

LTS (CHEMICAL) INC.
MATERIAL SAFETY DATA SHEET
GADOLINIUM IRON COBALT ALLOY

GENERAL

MANUFACTURER/SUPPLIER: LTS RESEARCH LABORATORIES, INC.
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DATE MSDS PREPARED: 12/28/09

1. PRODUCT IDENTIFICATION

PRODUCT NAME: GADOLINIUM IRON COBALT ALLOY
FORMULA: Gd/Fe/Co
CAS #: 7440-54-2/7439-89-6/7440-48-4

2. PHYSICAL AND CHEMICAL CHARACTERISTICS

BOILING POINT: N/A
MELTING POINT: N/A
SPECIFIC GRAVITY (H₂O=1): N/A
VAPOR DENSITY: N/A
VAPOR PRESSURE: N/A
EVAPORATION RATE: N/A
% VOLATILES: N/A
SOLUBILITY IN H₂O: INSOLUBLE
APPEARANCE AND ODOR: GRAY METALLIC TARGET



3. HAZARD IDENTIFICATION

HAZARD DESCRIPTION:
GADOLINIUM: F HIGHLY FLAMMABLE
IRON: N/A
COBALT: Xn HARMFUL
RISK PHRASES:
GADOLINIUM: 11 HIGHLY FLAMMABLE
15 CONTACT WITH WATER LIBERATES EXTREMELY
FLAMMABLE GAS
IRON: N/A
COBALT: 42/43 MAY CAUSE SENSITIZATION BY INHALATION AND
SKIN CONTACT
53 MAY CAUSE LONG-TERM ADVERSE EFFECTS IN THE
AQUATIC ENVIRONMENT

HMIS RATINGS:
GADOLINIUM:
HEALTH: 1
FLAMMABILITY: 3
REACTIVITY: 1
IRON:
HEALTH: 0
FLAMMABILITY: 0
REACTIVITY: 0
COBALT:
HEALTH: 0
FLAMMABILITY: 0
REACTIVITY: 0

4. FIRE FIGHTING MEASURES

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| FLASH POINT: | N/A |
| AUTOIGNITION TEMPERATURE: | N/A |
| FLAMMABLE LIMITS: | |
| UPPER: | N/A |
| LOWER: | N/A |
| EXTINGUISHING MEDIA: | IN CASE OF FIRE USE SAND, CARBON DIOXIDE, OR POWDERED EXTINGUISHING AGENT. NEVER USE WATER. |
| SPECIAL HAZARDS: | IN CASE OF FIRE METAL OXIDE FUMES MAY BE RELEASED |

5. HEALTH HAZARD INFORMATION

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| ACUTE EFFECTS: | |
| SKIN: | IRRITANT TO SKIN AND MUCOUS MEMBRANES |
| EYE: | IRRITATING EFFECT |
| SENSITIZATION: | POSSIBLE THROUGH INHALATION AND SKIN CONTACT |
| CHRONIC EFFECTS: | |
| GADOLINIUM: | LANTHANONS CAN CAUSE DELAYED BLOOD CLOTTING LEADING TO HEMORRHAGES. EXPOSURE MAY ALSO LEAD TO SENSITIVITY TO HEAT, ITCHING, INCREASED AWARENESS OF ODOR AND TASTE, AND LIVER DAMAGE. |
| IRON: | IRON COMPOUNDS CAN CAUSE VOMITING, DIARRHEA, PINK URINE, BLACK STOOL, AND LIVER DAMAGE. MAY CAUSE DAMAGE TO THE KIDNEYS. IRRITATING TO THE RESPIRATORY TRACT, THEY MAY CAUSE PULMONARY FIBROSIS IF DUSTS ARE INHALED. |
| COBALT: | COBALT IS AN EXPERIMENTAL NEOPLASTIGEN AND TUMORIGEN. IT IS AN EXPERIMENTAL CARCINOGEN OF THE CONNECTIVE TISSUE AND LUNGS. COBALT METAL AND INORGANIC COMPOUNDS ARE CLASSIFIED AS AN ANIMAL CARCINOGEN BY THE ACGIH. INGESTION MAY CAUSE BURNING IN THE MOUTH, ESOPHAGUS, AND STOMACH. INHALATION OF DUSTS AND FUMES MAY CAUSE IRRITATION OF THE RESPIRATORY TRACT AND LABORED BREATHING AND COUGHING. SENSITIZATION, NAUSEA, FLUSHING OF THE FACE AND RINGING IN THE EARS IS ALSO POSSIBLE. CHRONIC INGESTION MAY RESULT IN PERICARDIAL EFFUSION, POLYCARDIAL EFFUSION, POLYCYTHEMIA, CARDIAC FAILURE, VOMITING, CONVULSION AND THYROID ENLARGEMENT. |

6. STABILITY

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| STABILITY: | STABLE |
| CONDITIONS TO AVOID: | NONE |
| MATERIAL TO AVOID: | AIR, WATER/MOISTURE, OXIDIZING AGENTS, ACIDS, INTERHALOGENS |
| DANGEROUS REACTIONS: | POWDER MAY CAUSE FIRE, CONTACT WITH WATER RELEASES FLAMMABLE GASES. |
| HAZARDOUS DECOMPOSITION PRODUCTS: | METAL OXIDE FUMES |

7. EMERGENCY AND FIRST AID PROCEDURES:

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| INHALATION: | REMOVE TO FRESH AIR AND PROVIDE ARTIFICIAL RESPIRATION IF NECESSARY. SEEK IMMEDIATE MEDICAL ADVICE. |
| INGESTION: | SEEK IMMEDIATE MEDICAL ATTENTION. |

SKIN: WASH SKIN THOROUGHLY WITH MILD SOAP AND WATER. RINSE THOROUGHLY. SEEK IMMEDIATE MEDICAL ADVICE.

EYE: FLUSH EYES WITH PLENTY OF WATER. SEEK IMMEDIATE MEDICAL ADVICE.

8. HANDLING AND STORAGE

HANDLING & STORAGE: STORE IN A COOL, DRY PLACE IN TIGHTLY SEALED CONTAINERS. ENSURE GOOD VENTILATION. PREVENT FORMATION OF DUST. PROTECT FROM HUMIDITY AND WATER. NO SPECIAL REQUIREMENTS ARE NECESSARY IF USED CORRECTLY.

9. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

RESPIRATION: WEAR NIOSH APPROVED DUST-MIST VAPOR RESPIRATOR.
VENTILATION: LOCAL EXHAUST TO MAINTAIN CONCENTRATION AT OR BELOW THE PEL, TLV.

PROTECTIVE GLOVES: RUBBER GLOVES.
EYE PROTECTION: SAFETY GLASSES
PROTECTIVE CLOTHING: PROTECTIVE GEAR SUITABLE TO PREVENT CONTAMINATION.

WASTE DISPOSAL METHOD: DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

10. TOXICITY DATA

LD/LC50 VALUES:

GADOLINIUM: N/A
IRON: ORAL: LD50 20000 mg/kg (GUINEA PIG)
ORAL: LD50 30000 mg/kg (RAT)
COBALT: ORAL: LD50 6170 mg/kg (RAT)
INHALATIVE: LC50/30M 100 mg/m³ (RABBIT)

THE REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES REPORTS THE FOLLOWING EFFECTS IN LABORATORY ANIMALS:

GADOLINIUM: TUMORIGENIC – EQUIVOCAL TUMORIGENIC AGENT BY RTECS CRITERIA
TUMORIGENIC – TUMORS AT SITE OF APPLICATION

IRON: BEHAVIORAL – IRRITABILITY
GASTROINTESTINAL – NEASEA OR VOMITING
BLOOD – NORMOCYTIC ANEMIA
BLOOD – OTHER CHANGES
BIOCHEMICAL – ENZYME INHIBITION, INDUCTION, OR CHANGE IN BLOOD OR TISSUE LEVELS – CATALESES
NUTRITIONAL AND GROSS METABOLIC – WEIGHT LOSS OR DECREASED WEIGHT GAIN
LIVER- OTHER CHANGES
LIVER – TUMORS
LUNGS, THORAX, OR RESPIRATION – CHRONIC PULMONARY EDEMA
LUNGS, THORAX, OR RESPIRATION – TUMORS
LUNGS, THORAX, OR RESPIRATION – OTHER CHANGES
TUMORIGENIC – ACTIVE AS ANTI-CANCER AGENT
TUMORIGENIC – PROTECTS AGAINST INDUCTION OR EXPERIMENTAL TUMORS
TUMORIGENIC – EQUIVOCAL TUMORIGENIC AGENT BY RTECS CRITERIA

COBALT: N/A

CARCINOGENICITY:
GADOLINIUM: NO CLASSIFICATION DATA ON CARCINOGENIC PROPERTIES OF THIS MATERIAL IS AVAILABLE FROM THE EPA, IARC, NTP, OSHA, OR ACGIH.

IRON: NO CLASSIFICATION DATA ON CARCINOGENIC PROPERTIES OF THIS MATERIAL IS AVAILABLE FROM THE EPA, IARC, NTP, OSHA, OR ACGIH.

COBALT: AIRC-2B: POSSIBLY CARCINOGENIC TO HUMANS – LIMITED EVIDENCE IN HUMANS IN THE ABSENCE OF SUFFICIENT EVIDENCE IN EXPERIMENTAL ANIMALS
ACGIH A3: ANIMAL CARCINOGEN – AGENT IS CARCINOGENIC IN EXPERIMENTAL ANIMALS AT A RELATIVELY HIGH DOSE, NY OUTES OF ADMINISTRATION, AT SITES, OF HISTOLOGICAL TYPES, OR BY MECHANISMS NOT CONSIDERED RELEVANT TO WORKER EXPOSURE. AVAILABLE EPIDEMIOLOGIC STUDIES DO NOT CONFIRM AN INCREASED RISK OF CANCER IN EXPOSED HUMANS. AVAILABLE EVIDENCE SUGGESTS THAT THE AGENT IS NOT LIKELY TO CAUSE CANCER IN HUMANS EXCEPT UNDER UNCOMMON OR UNLIKELY ROUTES OR LEVELS OF EXPOSURE.

ADDITIONAL INFORMATION: TO THE BEST OF OUR KNOWLEDGE THE ACUTE AND CHRONIC TOXICITY OF THIS SUBSTANCE IS NOT FULLY KNOWN.

11. TRANSPORTATION DATA

UN NUMBER: NONE
HAZARD CLASS: NONE
ADR/RID CLASS: NONE
IMDG CLASS: NONE
ICAO/IATA CLASS: NONE

12. OTHER INFORMATION

THIS SAFETY DATA SHEET SHOULD BE USED IN CONJUNCTION WITH TECHNICAL SHEETS. IT DOES NOT REPLACE THEM. THE INFORMATION GIVEN IS BASED ON OUR KNOWLEDGE OF THIS PRODUCT, AT THE TIME OF PUBLICATION. IT IS GIVEN IN GOOD FAITH. THE ATTENTION OF THE USER IS DRAWN TO THE POSSIBLE RISKS INCURRED BY USING THE PRODUCT FOR ANY OTHER PURPOSE OTHER THAN THAT FOR WHICH IT WAS INTENDED. THIS DOES NOT IN ANY WAY EXCUSE THE USER FROM KNOWING AND APPLYING ALL THE REGULATIONS GOVERNING HIS ACTIVITY. IT IS THE SOLE RESPONSIBILITY OF THE USER TO TAKE ALL PRECAUTIONS REQUIRED IN HANDLING THE PRODUCT. THE AIM OF THE MANDATORY REGULATIONS MENTIONED IS TO HELP THE USER TO FULFILL HIS OBLIGATIONS REGARDING THE USE OF HAZARDOUS PRODUCTS.