must be based on contamination levels found in the work place, must be based on the specific operation, must not exceed the working limits of the respirator and must be jointly approved by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration (NIOSH-MSHA).

Any chemical cartridge respirator with organic vapor cartridge(s) and a full facepiece.

Any gas mask with organic vapor canister (chin-style or front- or back-mounted canister), with a full facepiece.

Any type 'C' supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure mode or with a full facepiece, helmet or hood operated in a continuous-flow mode.

Any self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.

**FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:**
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

## SECTION 7 - PRECAUTIONS FOR SAFE HANDLING & USE/LEAK PROCEDURES

### ACCIDENTAL RELEASE MEASURES

**OCCUPATIONAL SPILL:**
Shut off ignition sources; no flares, smoking or flames in hazard area. Stop leak if you can do it without risk. Water spray may reduce vapor; but it may not prevent ignition in closed spaces. For small spills, take up with sand or other noncombustible absorbent material and place into containers for later disposal. For larger spills, dike far ahead of spill for later disposal. Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind; keep out of low areas.

### HANDLING AND STORAGE

Observe all federal, state and local regulations when storing this substance. Store in accordance with 29 CFR 1910.106. Store at 4 C. Store away from incompatible substances.

Bonding and grounding: Substances with low electroconductivity, which may be ignited by electrostatic sparks, should be stored in containers which meet the bonding and grounding guidelines specified in NFPA 77-1983, Recommended Practice on Static Electricity.

### DISPOSAL INFORMATION

Observe all federal, state and local regulations when disposing of this substance.

## SECTION 8 - TRANSPORTATION AND REGULATORY INFORMATION

**TRANSPORTATION INFORMATION:**
U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
Flammable liquids, n.o.s. (n,n,n',n'-tetramethylethylenediamine) -UN 1993

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
3 - Flammable liquid

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101: PG II

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101 AND SUBPART E: Flammable liquid.

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS:
EXCEPTIONS: 49 CFR 173.150
NON-BULK PACKAGING: 49 CFR 173.202
BULK PACKAGING: 49 CFR 173.242

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: 5 L
CARGO AIRCRAFT ONLY: 60 L

**REGULATORY INFORMATION:**

| | |
|---|---|
| **TSCA STATUS:** | Y |
| **CERCLA SECTION 103 (40CFR302.4):** | N |
| **SARA SECTION 302 (40CFR355.30):** | N |
| **SARA SECTION 304 (40CFR355.40):** | N |
| **SARA SECTION 313 (40CFR372..65):** | N |
| **OSHA PROCESS SAFETY (29CFR1910.119):** | N |
| **CALIFORNIA PROPOSITION 65:** | N |

**SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40 CFR 370.21)**

| | |
|---|---|
| **ACUTE HAZARD:** | Y |
| **CHRONIC HAZARD:** | N |
| **FIRE HAZARD:** | Y |
| **REACTIVITY HAZARD:** | N |
| **SUDDEN RELEASE HAZARD:** | N |

While the information and recommendations set forth herein are believed to be accurate as of the date hereof,

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