

# MATERIAL SAFETY DATA SHEET

August 22, 2011

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## SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

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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  
ADDRESS: HATFIELD PA 19440

EMERGENCY PHONE: 215-412-8400  
CHEMTREC PHONE: 800-424-9300

FAX PHONE: 215-412-8450

CHEMICAL NAME: OSMIUM TETROXIDE  
CHEMICAL FAMILY: PLATINUM GROUP METAL SALTS  
CHEMICAL FORMULA: OsO4

PRODUCT USE: RESEARCH

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## SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

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### INGREDIENT:

OSMIUM TETROXIDE/OSMIUM OXIDE

<u>CAS NO.</u>	<u>% WT</u>	<u>% VOL</u>	<u>SARA 313</u>
<u>REPORTABLE</u> 20816-12-0	99.9		

	<u>ppm</u>	<u>mg/m3</u>
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 CAN 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.

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## SECTION 3: HAZARDS IDENTIFICATION

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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 VISION, LOSS OF VISION, SEVERE DEEP BURNS.

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

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

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

ACUTE HEALTH HAZARDS: AVOID ALL CONTACT WITH THIS CHEMICAL

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

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: POTENTIAL KIDNEY DAMAGE.

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### CARCINOGENICITY

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

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## SECTION 4: FIRST AID MEASURES

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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

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## SECTION 5: FIRE-FIGHTING MEASURES

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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.

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## SECTION 6: ACCIDENTAL RELEASE MEASURES

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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).

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## SECTION 7: HANDLING AND STORAGE

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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. LDH 1mg/m3

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## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

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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

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## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

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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):

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

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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**

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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

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**SECTION 11: TOXICOLOGICAL INFORMATION**

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

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**SECTION 12: ECOLOGICAL INFORMATION**

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

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**SECTION 13: DISPOSAL CONSIDERATIONS**

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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

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## SECTION 14: TRANSPORT INFORMATION

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U.S. DEPARTMENT OF TRANSPORTATION  
PRODUCT/SIZE .5G

INFORMATION REPORTED FOR

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: POISON

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## SECTION 15: REGULATORY INFORMATION

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### 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

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**SECTION 16: OTHER INFORMATION**

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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.