

***IRON**

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MATERIAL SAFETY DATA SHEET

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 7439-89-6

SUBSTANCE: ***IRON**

TRADE NAMES/SYNONYMS:
FERRIUM; IRON DUST; ARMCO IRON; REMKO; FERROVAC E; I-60; I-61; I-62; I-185; I-57;

CHEMICAL FAMILY:
METAL

MOLECULAR FORMULA: FE

MOLECULAR WEIGHT: 55.85

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

COMPONENTS AND CONTAMINANTS

COMPONENT: IRON

PERCENT: 100

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
IRON OXIDE (FUME):
10 MG/M3 OSHA TWA
5 MG/M3 ACGIH TWA

NUISANCE PARTICULATES (NUISANCE DUST):
5 MG/M3 OSHA TWA (RESPIRABLE DUST); 15 MG/M3 OSHA TWA (TOTAL DUST)
10 MG/M3 ACGIH TWA (TOTAL DUST) (NO ASBESTOS AND < 1% CRYSTALLINE SILICA)

PHYSICAL DATA

DESCRIPTION: SILVER-WHITE METAL, SOFT, MALLEABLE.

BOILING POINT: 4982 F (2750 C) MELTING POINT: 2795 F (1535 C)

SPECIFIC GRAVITY: 8.0 VAPOR PRESSURE: 1 MMHG @ 1787 C

SOLUBILITY IN WATER: INSOLUBLE

SOLVENT SOLUBILITY: ACIDS

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLECTIBLE FIRE HAZARD IN METALLIC FORM; HOWEVER, DUST, POWDER, OR FUMES ARE FLAMMABLE OR EXPLOSIVE WHEN EXPOSED TO HEAT OR FLAMES.

FLASH POINT: FLAMMABLE (DUST)

FIREFIGHTING MEDIA:
USE DRY SAND, DOLOMITE, GRAPHITE, SODIUM CHLORIDE, SODA ASH, OR APPROPRIATE METAL-EXTINGUISHING POWDER. DO NOT APPLY WATER TO BURNING MATERIAL (NFPA FIRE PROTECTION HANDBOOK, 16TH EDITION).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAME WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM STORAGE TANK ENDS. FOR MASSIVE FIRE IN CARGO AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; ELSE WITHDRAW AND LET FIRE BURN (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4, GUIDE PAGE 32).

EXTINGUISH USING AGENT FOR TYPE OF FIRE. AVOID BREATHING FUMES FROM BURNING MATERIAL.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49CFR172.101:
*FLAMMABLE SOLID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49CFR172.101 AND 172.102:
 *FLAMMABLE SOLID

*HAZARD CLASSIFICATION AND LABEL APPLY TO DUST AND POWDER FORM ONLY.

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49CFR173.154
 EXCEPTIONS: 49CFR173.153

 TOXICITY

IRON:
 20 MG/KG INTRAPERITONEAL-RABBIT LDLO; TUMORIGENIC DATA (RTECS).
 CARCINOGEN STATUS: NONE. IRON AND STEEL FOUNDRY: HUMAN LIMITED EVIDENCE
 (IARC). THE AVAILABLE EPIDEMIOLOGICAL STUDIES PROVIDE LIMITED EVIDENCE THAT
 CERTAIN EXPOSURES IN IRON AND STEEL FOUNDRIES ARE CARCINOGENIC TO HUMANS,
 GIVING RISE TO LUNG CANCER. THERE IS INADEQUATE EVIDENCE THAT SUCH EXPOSURES
 RESULT IN CANCERS OF THE DIGESTIVE SYSTEM AND GENITO-URINARY SYSTEM.
 IRON MAY BE IRRITATING TO EYES AND MUCOUS MEMBRANES. POISONING MAY AFFECT
 THE GASTROINTESTINAL, RESPIRATORY, NERVOUS AND HEMATOPOIETIC SYSTEMS AND THE
 LIVER.

 HEALTH EFFECTS AND FIRST AID

INHALATION:

IRON:
 ACUTE EXPOSURE- DUST MAY CAUSE MUCOUS MEMBRANE AND RESPIRATORY IRRITATION
 DUE TO MECHANICAL ACTION. METAL FUME FEVER, AN INFLUENZA-LIKE ILLNESS,
 MAY OCCUR DUE TO THE INHALATION OF FRESHLY FORMED IRON 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.
 CHRONIC EXPOSURE- PROLONGED OR REPEATED EXPOSURE MAY CAUSE A MOTTLING OF
 THE LUNGS, A CONDITION CALLED SIDEROSIS WHICH IS CONSIDERED TO BE A
 BENIGN PNEUMOCONIOSIS THAT DOES NOT CAUSE SIGNIFICANT PHYSIOLOGIC
 IMPAIRMENT. SYMPTOMS MAY INCLUDE CHRONIC BRONCHITIS, EMPHYSEMA, AND
 DYSPNEA ON EXERTION.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING
 HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST.
 TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

IRON:
 ACUTE EXPOSURE- DUST MAY CAUSE IRRITATION. PENETRATION OF IRON PARTICLES IN
 THE SKIN MAY CAUSE AN EXOGENOUS SIDEROSIS WHICH MAY BE CHARACTERIZED BY
 A RED-BROWN PIGMENTATION OF THE AFFECTED AREA.
 CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED
 AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO
 EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL
 ATTENTION IMMEDIATELY.

EYE CONTACT:

IRON:
 ACUTE EXPOSURE- MAY CAUSE IRRITATION DUE TO MECHANICAL ACTION. IRON
 PARTICLES IMBEDDED IN THE EYE MAY CAUSE OCULAR SIDEROSIS. EFFECTS MAY
 INCLUDE DISCOLORATION OF THE CORNEA AND IRIS, AND PUPILLARY EFFECTS
 INCLUDING POOR REACTION TO LIGHT, ACCOMODATION, AND ATROPINE. IF A
 PARTICLE ENTERS THE LENS THERE MAY BE CATARACT FORMATION. GLAUCOMA
 OCCURS RARELY IN SOME CASES OF OCULAR SIDEROSIS.
 CHRONIC EXPOSURE- REPEATED AND PROLONGED CONTACT MAY CAUSE CONJUNCTIVITIS.

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 (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

IRON:
 ACUTE EXPOSURE- THERE ARE NO REPORTS AVAILABLE ON POISONING FROM METALLIC
 IRON. THE PRINCIPAL MANIFESTATIONS OF POISONING WITH IRON COMPOUNDS ARE
 VOMITING, DIARRHEA, AND CIRCULATORY COLLAPSE.
 CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE HEMOSIDEROSIS,
 OR HEMOCHROMATOSIS.

FIRST AID- TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION
 IMMEDIATELY. IF VOMITING OCCURS, KEEP HEAD LOWER THAN HIPS TO PREVENT
 ASPIRATION.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

 REACTIVITY

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IRON:

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OXIDIZES READILY IN MOIST AIR FORMING RUST. MAY REACT WITH STEAM WHEN HOT TO YIELD HYDROGEN AND IRON OXIDES.

INCOMPATIBILITIES:

IRON:

ACETALDEHYDE: POLYMERIZES READILY.
AMMONIUM NITRATE: VIOLENT OR EXPLOSIVE REACTION.
AMMONIUM PEROXODISULFATE: VIOLENT REACTION.
BROMINE PENTAFLUORIDE: VIOLENT REACTION AND POSSIBLE IGNITION.
CHLORIC ACID: FORMS EXPLOSIVE COMPOUND.
CHLORINE (GAS): IGNITES.
CHLORINE TRIFLUORIDE: VIOLENT REACTION AND POSSIBLE IGNITION.
CHLOROFORMAMIDINIUM NITRATE: EXPLOSIVE IGNITION.
DINITROGEN TETRAOXIDE: IGNITES.
FLUORINE: IGNITES.
HYDROGEN PEROXIDE: VIOLENT DECOMPOSITION.
NITROGEN DIOXIDE: INCANDESCENT REACTION.
NITRYL FLUORIDE: INCANDESCES WHEN HEATED.
PHOSPHORUS: INCANDESCES WHEN HEATED.
POLYSTYRENE BEADS: POSSIBLE STATIC IGNITION.
POTASSIUM DICHROMATE: IGNITES ON CONTACT.
POTASSIUM PERCHLORATE + MANGANESE DIOXIDE: IGNITES.
SODIUM ACETYLIDE: POSSIBLE VIOLENT REACTION.
SODIUM PEROXIDE: IGNITES UNDER FRICTION @ 240 C.
SULFURIC ACID: POSSIBLE EXPLOSION HAZARD.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF IRON AND IRON FUMES.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

CONDITIONS TO AVOID

AVOID DISPERSION OF DUST IN AIR. FINELY DIVIDED PARTICLES, DUST, OR FUMES MAY BE FLAMMABLE OR EXPLOSIVE. KEEP AWAY FROM SPARKS OR IGNITION SOURCES.

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
FOR LARGE SPILLS, SWEEP UP WITH A MINIMUM OF DUSTING AND PLACE INTO SUITABLE CLEAN, DRY CONTAINERS FOR RECLAMATION OR LATER DISPOSAL.

RESIDUE SHOULD BE CLEANED UP USING A HIGH-EFFICIENCY PARTICULATE FILTER VACUUM.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET THE PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON THE CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION.

THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON THE DATA FOUND IN THE PHYSICAL DATA, HEALTH EFFECTS AND TOXICITY SECTIONS. THEY ARE RANKED IN ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION:

DUST, MIST, AND FUME RESPIRATOR.

POWERED AIR-PURIFYING RESPIRATOR WITH A DUST, MIST, AND FUME FILTER.

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.

SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACE PIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN 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.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

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EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT
EYE CONTACT WITH THIS SUBSTANCE. CONTACT LENSES SHOULD NOT BE WORN.

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