

ORION MATERIAL SAFETY DATA SHEET

ORION RESEARCH INCORPORATED
THE SCHRAFFT CENTER
529 MAIN STREET
BOSTON, MA 02129 USA
TELEPHONE 617-242-3900

I. PRODUCT IDENTIFICATION

PRODUCT NAME:
ORION APPLICATION SOLUTION 948206

CATALOG NO.: 948206
EFFECTIVE DATE: 4/29/91

HAZARDOUS SHIPMENT LABELING: DOT IATA
TESTING BY BUREAU OF EXPLOSIVES HAS INDICATED THAT THIS IS NOT AN OXIDIZER.

PREPARED BY: THOMAS F. FLYNN TITLE: QUALITY ASSURANCE CHEMIST
APPROVED BY: LYNN ORLOWITZ TITLE: DIRECTOR REGULATORY MATTERS

II. HAZARDOUS INGREDIENTS (IDENTITY INFORMATION)

HAZARDOUS COMPONENTS*						
SPECIFIC CHEMICAL IDENTITY: COMMON NAME(S)	CAS NO.	%	OSHA PEL	ACGIH TLV	LD 50 MG/KG	
LEAD PERCHLORATE PB(CLO4)2	63916-96-1	4.6	50 UG/M3 (PB)	0.15 MG/M3 (PB)	275 (IPR-MUS)	
**DEIONIZED WATER (H2O)	7732-18-5	95.4	NONE	NONE	629 (ORL-DOG)	

* CHEMICALS WHICH ARE NOT CLASSIFIED AS HAZARDOUS PER U.S. OSHA GUIDELINES (29CFR PARTS 1915.2 OR 1916.2) OR THE MASSACHUSETTS SUBSTANCE LIST (105CMR670.000 APPENDIX A) WILL NOT NECESSARILY BE LISTED ON THIS FORM EVEN THOUGH ONE OR MORE MAY BE A CONSTITUENT OF THIS PRODUCT.

NA* NOT AVAILABLE OR NOT APPLICABLE.

** NON-HAZARDOUS COMPONENT.

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III. PHYSICAL DATA

BOILING POINT (760 MM HG): 100 C
SPECIFIC GRAVITY (H2O = 1): 1.02
PH @ 25 C: (4.0 - 6.5)
VOLATILES, % BY WT.: NA
VAPOR DENSITY (AIR = 1): NA
APPEARANCE AND ODOR: COLORLESS, ODORLESS LIQUID
FREEZING POINT: 0 C
VAPOR PRESSURE @: NA*
SOLUBILITY IN WATER, % BY WT. @: MISCIBLE
EVAPORATION RATE (BUTYL, ACETATE = 1): NA

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (TEST METHOD): NA
AUTOIGNITION TEMPERATURE: NA

FLAMMABLE LIMITS IN AIR, % BY VOLUME: LOWER-NA UPPER-NA
EXTINGUISHING MEDIA: ANY
SPECIAL FIRE-FIGHTING PROCEDURES: NA
UNUSUAL FIRE AND EXPLOSION HAZARDS:
MAY OXIDIZE AND RENDER OTHER MATERIALS MORE COMBUSTIBLE IF ALLOWED TO DRY
OUT UPON THEM.

V. REACTIVITY DATA

STABILITY: STABLE
CONDITIONS TO AVOID:
STORING NEAR HEAT OR INCOMPATIBLE CHEMICALS.

INCOMPATIBILITY (MATERIALS TO AVOID):
REDUCING AGENTS, B, BAS, CHARCOAL, S, TRICHLOROETHYLENE

HAZARDOUS DECOMPOSITION PRODUCTS:
OXIDES UPON HEATING TO DECOMPOSITION.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR
CONDITION TO AVOID: NA

VI. HEALTH HAZARD DATA

ROUTE(S) OF ENTRY: INHALATION?-NO SKIN?-NO INGESTION?-YES

HEALTH HAZARDS (ACUTE AND CHRONIC):
BECAUSE THIS PRODUCT IS 96% WATER, IT DOES NOT PRESENT A SERIOUS HEALTH
HAZARD VIA SKIN AND INHALATION ROUTES. INGESTION: ACUTE LEAD IS A SYSTEMATIC
POISON THAT CAN CAUSE SEIZURES, COMA, AND THAT CAN LEAD TO DEATH. CHRONIC:
LONG-TERM EXPOSURE CAN RESULT IN SEVERE DAMAGE TO THE BLOOD-FORMING ORGANS
AND THE NERVOUS, URINARY, AND REPRODUCTIVE SYSTEMS.

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CARCINOGENICITY: NTP? IARC MONOGRAPHS? OSHA REGULATED?
NOT FOUND ON THESE LISTS.

SIGNS AND SYMPTOMS OF EXPOSURE:
METALLIC TASTE IN MOUTH, ANXIETY, CONSTIPATION, NAUSEA, PALLOR, WEAKNESS,
INSOMNIA, HEADACHE, MUSCLE PAIN, AND POSSIBLE SEVERE ABDOMINAL PAIN.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:
HEART, KIDNEY, AND RESPIRATORY CONDITIONS.

EMERGENCY AND FIRST AID PROCEDURES:
SKIN AND EYES: WASH OFF WITH PLENTY OF WATER. IRRIGATE EYES FOR AT
LEAST 10 MINUTES. INGESTION: CONSULT PHYSICIAN.

VII. PRECAUTIONS (SAFE HANDLING AND USE)

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
DILUTE SPILL WITH WATER, CLEAN UP AND STORE FOR WASTE DISPOSAL.

WASTE DISPOSAL METHOD:
CONTROLLED BY OSHA STANDARDS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:
NFPA RATING: SCALE (0-4); HEALTH-2, FIRE-0, REACTIVITY-0, SPECIFIC-0.

OTHER PRECAUTIONS:
NO FOOD IN WORK AREA; ALWAYS WASH HANDS AND PROTECTIVE CLOTHING AFTER USING
THESE PRODUCTS. SARA TITLE III: LEAD METAL AND ITS INORGANIC COMPOUNDS ARE

REGULATED UNDER OSHA STANDARD (29CFR 1910.1025) AND SECTIONS 313, 312, AND 311 OF SARA TITLE III. NOT FOUND ON CAL. PROP. 65 LISTING.

VIII. CONTROL MEASURES

RESPIRATORY PROTECTION (SPECIFY TYPE): NONE NECESSARY

VENTILATION:
LOCAL EXHAUST-CONTROL TO EXPOSURE LIMITS
MECHANICAL (GENERAL)-NO
SPECIAL-NO
OTHER-NO

PROTECTIVE GLOVES: YES

EYE PROTECTION: SAFETY GOGGLES

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: LAB COAT

WORK/HYGIENIC PRACTICES:
EMERGENCY EYE WASH MUST BE AVAILABLE.

LIABILITY IS EXPRESSLY DISCLAIMED FOR ANY LOSS OR INJURY ARISING OUT OF THE USE OF THIS INFORMATION OR THE USE OF ANY MATERIALS DESIGNATED. SAFE USE OF THE MATERIALS IS THE RESPONSIBILITY OF THE USER.

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ORION MATERIAL SAFETY DATA SHEET

ORION RESEARCH INCORPORATED
THE SCHRAFFT CENTER
529 MAIN STREET, BOSTON, MA 02129 USA
TELEPHONE 617-242-3900

I. PRODUCT IDENTIFICATION

PRODUCT NAME: ORION APPLICATION SOLUTION - PH ELECTRODE STORAGE SOLUTION

CATALOG NO.: 910001

EFFECTIVE DATE: 08/25/91

HAZARDOUS SHIPMENT LABELING: DOT NONE IATA NONE

PREPARED BY THOMAS FLYNN TITLE: QUALITY ASSURANCE CHEMIST

APPROVED BY LYNN ORLOWITZ TITLE: DIRECTOR REGULATORY MATTERS

II. HAZARDOUS INGREDIENTS (IDENTITY INFORMATION)

HAZARDOUS COMPONENTS* SPECIFIC CHEMICAL IDENTITY: COMMON NAME(S)	CAS NO.	%	OSHA PEL	ACGIH TLV	LD 50 MG/KG
POTASSIUM CHLORIDE (KCL)**	7447-40-7	11.1	NONE	NONE	938 (ORL-INF)
POTASSIUM PHOSPHATE MONOBASIC (KH ₂ PO ₄)	7778-77-0	0.17	NONE	NONE	NA*
SODIUM PHOSPHATE DIBASIC (NA ₂ HPO ₄)	7558-79-4	0.18	NONE	NONE	1,070 (IVN-RBT)
**DEIONIZED WATER (H ₂ O)	7732-18-5	88.55	NONE	NONE	629,000 (ORL-DOG)

III. PHYSICAL DATA

BOILING POINT 760 MM HG 100 DEGREES C

FREEZING POINT: -3 DEGREES C

SPECIFIC GRAVITY (H2O = 1): 1.05

VAPOR PRESSURE @: NA*

PH @ 25 DEGREES C: 6.3-6.9

SOLUBILITY IN WATER, % BY WT. @: MISCIBLE

VOLATILES, % BY WT.: NA

EVAPORATION RATE (BUTYL, ACETATE = 1): NA

VAPOR DENSITY (AIR = 1): NA

APPEARANCE AND ODOR: CLEAR, COLORLESS, ODORLESS LIQUID

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (TEST METHOD): NA AUTOIGNITION TEMPERATURE NA

FLAMMABLE LIMITS IN AIR, % BY VOLUME:	LOWER	UPPER
	NA	NA

EXTINGUISHING MEDIA: ANY

SPECIAL FIRE-FIGHTING PROCEDURES: NONE, THIS SOLUTION IS NON-FLAMMABLE.

UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE

V. REACTIVITY DATA

STABILITY: STABLE

CONDITIONS TO AVOID: NONE

INCOMPATIBILITY (MATERIALS TO AVOID): MAGNESIUM AND SODIUM METALS

HAZARDOUS DECOMPOSITION PRODUCTS: MAY EMIT TOXIC POX FUMES IF HEATED TO DECOMPOSITION.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITION TO AVOID: HEATING TO DECOMPOSITION

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VI. HEALTH HAZARD DATA

ROUTE(S) OF ENTRY: INHALATION? NO SKIN? NO INGESTION? NO

HEALTH HAZARDS (ACUTE AND CHRONIC)

LOW HAZARD FOR BOTH ACUTE AND CHRONIC BECAUSE OF LOW CONCENTRATION OF PHOSPHATE SALTS. THIS COMPOSITION IS ALSO USED AS A BUFFER IN PHARMACEUTICALS.

CARCINOGENICITY:

NOT FOUND ON THESE LISTS.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: COULD AGGRAVATE DISEASES OF THE SKIN.

EMERGENCY AND FIRST PROCEDURES: WASH OFF CONTACT AREA WITH SOAP AND WATER.
INTERNAL: DILUTE WITH WATER AND CONSULT PHYSICIAN.

VII. PRECAUTIONS (SAFE HANDLING AND USE)

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
CLEAN UP AND WASH DOWN DRAIN IF LOCAL LAW ALLOWS.

WASTE DISPOSAL METHOD:
WASH DOWN DRAIN. OBSERVE ALL FEDERAL, STATE, AND LOCAL LAWS WHEN DISPOSING OF THIS PRODUCT.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:
NFPA RATING: SCALE(0-4); HEALTH - 1, FIRE - 0, REACTIVITY - 0 SPECIFIC - NONE.

OTHER PRECAUTIONS:
SARA TITLE III NA₂HPO₄ IS A CERCLA HAZARD AND RELEASES ARE SUBJECT TO SECTION 304 OF TITLE III. NOT FOUND ON CAL. PROP. 65. REPORTED IN EPA TSCA INVENTORY.

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VIII. CONTROL MEASURES

RESPIRATORY PROTECTION (SPECIFY TYPE): NONE

VENTILATION: LOCAL EXHAUST: NONE SPECIAL: NONE
MECHANICAL (GENERAL): NONE OTHER: NONE

PROTECTIVE GLOVES: NONE EYE PROTECTION: SAFETY GLASSES

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: EYE WASH STATION SHOULD BE AVAILABLE.

WORK/HYGIENIC PRACTICES: NO EATING OR DRINKING IN WORK AREA.

* CHEMICALS WHICH ARE NOT CLASSIFIED AS HAZARDOUS PER U.S. OSHA GUIDELINES (29CFR PARTS 1915.2 OR 1916.2) OR THE MASSACHUSETTS SUBSTANCE LIST (105CMR670.000 APPENDIX A) WILL NOT NECESSARILY BE LISTED ON THIS FORM EVEN

THOUGH ONE OR MORE MAY BE A CONSTITUENT OF THIS PRODUCT.

*NA NOT AVAILABLE/NOT APPLICABLE

** NON-HAZARDOUS COMPONENT.

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ORION MATERIAL SAFETY DATA SHEET

SHEET 1 OF 2

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THE SCHRAFFT CENTER
529 MAIN STREET, BOSTON, MA 02129 USA
TELEPHONE: 617-242-3900

I. PRODUCT IDENTIFICATION

PRODUCT NAME	CATALOG NO.	EFFECTIVE DATE
ORION APPLICATION SOLUTION 948206	948206	4/29/91

HAZARDOUS SHIPMENT LABELLING:	DOT	IATA
	TESTING BY BUREAU OF EXPLOSIVES HAS INDICATED THAT THIS IS NOT AN OXIDIZER.	

PREPARED BY THOMAS FLYNN	TITLE QUALITY ASSURANCE CHEMIST
APPROVED BY LYNN ORLOWIZ	TITLE DIRECTOR REGULATORY MATTERS

II. HAZARDOUS INGREDIENTS (IDENTITY INFORMATION)

HAZARDOUS COMPONENTS*	CAS NO.	%	OSHA PEL	ACGIH TLV	LD
SPECIFIC CHEMICAL IDENTITY: COMMON NAME(S)					50 MG/KG
LEAD PERCHLORATE PB(CLO4)2	63916-96-1	4.6	50UG/M3 (PB)	0.15MG/M3 (PB)	275 (IPR-MUS)

**DEIONIZED WATER (H2O)	7732-18-5	95.4	NONE	NONE	629 (ORL-DOG)
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III. PHYSICAL DATA

BOILING POINT	FREEZING POINT
760 MM HG 100 'C	0 'C
SPECIFIC GRAVITY (H20=1) 1.02	VAPOR PRESSURE @ N A*
PH @ 'C 25 (4.0-6.5)	SOLUBILITY IN WATER, % BY WT. @ MISCIBLE
VOLATILES, % BY WT. N A	EVAPORATION RATE (BUTYL ACETATE=1) N A
VAPOR DENSITY (AIR=1) NA	APPEARANCE AND ODOR COLORLESS, ODORLESS LIQUID

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (TEST METHOD) N A	AUTOIGNITION TEMPERATURE NA
FLAMMABLE LIMITS IN AIR, % BY VOLUME: LOWER NA UPPER NA	
EXTINGUISHING MEDIA ANY	
SPECIAL FIRE-FIGHTING PROCEDURES N A	
UNUSUAL FIRE AND EXPLOSION HAZARDS	

MAY OXIDIZE AND RENDER OTHER MATERIALS MORE COMBUSTIBLE IF ALLOWED TO DRY OUT UPON THEM.

*CHEMICALS WHICH ARE NOT CLASSIFIED AS HAZARDOUS PER U.S. OSHA GUIDELINES (29CFR PARTS 1915.2 OR 1916.2) OR THE MASSACHUSETTS SUBSTANCE LIST WILL NOT NECESSARILY BE LISTED ON THIS FORM EVEN THOUGH ONE OR MORE MAY BE A CONSTITUENT OF THIS PRODUCT.	LIABILITY IS EXPRESSLY DISCLAIMED FOR ANY LOSS OR INJURY ARISING OUT OF THE USE OF THIS INFORMATION OR THE USE OF ANY MATERIALS DESIGNATED. SAFE USE OF THE MATERIALS IS THE RESPONSIBILITY OF THE USER.	DOCUMENT NO. 205479-001 REV. E
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N A* NOT AVAILABLE OR NOT APPLICABLE

* * NON-HAZARDOUS COMPONENT

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ORION MATERIAL SAFETY DATA SHEET

SHEET 2 OF 2

PRODUCT NAME: ORION APPLICATION SOLUTION

CATALOG NO.: 948206

V. REACTIVITY DATA

STABILITY CONDITIONS TO AVOID
UNSTABLE STABLE X STORING NEAR HEAT OR INCOMPATIBLE CHEMICALS
INCOMPATIBILITY (MATERIALS TO AVOID)
REDUCING AGENTS, B, BAS, CHARCOAL, S, TRICHLOROETHYLENE
HAZARDOUS DECOMPOSITION PRODUCTS
OXIDES UPON HEATING TO DECOMPOSITION.
HAZARDOUS POLYMERIZATION: CONDITION TO AVOID
MAY OCCUR WILL NOT OCCUR X N A

VI. HEALTH HAZARD DATA

ROUTE(S) OF ENTRY: INHALATION? SKIN? INGESTION?
NO NO YES
HEALTH HAZARDS (ACUTE AND CHRONIC) BECAUSE THIS PRODUCT IS 96% WATER, IT DOES NOT PRESENT A SERIOUS HEALTH HAZARD VIA SKIN AND INHALATION ROUTES. INGESTION: ACUTE LEAD IS A SYSTEMATIC POISON THAT CAN CAUSE SEIZURES, COMA, AND THAT CAN LEAD TO DEATH. CHRONIC: LONG-TERM EXPOSURE CAN RESULT IN SEVERE DAMAGE TO THE BLOOD FORMING ORGANS AND THE NERVOUS, URINARY, AND REPRODUCTIVE SYSTEMS.
CARCINOGENICITY: NTP? IARC MONOGRAPHS? OSHA REGULATED?
NOT FOUND ON THESE LISTS.
SIGNS AND SYMPTOMS OF EXPOSURE
METALLIC TASTE IN MOUTH, ANXIETY, CONSTIPATION, NAUSEA, PALLOR, WEAKNESS, INSOMNIA, HEADACHE, MUSCLE PAIN, AND POSSIBLE SEVERE ABDOMINAL PAIN.
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE HEART, KIDNEY, AND RESPIRATORY CONDITIONS.

EMERGENCY AND FIRST AID PROCEDURES SKIN AND EYES: WASH OFF WITH PLENTY OF WATER. IRRIGATE EYES FOR AT LEAST 10 MINUTES. INGESTION: CONSULT PHYSICIAN.

VII. PRECAUTIONS (SAFE HANDLING AND USE)

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
DILUTE SPILL WITH WATER, CLEAN UP AND STORE FOR WASTE DISPOSAL.
WASTE DISPOSAL METHODS CONTROLLED BY OSHA STANDARDS.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING NFPA RATING: SCALE (0-4); HEALTH -2, FIRE -0, REACTIVITY -0, SPECIFIC -0.
OTHER PRECAUTIONS NO FOOD IN WORK AREA; ALWAYS WASH HANDS AND PROTECTIVE CLOTHING AFTER USING THESE PRODUCTS. SARA TITLE III: LEAD METAL AND IT'S INORGANIC COMPOUNDS ARE REGULATED UNDER OSHA STANDARD (29CFR 1910.1025) AND SECTIONS 313, 312, 311 OF SARA TITLE III. NOT FOUND ON CAL. PROP. 65 LISTING.

VIII. CONTROL MEASURES

RESPIRATORY PROTECTION (SPECIFY TYPE) NONE NECESSARY
VENTILATION LOCAL EXHAUST CONTROL TO EXPOSURE LIMITS SPECIAL NO
MECHANICAL (GENERAL) NO OTHER NO
PROTECTIVE GLOVES YES EYE PROTECTION SAFETY GOGGLES
OTHER PROTECTIVE CLOTHING OR EQUIPMENT LAB COAT
WORK/HYGENIC PRACTICES EMERGENCY EYE WASH MUST BE AVAILABLE.