MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
8725 JOHN J. KINGMAN ROAD
SUITE 3339
FORT BELVOIR, VA 22060-6223

EMERGENCY TELEPHONE NUMBER:
1-800-424-9300 (NORTH AMERICA)
1-703-527-3887 (INTERNATIONAL)

SUBSTANCE: FERROMANGANESE, HIGH CARBON

TRADE NAMES/SYNONYMS:
DLANA389

EATION DATE: Jul 24 1992
EVISION DATE: Dec 11 2008

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: MANGANESE
CAS NUMBER: 7439-96-5
EC NUMBER (EINECS): 231-105-1
PERCENTAGE: 76.0-78.0

COMPONENT: CARBON
CAS NUMBER: 7440-44-0
EC NUMBER (EINECS): 231-153-3
PERCENTAGE: <7.50

COMPONENT: SILICON
CAS NUMBER: 7440-21-3
EC NUMBER (EINECS): 231-130-8
PERCENTAGE: <1.00

COMPONENT: PHOSPHORUS, WHITE
CAS NUMBER: 7723-14-0
EC NUMBER (EINECS): 231-768-7
PERCENTAGE: <0.95
COMPONENT: ARSENIC
CAS NUMBER: 7440-38-2
    EC NUMBER (EINECS): 231-148-6
    PERCENTAGE: <0.90

COMPONENT: CHROMIUM
CAS NUMBER: 7440-47-3
    EC NUMBER (EINECS): 231-157-5
    PERCENTAGE: <0.50

COMPONENT: OXYGEN, COMPRESSED GAS
CAS NUMBER: 7782-44-7
    EC NUMBER (EINECS): 231-956-9
    PERCENTAGE: <0.50

COMPONENT: SULFUR
CAS NUMBER: 7704-34-9
    EC NUMBER (EINECS): 231-722-6
    PERCENTAGE: <0.05

COMPONENT: LEAD
CAS NUMBER: 7439-92-1
    EC NUMBER (EINECS): 231-100-4
    PERCENTAGE: <0.05

COMPONENT: TIN
CAS NUMBER: 7440-31-5
    EC NUMBER (EINECS): 231-141-8
    PERCENTAGE: <0.02

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=0 REACTIVITY=1

EMERGENCY OVERVIEW:

PHYSICAL DESCRIPTION: Hard, dense lumps.

MAJOR HEALTH HAZARDS: nerve damage, cancer hazard (in humans)
PHYSICAL HAZARDS: Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode. Contact with water or moist air may generate flammable and/or toxic gases.

POTENTIAL HEALTH EFFECTS:

INHALATION:
SHORT TERM EXPOSURE: irritation, changes in body temperature, nausea, vomiting, diarrhea, headache
LONG TERM EXPOSURE: irritation, loss of appetite, difficulty breathing, disorientation, difficulty speaking, sleep disturbances, emotional disturbances, hallucinations, mood swings, tremors, muscle cramps, loss of coordination, hearing loss, visual disturbances, lung damage, blood disorders, kidney damage, liver damage, nerve damage, cancer

SKIN CONTACT:
SHORT TERM EXPOSURE: irritation

EYE CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: irritation

INGESTION:
SHORT TERM EXPOSURE: gastrointestinal irritation, nausea, vomiting, diarrhea
LONG TERM EXPOSURE: drowsiness, cancer

CARCINOGEN STATUS:
OSHA: Yes
NTP: Yes
IARC: Yes

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If a large amount is swallowed, get medical attention.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode.

EXTINGUISHING MEDIA: dolomite, dry powder for metal fires, dry sand, graphite, soda ash, sodium chloride

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Use extinguishing agents appropriate for surrounding fire. Avoid inhalation of material or combustion by-products.

6. ACCIDENTAL RELEASE MEASURES

WATER RELEASE:
Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

OCCUPATIONAL RELEASE:
Collect spilled material in appropriate container for disposal. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (U.S.A) or (202)426-2675 (USA).
7. HANDLING AND STORAGE

**STORAGE:** Store and handle in accordance with all current regulations and standards. See original container for storage recommendations. Keep separated from incompatible substances.

**HANDLING:** Use methods to minimize dust.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

**EXPOSURE LIMITS:**

**MANGANESE:**

MANGANESE AND COMPOUNDS (as Mn):
5 mg/m³ OSHA ceiling (metal) (fume) (compounds)
1 mg/m³ OSHA TWA (particulate) (vacated by 58 FR 35338, June 30, 1993)
3 mg/m³ OSHA STEL (particulate) (vacated by 58 FR 35338, June 30, 1993)
0.2 mg/m³ ACGIH TWA (metal and inorganic compounds)
1 mg/m³ NIOSH recommended TWA 10 hour(s) (metal) (fume) (compounds)
3 mg/m³ NIOSH recommended STEL (metal) (fume) (compounds)
0.5 mg/m³ DFG MAK (inhalable fraction) (metal and inorganic compounds)
0.5 mg/m³ UK WEL TWA (metal) (inorganic compounds)

**MEASUREMENT METHOD:** NIOSH IV # 7300, 7301, 7303, 9102; OSHA # ID121, ID125G

**SENIC:**
100 ug(As)/m³ OSHA TWA
5 ug(As)/m³ OSHA action level
0.01 mg/m³ ACGIH TWA
0.002 mg/m³ NIOSH recommended ceiling 15 minute(s)
0.1 mg/m³ UK WEL TWA

**MEASUREMENT METHOD:** NIOSH IV # 7300, 7301, 7303, 7900, 9102; OSHA ID105

**VENTILATION:** Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

**EYE PROTECTION:** Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

**CLOTHING:** Wear appropriate chemical resistant clothing.

**GLOVES:** Wear appropriate chemical resistant gloves.

**RESPIRATOR:** Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use. Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100 or P100. Any air-purifying full-facepiece respirator equipped with an N95, R95, or P95 filter. The following filters may also be 1: N99, R99, P99, N100, R100 or P100. Any powered, air-purifying respirator with a high-efficiency particulate filter. Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter.
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode. For Unknown Concentrations or Immediately Dangerous to Life or Health -

Any supplied-air respirator with a full facepiece that 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.

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION: Hard, dense lumps.
BOILING POINT: Not applicable
MELTING POINT: Not available
VAPOR PRESSURE: Not applicable
VAPOR DENSITY: Not applicable
SPECIFIC GRAVITY: Not available
WATER SOLUBILITY: Not available
PH: Not applicable
VOLATILITY: Not applicable
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not applicable
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure. Contact with water or moist air may form flammable and/or toxic gases or vapors.

CONDITIONS TO AVOID: None reported.

INCOMPATIBILITIES: metals, oxidizing materials, halogens, peroxides, combustible materials, acids, reducing agents

MANGANESE:
ALUMINUM (DUST): Forms explosive mixtures with air.
AMMONIUM NITRATE (FUSED): Violent or explosive reaction.
BROMINE PENTAFLUORIDE: Violent reaction and possible ignition.
CARBON DIOXIDE: Ignores.
CHLORINE: Ignores.
FLUORINE: Incandescent reaction.
HYDROGEN PEROXIDE: Violent decomposition and/or ignition.
NITRIC ACID: Incandescent reaction and feeble explosion.
NITROGEN DIOXIDE: Ignition.
OXIDIZERS (STRONG): Fire and explosion hazard.
PHOSPHORUS: Incandescent reaction when heated.
SULFUR DIOXIDE: Burns brilliantly on warming.

CARBON:
ALKALI METALS: Contact may result in an exothermic reaction with ignition.
or an explosion.
AMMONIUM NITRATE: Possible explosion when heated.
MONIUM PERCHLORATE: Possible explosion on heating.
BROMATES: Contact is likely to result in ignition or an explosion.
CALCIUM HYPOCHLORITE: Possible explosion on heating.
CHLORATES: Contact is likely to result in ignition or an explosion.
CHLORINE MONOXIDE: Explosives.
CHROMATES: Incompatible.
DICHLORINE OXIDE: Explosion reaction.
HALOGENS: Contact of carbon with any halogen is liable to result in
ignition or an explosion.
INTERHALOGENS: Contact of carbon with any interhalogen is liable
result in ignition or an explosion.
IODATES: Contact is likely to result in ignition or an explosion.
IODINE PENTOXIDE: Explosives when warmed.
METAL NITRATES: Contact is likely to result in ignition or an explosion.
NITRIC ACID: Violent reaction.
NITROGEN OXIDE: Ignition with incandescence.
NITROGEN TRIFLUORIDE: Explosion at reduced temperatures.
OILS (UNSATURATED): Fire and explosion hazard.
OXIDES: Contact with many oxides is likely to result in ignition
or an explosion.
OXIDIZERS (STRONG): Fire and explosion hazard.
OXOSALTS: Contact is likely to result in ignition or an explosion.
OXYGEN: May result in ignition or an explosion.
YGEN DIFLUORIDE: Possible explosion.
OZONE: Fire hazard.
PEROXIDES: Contact is likely to result in ignition or an explosion.
PEROXYFORMIC ACID: Violent oxidation.
PEROXYPEROIC ACID: Explosive decomposition.
POTASSIUM PERMANGANATE: Ignition on heating.
SODIUM SULFIDE: May undergo spontaneous heating.
TRIOXYGEN DIFLUORIDE: Ignition with possible explosion.

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: miscellaneous decomposition products

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

MANGANESE:
IRRITATION DATA: 500 mg/24 hour(s) skin-rabbit mild; 500 mg/24 hour(s) eyes-rabbit mild
TOXICITY DATA: 2300 ug/m3 inhalation-man TClO; 9 gm/kg oral-rat LD50; 3709 mg/m3/6 hour(s)-13 week(s)
intermittent inhalation-rat TClO; 180 mg/kg/30 day(s) intermittent intraperitoneal-rat TDL0; 210 ug/m3/5 year(s)
intermittent inhalation-man TClO; 0.3 mg/m3/5 hour(s)-26 week(s) intermittent inhalation-rat TClO; 0.3 mg/m3/5
week(s)-26 week(s) intermittent inhalation-monkey TClO; 0.7 mg/m3/24 hour(s)-22 week(s) continuous inhalation-rat
TClO; 0.7 mg/m3/24 hour(s)-22 week(s) continuous inhalation-mouse TClO; 250 mg/m3/1 year(s) intermittent
inhalation-human TClO; 0.5 mg/m3/39 week(s) intermittent inhalation-human TClO; 200 mg/kg/20 day(s) intermittent
oral-rat TDLo; 216 mg/kg/15 week(s) intermittent intraperitoneal-rat TDLo; 144 mg/kg/5 week(s) intermittent intraperitoneal-rat TDLo; 24 mg/kg/5 week(s) intermittent unreported-rat TDLo; 72 mg/kg/5 week(s) intermittent reported-rat TDLo; 57.6 mg/kg/4 week(s) intermittent intraperitoneal-rat TDLo; 0.71 mg/m3/2 hour(s)-10 day(s) intermittent inhalation-rat; 5.25 mg/kg/21 day(s) intermittent oral-rat; 185 mg/kg/37 day(s) continuous oral-rat TDLo

**ACUTE TOXICITY LEVEL:**
Slightly Toxic: ingestion

**TARGET ORGANS:** nervous system

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** history of alcoholism, blood system disorders, liver disorders, nervous system disorders, respiratory disorders

**TUMORIGENIC DATA:** 400 mg/kg intramuscular-rat TDLo/1 year(s) intermittent

**MUTAGENIC DATA:** dominant lethal test - rat intraperitoneal 25 mg/kg

**REPRODUCTIVE EFFECTS DATA:** 50 mg/kg oral-rat TDLo 20 day(s) post pregnancy continuous; 322.5 mg/kg oral-mouse TDLo 43 day(s) male; 1290 mg/kg oral-mouse TDLo 43 day(s) male; 0.71 mg/m3 inhalation-rat TCLo 15-16 day(s) pregnant female continuous; 0.71 mg/m3 inhalation-rat TCLo multigenerations; 90 mg/kg oral-rat TDLo 18 day(s) post pregnancy continuous

**ADDITIONAL DATA:** Symptoms may depend on a combination of contributing factors including genetic predisposition, age, nutrition, anemia or alcohol.

**CARBON:**

**TOXICITY DATA:** >5 gm/kg oral-rat LD; >5 gm/kg intraperitoneal-rat LD; >5 gm/kg subcutaneous-rat LD; >5 gm/kg oral-mouse LD; >5 gm/kg intraperitoneal-mouse LD; >5 gm/kg subcutaneous-mouse LD; 440 mg/kg intravenous-mouse LD50; >5 gm/kg oral-dog LD; >5 gm/kg intraperitoneal-dog LD; >5 gm/kg subcutaneous-dog LD

**REPRODUCTIVE EFFECTS DATA:** 187 mg/kg subcutaneous-rat TDLo 8 day(s) pregnant female continuous

**ARSENIC:**

**CICLITY DATA:** 7857 mg/kg/55 year(s) oral-man TDLo; 4 mg/kg oral-child TDLo; 763 mg/kg oral-rat LD50; 13390 ug/kg intraperitoneal-rat LD50; 145 mg/kg oral-mouse LD50; 46200 ug/kg intraperitoneal-mouse LD50; 300 mg/kg subcutaneous-rabbit LDLo; 10 mg/kg intraperitoneal-guinea pig LDLo; 300 mg/kg subcutaneous-guinea pig LDLo; 144 mg/kg oral-mouse LD50; 1000 mg/kg intraperitoneal-mouse LD50; 5 mg/kg oral-rat TDLo; 1360 mg/kg/17 day(s) intermittent oral-rat TDLo; 280 mg/kg/4 week(s) continuous oral-mouse TDLo; 0.35 mg/kg/5 week(s) continuous oral-mouse TDLo

**CARCINOGEN STATUS:** OSHA: Carcinogen; NTP: Known Human Carcinogen; IARC: Human Sufficient Evidence, Animal Limited Evidence, Group 1; ACGIH: A1 -Confirmed Human Carcinogen

An increased incidence of urinary bladder, skin, lung, liver, and kidney cancer has been associated with inorganic arsenic compounds through medical treatment, contaminated drinking water, arsenical pesticide residues or occupational exposure. Cancers at other sites have also been reported, but a clear association has not been confirmed.

**LOCAL EFFECTS:**
Irritant: inhalation, skin, eye

**ACUTE TOXICITY LEVEL:**
Moderate Toxic: ingestion

**TARGET ORGANS:** immune system (sensitizer), nervous system

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** diabetes, heart or cardiovascular disorders, immune system disorders or allergies, kidney disorders, liver disorders, nervous system disorders, skin disorders and allergies

**TUMORIGENIC DATA:** 76 mg/kg oral-man TDLo/12 year(s) intermittent; 75 mg/kg implant-rabbit TDLo

**MUTAGENIC DATA:** cytogenetic analysis - human unreported 4286 ug/kg; cytogenetic analysis - mouse oral 280 mg/kg 8 week(s); sister chromatid exchange - human oral 0.211 mg/L 15 year(s); cytogenetic analysis - human oral 0.211 mg/L 15 year(s); DNA damage - human lung 5 umol/L; cytogenetic analysis - human lung 5 umol/L; DNA damage - mouse fibroblast 5 mmol/L 24 hour(s); cytogenetic analysis - human lymphocyte 131.90 ug/L; micronucleus - other fish multiple 451.40 ppb 15 day(s)-continuous

**REPRODUCTIVE EFFECTS DATA:** 605 ug/kg oral-rat TDLo 35 week(s) pre pregnancy continuous; 580 ug/kg oral-rat TDLo 30 week(s) pre pregnancy/1-20 day(s) pregnant female continuous; 187 mg/kg oral-mouse TDLo 8-18
day(s) pregnant female continuous

ALTH EFFECTS:
INHALATION:
ACUTE EXPOSURE:
MANGANESE: Dust or fumes may be irritating to the mucous membranes. Occupational exposure to dust or fumes has been reported to cause upper respiratory tract problems, black mucous membrane discharge from the nose, and neurological damage. Metal fume fever, an influenza-like illness, may occur due to the inhalation of freshly formed metal oxide particles sized below 1.5 microns and usually between 0.02-0.05 microns. Symptoms may be delayed 4-12 hours and begin with a sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea and prostration may also occur. Tolerance to fumes develops rapidly, but is quickly lost. All symptoms usually subside within 24-36 hours.

CARBON: Inhalation of dust may cause slight mucous membrane irritation.

CHRONIC EXPOSURE:
MANGANESE: If sufficient quantities of manganese dust or fumes are inhaled and absorbed, systemic poisoning known as "manganese", a Parkinsonian-like syndrome may occur. It is characterized initially by anorexia, asthenia, headache, insomnia or somnolence, irritability, restlessness, and spasm or pain in the muscles. Manganese psychosis may follow with uncontrollable behavior, unaccountable laughing or crying, visual hallucinations, confusion and euphoria. Sexual excitement followed by impotence may occur. These symptoms may disappear with the onset of true neurological manifestations of slow, slurred and irregular speech, monotonous tone, double vision, impaired hearing, difficulty with fine motor movements, and disturbances in gait and balance with frequent propulsions or retropulsion.

SKIN contact, decreased movement of the eyelids and eyes and tremors of the upper extremities and head may also occur. Other signs and symptoms may include urinary bladder disturbances, excessive salivation and sweating, hematological changes, vasomotor disorders, decreased pulmonary function, kidney and possibly liver damage. Removal from exposure shortly after onset of symptoms usually results in improvement, although there may be residual disturbances in gait and speech. Once manganism is well established it becomes irreversible and progressive, but not fatal. An increased incidence of bronchitis and pneumonitis has been reported in studies of workers exposed to manganese dust and fume, and although these effects have been confirmed by animal experiments, they may represent an aggravation of a pre-existing condition. Allergic diseases of the respiratory tract have also been reported in one study.

CARBON: Repeated or prolonged exposure may cause irritation and pulmonary disorders. Lung damage may result if sufficient exposure occurs.

SKIN CONTACT:
ACUTE EXPOSURE:
MANGANESE: 500 mg applied to the skin of rabbits caused mild irritation.

CARBON: Contact may cause irritation.

CHRONIC EXPOSURE:
MANGANESE: Sensitization has been reported in guinea pigs.

CARBON: Repeated or prolonged contact may cause mechanical irritation.

EYE CONTACT:
ACUTE EXPOSURE:
MANGANESE: Dust or fumes may be irritating to the eyes. 500 mg applied to the eyes of rabbits caused mild irritation.

CARBON: Contact with dust may cause mechanical irritation. May also cause conjunctivitis.

CHRONIC EXPOSURE:
MANGANESE: Fumes may cause conjunctivitis.

CARBON: Repeated or prolonged exposure may cause mechanical irritation.

INGESTION:
ACUTE EXPOSURE:
MANGANESE: Extremely large doses may cause gastrointestinal irritation and possibly systemic toxicity.

CARBON: Extremely large doses may produce gastrointestinal disturbances.

CHRONIC EXPOSURE:
MANGANESE: Manganese poisoning has been reported in persons drinking manganese-contaminated well water. Prolonged ingestion of manganese in water has produced lethargy, edema, and decreased movement of the eyes and eyelids.

CARBON: No data available.

12. ECOLOGICAL INFORMATION

Not available

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION: No classification assigned.

CANADIAN TRANSPORTATION OF DANGEROUS GOODS: No classification assigned.

LAND TRANSPORT ADR: No classification assigned.

LAND TRANSPORT RID: No classification assigned.

AIR TRANSPORT IATA: No classification assigned.

AIR TRANSPORT ICAO: No classification assigned.

\$RITE TRANSPORT IMDG: No classification assigned.
15. REGULATORY INFORMATION

REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
ARSENIC: 1 LBS RQ (solid metal particles < 100 micrometer diameter (0.004 inches))
PHOSPHORUS, WHITE: 1 LBS RQ
CHROMIUM: 5000 LBS RQ (solid metal particles < 100 micrometer diameter (0.004 inches))
LEAD: 10 LBS RQ (solid metal particles < 100 micrometer diameter (0.004 inches))


SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B and C):
ACUTE: No
CHRONIC: Yes
FIRE: No
REACTIVE: Yes
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65):
ARSENIC
MANGANESE AND COMPOUNDS (as Mn)


STATE REGULATIONS:
California Proposition 65:
Known to the state of California to cause the following:
ARSENIC
Cancer (Feb 27, 1987)
LEAD
Cancer (Oct 01, 1992)
Developmental toxicity (Feb 27, 1987)
Male reproductive toxicity (Feb 27, 1987)
Female reproductive toxicity (Feb 27, 1987)

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Not determined.

EUROPEAN REGULATIONS:
EC CLASSIFICATION (CALCULATED): Not determined.

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

2A 12(b) EXPORT NOTIFICATION: Not listed.