

MATERIAL SAFETY DATA SHEET

ACRYLAMIDE/BISACRYLAMIDE

SECTION 1 - MATERIAL IDENTIFICATION AND INFORMATION

MANUFACTURER'S NAME: GENOMIC SOLUTIONS
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)

SUBSTANCE: ACRYLAMIDE/BISACRYLAMIDE

TRADE NAMES/SYNONYMS:

80-0147, DURACRYL 30% BIS 0.8% 100 ML; 80-0085, DURACRYL 30% BIS 0.65% 1000 ML; 80-0148, DURACRYL 30% BIS 0.8% 1000 ML; 80-0084, ACRYLAMIDE 30% BIS 0.8% 1000 ML; 70-3924, DURACRYL 30% BIS 0.65% 1000 ML; ACRYLAMIDE/N,N,N',METHYLENE BISACRYLAMIDE; DURACRYL HIGH TENSILE STRENGTH ACRYLAMIDE

CHEMICAL FAMILY: MIXTURE

CREATION DATE: 5/24/95
REVISED: 3/28/01

SECTION 2 - PHYSICAL / CHEMICAL CHARACTERISTICS

COMPONENT	CAS NUMBER	PERCENTAGE
ACRYLAMIDE	79-06-1	28 - 30
N,N'-METHYLENEBISACRYLAMIDE	110-26-9	< 1.0
WATER	7732-18-5	70

PHYSICAL AND CHEMICAL PROPERTIES

DESCRIPTION: Pale yellow liquid
MELTING POINT: no data available
SPECIFIC GRAVITY: no data available
WATER SOLUBILITY: Soluble

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

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

EMERGENCY OVERVIEW:

Warning, harmful if swallowed, inhaled or absorbed through skin. Affects central and peripheral nervous systems and reproductive systems. Causes irritation to skin, eyes and respiratory tract. Suspect cancer hazard. May cause cancer. Risk of cancer depends on level and duration of exposure. Possible birth defect hazard. May cause birth defects based on animal data.

May polymerize and violently rupture container. Avoid contact with eyes, skin and clothing. Keep container tightly closed. Avoid contact with incompatible materials. Wash thoroughly after handling. Use only with adequate ventilation. Handle with caution.

MATERIAL SAFETY DATA SHEET

ACRYLAMIDE/BISACRYLAMIDE

POTENTIAL HEALTH EFFECTS

Acrylamide is a suspected human carcinogen, severe neurotoxin, and causes irritation of the eyes, skin (is readily absorbed), and respiratory tract.

INHALATION:

May cause drowsiness, tingling sensations, fatigue, weakness, stumbling, slurred speech, and shaking. May cause central and peripheral nervous system damage. Severe intoxications may cause permanent nerve damage. Causes irritation to the respiratory tract. May affect reproductive system and act as a teratogen.

SKIN CONTACT:

May cause irritation and redness. Can be absorbed through the skin causing systemic poisoning; symptoms may parallel those of inhalation.

EYE CONTACT:

Causes irritation, redness, and pain

INGESTION:

Toxic. May cause systemic poisoning with symptoms paralleling those of inhalation

Chronic Exposure: Prolonged or repeated exposure through any route may cause muscular weakness, incoordination, skin rashes, excessive sweating of hands and feet, cold hands, peeling of the skin, numbness, abnormal skin or muscle sensations, fatigue, and cause central and peripheral nervous system damage. Suspect cancer hazard. May cause cancer. May affect the reproductive system and act as a teratogen.

CARCINOGEN STATUS:

OSHA: N

NTP: Y

IARC: Y

FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARD:

Slight fire hazard when exposed to heat or flame.

EXTINGUISHING MEDIA:

Dry chemical, water spray or regular foam (1993 Emergency Response Guidebook, RSPA P 5800.6).

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

FIREFIGHTING:

Move container from fire area if you can do it without risk. Fight fire from maximum distance. Stay away from ends of tanks. Dike fire-control water for later disposal; do not scatter the material (1993 Emergency Response Guidebook, RSPA P 5800.6, Guide Page 55).

Extinguish only if flow can be stopped. Extinguish using agents indicated. Use flooding amounts of water as a fog. Cool containers with flooding amounts of water from as far a distance as possible. Avoid breathing poisonous vapors, keep upwind. Consider evacuation of downwind area if material is leaking.

HAZARDOUS COMBUSTION PRODUCTS:

Thermal decomposition products may toxic oxides of nitrogen and carbon.

MATERIAL SAFETY DATA SHEET

ACRYLAMIDE/BISACRYLAMIDE

SECTION 4 - REACTIVITY HAZARD DATA

STABILITY AND REACTIVITY

REACTIVITY:

ACRYLAMIDE/BISACRYLAMIDE DRY MIXTURES AND SOLUTIONS:
May polymerize above the melting point or when exposed to ultraviolet light.

CONDITIONS TO AVOID:

May burn but does not ignite readily. Containers may explode in heat of fire.

INCOMPATIBILITIES:

ACIDS: Incompatible.
ALKALIES: Incompatible.
ALUMINUM: Incompatible.
BRASS: Incompatible.
COPPER: Incompatible.
OXIDIZERS (STRONG): Fire and explosion hazard
REDUCING AGENTS: Fire and explosion hazard

N,N'-METHYLENEBISACRYLAMIDE:

OXIDIZERS (STRONG): Fire and explosion hazard.

HAZARDOUS DECOMPOSITION:

Thermal decomposition products may include toxic oxides of nitrogen and carbon.

POLYMERIZATION:

ACRYLAMIDE/BISACRYLAMIDE DRY MIXTURES OR SOLUTIONS:
May undergo polymerization if exposed to heat or ultraviolet light.

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). Get medical attention immediately.

EYE CONTACT:

First Aid - Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.

INGESTION:

First Aid - Treat symptomatically and supportively. Get medical attention immediately. Maintain airway, blood pressure and respiration. If vomiting occurs, keep head lower than hips to help prevent aspiration. Do not give anything by mouth or induce vomiting if person is unconscious or otherwise unable to swallow. If a poisonous substance has been ingested, it is generally suggested to proceed with the following: induce emesis. Qualified

MATERIAL SAFETY DATA SHEET

ACRYLAMIDE/BISACRYLAMIDE

medical personnel should consider the following: perform gastric lavage (if there is no sign of perforation or corrosive injury). If a corrosive substance has been ingested and perforation has not occurred, it is generally suggested to proceed with the following: rinse mouth with water. Give milk or water.

TOXICOLOGY INFORMATION

ACRYLAMIDE:

IRRITATION DATA:

50 mg/3 days skin-rabbit mild

10 mg/30 seconds rinsed eye-rabbit mild

500 mg/24 hours skin-rabbit mild

100 mg/24 hours eye-rabbit moderate

TOXICITY DATA:

400 mg/kg skin-rat LD50

780 mg/kg/13 weeks-intermittent intraperitoneal-rat TDLo

1680 µl/kg skin-rabbit LD50

200 mg/kg/2 days-intermittent intraperitoneal-monkey TDLo

124 mg/kg oral-rat LD50

200 mg/kg/4 days-intermittent intravenous-monkey TDLo

107 mg/kg oral-mouse LD50

90 mg/kg intraperitoneal-rat LD50

150 mg/kg oral-rabbit LD50

170 mg/kg intraperitoneal-mouse LD50

150 mg/kg oral-guinea pig LD50

156 mg/kg unreported-mouse LD50

100 mg/kg oral-mammal LD50

173 mg/kg unreported-guinea pig LD50

1800 mg/kg/90 days continuous oral-rat TDLo

208 mg/kg unreported-rat LD50

568 mg/kg/8 weeks intermittent oral-mouse TDLo

280 mg/kg unreported-rabbit LD50

671 mg/kg/75 weeks intermittent oral-monkey TDLo

mutagenic data (RTECS)

771 mg/kg/1 year intermittent oral-cat TDLo

reproductive effects data (RTECS)

170 mg/kg subcutaneous-guinea pig LD50

tumorigenic data (RTECS)

190 mg/kg intravenous-mammal LDLo

CARCINOGEN STATUS: Anticipated Human Carcinogen (NTP); Animal Sufficient Evidence (IARC Group-2B).

Intragastric or intraperitoneal administration to mice caused increased incidence of lung adenomas. Oral administration to rats increased the incidences of neoplasms at several sites including the thyroid gland, scrotum, mammary gland, oral cavity, uterus, and the adrenal, clitoral and pituitary gland. Acrylamide showed initiating activity to the skin of female mice after oral, topical, or intraperitoneal administration followed by chronic topical treatment with 12-o-tetra-decanolylphorbol 13-acetate.

LOCAL EFFECTS: Irritant - skin, eye

ACUTE TOXICITY LEVEL: Toxic by dermal absorption and ingestion.

TARGET EFFECTS: Neurotoxin.

AT INCREASED RISK FROM EXPOSURE: Persons with pre-existing skin disorders, eye problems, and/or central or peripheral nervous system conditions.

ADDITIONAL DATA: Alcohol may enhance the toxic effects.

N,N'-METHYLENEBISACRYLAMIDE:

TOXICITY DATA:

390 mg/kg oral-cat LD50

401 mg/kg oral-mouse LD50

mutagenic data (RTECS)

reproductive effects data (RTECS)

3206 mg/kg/8 weeks intermittent oral-mouse TDLo

CARCINOGEN STATUS: None

LOCAL EFFECTS: No data available

ACUTE TOXICITY LEVEL: Toxic by ingestion

TARGET EFFECTS: No data available

MATERIAL SAFETY DATA SHEET

ACRYLAMIDE/BISACRYLAMIDE

HEALTH EFFECTS

INHALATION:

ACRYLAMIDE:

NEUROTOXIN:

Acute Exposure: May cause irritation to the respiratory tract. If sufficient amounts of acrylamide are inhaled, systemic toxicity, as detailed in acute skin contact, may occur. Seizures were reported in animals exposed to acrylamide.

Chronic Exposure: Prolonged or repeated exposure to low concentrations may cause symptoms details in chronic skin contact. Histopathologic studies of animals have reported degeneration of the axon and myelin sheaths.

N,N'-METHYLENEBISACRYLAMIDE:

Acute Exposure: No data available.

Chronic Exposure: Repeat or prolonged exposure to unsaturated amides may cause muscular weakness, incoordination, skin rashes, excessive sweating of heads and feet, cold hands and peeling of the skin.

SKIN CONTACT:

ACRYLAMIDE

IRRITANT/NEUROTOXIN/TOXIC.

Acute Exposure: The lethal dose reported in rats was 400 mg/kg. Direct contact may cause irritation with redness and blistering. Acrylamide may be absorbed through the skin to cause injury to the central, peripheral, and autonomic nervous systems. Effects may include encephalopathy with confusion, disorientation, memory disturbances, hallucinations, ataxia, and mild peripheral neuropathy. Neurologic effects may be recalled with subsequent exposure to lesser amounts of acrylamide. Permanent neurologic sequel may occur after severe poisoning.

Chronic Exposure: Repeated and prolonged exposure may cause dermatitis as well as the symptoms detailed in acute exposure. Polyneuritis with sensory changes in the limbs, numbness of the extremities, muscle pain, incoordination, tremors, positive Romberg sign, absence of deep tendon reflexes, secondary muscle atrophy may occur. Slurred speech, nystagmus, changes in the visual fields, dripping, cold, and peeling hands ad feet, bluish-red skin discoloration, weight loss, and difficulties in urination and defecation may also result. Symptoms may be delayed for months to years following exposure. Skin sensitization has been reported in guinea pigs. Dermal absorption studies using mice showed a significant increase in the number of dead embryos in females mated with males exposed to 125, 100, 75 and 50 mg/kg day for 5 consecutive days. No significant changes resulted in the number of living embryos per female in those mated with males exposed to 25 mg/kg day.

N,N'-METHYLENEBISACRYLAMIDE:

Acute Exposure: May be irritating. Some amides may be absorbed through the skin.

Chronic Exposure: Repeat or prolonged exposure may cause effects described in chronic inhalation.

EYE CONTACT:

ACRYLAMIDE:

Acute Exposure: Direct contact may cause irritation and possibly burns. A 10% aqueous solution applied in rabbit eyes caused slight pain and conjunctival irritation; a 40% solution for 30 seconds caused more pain; and a 40% solution applied and not rinsed caused superficial corneal injury, but the cornea was clear in 24 hours.

Chronic Exposure: Prolonged or repeated contact with irritants may cause conjunctivitis. Application of 0.1ml of a 50% aqueous solution for 10 days resulted in one of six rabbits developing the characteristic motor syndrome of acrylamide intoxication.

N,N'-METHYLENEBISACRYLAMIDE:

Acute Exposure: May cause irritation.

Chronic Exposure: No data available.

INGESTION:

ACRYLAMIDE:

MATERIAL SAFETY DATA SHEET

ACRYLAMIDE/BISACRYLAMIDE

NEUROTOXIN/CARCINOGEN/TOXIC.

Acute Exposure: The reported lethal dose in rats was 124 mg/kg. Ingestion may cause systemic toxicity as detailed in acute skin contact. In animals, single doses of 20-252 mg/kg caused weight loss, tremors, and pupil dilation. Reproductive effects have been reported in animals.

Chronic Exposure: Ingestion by humans resulted in symptoms detailed in chronic skin contact. Rhinorrhea, coughing, dizziness, sleepiness, and irrational behavior also occurred. Reproductive effects including testicular atrophy, reduced fertility and pre-/post-implantation mortality have been reported in animals. Repeated ingestion of acrylamide in drinking water of rats induced an increased incidence of benign or malignant neoplasms at several sites, including thyroid gland, mammary gland, scrotum, oral cavity, and adrenal gland. Repeated intragastric administration to mice caused and increased incidence of lung adenomas.

N,N'-METHYLENEBISACRYLAMIDE:

Acute Exposure: The lethal dose in rats was 390 mg/kg. The symptoms were not reported.

Chronic Exposure: Repeat or prolonged exposure may cause effects described in chronic inhalation. Minor changes in the peripheral motor nerve endings were reported in rats which had received a cumulative dose of 3000 mg/kg. Reproductive effects have been reported in animals.

SECTION 6 - CONTROL AND PROTECTIVE MEASURES

EXPOSURE LIMITS:

ACRYLAMIDE:

0.03 mg/m³ OSHA TWA (skin)

0.03 mg/m³ NIOSH recommended TWA (skin)

0.03 mg/m³ ACGIH TWA (skin)

ACGIH A2-Suspected Human Carcinogen

Measurement method: Particulate filter/silica gel tube; methanol; gas chromatography with nitrogen detection; (OSHA #21).

1000/10,000 pounds SARA Section 302 Threshold Planning Quantity

5000 pound SARA Section 304 Reportable Quantity

5000 pounds CERCLA Section 103 Reportable Quantity

Subject to SARA Section 313 Annual Toxic Chemical Release Reporting

Subject to California Proposition 65 cancer and/or reproductive toxicity warning and release requirements (January 1, 1990)

OSHA revoked the final rule limits of January 19, 1989 in response to the 11th Circuit Court of Appeals decision (AFL-CIO v. OSHA) effective June 30, 1993. See 29 CFR 1910.1000 (58 FR 35338)

VENTILATION:

Provide local exhaust or process enclosure ventilation to meet the published exposure limits. 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 to prevent eye 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 any possibility of skin contact with this substance.

MATERIAL SAFETY DATA SHEET

ACRYLAMIDE/BISACRYLAMIDE

GLOVES:

Employee must wear clean impervious rubber or plastic 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 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 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: Do not touch spilled material. Stop leak if you can do it without risk. Use water spray to reduce vapors. For small spills, take up with sand or other absorbent material and place into containers for later disposal. For small dry spills, with a clean shovel place material into clean, dry containers and cover. Move containers from spill area. For larger spill, dike far ahead of spill for later disposal. keep unnecessary people away. Isolate hazard area and deny entry. Ventilate closed spaces before entering.

Reportable Quantity (RQ):

The Superfund Amendments and Reauthorization Act (SARA) Section 304 requires that a release equal to or greater than the reportable quantity for this substance be immediately reported to the local emergency planning committee and the state emergency response commission (40 CFR 355.40). If the release of this substance is reportable under CERCLA Section 103, the National Response Center must be notified immediately at (800) 424-8802 or (202) 426-2675 in the metropolitan Washington, D.C. area (40 CFR 302.6).

WATER SPILL:

The California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) prohibits contaminating any known source of drinking water with substances known to cause cancer and/or reproductive toxicity.

MATERIAL SAFETY DATA SHEET

ACRYLAMIDE/BISACRYLAMIDE

HANDLING AND STORAGE

Observe all federal, state and local regulations when storing this substance. Store away from incompatible substances.

Threshold Planning Quantity (TPQ):

The Superfund Amendments and Reauthorization Act (SARA) Section 302 requires that each facility where any extremely hazardous substance is present in a quantity equal to or greater than the TPQ established for that substance notify the state emergency response commission for the state in which it is located. Section 303 of SARA requires these facilities to participate in local emergency response planning (40 CFR 355.30).

Store at 4°C

DISPOSAL INFORMATION

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

SECTION 8 - TRANSPORTATION AND REGULATORY INFORMATION
--

TRANSPORTATION INFORMATION:

Domestic (Land, D.O.T.)

Proper Shipping Name: TOXIC LIQUID, ORGANIC, N.O.S. (ACRYLAMIDE)

Hazard Class: 6.1

UN/NA: UN2810

Packing Group: III

International (Water, I.M.O.)

Proper Shipping Name: TOXIC LIQUID, ORGANIC, N.O.S. (ACRYLAMIDE)

Hazard Class: 6.1

UN/NA: UN2810

Packing Group: III

International (Air, I.C.A.O.)

Proper Shipping Name: TOXIC LIQUID, ORGANIC, N.O.S. (ACRYLAMIDE)

Hazard Class: 6.1

UN/NA: UN2810

Packing Group: III

REGULATORY INFORMATION:

TSCA STATUS: Y

CERCLA SECTION 103 (40CFR302.4): Y

ACRYLAMIDE: 5000 pounds RQ

SARA SECTION 302 (40CFR355.30): Y

ACRYLAMIDE: 1000/10,000 pounds TPQ

SARA SECTION 304 (40CFR355.40): Y

ACRYLAMIDE: 5000 pounds RQ

SARA SECTION 313 (40CFR372..65): Y

OSHA PROCESS SAFETY (29CFR1910.119): N

MATERIAL SAFETY DATA SHEET

ACRYLAMIDE/BISACRYLAMIDE

CALIFORNIA PROPOSITION 65: Y

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

ACUTE HAZARD: Y

CHRONIC HAZARD: Y

FIRE HAZARD: N

REACTIVITY HAZARD: Y

SUDDEN RELEASE HAZARD: N

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, Genomic Solutions, Inc. makes no warranty with respect thereto and disclaims all liability from reliance thereon.