MATERIAL SAFETY DATA SHEET

MAY 31, 2008

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: OSMIUM TETROXIDE
SYNONYMS: OSMIC ACID, OSMIC ACID ANHYDRIDE
PRODUCT CODES: 19100 -19134

MANUFACTURER: ELECTRON MICROSCOPY SCIENCES
DIVISION: 1560 INDUSTRY ROAD/P.O.BOX 550
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CHEMICAL NAME: OSMIUM TETROXIDE
CHEMICAL FAMILY: PLATINUM GROUP METAL SALTS
CHEMICAL FORMULA: 0s04

PRODUCT USE: RESEARCH

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT:
OSMIUM TETROXIDE/OSMIUM OXIDE

CAS NO.	% WT	% VOL	SARA 313 REPORTABLE
20816-12-0	99.9		

	ppm	mg/m3
OSHA PEL-TWA:		0.002mg/m3
OSHA PEL STEL :		
OSHA PEL CEILING:		
ACGIH TLV-TWA:		0.20 ppb
ACGIH TLV STEL:		0.60 ppb
ACGIH TLV CEILING:		

SECTION 2 NOTES:
THE SUBSTANCE CA BE ABSORBED INTO THE BODY BY INHALATION OF ITS VAPORS, BY INHALATION OF ITS AEROSOL AND BY INGESTION. A HARMFUL CONTAMINATION OF AIR CAN BE REACHED VERY QUICKLY ON EVAPORATION OF THIS SUBSTANCE AT 20 DEGREE C.

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES SEVERE IRRITATION TO EYES, SKIN AND RESPIRATORY TRACT.

ROUTES OF ENTRY: EYES: LIKELY, INHALATION: LIKELY, SKIN: LIKELY, INGESTION: LIKELY

POTENTIAL HEALTH EFFECTS

EYES : REDNESS, PAIN, BLURRED VISON, LOSS OF VISION, SEVERE DEEP BURNS.

SKIN: POSSIBLE SKIN DISCOLORATION (GREEN OR BLACK), REDNESS, SKIN BURNS, PAIN, BLISTERS.

INGESTION: ABDOMINAL CRAMPS, BURNING SENSATON, SHOCK OR COLLAPSE.

INHALATION: BURNING SENSATION, COUGH, HEADACHE, WHEEZING, SHORTNESS OF BREATH, VISUAL DISTURBANCES, SYMPTOMS MAY BE DELAYED.

ACUTE HEALTH HAZARDS: AVOID AL CONTACT WITH THIS CHEMICAL

CHRONIC HEALTH HAZARDS: TARGET ORGAN EFFECTS-EYES, SKIN, AND RESPIRATORY SYSTEM

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: POTENTIAL KIDNEY DAMAGE.

CARCINOGENICITY

OSHA:	ACGIH:	NTP:	IARC:
OTHER:	NO	NO	NONE

SECTION 4: FIRST AID MEASURES

EYES: FIRST RINSE WITH PLENTY OF WATER FOR 15 MINUTES, THEN CONTACT A PHYSICIAN IMMEDIATELY.

SKIN: FIRST RINSE WITH PLENTY OF WATER FOR 15 MINUTES, THEN REMOVE CONTAMINATED CLOTHES AND RINSE AGAIN. THEN CONTACT A PHYSICIAN IMMEDIATELY.

INGESTION: RINSE MOUTH. GIVE NOTHING TO DRINK. REST. SEEK MEDICAL ATTENTION IMMEDIATELY.

INHALATION: FRESH AIR, REST. HALF-UPRIGHT POSITION. ARTIFICIAL RESPIRATION IF INDICATED, SEEK MEDICAL ATTENTION IMMEDIATELY.

NOTES TO PHYSICIANS OR FIRST AID PROVIDERS: NOT AVAILABLE

SECTION 5: FIRE-FIGHTING MEASURES

FLAMMABLE LIMITS IN AIR, UPPER: NOT APPLICABLE
(% BY VOLUME) LOWER:
FLASH POINT: NOT APPLICABLE
F: N/A
C: N/A
METHOD USED:

AUTOIGNITION TEMPERATURE: NOT APPLICABLE
F: N/A
C: N/A

NFPA HAZARD CLASSIFICATION
HEALTH: 4 FLAMMABILITY: 0 REACTIVITY: 1
OTHER: VERY TOXIC

HMIS HAZARD CLASSIFICATION
HEALTH: 4 FLAMMABILITY: 0 REACTIVITY: 1
PROTECTION: J

EXTINGUISHING MEDIA: IN CASE OF A FIRE IN THE SURROUNDING AREA, ALL EXTINGUISHING AGENTS ALLOWED.

SPECIAL FIRE FIGHTING PROCEDURES: IN EVENT OF A FIRE, WEAR FULL PROTECTIVE CLOTHING AND NIOSH-APPROVED SELF-CONTAINED BREATHING APPARATUS WITH FULL APPARATUS WITH FULL FACEPIECE OPERATED IN The PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

UNUSUAL FIRE AND EXPLOSION HAZARDS: 040s IS A STRONG OXIDIZER AND MAY REACT EXPLOSIVELY WITH MANY ORGANIC COMPOUNDS. RISK OF FIRE AND EXPLOSION WHEN MIXED WITH COMBUSTIBLE SUBSTANCES. NO CONTACT WITH FLAMMABLE SUBSTANCES. NOT COMBUSTIBLE BUT ENHANCES COMBUSTION OF OTHER SUBSTANCES.

HAZARDOUS DECOMPOSITION PRODUCTS: WHEN HEATED TO DECOMPOSITION, EMITS HIGHLY TOXIC FUMES OF OSMIUM.

SECTION 6: ACCIDENTAL RELEASE MEASURES

ACCIDENTAL RELEASE MEASURES: EVACUATE AREA IMMEDIATELY! CONSULT AN EXPERT. SWEEP SPILLED

SUBSTANCE INTO CONTAINERS. IF APPROPRIATE, MOISTEN FIRST TO PREVENT DUSTING THEN REMOVE TO SAFE PLACE. DO NOT ABSORB IN SAW-DUST OR OTHER COMBUSTIBLE MATERIAL. DO NOT LET THIS CHEMICAL ENTER THE ENVIRONMENT (EXTRA PERSONAL PROTECTIVE EQUIPMENT WITH FULL PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS IS A MUST).

SECTION 7: HANDLING AND STORAGE

HANDLING AND STORAGE: IF EYES ARE EXPOSED TO VAPOR OVER A SHORT PERIOD OF TIME, NIGHT VISION WILL BE AFFECTED FOR ABOUT ONE EVENING. ONE WILL NOTICE COLORED HALOS AROUND LIGHTS. STORE COMPATIBLE CHEMICAL-RESISTANT GLOVES. WASH HAND THOROUGHLY AFTER HANDLING.

OTHER PRECAUTIONS: 0.1 MGM3 SUPPLIED RESPIRATOR WITH A FULL FACEPIECE, ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE. ANY CHEMICAL CARTRIDGE RESPIRATOR WITH A HIGH EFFICIENCY PARTICULATE FILTER WITH A FULL FACEPIECE AND CARTRIDGES PROVIDING PROTECTION AGAINST OSMIC ACID. ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN STYLE FRON OR BACK MOUNTED CANISTER PROVIDING PROTECTION AGAINST OSMIUM TETROXIDE AND HAVING A HIGH EFFICIENCY PARTICULATE FILTER. 1 MG/M3 ANY SUPPLIED AIR RESPIRATOR WITH A FULL FACPIECE AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.
EMERGENCY OR PLANNED ENTRY IN UNKNOWN CONCENTRATION OR IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS. ANY SELF CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE. ANY SELF –CONTAINED BREATHING APPARATUS.
ESCAPE: ANY AIR-PURIFYING FULL FACE PIECE RESPIRATOR (GAS MASK) WITH A CHIN STYLE OR FRONT OR BACK MOUNTED CANISTER PROVIDING PROTECTION AGAINST OSMIUM TETROXIDE AND HAVING A HIGH EFFICIENCY PARTICULATE FILTER. ANY APPROPRIATE ESCAPE TYPE SELF-CONTAINED BREATHING APPARATUS.
LDLH 1mg/m3

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: LOCAL EXHAUST: REQUIRED IN HANDLING AREA
MECHANICAL: DESIRABLE TO INSURE CONCENTRATION OF MATERIAL BELOW TLV/TWA LEVELS.
OTHER: FUME HOOD

RESPIRATORY PROTECTION: CHEMICAL CARTRIDGE RESPIRATOR FOR ACID GAS AND DUST/MIST/FUME OR SELF-CONTAINED BREATHING APPARATUS WITH FULL FACE SHIELD.

EYE PROTECTION: ANSI APPROVED SAFETY GLASSES/GOGGLES OR FULL FACE PIECE WITH RESPIRATOR

SKIN PROTECTION: RUBBER/NEOPRENE (USE COMPATIBLE CHEMICAL-RESISTANT GLOVES)

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: LAB COAT/APRON, FLAME AND CHEMICAL RESISTANT PROTECTIVE CLOTHING, EYE WASH, SAFETY SHOWER, AND HYGIENE FACILITIES FOR WASHING.

EXPOSURE GUIDELINES: NIOSH REL: TWA 0.002 MG/M3 (0.002 PPM) ST 0.006 MG/M3 (0.0006 PPM)
OSHA PEL- TWA 0.002 MG/M3
IDLH: 1 MG/M3 AS (Os)
CONVERSION: 1 PPM= 10.40 MG/M3
NIOSH: RTECS RN1140000

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: COLORLESS YELLOW SOLID

ODOR: A SHARP CHLORINE LIKE ODOR

PHYSICAL STATE: SOLID

pH AS SUPPLIED: NO INFORMATION FOUND
pH (Other):
BOILING POINT:
F: 266.0°
C: 130°

MELTING POINT:
F: 107.6°
C: 42°
FREEZING POINT:
F: N/A
C:
VAPOR PRESSURE (mmHg):
@ 27 DEGREE C: 1.5 kPa

VAPOR DENSITY (AIR = 1):
@ 8.8

SPECIFIC GRAVITY (H2O = 1):
@ 5.10

EVAPORATION RATE: NO INFORMATION FOUND

BASIS (=1):

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES (con't)

SOLUBILITY IN WATER: 6%@ 77 DEGRESS F

PERCENT SOLIDS BY WEIGHT: N/A

PERCENT VOLATILE: N/A
BY WT/ BY VOL @
F: 70
C: 21
VOLATILE ORGANIC COMPOUNDS (VOC): NOT AVAILABLE

WITH WATER: LBS/GAL
WITHOUT WATER: LBS/GAL

MOLECULAR WEIGHT: 254.2
VISCOSITY: NL

SECTION 10: STABILITY AND REACTIVITY

STABLE **UNSTABLE**

STABILITY: STABLE

CONDITIONS TO AVOID (STABILITY): COMBUSTIBLE MATERIAL, HCl AND OXIDIZED AGENTS

INCOMPATIBILITY (MATERIAL TO AVOID): COMBUSTIBLE MATERIAL, HCl AND OXIDIZED AGENTS.

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS: BEGINS TO SUBLIME BELOW BOILING POINT, CONTACT WITH OTHER MATERIALS MAY CAUSE FIRE.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID (POLYMERIZATION): WILL NOT POLYMERIZE

SECTION 11: TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION: REPEATED OR PROLONGED CONTACT WITH SKIN MAY CAUSE DERMATITIS. THE SUBSTANCE MAY CAUSE EFFECT ON THE KIDNEY.

SECTION 12: ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: THIS SUBSTANCE MAY BE HAZARDOUS TO THE ENVIRONMENT, SPECIAL ATTENTION SHOULD BE GIVEN TO CRUSTACEA.

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: CONSULT EPA, STATE AND LOCAL REGULATIONS FOR PROPER DISPOSAL/RECYCLE/ RECLAMATION NOTE: CHEMICAL ADDITIONS, PROCESSING, OR OTHERWISE ALTERING THIS MATERIAL MAY MAKE THE WASTE MANAGEMENT INFORMATION PRESENTED ABOVE INCOMPLETE, INACCURATE, OR OTHERWISE INAPPROPRIATE.

RCRA HAZARD CLASS: OSO4 IS A LISTED EPA HAZARDOUS WASTE-P087

SECTION 14: TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION **INFORMATION REPORTED FOR PRODUCT/SIZE .5G**

PROPER SHIPPING NAME: OSMIUM TETROXIDE
HAZARD CLASS: 6.1
ID NUMBER: 2471
PACKING GROUP: I
LABEL STATEMENT: POISON

WATER TRANSPORTATION
PROPER SHIPPING NAME:
HAZARD CLASS:
ID NUMBER: NOT AVAILABLE
PACKING GROUP:
LABEL STATEMENTS:
INTERNATIONAL (WATER, I.M.O.)

AIR TRANSPORTATION
PROPER SHIPPING NAME: OSMIUM TETROXIDE
HAZARD CLASS: 6.1
ID NUMBER: 2471
PACKING GROUP: I
LABEL STATEMENTS: POISION

SECTION 15: REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS
TSCA (TOXIC SUBSTANCE CONTROL ACT): THIS CHEMICAL IS TSCA LISTED, AND IS ALSO cGMP UNDER FDA FOR IVD TESTING.

CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT):

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT):

311/312 HAZARD CATEGORIES: NFPA RATING -HEALTH 4, FIRE 0, REACTIVITY –1, OTHER: TOX
313 REPORTABLE INGREDIENTS: N/A

SECTION 16: OTHER INFORMATION

OTHER INFORMATION: NONE

PREPARATION INFORMATION: NONE

DISCLAIMER:

ELECTRON MICROSCOPY SCIENCES MAKES NO PRESENTATION AS TO THE ACCURACY OF THE INFORMATION IN THE MSDS. THE INFORMATION IS BELIEVED TO BE CORRECT; HOWEVER, YOU (THE CUSTOMER), SHOULD PERFORM YOUR OWN INVESTIGATION AND INDEPENDENT VERIFICATION. IF YOU RESELL THE PRODUCT, YOU ARE RESPONSIBLE TO FORWARD THE INFORMATION IN THE MSDS TO YOUR CUSTOMER.