SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION

PRODUCT NAME: INDIUM (METAL RODS OR INGOTS)
US D.O.T. / UN NAME: NOT REGULATED FOR TRANSPORT IN FORM SUPPLIED
RECOMMENDED USES: ULTRA HIGH PURITY METAL FOR USE IN MOLECULAR BEAM EPITAXY (MBE) BULK CRYSTAL GROWTH, SEMICONDUCTOR INDUSTRY

COMPANY:
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SECTION 2 - HAZARD IDENTIFICATION

GHS HAZARD CLASSIFICATION:
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE), CATEGORY 1

GHS LABEL ELEMENTS:
SIGNAL WORD: DANGER
LABEL CODES / PICTOGRAMS: GHS08
HAZARD STATEMENTS: H372 CAUSES DAMAGE TO ORGANS - LUNGS, SKELETAL SYSTEM, DIGESTIVE TRACT, + OTHERS (SEE SECTION 11) – THROUGH PROLONGED OR REPEATED EXPOSURE

PRECAUTIONARY STATEMENTS
PREVENTION: P260 DO NOT BREATHE DUST/FUME/GAS/MISTS/VAPORS/SPRAY
P264 WASH THOROUGHLY AFTER HANDLING
P270 DO NOT EAT, DRINK OR SMOKE WHEN USING THIS PRODUCT
RESPONSE: P314 GET MEDICAL ADVICE/ATTENTION IF YOU FEEL UNWELL
STORAGE: NO GHS PRECAUTIONARY STATEMENT FOR STORAGE
DISPOSAL: P501 DISPOSE OF CONTENTS/CONTAINER IN ACCORDANCE WITH ALL LOCAL/ REGIONAL/ NATIONAL/ INTERNATIONAL REGULATIONS.

OTHER HAZARDS / U.S. - HAZARDS NOT OTHERWISE CLASSIFIED / UN GHS - OTHER HAZARDS WHICH DO NOT RESULT IN CLASSIFICATION:
IF PROCESSING TO DUST / POWDER – MAY FORM COMBUSTIBLE DUST CONCENTRATIONS IN AIR. NO COMBUSTIBLE DUST TESTING AVAILABLE AS MATERIAL IS ONLY SUPPLIED IN INGOT OR ROD FORMS.

SECTION 3 – COMPOSITION / INFORMATION ON INGREDIENTS

CHEMICAL COMPOSITION:
COMPONENTS: INDIUM
7440-74-6
=100
SYNONYMS: INDIUM, HIGH PURITY;
CHEMICAL FAMILY: METALLIC ELEMENTS - In

SECTION 4 – FIRST AID MEASURES

FIRST AID:
SKIN: IF ON SKIN: WASH WITH PLENTY OF SOAP AND WATER. IF IRRITATION OR MOLTEN BURNS SHOULD OCCUR AS A RESULT OF PROCESSING OPERATIONS: GET IMMEDIATE MEDICAL ADVICE/ATTENTION.
EYES: DO NOT RUB EYES. IF PROCESSING DUST/PARTICULATES GET IN EYES: RINSE CAUTIOUSLY WITH WATER FOR SEVERAL MINUTES. REMOVE CONTACT LENSES, IF PRESENT AND EASY TO DO SO. CONTINUE RINSEING. IF EYE IRRITATION PERSISTS OR A METAL PARTICLE IS LODGED IN THE EYE: GET IMMEDIATE MEDICAL ADVICE/ATTENTION.
INHALATION: IF PROCESSING PRODUCES POWDER OR METAL FUME THAT IS INHALED: REMOVE VICTIM TO FRESH AIR AND KEEP AT REST IN A POSITION COMFORTABLE FOR BREATHING. CALL A POISON CENTER OR DOCTOR/PHYSICIAN IF YOU FEEL UNWELL.
INGESTION: IN THE EVENT THE FORMED PIECES ARE SWALLOWED, CONTACT A PHYSICIAN IMMEDIATELY. IF CONSCIOUS, DRINK PLENTY OF WATER, INDUCE VOMITING ONLY UNDER THE DIRECTION OF MEDICAL PERSONNEL.

MOST IMPORTANT SYMPTOMS/EFFECTS, ACUTE AND DELAYED
ACUTE: NO EFFECTS EXPECTED WHEN USED IN FORM SUPPLIED. IF DUSTS ARE GENERATED IN PROCESSING, THEN INHALATION OF POWDER/PARTICULATE OR FUMES MAY CAUSE RESPIRATORY IRRITATION POSSIBLY CAUSING COUGH, SHORTNESS OF BREATH, SORE THROAT, CONTACT WITH DUSTS/METAL POWDER OR SHARP PIECES MAY CAUSE MECHANICAL SKIN AND EYE IRRITATION, AND POSSIBLE EYE ABRASIONS. CONTACT WITH HOT OR MOLTEN METAL FORMS CAN CAUSE THERMAL BURNS. (SEE SECTION 11 FOR MORE INFORMATION). INGESTION MAY CAUSE NAUSEA AND VOMITING CHRONIC: NONE EXPECTED IN FORM SUPPLIED. IF PROCESSED TO AN INHALABLE FORM (DUST/FUME), CHRONIC, REPEATED OVEREXPOSURE CAN CAUSE DAMAGE TO LUNGS, SKELETAL SYSTEM, AND DIGESTIVE TRACT.

INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT IF NECESSARY:
CALL A POISON CENTER OR DOCTOR/PHYSICIAN IF YOU FEEL UNWELL.
N/A = NOT APPLICABLE
LOC
SECTION 5 – FIRE FIGHTING MEASURES

SUITABLE EXTINGUISHING MEDIA: WATER: (X-AS FINE MIST*) FOAM: () CO2: () DRY CHEMICAL: (X)
USE SPECIAL CLASS D CHEMICAL POWDER EXTINGUISHING MEDIA SUITABLE FOR METAL DUST/FINES/POWDER FIRES. *DO NOT USE DIRECT WATER STREAMS ON MOLTEN METAL FIRES (SEE BELOW). BLANKET EDGE AND TOP OF MOLTEN POOL WITH A FINE MIST OF WATER TO COOL AND HARDEN MATERIAL.

SPECIFIC HAZARDS IN CASE OF FIRE: WILL EMIT IRRITATING, CORROSIVE OR TOXIC GASES IN A FIRE. METAL POWDER/DUST FORM. IN HIGH CONCENTRATIONS IN AIR, MAY BE FLAMMABLE/EXPLOSIVE. INDUM HAS A LOW MELTING POINT. MOLTEN METAL MAY EXPLODE/FLASH UP UPON CONTACT WITH WATER JET STREAM. MATERIAL MAY IGNITE AGAIN EVEN AFTER IT HAS BEEN EXTINGUISHED. MATERIAL WILL EMIT IRRITATING/CORROSIVE AND/OR TOXIC GASES IN A FIRE. IF IT CAN BE DONE SO WITHOUT RISK, MOVE EXPOSED CONTAINERS FROM FIRE AREA AND COOL CONTAINER USING LARGE AMOUNTS OF WATER.

SPECIAL PROTECTIVE EQUIPMENT & PRECAUTION FOR FIRE FIGHTERS: SELF-CONTAINED BREATHING APPARATUS OPERATED IN THE PRESSURE DEMAND MODE AND FULL CHEMICAL RESISTANT PROTECTIVE GEAR MUST BE WORN.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: WEAR FULL PROTECTIVE EQUIPMENT (SEE SECTION 8). ELIMINATE ALL SOURCES OF HEAT & ILLUMINATION. AVOID THE GENERATION OF DUST. DO NOT EAT, DRINK OR SMOKE WHEN USING THIS PRODUCT.

ENVIRONMENTAL PRECAUTIONS: DO NOT RELEASE TO DRAINS, SEWERS AND OTHER BODIES OF WATER.

METHODS AND MATERIAL FOR CONTAINMENT AND CLEAN UP: SOLID METAL PIECES MAY BE PICKED UP WITH ORDINARY HOUSEKEEPING UTENSILS. PLACE SOLIDS IN LABELED CONTAINER FOR PROPER DISPOSAL. AVOID GENERATING DUST. MOLTEN MATERIAL SHOULD BE ALLOWED TO COOL/HARDEN BEFORE CLEANING UP.

SECTION 7 – HANDLING & STORAGE

FOR INDUSTRIAL USE ONLY

PRECAUTIONS FOR SAFE HANDLING: WEAR PROTECTIVE GLOVES AND GEAR SUITABLE FOR YOUR PROCESSING OPERATION. WASH THOROUGHLY AFTER HANDLING. DO NOT EAT, DRINK OR SMOKE WHEN USING/HANDLING THE MATERIAL.

CONDITIONS FOR SAFE STORAGE, INCLUDING INCOMPATIBILITIES: KEEP IN TIGHTLY CLOSED CONTAINER. STORE IN A COOL, DRY AREA. PROTECT AGAINST PHYSICAL DAMAGE AND AVOID CONTACT WITH INCOMPATIBLES. CONTAINERS OF THE MATERIAL MAY CONTAIN RESIDUAL DUST OR SOLIDS. FINE POWDER AND DUSTS MAY BE FLAMMABLE - AVOID SPARKS, HEAT, SOURCES OF ILLUMINATION.

SECTION 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

CONTROL PARAMETERS:
EXPOSURE LIMITS: U.S. OSHA PEL:
U.S. ACGIH TLV:
APPROPRIATE ENGINEERING CONTROLS:
USE LOCAL/MECHANICAL EXHAUST TO MEET PERMISSIBLE EXPOSURE LIMITS / TLV FOR FORM SUPPLIED; FOR PROCESSING TO POWDER/PARTICULATE – USE EXPLOSION-PROOF VENTILATION.

PERSONAL PROTECTIVE EQUIPMENT:
RESPIRATORY PROTECTION:

HAND PROTECTION:
USE GLOVES SUITABLE TO OPERATIONS (SUCH AS THERMAL PROOF IF HEATING, ETC.)

EYE PROTECTION:
SAFETY GOGGLES OR GLASSES SUITABLE TO OPERATIONS; FACE SHIELD FOR MOLTEN MATERIAL OPERATIONS.

OTHER PROTECTIVE EQUIPMENT:
LABCOAT; COVERALLS TO PROTECT SKIN (FLAME RETARDANT CLOTHING IF MATERIAL IS HEATED); ACCESS TO AN EYEWASH FOUNTAIN AND SAFETY DRENCH SHOWER IF OPERATIONS WARRANT IT.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:
SOFT DUCTILE SILVER-WHITE METAL PIECES

ODOR:
NO ODOR

ODOR THRESHOLD:
NOT FOUND

pH (% IN WATER):
NOT KNOWN

MELTING POINT / FREEZING POINT (°C):
>151.61 (313.9°F)

BOILING POINT (°C):
2070-2080 (>3758°F)

FLASH POINT (°F):
NOT KNOWN

EVAPORATION RATE:
NOT KNOWN

FLAMMABILITY:
N/A IN FORM SUPPLIED

FLAMMABLE LIMITS:
LEL: (N/A) UEL: (N/A)

VAPOR PRESSURE (mm Hg):
<10⁻⁴

VAPOR DENSITY (AIR=1):
N/A

SPECIFIC GRAVITY/DENSITY (g/cm³):
7.31

SOLUBILITY IN WATER (PH=7):
INSOLUBLE

PARTITION COEFFICIENT (octanol/water):
Log Pow=2.98 (estimated)

AUTO IGNITION TEMPERATURE (°F):
NOT KNOWN

DECOMPOSITION TEMPERATURE:
NOT KNOWN

VISCOSITY:
N/A - SOLID

N/A = NOT APPLICABLE
SECTION 10 – STABILITY AND REACTIVITY

REACTIVITY: SEE HAZARDOUS REACTIONS BELOW
CHEMICAL STABILITY: STABLE IN SOLID FORM SUPPLIED AT AMBIENT TEMPERATURES
POSSIBILITY OF HAZARDOUS REACTIONS: SOLUBLE IN MOST ACIDS; REACTS WITH STRONG OXIDIZING AGENTS; EXPLOSIVE REACTION WITH ACETONITRILE+DI-NITROGEN TETRAOXIDE; VIOLENT REACTION WITH MERCURY (II) BROMIDE AT 350ºC (662ºF); MIXTURES WITH SULFUR IGNITE WHEN HEATED; REACTS WITH HALOGENS, S, Sb, Te, As, P ON HEATING.
CONDITIONS TO AVOID: CONTACT WITH INCOMPATIBLES; AVOID HUMIDITY, WATER. (HYDRATED INDIUM OXIDE IS A POISON BY INTRAVENOUS ROUTE); GENERATING DUST INCOMPATIBLE MATERIALS: ACIDS, OXIDIZING AGENTS, SULFUR
HAZARDOUS DECOMPOSITION PRODUCTS: METAL OXIDE FUME CAN BE GENERATED AT TEMPERATURE ABOVE THE MELTING POINT

SECTION 11 – TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS:

ROUTES OF EXPOSURE: SKIN, EYES, INHALATION (IF PROCESSED TO DUST / POWDER), INGESTION

SKIN: NO EFFECTS ARE EXPECTED IN FORMS SUPPLIED. IF PROCESSING TO DUST/PowDER, MAY CAUSE MECHANICAL IRRITATION TO SKIN AS A METAL POWDER. IF PROCESSING TO MOLTEN METAL FORM. THERMAL BURN MAY OCCUR ON CONTACT WITH HOT METAL. NOTE: MOLTEN/HOT METAL MAY NOT GLOW RED WHEN HEATED – USE CAUTION.

EYES: NO EFFECTS ARE EXPECTED IN FORMS SUPPLIED. IF PROCESSING TO DUST/PowDER, MAY CAUSE MECHANICAL IRRITATION TO EYES AS A METAL POWDER.

INHALATION: INHALATION IS NOT LIKELY IN THE SOLID METAL FORMS SUPPLIED. IF DUSTS / POWDER / FUMES ARE GENERATED IN PROCESSING. THEN INHALATION MAY CAUSE RESPIRATORY TRACT IRRITATION.

INGESTION: INGESTION IS NOT LIKELY IN THE SOLID FORMS SUPPLIED, HOWEVER, IF SWALLOWED, MAY CAUSE IRRITATION TO THE GASTROINTESTINAL TRACT. INDUIM IS POORLY ABSORBED FROM THE GI TRACT.

CHRONIC: RTECS # BD0330000 REFERENCE POSSIBLE COUGH AND DYSPNEA EFFECTS FOR HUMAN INHALATION OF DUSTS/POWER/FUMES: POSSIBLE FIBROSIS, HYPOGLYCEMIA, AND CHANGES IN BLOOD SERUM COMPOSITION FOR RAT INHALATION; REPRODUCTIVE EFFECTS ARE CITED. INDUIM INDUIM COMPOUNDS (ESPECIALLY SOLUBLE SALTS) HAVE BEEN CITED FOR POSSIBLE LONG TERM DAMAGE/EFFECTS TO THE LUNGS, KIDNEYS, LIVER, SPLEEN, TEETH (DECAy), GUMS, BONE/JOINT PAIN, CIRCULATORY, NERVOUS & GASTROINTESTINAL SYSTEMS.

NOTE - THE FORM SUPPLIED IS NOT TYPICAL OF AN INHALABLE OR INGESTIBLE FORM (INGOTS/RODS).

ACUTE TOXICITY: ORAL(RAT) LD50=420mg/kg BASED ON LITERATURE REFERENCE FOR INDIUM METAL
SKIN CORROSION / IRRITATION: TEST DATA IS NOT AVAILABLE BUT EXPECTED TO BE NON-IRRITATING IN FORM SUPPLIED
SERIOUS EYE DAMAGE / IRRITATION: TEST DATA IS NOT AVAILABLE; PARTICULATE MAY CAUSE MECHANICAL IRRITATION
RESPIRATORY OR SKIN SENSITIZATION: DATA IS NOT AVAILABLE; NOT EXPECTED TO BE A SENSITIZER
GERM CELL MUTAGENICITY: TEST DATA IS NOT AVAILABLE
CARCINOGENICITY: U.S. LISTED CARCINOGEN: NONE (X) OSHA () NTP () IARC () OTHER ()
REPRODUCTIVE TOXICITY: NO TEST DATA AVAILABLE
SPECIFIC TARGET ORGAN TOXICITY: NO DATA AVAILABLE
ASPIRATION HAZARD: DATA IS NOT AVAILABLE; NOT EXPECTED TO BE AN ASPIRATION HAZARD IN FORMS SUPPLIED

SECTION 12 – ECOLOGICAL INFORMATION

ECOTOXICITY: DO NOT RELEASE TO THE ENVIRONMENT OR WATERWAYS. TEST DATA IS NOT AVAILABLE TO DETERMINE THE FULL TOXICITY EFFECTS OF INDIUM ON THE ENVIRONMENT.

TOXICITY - AQUATIC: NO TEST DATA AVAILABLE BUT NOT EXPECTED TO BE HARMFUL TO AQUATIC LIFE
TOXICITY - TERRESTRIAL: NO DATA AVAILABLE
PERSISTANCE & DEGRADABILITY: NO TEST DATA AVAILABLE BUT NOT EXPECTED TO BE BIODEGRADABLE
BIOACCUMULATIVE POTENTIAL: NO TEST DATA AVAILABLE BUT NOT EXPECTED TO BIOACCUmulate
MOBILITY IN SOIL: NO TEST DATA AVAILABLE BUT NOT EXPECTED TO BE MOBILE
OTHER ADVERSE EFFECTS: NO DATA AVAILABLE

SECTION 13 – DISPOSAL CONSIDERATIONS

DISPOSAL METHODS: DO NOT RELEASE TO THE ENVIRONMENT. DISPOSE OF IN SEALED CONTAINERS, USING A LICENSED CHEMICAL WASTE HAULER IN ACCORDANCE WITH ALL LOCAL, STATE, FEDERAL / NATIONAL LAWS. NOTE SOLIDS CAN BE DISPOSED OF AS NON-HAZARDOUS MATERIAL. FINE POWDER OR SHAVINGS MAY NEED TO BE DISPOSED OF AS RCRA HAZARDOUS WASTE - CHARACTERISTIC OF IGNITABILITY, D001. PROCESSING TO OTHER FORMS/ COMPOUNDS WILL NEED TO BE EVALUATED BASED ON END PRODUCT WASTE.

N/A = NOT APPLICABLE
SECTION 14 – TRANSPORT INFORMATION

BY ROAD OR RAIL - U.S. D.O.T. REGULATED: YES (I) NO (X) RQ: (N/A)
   IF REGULATED, UN PROPER SHIPPING NAME: (X)
   UN IDENTIFICATION NO.: (X)
   PACKING GROUP: ( ) LABEL REQUIRED: ( )
   U.S. MARINE POLLUTANT: YES (I) NO (X)
   SEVERE U.S. MARINE POLLUTANT: YES (I) NO (X)
   U.S. ENVIRONMENTALLY HAZARDOUS SUBSTANCE: YES (I) NO (X)
   INLAND BL/:
   EMERGENCY RESPONSE GUIDE NO.: (172)

BY SEA - IMDG REGULATED: YES (I) NO (X)
BY AIR - IATA REGULATED: YES (I) NO (X)

STOWAGE CATEGORY: NOT APPLICABLE
PKG INSTRUCTIONS NO.: NOT APPLICABLE

SPECIAL PRECAUTIONS: READ SAFETY DATA SHEET BEFORE HANDLING

SECTION 16 – REGULATORY INFORMATION

U.S. TSCA: WE CERTIFY THAT ALL COMPONENTS OF THIS PRODUCT ARE REGISTERED UNDER THE REGULATIONS OF THE TOXIC SUBSTANCES CONTROL ACT.

U.S. SARA TITLE III, SECT. 313: LISTED (I) NOT LISTED (X)

U.S. RCRA HAZARDOUS WASTE: NO (X-IN FORMS SUPPLIED) YES (I) RCRA #: (N/A-IN FORM SUPPLIED)
   *FIRE POWER OR SHAVINGS MAY REQUIRE DISPOSAL AS RCRA HAZARDOUS WASTE, CHARACTERISTIC OF IGNITABILITY, D001

U.S. CERCLA: NO (X) YES (I) RQ (N/A)

CALIFORNIA PROPOSITION 65: LISTED (I) NOT LISTED (X)

SECTION 16 – OTHER INFORMATION

REVISION DATE: MAY 26, 2015 PREPARED BY: EHSA COORDINATOR / UNITED MINERAL & CHEMICAL CORP.

ABBREVIATIONS / ACRONYMS:
   N/A=NOT APPLICABLE; LEL=LOWER EXPLOSION LIMIT; UEL=UPPER EXPLOSION LIMIT;
   PEL=PERMISSIBLE EXPOSURE LIMIT; TLV=THRESHOLD LIMIT VALUE; TWA=TIME WEIGHTED
   AVERAGE OVER 8 HOUR WORKDAY; LD50 OR LC50=LETHAL DOSE OR LETHAL CONCENTRATION
   THAT KILLS 50% OF DOSED GROUP; g=GRAM; kg=KILOGRAM

IN ACCORDANCE WITH GOOD PRACTICES OF PERSONAL HYGIENE, HANDLE WITH DUE CARE AND AVOID ANY UNNECESSARY CONTACT WITH THIS PRODUCT. USE RECOMMENDED PERSONAL PROTECTION WHEN HANDLING (SEE SECTION 8).

THIS INFORMATION IS BEING SUPPLIED TO YOU UNDER OSHA "RIGHT TO KNOW" REGULATION 29 CFR 1910.1200 AND IS OFFERED IN GOOD FAITH AS TYPICAL VALUES AND NOT AS PRODUCT SPECIFICATION. THE INFORMATION IS BELIEVED TO BE TRUE AND ACCURATE. NO WARRANTY, EXPRESSED OR IMPLIED, REGARDING THE ACCURACY OF THIS DATA, THE HAZARD CONNECTED WITH USE OF THE MATERIAL, OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF, IS MADE. UNITED MINERAL & CHEMICAL CORPORATION AND ITS SUPPLIERS ASSUME NO RESPONSIBILITY FOR DAMAGE OR INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN.

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N/A = NOT APPLICABLE