J. 4 MATERIAL SAFETY DATA SHEET (JUN 05)-FERROCHROMIUM, HIGH CARBON

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: FERROCHROMIUM, HIGH CARBON

TRADE NAMES/SYNONYMS:
DLANA386

PRODUCT USE: alloy

CREATION DATE: Jul 24 1992
REVISION DATE: Jun 16 2005

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: CHROMIUM
CAS NUMBER: 7440-47-3
EC NUMBER (EINECS): 231-157-5
PERCENTAGE: 62.0-71.0

COMPONENT: CARBON
CAS NUMBER: 7440-44-0
EC NUMBER (EINECS): 231-153-3
PERCENTAGE: <8.0

COMPONENT: SILICON
CAS NUMBER: 7440-21-3
EC NUMBER (EINECS): 231-130-8
PERCENTAGE: <3.0

COMPONENT: MANGANESE
CAS NUMBER: 7439-96-5
EC NUMBER (EINECS): 231-105-1
PERCENTAGE: <0.75

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

COMPONENT: PHOSPHORUS, WHITE
CAS NUMBER: 7723-14-0
EC NUMBER (EINECS): 231-768-7
PERCENTAGE: <0.025

COMPONENT: ANTIMONY
CAS NUMBER: 7440-36-0

EC NUMBER (EINECS): 231-146-5
PERCENTAGE: <0.01

COMPONENT: ARSENIC
CAS NUMBER: 7440-38-2
EC NUMBER (EINECS): 231-148-6
PERCENTAGE: <0.005

COMPONENT: LEAD
CAS NUMBER: 7439-92-1
EC NUMBER (EINECS): 231-100-4
PERCENTAGE: <0.005

COMPONENT: TIN
CAS NUMBER: 7440-31-5
EC NUMBER (EINECS): 231-141-8
PERCENTAGE: <0.005

COMPONENT: ZINC
CAS NUMBER: 7440-66-6
EC NUMBER (EINECS): 231-175-3
PERCENTAGE: <0.005

3. HAZARDS IDENTIFICATION

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

EMERGENCY OVERVIEW:
PHYSICAL DESCRIPTION: Hard, dense lumps.
MAJOR HEALTH HAZARDS: No significant target effects reported.
PHYSICAL HAZARDS: Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: irritation, difficulty breathing, lung damage
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: irritation, skin disorders
EYE CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: irritation
INGESTION:
SHORT TERM EXPOSURE: gastrointestinal irritation, vomiting, stomach pain, dizziness
LONG TERM EXPOSURE: no information on significant adverse effects

CARCINOGEN STATUS:
OSHA: No
NTP: No
IARC: No

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 the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) 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:
CHROMIUM:
1 mg(Cr)/m3 OSHA TWA (metal) (insoluble salts)
0.5 mg(Cr)/m3 OSHA TWA (chromium (II) compounds) (chromium (III) compounds)
0.5 mg/m3 ACGIH TWA
0.5 mg/m3 NIOSH recommended TWA 10 hour(s)
DFG MAK (skin sensitizer) (dust) (aerosol)
0.5 mg/m3 UK WEL TWA

MEASUREMENT METHOD: Particulate filter; Acid; Flame atomic absorption spectrometry; NIOSH IV # 7024

SILICON:
5 mg/m3 OSHA TWA (respirable dust fraction)

15 mg/m3 OSHA TWA (total dust)
10 mg/m3 OSHA TWA (total particulate) (vacated by 58 FR 35338, June 30, 1993)
10 mg/m3 ACGIH TWA
5 mg/m3 NIOSH recommended TWA 10 hour(s) (respirable fraction)
10 mg/m3 NIOSH recommended TWA 10 hour(s) (total particulate)
10 mg/m3 UK WEL TWA (total inhalable dust)
4 mg/m3 UK WEL TWA (respirable dust)

MEASUREMENT METHOD: Particulate filter; Gravimetric; NIOSH IV # 0500, Nuisance Dust (total), # 0600 (respirable)

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 dust, mist, and fume respirator.
Any air-purifying respirator with a high-efficiency particulate filter.
Any powered, air-purifying respirator with a dust, mist, and fume filter.
Any powered, air-purifying respirator with a high-efficiency particulate filter.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

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

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: None reported.

INCOMPATIBILITIES: bases, oxidizing materials, halogens, peroxides, metals, combustible materials, acids, reducing agents, metal carbide, metal salts

CHROMIUM:

ALKALI CARBONATES: Attacked.
ALKALIES (CAUSTIC): Attacked.
AMMONIUM NITRATE (FUSED): Violent or explosive reaction.
BROMINE PENTAFLUORIDE: Violent reaction and possible ignition.
HYDROGEN PEROXIDE: Violent decomposition reaction.
LITHIUM (MOLTEN): Vigorous reaction at elevated temperatures.
NITROGEN OXIDE: Incandescent reaction.
OXIDIZERS (STRONG): Fire and explosion hazard.
POTASSIUM CHLORATE (FUSED): Vigorous incandescent reaction.
SULPHUR DIOXIDE: Incandescent reaction.

CARBON:
ALKALI METALS: Contact may result in an exothermic reaction with ignition or an explosion.
AMMONIUM NITRATE: Possible explosion when heated.
AMMONIUM 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: Explodes.
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 to result in ignition or an explosion.
IODATES: Contact is likely to result in ignition or an explosion.
IODINE PENTOXIDE: Explodes 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.
OXYGEN DIFLUORIDE: Possible explosion.
OZONE: Fire hazard.
PEROXIDES: Contact is likely to result in ignition or an explosion.
PEROXYFORMIC ACID: Violent oxidation.
PEROXYFUROIC ACID: Explosive decomposition.
POTASSIUM PERMANGANATE: Ignition on heating.
SODIUM SULFIDE: May undergo spontaneous heating.
TRIOXYGEN DIFLUORIDE: Ignition with possible explosion.

SILICON:
ALUMINUM + LEAD OXIDE: Mixture may explode on heating.
BROMINE TRIFLUORIDE: Ignition reaction.
CESIUM ACETYLIDE: Vigorous reaction on heating.
CALCIUM: Violently incandescent reaction above 1050 C, after a short delay.
CHLORINE (GASEOUS): Ignition on contact at ambient temperatures.
CHLORINE TRIFLUORIDE: Ignition reaction.
COBALT TRIFLUORIDE: Exothermic reaction, attaining red heat on warming.
FLUORINE: Ignites at room temperature; attains temperatures above 1400 C.
HYDROFLUORIC ACID: Attacks silicon.

HYDROFLUORIC ACID + NITRIC ACID MIXTURE: Attacks silicon.
IODINE PENTAFLUORIDE: Incandescent reaction.
IRIDIUM HEXAFLUORIDE: During reduction to pentafluoride, hexafluoride must not be condensed directly onto undiluted silicon powder or explosion may occur.
LEAD OXIDE: An initiating mixture of silicon and lead dioxide (2:1) attains a temperature around 1100 C after ignition by small flame.
MANGANESE TRIFLUORIDE: Violent reaction.
METAL CARBONATES (ALKALI): Exothermic reaction on heating, attaining incandescence and evolving carbon monoxide.
MOLYBDENUM HEXAFLUORIDE: During reduction to pentafluoride, hexafluoride must not be condensed directly onto undiluted silicon powder or explosion may occur.
NITROSYL FLUORIDE: Reacts with incandescence.
OSMIUM HEXAFLUORIDE: During reduction to pentafluoride, hexafluoride must not be condensed directly onto undiluted silicon powder or explosion may occur.
OXIDIZERS (STRONG): Fire and explosion hazard.
OXYGEN DIFLUORIDE: Generates sparks on heating.
PEROXYFORMIC ACID: Traces of manganese dioxide may promote oxidation with ignition.
RHENIUM HEXAFLUORIDE: During reduction to pentafluoride, hexafluoride must not be condensed directly onto undiluted silicon powder or explosion may occur.
RUBIDIUM ACETYLIDE: Reacts vigorously on warming.
SILVER FLUORIDE: Violent reaction.
SODIUM-POTASSIUM ALLOY: The reaction forms sodium silicide, which is spontaneously flammable in air.
URANIUM HEXAFLUORIDE: During reduction to pentafluoride, hexafluoride must not be condensed directly onto undiluted silicon powder or explosion may occur.
WATER: Combustible or explosive reaction at sufficiently high temperatures and pressures.

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: miscellaneous decomposition products

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

CHROMIUM:
TOXICITY DATA:
27500 ug/kg unreported-rat LD50
CARCINOGEN STATUS: IARC: Human Inadequate Evidence, Animal Inadequate Evidence, Group 3 (Chromium metal); ACGIH: A4 -Not Classifiable as a Human Carcinogen
ACUTE TOXICITY LEVEL: Insufficient Data.
TUMORIGENIC DATA:
2160 ug/kg intravenous-rat TDLo/6 week(s) intermittent; 1200 ug/kg implant-rat TDLo/6 week(s) intermittent; 75 mg/kg implant-rabbit TDLo
MUTAGENIC DATA:
DNA damage - human lung 1 umol/L
ADDITIONAL DATA: May cross the placenta. May be excreted in breast milk.

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
ACUTE TOXICITY LEVEL: Insufficient Data.

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

SILICON:
IRRITATION DATA:
3 mg eyes-rabbit mild
TOXICITY DATA:
3160 mg/kg oral-rat LD50; 500 mg/kg intraperitoneal-rat LDLo
ACUTE TOXICITY LEVEL:
Moderately Toxic: ingestion
ADDITIONAL DATA: Nephrotoxicity has been demonstrated with excessive exposure to silicon.

HEALTH EFFECTS:
INHALATION:
ACUTE EXPOSURE:
CHROMIUM: High concentrations of dusts or fumes may cause irritation.

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

SILICON: Dust may cause respiratory and mucous membrane irritation. Intratracheal administration of 25 mg in rabbits produced slight pulmonary lesions.

CHRONIC EXPOSURE:
CHROMIUM: Repeated or prolonged exposure to various chromium compounds has been reported to result in ulceration and perforation of the nasal septum, irritation of the throat and lower respiratory tract, less commonly in gastrointestinal disturbances, blood changes, pulmonary sensitization, pulmonary pneumoconiosis or fibrosis, and rarely liver effects. These effects have not been reported from exposure to the metal per se.

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

SILICON: Inert dust may cause excessive production of mucous, mucous gland hypertrophy, and increased airway resistance and may contribute to chronic bronchitis.

SKIN CONTACT:
ACUTE EXPOSURE:
CHROMIUM: Contact with dusts or powder may cause irritation.

CARBON: Contact may cause irritation.

SILICON: May cause mechanical irritation.

CHRONIC EXPOSURE:
CHROMIUM: Repeated or prolonged exposure to various chromium compounds has been reported to cause various types of dermatitis, including eczema, "chrome holes", sensitization, and, in contact with damaged skin, kidney damage. These effects have not been reported from exposure to the metal per se.

CARBON: Repeated or prolonged contact may cause mechanical irritation.

SILICON: No data available.

EYE CONTACT:
ACUTE EXPOSURE:
CHROMIUM: Contact with dusts or powders may cause irritation.

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

SILICON: Silicon dust may cause irritation.

CHRONIC EXPOSURE:
CHROMIUM: Repeated or prolonged exposure to some chromium compounds may cause conjunctivitis and lacrimation. These effects have not been reported from exposure to the metal per se.

CARBON: Repeated or prolonged exposure may cause mechanical irritation.

SILICON: No data available.

INGESTION:
ACUTE EXPOSURE:
CHROMIUM: Chromium metal is poorly absorbed by the intestinal tract. Absorption of sufficient amounts of some chromium compounds may result in dizziness, intense thirst, abdominal pain, vomiting, shock, oliguria or anuria, and uremia, which may be fatal.

CARBON: Extremely large doses may produce gastrointestinal disturbances.

SILICON: No data available.

CHRONIC EXPOSURE:
CHROMIUM: No data available.

CARBON: No data available.

SILICON: 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.

MARITIME TRANSPORT IMDG: No classification assigned.

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):

CHROMIUM: 5000 LBS RQ
PHOSPHORUS, WHITE: 1 LBS RQ
ANTIMONY: 5000 LBS RQ
ARSENIC: 1 LBS RQ
LEAD: 10 LBS RQ (solid metal particles < 100 micrometer diameter (0.004 inches))
ZINC: 1000 LBS RQ

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: No
CHRONIC: No
FIRE: No
REACTIVE: No
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65):
CHROMIUM

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

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)
LEAD COMPOUNDS
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.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

16. OTHER INFORMATION

MSDS SUMMARY OF CHANGES
3. HAZARDS IDENTIFICATION
8. EXPOSURE CONTROLS, PERSONAL PROTECTION
11. TOXICOLOGICAL INFORMATION

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: FERROCHROMIUM, LOW CARBON

TRADE NAMES/SYNONYMS:
DLANA385

PRODUCT USE: alloy

CREATION DATE: Jul 29 1992
REVISION DATE: Jun 16 2005

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: CHROMIUM
CAS NUMBER: 7440-47-3
EC NUMBER (EINECS): 231-157-5
PERCENTAGE: >67.0

COMPONENT: SILICON
CAS NUMBER: 7440-21-3
EC NUMBER (EINECS): 231-130-8
PERCENTAGE: <1.0

COMPONENT: CARBON
CAS NUMBER: 7440-44-0
EC NUMBER (EINECS): 231-153-3
PERCENTAGE: <0.05

COMPONENT: PHOSPHORUS, WHITE
CAS NUMBER: 7723-14-0
EC NUMBER (EINECS): 231-768-7
PERCENTAGE: <0.03

COMPONENT: SULFUR
CAS NUMBER: 7704-34-9
EC NUMBER (EINECS): 231-722-6
PERCENTAGE: <0.025

3. HAZARDS IDENTIFICATION

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

EMERGENCY OVERVIEW:
PHYSICAL DESCRIPTION: Hard, dense lumps, bricks, briquettes or pellets.
MAJOR HEALTH HAZARDS: No significant target effects reported.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: irritation
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: irritation, skin disorders
EYE CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: irritation
INGESTION:
SHORT TERM EXPOSURE: vomiting, stomach pain, dizziness
LONG TERM EXPOSURE: no information on significant adverse effects

CARCINOGEN STATUS:
OSHA: No
NTP: No
IARC: No

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

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 the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) 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:
CHROMIUM:
1 mg(Cr)/m3 OSHA TWA (metal) (insoluble salts)
0.5 mg(Cr)/m3 OSHA TWA (chromium (II) compounds) (chromium (III) compounds)
0.5 mg/m3 ACGIH TWA
0.5 mg/m3 NIOSH recommended TWA 10 hour(s)
DFG MAK (skin sensitizer) (dust) (aerosol)
0.5 mg/m3 UK WEL TWA

MEASUREMENT METHOD: Particulate filter; Acid; Flame atomic absorption spectrometry; NIOSH IV # 7024

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 dust, mist, and fume respirator.
Any air-purifying respirator with a high-efficiency particulate filter.
Any powered, air-purifying respirator with a dust, mist, and fume filter.
Any powered, air-purifying respirator with a high-efficiency particulate filter.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION: Hard, dense lumps, bricks, briquettes or pellets.
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

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: None reported.

INCOMPATIBILITIES: bases, oxidizing materials, halogens, peroxides, metals

CHROMIUM:
ALKALI CARBONATES: Attacked.
ALKALIES (CAUSTIC): Attacked.
AMMONIUM NITRATE (FUSED): Violent or explosive reaction.
BROMINE PENTAFLUORIDE: Violent reaction and possible ignition.
HYDROGEN PEROXIDE: Violent decomposition reaction.
LITHIUM (MOLTEN): Vigorous reaction at elevated temperatures.
NITROGEN OXIDE: Incandescent reaction.
OXIDIZERS (STRONG): Fire and explosion hazard.
POTASSIUM CHLORATE (FUSED): Vigorous incandescent reaction.
SULPHUR DIOXIDE: Incandescent reaction.

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: miscellaneous decomposition products

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

CHROMIUM:
TOXICITY DATA:
27500 ug/kg unreported-rat LD50
CARCINOGEN STATUS: IARC: Human Inadequate Evidence, Animal Inadequate Evidence, Group 3 (Chromium metal); ACGIH: A4 -Not Classifiable as a Human Carcinogen
ACUTE TOXICITY LEVEL: Insufficient Data.
TUMORIGENIC DATA:
2160 ug/kg intravenous-rat TDLo/6 week(s) intermittent; 1200 ug/kg implant-rat TDLo/6 week(s) intermittent; 75 mg/kg implant-rabbit TDLo
MUTAGENIC DATA:
DNA damage - human lung 1 umol/L
ADDITIONAL DATA: May cross the placenta. May be excreted in breast milk.

HEALTH EFFECTS:
INHALATION:
ACUTE EXPOSURE:
CHROMIUM: High concentrations of dusts or fumes may cause irritation.

CHRONIC EXPOSURE:
CHROMIUM: Repeated or prolonged exposure to various chromium compounds has been reported to result in ulceration and perforation of the nasal septum, irritation of the throat and lower respiratory tract, less commonly in gastrointestinal disturbances, blood changes, pulmonary sensitization, pulmonary pneumoconiosis or fibrosis, and rarely liver effects. These effects have not been reported from exposure to the metal per se.

SKIN CONTACT:
ACUTE EXPOSURE:
CHROMIUM: Contact with dusts or powder may cause irritation.

CHRONIC EXPOSURE:

CHROMIUM: Repeated or prolonged exposure to various chromium compounds has been reported to cause various types of dermatitis, including eczema, "chrome holes", sensitization, and, in contact with damaged skin, kidney damage. These effects have not been reported from exposure to the metal per se.

EYE CONTACT:
ACUTE EXPOSURE:
CHROMIUM: Contact with dusts or powders may cause irritation.

CHRONIC EXPOSURE:
CHROMIUM: Repeated or prolonged exposure to some chromium compounds may cause conjunctivitis and lacrimation. These effects have not been reported from exposure to the metal per se.

INGESTION:
ACUTE EXPOSURE:
CHROMIUM: Chromium metal is poorly absorbed by the intestinal tract. Absorption of sufficient amounts of some chromium compounds may result in dizziness, intense thirst, abdominal pain, vomiting, shock, oliguria or anuria, and uremia, which may be fatal.

CHRONIC EXPOSURE:
CHROMIUM: 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.

MARITIME TRANSPORT IMDG: No classification assigned.

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
CHROMIUM: 5000 LBS RQ
PHOSPHORUS, WHITE: 1 LBS RQ

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: No
CHRONIC: No
FIRE: No
REACTIVE: No
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65):
CHROMIUM

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Not determined.

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

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

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

16. OTHER INFORMATION

MSDS SUMMARY OF CHANGES
8. EXPOSURE CONTROLS, PERSONAL PROTECTION