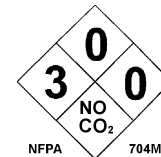


Rapid Electroplating Process, Inc SAFETY DATA SHEET



Conforms to: 29CFR 1900.1200 App D
Complies with Canadian WHMIS MSDS Requirements
Based on CCOHS: A Brief Summary of Canadian Requirements (Apr 2014)
Conforms to Regulation (EC) No.453/2010/EU (REACH)

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

Product Identification:	Activator #4
Product Use:	Selective Electroplating
Manufacturer:	Rapid Electroplating Process, Inc. 2901 W. Soffel Ave. Melrose Park, IL 60160 USA
Telephone	00-1-708-344-2504 (9:00 A.M. -4:30 PM, CST/CDT, M-F)
Emergency telephone:	In U.S.--CHEMTREC 1-800-424-9300 (24 Hrs) Outside U.S.-- 001-703-527-3887 (call collect)
Date of Issue (Version):	Jan 2018

2. HAZARDS IDENTIFICATION

Note: Unless noted, hazard information presented here is based on the properties of the full strength constituent chemicals with RAPID product concentrations > 1 wt% (>0.1 wt% if identified as carcinogenic). This product contains diluted forms of the chemicals which should be taken into account when evaluating the hazards of the product as a whole.

Hazard	Category	Hazard	Category
Acute Toxicity	--	Reproductive Hazard	--
Oral	3 (ATE Product LD50)	Germ Cell Mutagenicity	Unknown
Dermal	Unknown	Reproductive Toxicity	DUPONT reports that limited reproductive studies do not suggest effects from sodium cyanide. Some tests have shown the potential for developmental toxicity but only at exposure levels producing toxic effects in the adult animal.
Inhalation Dusts/Mists	Unknown	Lactation	Unknown
Skin Corrosion	1B (pH<11.5, in vitro test)	Target Organ Toxicity	--
Serious Eye Damage/Irritation	1	Single Exposure	Eyes, skin, cardiovascular system, respiratory system, mucous membranes
Carcinogenicity	No Component Categorized by IARC, NTP	Chronic Exposure	Central nervous system, thyroid
Respiratory/Skin Sensitizations	Unknown	Aspiration Hazard	Unknown

Hazard Category	Signal Word	Precautionary Statements:	Hazard Symbol(s) (GHS):
1B (Skin Corrosion/Irritation)	Danger	Causes severe skin burns and eye damage	
3 (Acute Toxicity-Oral)	Danger	Toxic if swallowed	

Hazard Statements (US-GHS):

ID	Hazard Statement
EUH031	Contact with acids liberates toxic gas
EUH066	Repeated exposure may cause skin dryness or cracking
EUH210	Safety data sheet available on request.
EUH401	To avoid risks to human health and the environment, comply with the instructions for use.
H301	Toxic if swallowed
H311	Toxic in contact with skin
H314	Causes severe skin burns and eye damage
H320	Causes eye irritation
H331	Toxic if inhaled
H401	Toxic to aquatic life

Precautionary Statements (US-GHS):

ID	Precautionary Statement
P102	Keep out of reach of children
P103	Read label before use
P220	Keep/Store away from clothing/acids/foodstuffs/combustible materials
P233	Keep container tightly closed
P234	Keep only in original container
P235	Keep cool

ID	Precautionary Statement
P261	Avoid breathing dust/fume/gas/mist/vapours/spray
P262	Do not get in eyes, on skin, or on clothing
P264	Wash exposed skin thoroughly after handling
P270	Do not eat, drink or smoke when using this product
P271	Use only outdoors or in a well-ventilated area
P273	Avoid release to the environment
P280	Wear protective gloves/protective clothing/eye protection/face protection
P301+310	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER or doctor/physician
P303+361+353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P305+351+338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing
P309+311	IF exposed or you feel unwell: Call a POISON CENTER or doctor/physician
P321	Specific treatment (see items on label and SDS)
P330	If swallowed, rinse mouth
P332+313	If skin irritation occurs: Get medical advice/attention
P337+313	If eye irritation persists get medical advice/attention
P362	Take off contaminated clothing and wash before reuse
P370	In case of fire use extinguishers suitable for surrounding fire (avoid CO2).
P403+233	Store in a well ventilated place. Keep container tightly closed
P405	Store locked up
P501	Dispose of contents/waste/container according to national/state/local regulations

Hazards Not Otherwise Classified	None known.
Ingredients with Unknown Toxicity	None >1%

3. COMPOSITION/INFORMATION ON INGREDIENTS

Coatalyte/Activator (Activator #4):

Chemical Name	Common Name	CAS-No	Concentration (Wt%)
Sodium Cyanide	Prussiate	143-33-9	< 7
Sodium Carbonate Monohydrate	Soda Ash Light	497-19-8 (Anhydrous)	< 5
Components not designated as hazardous or <1 wt% or carcinogen <0.1 wt%	Various	Various	> 88

Note Because of manufacturing variances and possible product improvements, the compositions and physical properties listed here should be considered representative. The values listed should not be construed as specifications.

4. FIRST AID MEASURES

Description of First Aid Measures:	
General Information:	Move to fresh air; flush affected area with water (especially under eyelids if eyes affected); remove contaminated clothing; treat for shock as necessary. Never give anything by mouth to an unconscious person.
Following Inhalation:	Move to fresh air. If breathing stops, give artificial respiration/oxygen as appropriate. Call physician.
Following Eye contact:	Rinse with clear water, especially under eyelid. Consult Physician.
Following Skin contact:	Wash affected area with soap and water. Consult physician if irritation occurs.
Following Ingestion:	Call a poison control center (PCC)/physician/emergency responders immediately and follow instructions. If victim is conscious: Rinse mouth. If directed, administer water or milk and/or oxygen if symptoms develop. Do not administer emetic or induce vomiting. Never give anything by mouth to an unconscious person. If victim has stopped breathing: Call a poison control center (PCC)/physician/emergency responders immediately and follow instructions. As a part of safety planning, consult physician regarding use of oxygen/amyl nitrate especially if heart conditions exist in workers.
Most Important Symptoms and Effects	--
Acute:	Irritant to skin, eyes and other mucous membranes. TLV 'skin' notation indicates that cyanide may penetrate the skin, especially if broken.
Delayed:	DUPONT suggests that small exposures to cyanide continuing over a long period have caused decreased thyroid activity and kidney changes. Long-term administration to dogs have produced unspecified acute intoxication symptoms, increased numbers of red blood cells, decreased proteins and central nervous system changes. Literature indicates that body can metabolize small amounts of cyanide without chronic/long term residual effects.
Indication of Immediate Medical Attention and Special Treatment Needed:	Cyanide Exposure: Weakness, dizziness, confusion, headache, vomiting, skin/mucous membrane irritation. In the extreme case, cyanosis, unconsciousness and death. Cyanide disrupts the oxidative mechanism; skin may have deceptively healthy pink to red color but with injury or lack of oxygen may be bluish. Prompt action is needed to prevent further injury or death.

Note to physicians:	DUPONT suggests that intravenous injections by a physician of sodium nitrite and sodium thiosulfate may be useful for severe cyanide exposure. Without symptoms, no treatment is suggested--decontaminate and observe for at least 30 minutes (the biological half-life of cyanide in the body is about 20-90 minutes). An expansive discussion of cyanide first aid from the DUPONT MSDS is available on request. The Center for Disease Control also offers guidance for cyanide emergencies at http://www.bt.cdc.gov/agent/cyanide/ . Note: Dupont suggests that to prepare activated charcoal slurry, mix thoroughly 50 g of activated charcoal in 400 ml (about 2 cups) water.
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5. FIRE-FIGHTING MEASURES

Extinguishing Media:	As appropriate for surrounding fire.
Extinguishing Media Which must not be used for safety reasons:	Avoid CO2 or acid-based extinguishers in confined area because they may react with spilled material to produce HCN.
Hazardous combustion products:	On extreme heating or mixing with acids: metal oxides, nitrous oxides, cyanates, and/or flammable HCN gas.
Special exposure hazards arising from the substance or mixture:	If material is free to mix with water, mixing may result in toxic water runoff.
Conditions of Flammability:	Not flammable (aqueous solution). See Section 9: Physical and Chemical Properties.
Advice for fire-fighters:	Wear self-contained breathing apparatus.
Additional information:	Collect contaminated fire extinguishing water separately. Do not allow entering drains or surface water.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:	Control access to spill area. Ensure adequate ventilation and avoid direct contact with material.
Environmental precautions:	Comply with all national, regional and local regulations for ultimate disposal of cyanide waste solution. Do not flush cyanide compounds into sewers which may contain an acid. Use toxic material disposal service or hypochlorite detoxification.
Methods for containment:	Use inert, absorbent material.
Methods for clean-up:	Confine material in appropriately marked container. After pickup, clean affected area with mild hypochlorite (bleach, etc.)
Additional information:	Dispose of in accordance with local, regional and national regulations.

7. HANDLING AND STORAGE

Precautions for safe handling:	--
Handling:	DO NOT TAKE INTERNALLY. USE IN WELL-VENTILATED AREA. DO NOT MIX WITH OTHER CHEMICALS. Keep container closed when not in use. Keep away from children. Activator 4 may give off some ammonia gas during use, and under unusual conditions, HCN.
Usage:	To reduce the possibility of injury by splatter or obstruction of ventilation/air movement, do not crowd workpiece with body or face. Avoid conditions that could allow workpiece to: bend/spring-back and "flick" solution; or drop into puddled solution and splash.
Storage:	Store/use in ventilated areas and avoid temperature extremes. Keep away from foodstuff, acids and other incompatible materials. Do not store near combustible/flammable materials (in the event of fire and container rupture, there is the potential for cyanide solution runoff from fire-fighting water). As a strong poison, cyanides should be controlled and handled by responsible individuals. Keep away from children and foodstuff.
Specific end use(s):	Recommendations: Observe instructions for use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limit values:			
Chemical Name	ACGIH TWA	ACGIH STEL	OSHA PEL
Cyanide Compounds	Not Listed.	5(Skin)C mg/m3 - as CN	5(Skin) mg/m3 - as CN
Sodium Carbonate Monohydrate	Not Listed.	Not Listed.	15 mg/m3 - Particulates Not Otherwise Regulated (PNOR); 5 - Respirable fraction
Sodium Cyanide	Not Listed.	5(Skin)C mg/m3	5(Skin) mg/m3 - as CN
Note	Under normal conditions of evaporation, only the water phase is expected to evaporate leaving the soluble salts behind. Any TWA is thus believed to be meaningful only for the abnormal case in which the solution as a whole is introduced into the air as an aerosol.		
Exposure controls:	--		
Engineering Controls:	Local exhaust.		
Personal protective equipment:	As appropriate for conditions of use: Chemical aprons/suits, eye wash fountain, safety shower.		
Respiratory protection:	NIOSH approved dust/mist respirator.		
Eye protection:	Chemical splash goggles/face shield. Avoid use of contact lenses.		
Hand protection:	Gloves, rubber, e.g., butyl or neoprene.		
Skin protection:	As appropriate for conditions of use: Rubber aprons/suits		
Environmental exposure controls:	Maintain levels below community environmental protection thresholds.		
General hygiene considerations:	DO NOT TAKE INTERNALLY. Keep away from eyes and out of open wounds. Practice good industrial/personal hygiene and safety practice; do not smoke/eat/drink in area of use; wash hands after use; wash clothing/materials that may have come in contact with chemicals.		

9. PHYSICAL AND CHEMICAL PROPERTIES

Coatalyte/Activator (Activator #4):

Physical state:	Liquid	Vapour pressure:	As Water
Appearance	Liquid	Vapor density:	As Water
Color:	Red	Relative Density:	1.03
Odor:	Slight ammonia odor.	Solubility (in water):	Aqueous solution--soluble in water.
pH:	11	Partition coefficient: n-octanol/water:	As Water
Melting point / melting range:	< 0° C (< 32° F)	Auto-ignition temperature:	Not Applicable (aqueous solution)
Boiling point / boiling range:	> 100° C (> 212° F)	Decomposition Temperature:	Not Applicable (aqueous solution)
Flash point:	Not Applicable (aqueous solution)	Viscosity:	As Water
Evaporation rate:	As Water	Oxidizing properties:	Not Applicable
Flammability (solid, gas):	Not Flammable	Explosion Data-Mechanical Impact:	Insensitive
Upper / Lower Flammability Limit--Explosive Limits:	Not Applicable (aqueous solution)	Explosion Data-Static Discharge:	Insensitive

10. STABILITY AND REACTIVITY

Reactivity:	Reacts with acids to release HCN gas
Chemical Stability:	Stable
Possibility of Hazardous Reactions:	On extreme heating or mixing with acids: metal oxides, nitrous oxides, cyanates, and/or flammable HCN gas.
Conditions to avoid:	High heat. Mixing with incompatible materials.
Incompatible Materials:	Acids, acid salts, and weak alkalies. Strong oxidizers (e.g. nitrates and chlorites) may react exothermally.
Hazardous decomposition products:	On extreme heating or mixing with acids: metal oxides, nitrous oxides, cyanates, and/or flammable HCN gas.

11. TOXICOLOGICAL INFORMATION

Toxic Levels:

Source	Chemical Name	LD50 (mg/kg)	LC50 (mg/M3)	IARC Listed	NTP Listed	OSHA Listed	ACGIH Carcinogenicity Listed
Act4	Cyanide Compounds	7 -11 OR - as Sodium Cyanide	15 R (4hr) (4 Hr)	No	No	No	No
Act4	Sodium Carbonate Monohydrate	4090 OR	2300 IR	No	No	No	No
Act4	Sodium Cyanide	7 -11 OR -as Sodium Cyanide	15 R (4 Hr)	No	No	No	No

Estimated Product LD50 (mg/kg) 154.56

EFFECTS OF ACUTE EXPOSURE

Eye contact:	Potential for eye irritation or chemical burns.
Inhalation:	Mist can cause respiratory irritation.
Skin contact:	Can cause skin irritation or chemical burns. Note that Cyanide TWA has a "skin" notation.
Ingestion:	Potentially toxic by ingestion.

EFFECTS OF CHRONIC EXPOSURE

Target organs:	Eyes, skin, cardiovascular system, central nervous system, thyroid, blood
Chronic Effects:	DUPONT suggests that small exposures to cyanide continuing over a long period have caused decreased thyroid activity and kidney changes. Long-term administration to dogs have produced unspecified acute intoxication symptoms, increased numbers of red blood cells, decreased proteins and central nervous system changes. Literature indicates that body can metabolize small amounts of cyanide without chronic/long term residual effects.
Carcinogenicity:	No component has been identified as a carcinogen.
Mutagenicity:	Unknown
Reproductive Effects:	DUPONT reports that limited reproductive studies do not suggest effects from sodium cyanide. Some tests have shown the potential for developmental toxicity but only at exposure levels producing toxic effects in the adult animal.
Developmental Effects:	--
Teratogenicity:	None known.
Embryotoxicity:	DUPONT reports that limited reproductive studies do not suggest effects from sodium cyanide. Some tests have shown the potential for developmental toxicity but only at exposure levels producing toxic effects in the adult animal.
Skin Sensitization:	None known.
Respiratory Sensitization:	None known.
Toxicologically Synergistic Materials	None known.

12. ECOLOGICAL INFORMATION

Specific Toxicity:

Chemical Name	Effect dose/concentration	Test duration	Species	Result/Evaluation	Method	Remark
Sodium Carbonate Monohydrate	EC50 200-227 mg/L	48 Hrs	ceriodaphnia (Water flea)	EC50	Unknown	-
Sodium Carbonate Monohydrate	LC50 300 mg/L	96 Hrs	Bluegill sunfish	LC50	Unknown	-
Sodium Cyanide	EC50 10 mg/l	48 Hrs	Water flea (Daphnia pulex)	EC50	Unknown	Information given is based on data obtained from similar substances

Chemical Name	Effect dose/concentration	Test duration	Species	Result/Evaluation	Method	Remark
Sodium Cyanide	EC50 0.05 mg/l	96 Hrs	Algae	EC50	Unknown	Information given is based on data obtained from similar substances
Sodium Cyanide	LC50 ca. 0.025 mg/l	96 Hrs	Fish	LC50	Unknown	Information given is based on data obtained from similar substances

Persistence and degradability:	Cyanide biodegrades.
Bioaccumulative potential:	Cyanide biodegrades.
Mobility in soil:	Cyanide is water soluble.
Results of PBT and vPvB Assessment:	None known.
Other adverse effects:	None known.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods:	Comply with all national, regional and local regulations for ultimate disposal of cyanide waste solution. Do not flush cyanide compounds into sewers which may contain an acid. Use toxic material disposal service or hypochlorite detoxification.
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14. TRANSPORT INFORMATION

Coatalyte/Activator (Activator #4):		
Information List	US DOT	IATA
UN Number	UN 2922	UN 2922
Hazard Class	8 (6.1)	8 (6.1)
Packing Group	II	II
Proper Shipping Name	Corrosive Liquids, Toxic, n.o.s.	Corrosive Liquid, Toxic, n.o.s.
Technical Name (if needed)	(Sodium Cyanide Solution)	(Sodium Cyanide Solution)
Labels	Corrosive, Poison	Corrosive, Toxic
Marine Pollutant	No	
Special Precautions	None beyond those above.	
Transport in Bulk	Not Applicable	

15. REGULATORY INFORMATION

Spill Notifications:	Notify local Safety Coordinators. If spill quantity warrants, notify appropriate government officials.
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Safety, health and environmental regulations/legislation specific for the substance or mixture

US Federal:

Chemical Name	CAS	CERCLA RQ (lbs)	Section 302 EHS TPQ (lbs)	Section 304 EHS RQ (lbs)	Section 313	RCRA Code
Cyanide Compounds	N106	CERCLA Class (No RQ)	Not Listed	Not Listed	313	Not Listed
Sodium Carbonate	497-19-8 (Anhydrous)	Not Listed	Not Listed	Not Listed	Not Listed	Not Listed
Sodium cyanide (Na(CN))	143-33-9	10	100	10	313c	P106

FEDERAL: 'Superfund Amendments and Reauthorization Act (SARA) of 1986': This product contains a toxic chemical subject to Title III SARA, Section 313 and 40 CFR Part 372 toxic chemical release reporting requirements.

Canada:

Chemical Name	CAS	WHMIS Note	WHMIS Class
Cyanide Compounds	N106	Discl; 1%	-
Sodium Carbonate	497-19-8 (Anhydrous)	Toxic, Corrosive; D2B, E	D2B Toxic Material Causing Other Toxic Effects 1 eye irritation in animals E Corrosive Material 2 corrodes aluminum surfaces
Sodium Cyanide	143-33-9	Very Toxic, Corrosive; D1A, E; 1%	D1A Very Toxic Material Causing Immediate and Serious Toxic Effects 1 Transportation of Dangerous Goods: Class 6.1 Group I E Corrosive Material 2 strong base (pH calculated = 11.7)

California:

Chemical Name	CAS	CA Prop 65 Toxicity	CA Acutely Hazardous TQ	CA Hazardous Substance	CA Hazardous Note
Cyanide Compounds	N106	Toxicity	Not Listed	Listed	--
Cyanide Compounds	N106	Toxicity, male	Not Listed	Listed	--
Sodium Carbonate	497-19-8 (Anhydrous)	Not Listed	Not Listed	Not Listed	--
Sodium Cyanide	143-33-9	Toxicity	Not Listed	Listed	--

CALIFORNIA: 'Safe Drinking Water and Toxic Enforcement Act of 1986' (Proposition 65): WARNING: This product contains a chemical known to the State of California to be toxic, and/or cause birth defects or other developmental/reproductive harm. Other listed chemicals may be present in the new/used product from trace amounts in the raw materials or by virtue of product use and contact with other materials.

16. OTHER INFORMATION

Key literature references and sources for data:
Centers for Disease Control and Prevention, NIOSH Pocket Guide to Chemical Hazards (05/18/2016)
Dudavari, Susan, Editor, The Merk Index (01/01/1989)
Sax, N. Irving, Dangerous Properties of Industrial Materials (01/01/1979)
ACGIH, 2013 TLVs and BEIs- (Threshold Limit Values for Chemical Substances in Work Air Adopted by ACGIH) (03/01/2013)

Key literature references and sources for data:	
National Toxicology Program (USHHS/PHS), 14th Report on Carcinogens (11/03/2016)	
IARC, Overall Evaluations of Carcinogenicity to Humans As evaluated in IARC Monographs Volumes 1-120 (05/17/2017)	
EPA, Title III List of Lists: Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(r) of the Clean Air Act, As Amended (03/01/2015)	
Code of Federal Regulations 29, Labor, Parts 1910.1000, SubPart Z	
Code of Federal Regulations 40, Protection of the Environment	
Code of Federal Regulations 49, Transportation	
California Code of Regulations 22 Division 2, Safe Drinking Water and Toxic Enforcement Act of 1986", "Chemicals known to the State to Cause Cancer and Reproductive Toxicity (12/29/2017)	
Toxicological Index Service, CSST, Classification according to WHMIS 1988 (12/13/2013)	
Toxicological Index Service, CSST, WHMIS Disclosure list (Repealed 2/11/2015) (04/15/2014)	
Canadian Centre for Occupational Health and Safety, Information Elements Required on a WHMIS 2015 Safety Data Sheet (SDS) (02/11/2015)	
IATA, Dangerous Goods Regulations, 59th Edition (01/01/2018)	
Various Chemical Suppliers, MSDS's which did not identify chemicals as hazardous	
Canadian centre for Occupational Health and Safety, First Aid for Chemical Exposures (01/09/2017)	
National Library of Medicine, TOXNET	
National Capital Poison Center, First Aid for Poisons (12/31/2017)	
Canadian Centre for Occupational Health and Safety, The Safety Data Sheet -- A Guide to First Aid Recommendations (01/02/2018)	
SDS for Sodium Carbonate	
SDS for Sodium Cyanide	

Disclaimer:	<p>This Material Data Sheet was prepared in accordance with US/Canadian guidelines. All information, recommendations and suggestions appearing herein concerning our product are based upon information and data believed to be reliable. However, it is the user's responsibility to determine the safety, toxicity and suitability of the product described herein for his/her own use. Since the actual use by others is beyond our control, no guarantees expressed or implied are made by Rapid Electroplating Process, Inc. as to the effects of such use, the results to be obtained, or the safety and toxicity of the product, nor does Rapid Electroplating Process, Inc. assume any liability arising out of use by others of the product referred to herein. Nor is the information herein to be construed absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.</p> <p>Versions of this MSDS in languages other than English may have been translated by automated means (e.g., GOOGLE Translate™). Content of the non-English version should be confirmed by the user against the English version to ensure correct translation.</p>
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Edition Date:	Jan 2018	Prepared by:	R. F. Rapids
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