

***ZINC POWDER OR DUST, NONPYROPHORIC**

PAGE 01 OF 04

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MATERIAL SAFETY DATA SHEET

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 7440-66-6

SUBSTANCE: ***ZINC POWDER OR DUST, NONPYROPHORIC**

TRADE NAMES/SYNONYMS:

ZINC DUST; ZINC POWDER; BLUE POWDER; GRANULAR ZINC; C.I. 77945;
C.I. PIGMENT BLACK 16; C.I. PIGMENT METAL 6; UN 1436; Z-2; Z-4; Z-5; Z-11;
Z-12; Z-15; Z-16; Z-46; Z-56;

CHEMICAL FAMILY:

METAL

MOLECULAR FORMULA: ZN

MOLECULAR WEIGHT: 65.38

CERCLA RATINGS (SCALE 0-3): HEALTH=U FIRE=3 REACTIVITY=3 PERSISTENCE=3
NFPA RATINGS (SCALE 0-4): HEALTH=0 FIRE=1 REACTIVITY=1

COMPONENTS AND CONTAMINANTS

COMPONENT: ZINC

PERCENT: 100

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:

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: BLUISH-GRAY POWDER BOILING POINT: 1664 F (907 C)

MELTING POINT: 787 F (420 C) SPECIFIC GRAVITY: 7.1

VAPOR PRESSURE: 1 MMHG @ 487 C SOLUBILITY IN WATER: REACTS

SOLVENT SOLUBILITY: SOLUBLE IN ACIDS, ALKALIS, ACETIC ACID

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:

DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME. DANGEROUS WHEN WET! MAY HEAT SPONTANEOUSLY AND IGNITE ON EXPOSURE TO AIR. DUST-AIR MIXTURES ARE EXPLOSIVE. EXPLOSION HAZARD WITH ACIDS, OXIDIZERS OR OTHER INCOMPATIBILITIES. EASILY IGNITED BY NAKED LIGHT, WITH POSSIBLE EXPLOSION.

FLASH POINT: FLAMMABLE SOLID UPPER EXPLOSIVE LIMIT: NOT AVAILABLE

LOWER EXPLOSIVE LIMIT: 500 GM/M3 AUTOIGNITION TEMP.: 860 F (460 C)

FIREFIGHTING MEDIA:

USE DRY CHEMICAL, SODA ASH, LIME OR SAND. DO NOT USE WATER OR FOAM.
(1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FIREFIGHTING:

DO NOT GET WATER INSIDE CONTAINER. MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. FOR MASSIVE FIRE IN STORAGE AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; ELSE WITHDRAW FROM AREA AND LET FIRE BURN (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4, GUIDE PAGE 76).

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 172.402:
FLAMMABLE SOLID AND DANGEROUS WHEN WET

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

TOXICITY

ZINC:
TOXICITY DATA: 300 UG/3 DAYS-INTERMITTENT SKIN-HUMAN MILD IRRITATION;
124 MG/M3/50 MINUTES INHALATION-HUMAN TCLO;
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: IRRITANT- MUCOUS MEMBRANES, SKIN.
ACUTE TOXICITY LEVEL: INSUFFICIENT DATA.
TARGET EFFECTS: POISONING MAY AFFECT THE BLOOD.
ADDITIONAL DATA: ZINC IS ESSENTIAL IN THE ACTIVITY OF NUMEROUS ENZYMES AND
METABOLIC PROCESSES. EXCESSIVE ZINC INTAKE HAS BEEN ASSOCIATED WITH A
COPPER-DEFICIENCY ANEMIA. APPARENTLY, ZINC INTERFERES WITH COPPER AND IRON
METABOLISM.

HEALTH EFFECTS AND FIRST AID

INHALATION:

ZINC:
ACUTE EXPOSURE- PURE ZINC POWDER OR DUST IS NOT EXPECTED TO BE IRRITATING ON
ACUTE EXPOSURE. HOWEVER, WHEN HEATED, IT EVOLVES A FUME OF ZINC OXIDE
WHICH WHEN INHALED FRESH CAN CAUSE A DISEASE KNOWN AS ZINC METAL FUME
FEVER. MOST AUTHORITIES AGREE THAT FRESH FUMES ARE NECESSARY TO PRODUCE
THE DISEASE BUT THAT THE PARTICLE SIZE IS THE MOST IMPORTANT FACTOR IN THE
GENESIS OF THE CONDITION. MOST OF THE RESPONSIBLE PARTICLES ARE IN THE
RANGE OF 0.02-0.25 MICRONS. SYMPTOMS MAY BE DELAYED 4-12 HOURS AND MAY
INCLUDE A METALLIC OR FOUL TASTE, DRY THROAT, CHEST PAIN, DYSPNEA, DRY
COUGH, CHILLS, LASSITUDE, MALAISE, FATIGUE, HEADACHE, MUSCLE CRAMPS,
NAUSEA, FEVER, PERSPIRATION, VOMITING AND LEUKOCYTOSIS. TOLERANCE TO FUMES
DEVELOPS RAPIDLY, BUT IS QUICKLY LOST. PRELIMINARY EXPOSURE TO ACETIC ACID
MAY INCREASE SUSCEPTIBILITY TO ZINC FUME FEVER. RECOVERY USUALLY OCCURS
WITHIN 24 TO 48 HOURS.
CHRONIC EXPOSURE- ZINC FACTORY WORKERS EXPOSED FOR 2-3 YEARS REPORTED UPPER
RESPIRATORY TRACT IRRITATION WITH NASOPHARYNGITIS AND LARYNGITIS.
GASTROINTESTINAL DISTURBANCES AND CLINICALLY LATENT LIVER DYSFUNCTION HAS
ALSO BEEN REPORTED TO OCCUR IN WORKERS AFTER LONG-TERM EXPOSURE.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING
HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD
PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND
AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. ADMINISTRATION OF OXYGEN
SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION
IMMEDIATELY.

SKIN CONTACT:

ZINC:
ACUTE EXPOSURE- PURE ZINC POWDER OR DUST IS NOT EXPECTED TO BE IRRITATING
ON SINGLE EXPOSURE.
CHRONIC EXPOSURE- MAY CAUSE DERMATITIS AFTER REPEATED OR PROLONGED EXPOSURE.
300 UG APPLIED TO HUMAN SKIN INTERMITTENTLY FOR THREE DAYS CAUSED MILD
IRRITATION. ALLERGIC SENSITIZATION IS EXTREMELY RARE.

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:

ZINC:
ACUTE EXPOSURE- NO DATA AVAILABLE. HOWEVER, IT IS EXPECTED TO CAUSE
IRRITATION TO SOME DEGREE DUE TO A FOREIGN PARTICLE EFFECT.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

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:

ZINC:
ACUTE EXPOSURE- THE ZINC ION IS ORDINARILY TOO POORLY ABSORBED TO CAUSE
ACUTE SYSTEMIC TOXICITY. AFTER LARGE DOSES HAVE BEEN INGESTED, FATAL
COLLAPSE MAY OCCUR AS A RESULT OF SERIOUS DAMAGE TO THE BUCCAL AND
GASTROENTERIC MUCOUS MEMBRANES. ACIDIC FOODS OR BEVERAGES PREPARED OR
STORED IN GALVANIZED ZINC CANS OR UTENSILS MAY DISSOLVE SUFFICIENT ZINC
METAL INTO ZINC SALTS. INGESTION OF THESE SOLUTIONS MAY CAUSE POISONING
WITH FEVER, NAUSEA, VIOLENT VOMITING, STOMACH CRAMPS, AND DIARRHEA WITHIN
3 TO 12 HOURS. SHOCK, COLLAPSE AND DEATH MAY ALSO OCCUR. SURVIVORS MAY
HAVE RESIDUAL NEPHRITIS AND STRICTURES OF THE ESOPHAGUS AND PYLORIC END OF
THE STOMACH.
CHRONIC EXPOSURE- PATIENTS TAKING ZINC IN AMOUNTS 10 TIMES THE RDA FOR
MONTHS AND YEARS HAVE NOT SHOWN ANY ADVERSE REACTIONS. EXCESSIVE
ABSORPTION MAY CAUSE COPPER-DEFICIENCY ANEMIA. APPARENTLY, ZINC INTERFERES
WITH COPPER AND IRON METABOLISM. THE TASTE THRESHOLD FOR ZINC IN WATER IS
APPROXIMATELY 15 PPM. DRINKING WATER CONTAMINATED WITH 40 PPM ZINC HAS
CAUSED DROWSINESS, MENTAL FATIGUE, NAUSEA, MUSCLE PAIN AND STIFFNESS,
INSOMNIA, ANOREXIA, LASSITUDE AND FATIGUE. ANIMAL STUDIES INDICATE THAT
RATS TOLERATED 0.1% ZINC IN THEIR DIET, BUT MORE THAN 0.5% REDUCED THEIR
CAPACITY TO REPRODUCE, AND 1% INHIBITED GROWTH AND CAUSED SEVERE ANEMIA
AND DEATH. 2% METALLIC ZINC IN THE DIET OF RATS RESULTED IN NO INJURY.

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

***ZINC POWDER OR DUST, NONPYROPHORIC**
ASPIRATION.

PAGE 03 OF 04

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:
ZINC METAL IS STABLE IN DRY AIR, BUT BECOMES COVERED WITH A WHITE COATING OF BASIC CARBONATE ON EXPOSURE TO MOIST AIR AND MAY BE EXPLOSIVE.
ZINC POWDER OR DUST EVOLVES HIGHLY FLAMMABLE HYDROGEN GAS ON CONTACT WITH WATER; THE HEAT OF THE REACTION MAY BE SUFFICIENT TO IGNITE THE HYDROGEN. ZINC FOIL MAY IGNITE IN THE PRESENCE OF MOISTURE.

INCOMPATIBILITIES:

ZINC:
ACIDS: EVOLVES HYDROGEN GAS WHICH MAY BE IGNITED BY THE HEAT OF THE REACTION
ALKALIES: EVOLVES HYDROGEN GAS WHICH MAY BE IGNITED BY THE HEAT OF THE REACTION.
ALUMINUM: POSSIBLE IGNITION.
ALUMINUM-MAGNESIUM ALLOY + RUSTED STEEL: MAY SPARK ON IMPACT.
AMMONIUM NITRATE: VIOLENT REACTION OR FORMATION OF EXPLOSIVE MIXTURE.
AMMONIUM SULFIDE: MAY EXPLODE IN A CLOSED CONTAINER.
ARSENIC: INCANDESCENT REACTION WHEN HEATED.
ARSENIC TRIOXIDE: EXPLOSIVE REACTION ON HEATING.
BROMOMETHANE: FORMS FLAMMABLE COMPOUNDS.
CADMIUM: INCANDESCENT REACTION.
CALCIUM CHLORIDE: EVOLVES HYDROGEN GAS WHICH MAY BE IGNITED BY THE HEAT OF THE REACTION.
CARBON DISULFIDE: INCANDESCENT REACTION.
CARBON TETRACHLORIDE + METHANOL: EXTREMELY VIGOROUS REACTION.
CHLORATES: FORMS SHOCK-SENSITIVE MIXTURES.
CHLORINATED RUBBER: VIOLENT OR EXPLOSIVE REACTION AT ELEVATED TEMPERATURES.
CHROMIC ANHYDRIDE: VIOLENT REACTION AND POSSIBLE IGNITION.
HALOCARBONS: POSSIBLE VIOLENT REACTION.
HALOGENS: POSSIBLE IGNITION.
HYDRAZINE NITRATE: IGNITES ABOVE 70 C.
HYDROXYLAMINE: MAY IGNITE OR EXPLODE WHEN HEATED.
INTERHALOGENS: VIOLENT REACTION AND POSSIBLE IGNITION.
LEAD AZIDE: FORMS EXPLOSIVE COMPOUND.
MANGANESE DICHLORIDE: EXPLOSIVE REACTION WHEN HEATED.
METAL HALIDES (TRANSITION) + IRON PENTACARBONYL: VIOLENT REACTION.
METAL OXIDES: POSSIBLE IGNITION.
NITRIC ACID: INCANDESCENT REACTION.
2-NITROANISOLE + SODIUM HYDROXIDE: EXOTHERMIC REACTION.
NITRYL FLUORIDE: INCANDESCENT WHEN WARMED.
OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.
PEROXYFORMIC ACID: VIOLENT EXPLOSION ON CONTACT.
POTASSIUM NITRATE: EXPLOSIVE REACTION ON HEATING.
POTASSIUM PEROXIDE: INCANDESCENT REACTION.
SELENIUM: INCANDESCENT REACTION.
SELENINYL BROMIDE: IGNITION.
SILVER + ELECTROLYTES (BATTERIES): MAY SPONTANEOUSLY COMBUST.
SULFUR: VIOLENT REACTION.
TELLURIUM: INCANDESCENT REACTION.

DECOMPOSITION:

ZINC:
THERMAL DECOMPOSITION RELEASES ACRID AND TOXIC FUMES OF ZINC OXIDE.

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

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

***STORAGE**

STORAGE: PROTECT AGAINST PHYSICAL DAMAGE. STORE IN COOL, DRY, VENTILATED PLACE. SEPARATE FROM ACIDS, HALOGENATED HYDROCARBONS, AND STRONG ALKALI HYDROXIDES. PROTECT FROM MOISTURE (NFPA 49, HAZARDOUS CHEMICALS DATA, 1975).

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

CONDITIONS TO AVOID

MAY BE IGNITED BY HEAT, SPARKS OR FLAMES. MAY BURN RAPIDLY WITH FLARE-BURNING EFFECT. MAY IGNITE IN PRESENCE OF MOISTURE. VIOLENT REACTION WITH WATER.

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:
DO NOT TOUCH SPILLED MATERIAL. SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING OR FLAMES IN HAZARD AREA. FOR SMALL DRY SPILLS, WITH CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; MOVE CONTAINERS FROM SPILL AREA.

ZINC POWDER OR DUST, NONPYROPHORIC PAGE 04 OF 04
NO WATER ON SPILLED MATERIAL; DO NOT GET WATER INSIDE CONTAINER. DIKE SPILL
FOR LATER DISPOSAL. CLEAN UP ONLY UNDER SUPERVISION OF AN EXPERT.

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 ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

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

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

EMERGENCY WASH FACILITIES:
WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE
EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN
AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - FISHER SCIENTIFIC GROUP, INC.
CREATION DATE: 12/08/84 REVISION DATE: 03/29/89

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