

Photographers' Formulary Cyanotype Kit

solution until the desired color is achieved. Wash in running water for 15 minutes, then dry.

TROUBLESHOOTING

Problem	Explanation
Areas of the coated surface were pre-exposed even before printing.	The areas where the support was dried is too humid, OR the chemicals are too old.
The emulsion on the negative was eaten away during exposure	The support was still damp when exposed.
The print started to develop in sunlight.	Coated surface too damp and started to activate the chemicals prematurely.
Print turned blue and overexposed while drying.	It was not washed enough. To prevent this, rinse well, and dry print in darkened room.
Stains remained in the skin after washing and would not come out.	Stains can be removed only by scrubbing with strong soap. Rubber gloves will prevent skin stains.

This kit contains the chemicals to prepare 1000 ml of sensitizer solution to do approximately 24 8 x 10's.

The popular and inexpensive cyanotypes have a long full scale and distinctive blue color. The process can be used to produce a pale white image on a blue background or a blue image on a white background. Cyanotype is an ultraviolet contact printing process that requires a negative the same size as the print you wish. The image can be transferred to a variety of media; paper, cloth, leather, etc.

The blue color of the print is due to Prussian blue formed from the reaction of ferrous ions (from photo reduction of the ferric ammonium citrate) and potassium ferricyanide. Under most conditions the image is permanent; however, Prussian blue will fade when alkaline. Since perspiration is alkaline a cyanotype print can be permanently damaged if it is touched. Cyanotype prints tend to fade in strong light. The color will return if the print is stored in a dark damp area. A faded Cyanotype can also be treated with a hydrogen peroxide oxidation bath to restore its color.

CHEMICALS CONTAINED IN THIS KIT

This kit contains the following chemicals:

Chemical	Amount
arrowroot starch	20 g
potassium ferricyanide	40 g
ferric ammonium citrate (green scale)*	100 g
potassium dichromate	1 g

* Ferric ammonium citrate (green scale) is somewhat light sensitive and should be stored in the dark.

CHEMICAL SAFETY

All chemicals are dangerous and must be treated with respect. Please read the chemical warnings on each package. The chemicals in this kit need special attention: potassium ferricyanide and potassium dichromate.

Potassium ferricyanide. In spite of the fact that this compound contains cyanide, it is not particularly toxic. The reason is that the cyanide groups are bound to the iron atom and are not free to act as a poison. The cyanide groups can be released as hydrogen cyanide gas if the potassium ferricyanide is placed in a strong acid solution; however, strong acid is not used in the cyanotype process.

To dispose of excess potassium ferricyanide (solid or in solution), wash the material down the sink with excess water.

Potassium dichromate is both toxic and an oxidizer (supplies oxygen to a fire). To dispose of excess solid potassium dichromate always wash the solid down a drain with a large volume of water. Never dispose of the compound in a wastepaper basket.

Spillage of a dichromate solution on the skin will cause a chemical burn, which will appear as an ulceration. In addition, all chromium salts are potential carcinogens. We strongly advise you to use disposable rubber gloves when handling this compound or its solutions. Clean all trays and containers thoroughly with water

10-0240



Material Safety Data Sheet

NFPA 	HMIS <table border="1"> <tr> <td>Health Hazard</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Fire Hazard</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Reactivity</td> <td style="text-align: center;">0</td> </tr> </table>	Health Hazard	1	Fire Hazard	1	Reactivity	0	Personal Protective Equipment See Section 15.
Health Hazard	1							
Fire Hazard	1							
Reactivity	0							

Section 1. Chemical Product and Company Identification			
Common Name/ Trade Name	Starch <i>Arrowroot Starch</i>	Code	S4830
Manufacturer	SPECTRUM CHEMICAL MFG. CORP. 14422 SOUTH SAN PEDRO STREET GARDENA, CALIFORNIA 90248-9985	CAS#	9005-25-8
Commercial Name(s)	Not available.	RTECS	GM5090000
Synonym	Not available.	TSCA	On the TSCA list.
Chemical Name	Not available. <i>Arrowroot Starch</i>	CI#	Not available.
Chemical Family	Not available.	In case of emergency	
Chemical Formula	Not available.	CHEMTREC (24hr) 800-424-9300	
Supplier	SPECTRUM QUALITY PRODUCTS 14422 S. SAN PEDRO STREET GARDENA, CA 90248-9985	Emergency phone: (310) 516-8000	

Section 2. Composition and Information on Ingredients					
			<i>Exposure Limits</i>		
Name	CAS#	TWA (mg/m3)	STEL (mg/m3)	CEIL (mg/m3)	% by Weight
Starch	9005-25-8				100
Toxicological Data on Ingredients Starch:					

Section 3. Hazards Identification	
Potential Acute Health Effects	Very slightly to slightly dangerous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.
Potential Chronic	CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. Toxicity of the product to the reproductive system: Not available. There

Health Effects

is no known effect from chronic exposure to this product. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4. First Aid Measures

Eye Contact NO known EFFECT on eye contact, rinse with water for a few minutes.

Skin Contact If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical touches the victim's exposed skin, such as the hands: Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Hazardous Skin Contact No additional information.

Inhalation Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Hazardous Inhalation No additional information.

Ingestion Remove dentures if any. Have conscious person drink several glasses of water or milk. INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. NEVER give an unconscious person anything to ingest. Seek medical attention.

Hazardous Ingestion No additional information.

Section 5. Fire and Explosion Data

Flammability of the Product Combustible.

Auto-Ignition Temperature Not available.

Flash Points Not available.

Flammable Limits Not available.

Products of Combustion	Not available.
Fire Hazards in Presence of Various Substances	No specific information is available in our database regarding the flammability of this product in presence of various materials.
Explosion in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. No specific information is available in our database regarding the product's risks of explosion in the presence of various materials.
Fire Fighting Media and Instructions	SMALL FIRE: Use DRY chemicals, CO2, water spray or foam. LARGE FIRE: Use water spray, fog or foam. DO NOT use water jet.
Special Remarks on Fire Hazards	No additional remark.
Special Remarks on Explosion Hazards	No additional remark.

Section 6. Accidental Release Measures

Small Spill	Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.
Large Spill	Our database contains no additional information in case of a spill and/or a leak of the product. Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7. Handling and Storage

Precautions	Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. DO NOT breathe dust.
Storage	Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Personal Protection	Safety glasses. Lab coat.
Personal	Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient;

**Protection in
Case of a
Large Spill**

Exposure Limits TWA: 10 (mg/m) from ACGIH [1995] Consult local authorities for acceptable exposure limits.

Section 9. Physical and Chemical Properties

Physical state and appearance	Solid.	Odor	Not available.
Molecular Weight	Not available.	Taste	Not available.
pH (1% soln/water)	Not available.	Color	Not available.
Boiling Point	Not available.		
Melting Point	Decomposes.		
Critical Temperature	Not available.		
Specific Gravity	Not available.		
Vapor Pressure	Not available.		
Vapor Density	Not available.		
Volatility	Not available.		
Odor Threshold	Not available.		
Evaporation rate	Not available.		
Viscosity	Not available.		
Water/Oil Dist. Coeff.	Not available.		
Ionicity (in Water)	Not available.		
Dispersion Properties	Not available.		
Solubility	Not available.]		

Section 10. Stability and Reactivity Data

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	No additional remark.
Incompatibility with Various Substances	No specific information is available in our database regarding the reactivity of this material in presence of various other materials.
Corrosivity	Non-corrosive in presence of glass.
Special Remarks on Reactivity	No additional remark.
Special Remarks on Corrosivity	No additional remark.

Section 11. Toxicological Information

Routes of Entry	Ingestion.
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Section 15. Other Regulatory Information and Pictograms

Federal and State Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires emergency planning based on Threshold Planning Quantities (TPQs) and release reporting based on Reportable Quantities (RQs) in 40 CFR 355 (used for SARA 302, 304, 311 and 312). Components present in this product at a level which could require reporting under the statute are:

NONE

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires submission of annual report release of toxic chemicals that appear in 40 CFR 372 (used for SARA 313). This information must be included in all MSDSs that are copied and distributed for this material. Components present in this product at a level which could require reporting under the statute are:

NONE

Pensylvania Right-To-Know, Hazardous substance List, Hazardous Substances and Special hazardous Substances on the list must be identified when present in products. Components present in this product at a level which could require reporting under the statute are:

Starch

Massachusetts Right-To-Know, Substance List (MSL) Hazardous Substances and Extraordinarily Hazardous Substances on the MSL must be identified when present in products. Components present in this product at a level which could require reporting under the statute are:

NONE

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center of release of quantities of Hazardous Substances equal or greater than the reportable quantities (RQs) in 40 CFR 302.4. Components present in this product at a level which could require reporting under the statute are:

NONE

WARNING: This product contains a chemical known to the State of California to cause cancer. Chemical ingredient(s) requiring this warning:

NONE

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Chemical ingredient(s) requiring this warning: NONE

Other Classifications

WHMIS (Canada)

DSCL (EEC)

Toxicity to Animals LD50: Not available. LC50: Not available.

Chronic Effects on Humans Toxicity of the product to the reproductive system: Not available.

Other Toxic Effects on Humans Very slightly to slightly dangerous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals No additional remark.

Special Remarks on Chronic Effects on Humans No additional remark.

Special Remarks on other Toxic Effects on Humans Nuisance dust.

Section 12. Ecological Information

Ecotoxicity Not available.

BOD5 and COD Not available.

Products of Biodegradation Not available.

Toxicity of the Products of Biodegradation The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation No additional remark.

Section 13. Disposal Considerations

Waste Disposal Recycle to process, if possible. Consult your local or regional authorities.

Section 14. Transport Information

DOT Classification Not a DOT controlled material (United States).

Identification Not applicable (PIN and PG).

Special Provisions for Transport Not applicable.

DOT (Pictograms)

Other Classifications

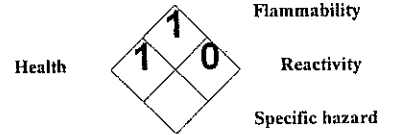
WHMIS (Canada)

DSCL (EEC)

HMIS (U.S.A.)

Health Hazard	<input type="radio"/>
Fire Hazard	<input checked="" type="radio"/>
Reactivity	<input checked="" type="radio"/>
Personal Protection	<input type="radio"/>

National Fire Protection Association (U.S.A.)



Personal Protective Equipment



Lab coat.



Safety glasses.

Section 16. Other Information

References Not available.

Catalog Number(s) S1551, S1552, S1553, S1554, S1557

Other Special Considerations No additional remark.

Validated by E. Brull on 12/17/96.

Verified by E. Brull.
Name

Emergency Phone: (310)516-8000

Notice to Reader

All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum Chemical Mfg. Corp. assumes no responsibility for the completeness or accuracy of the information contained herein.



Gardena, CA

Material Safety Data Sheet

NEPA	HMIS	Personal Protective Equipment						
	<table border="1"> <tr> <td>Health Hazard</td> <td style="text-align: center;">2</td> </tr> <tr> <td>Fire Hazard</td> <td style="text-align: center;">0</td> </tr> <tr> <td>Reactivity</td> <td style="text-align: center;">0</td> </tr> </table>	Health Hazard	2	Fire Hazard	0	Reactivity	0	<p>See Section 15.</p>
Health Hazard	2							
Fire Hazard	0							
Reactivity	0							

Section 1. Chemical Product and Company Identification	
Common Name/ Trade Name	Potassium ferricyanide
Code	P4290
CAS#	13746-66-2
Manufacturer	SPECTRUM CHEMICAL MFG. CORP. 14422 SOUTH SAN PEDRO STREET GARDENA, CALIFORNIA 90248-9985
RTECS	LJ8225000
TSCA	On the TSCA list.
Commercial Name(s)	Not available
CI#	Not available.
Synonym	Potassium hexacyanoferrate (III)
Chemical Name	potassium ferricyanide
Chemical Family	Not available.
Chemical Formula	K ₃ Fe(CN) ₆
Supplier	SPECTRUM QUALITY PRODUCTS 14422 S. SAN PEDRO STREET GARDENA, CA 90248-9985
In case of emergency CHEMTREC (24hr) 800-424-9300 Emergency phone: (310) 516-8000	

Section 2. Composition and Information on Ingredients					
		Exposure Limits			
Name	CAS#	TWA (mg/m ³)	STEL (mg/m ³)	CEIL (mg/m ³)	% by Weight
Potassium ferricyanide	13746-66-2				100
Toxicological Data on Ingredients	Potassium ferricyanide:				

Section 3. Hazards Identification	
Potential Acute Health Effects	Slightly dangerous to dangerous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Very slightly to slightly dangerous in case of skin contact (permeator). This product may irritate eyes and skin upon contact.
Potential Chronic	CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. The substance is toxic to lungs, mucous membranes. Toxicity of the

Health Effects

product to the reproductive system: Not available. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4. First Aid Measures

Eye Contact

Check for and remove any contact lenses. IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. DO NOT use an eye ointment. Seek medical attention.

Skin Contact

If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical touches the victim's exposed skin, such as the hands: Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. COLD water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Hazardous Skin Contact

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation

Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Hazardous Inhalation

No additional information.

Ingestion

Remove dentures if any. Have conscious person drink several glasses of water or milk. INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. NEVER give an unconscious person anything to ingest. Seek medical attention.

Hazardous Ingestion

No additional information.

Section 5. Fire and Explosion Data

Flammability of the Product Non-flammable.

Auto-Ignition Temperature Not applicable.

Flash Points Not applicable.

Flammable Limits Not applicable.

Products of Combustion	Not applicable.
Fire Hazards in Presence of Various Substances	Not applicable.
Explosion in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. No specific information is available in our database regarding the product's risks of explosion in the presence of various materials.
Fire Fighting Media and Instructions	Non-flammable.
Special Remarks on Fire Hazards	No additional remark.
Special Remarks on Explosion Hazards	No additional remark.

Section 6. Accidental Release Measures

Small Spill	Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.
Large Spill	Our database contains no additional information in case of a spill and/or a leak of the product. Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7. Handling and Storage

Precautions	DO NOT ingest. DO NOT breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.
Storage	No specific storage is required. Use shelves or cabinets sturdy enough to bear the weight of the chemicals. Be sure that it is not necessary to strain to reach materials, and that shelves are not overloaded.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Personal Protection	Splash goggles. Lab coat. Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Gloves (impervious). Wear appropriate respirator when ventilation is inadequate.
Personal	Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus

**Protection in
Case of a
Large Spill**

sufficient; consult a specialist BEFORE handling this product.

**Exposure
Limits**

Not available.

Section 9. Physical and Chemical Properties

Physical state and appearance	Solid.	Odor	Not available.
Molecular Weight	329.25	Taste	Not available.
pH (1% soln/water)	Not available.	Color	Not available.
Boiling Point	Not available.		
Melting Point	Decomposes.		
Critical Temperature	Not available.		
Specific Gravity	1.85 (Water = 1)		
Vapor Pressure	Not available.		
Vapor Density	Not available.		
Volatility	Not available.		
Odor Threshold	Not available.		
Evaporation rate	Not available.		
Viscosity	Not available.		
Water/Oil Dist. Coeff.	Not available.		
Ionicity (in Water)	Not available.		
Dispersion Properties	See solubility in water.		
Solubility	Soluble in cold water.		

Section 10. Stability and Reactivity Data

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	No additional remark.
Incompatibility with Various Substances	No specific information is available in our database regarding the reactivity of this material in presence of various other materials.
Corrosivity	Non-corrosive in presence of glass.
Special Remarks on Reactivity	No additional remark.
Special Remarks on Corrosivity	No additional remark.

Section 11. Toxicological Information

Routes of Entry	Ingestion. Inhalation.
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Toxicity to Animals LD50: Not available. LC50: Not available.

Chronic Effects on Humans The substance is toxic to lungs, mucous membranes. Toxicity of the product to the reproductive system: Not available.

Other Toxic Effects on Humans Slightly dangerous to dangerous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Very slightly to slightly dangerous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals No additional remark.

Special Remarks on Chronic Effects on Humans No additional remark.

Special Remarks on other Toxic Effects on Humans No additional remark.

Section 12. Ecological Information

Ecotoxicity Not available.

BOD5 and COD Not available.

Products of Biodegradation Some metallic oxides.

Toxicity of the Products of Biodegradation The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation No additional remark.

Section 13. Disposal Considerations

Waste Disposal Recycle to process, if possible. Consult your local or regional authorities.

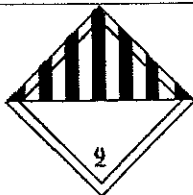
Section 14. Transport Information

DOT Classification DOT CLASS 9: Miscellaneous hazardous material.

Identification Environmentally hazardous substance, solid, n.o.s. (Potassium ferricyanide) UN3077 III

Special Provisions for Transport Marine Pollutant

DOT (Pictograms)



Section 15. Other Regulatory Information and Pictograms

Federal and State Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires emergency planning based on Threshold Planning Quantities (TPQs) and release reporting based on Reportable Quantities (RQs) in 40 CFR 355 (used for SARA 302, 304, 311 and 312). Components present in this product at a level which could require reporting under the statute are:

NONE

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires submission of annual report release of toxic chemicals that appear in 40 CFR 372 (used for SARA 313). This information must be included in all MSDSs that are copied and distributed for this material. Components present in this product at a level which could require reporting under the statute are:

NONE

WARNING: This product contains a chemical known to the State of California to cause cancer. Chemical ingredient(s) requiring this warning:

NONE

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Chemical ingredient(s) requiring this warning: NONE

Other Classifications

WHMIS (Canada)

WHMIS CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC)

R37- Irritating to respiratory system.
R42- May cause sensitization by inhalation.

Other Classifications

WHMIS (Canada)

WHMIS CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

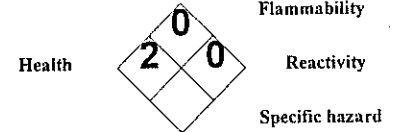
DSCL (EEC)

R37- Irritating to respiratory system.
R42- May cause sensitization by inhalation.

HMIS (U.S.A.)

Health Hazard	1
Fire Hazard	0
Reactivity	0
Personal Protection	0

National Fire Protection Association (U.S.A.)



Personal Protective Equipment



Protective Gloves (impervious).



Lab coat.



Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.



Splash goggles.

Section 16. Other Information**References** Not available.**Catalog Number(s)** P1285, P1286**Other Special Considerations** No additional remark.**Validated by** E. Brull on 12/17/96.**Verified by** E. Brull.
Name**Emergency Phone:** (310)516-8000**Notice to Reader**

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10-0500



Material Safety Data Sheet

NFPA	HMIS		Personal Protective Equipment
	Health Hazard	(2)	 See Section 15.
Fire Hazard	(1)		
Reactivity	(0)		

Section 1. Chemical Product and Company Identification																	
Common Name/ Trade Name	Ferric ammonium citrate																
Manufacturer	SPECTRUM CHEMICAL MFG. CORP. 14422 SOUTH SAN PEDRO STREET GARDENA, CALIFORNIA 90248-9985																
Commercial Name(s)	Not available																
Synonym	Not available.																
Chemical Name																	
Chemical Family	Not available.																
Chemical Formula	Not available.																
Supplier	SPECTRUM QUALITY PRODUCTS 14422 S. SAN PEDRO STREET GARDENA, CA 90248-9985																
	<table border="1"> <tr> <td>Code</td> <td>F3087</td> </tr> <tr> <td>CAS#</td> <td>1185-57-5</td> </tr> <tr> <td>RTECS</td> <td>GE7540000</td> </tr> <tr> <td>TSCA</td> <td>On the TSCA list.</td> </tr> <tr> <td>CI#</td> <td>Not available.</td> </tr> <tr> <td colspan="2">In case of emergency</td> </tr> <tr> <td colspan="2">CHEMTREC (24hr) 800-424-9300</td> </tr> <tr> <td colspan="2">Emergency phone: (310) 516-8000</td> </tr> </table>	Code	F3087	CAS#	1185-57-5	RTECS	GE7540000	TSCA	On the TSCA list.	CI#	Not available.	In case of emergency		CHEMTREC (24hr) 800-424-9300		Emergency phone: (310) 516-8000	
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CAS#	1185-57-5																
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TSCA	On the TSCA list.																
CI#	Not available.																
In case of emergency																	
CHEMTREC (24hr) 800-424-9300																	
Emergency phone: (310) 516-8000																	

Section 2. Composition and Information on Ingredients					
		<i>Exposure Limits</i>			
Name	CAS#	TWA (mg/m3)	STEL (mg/m3)	CEIL (mg/m3)	% by Weight
Ferric ammonium citrate	1185-57-5				100
Toxicological Data on Ingredients		Ferric ammonium citrate:			

Section 3. Hazards Identification	
Potential Acute Health Effects	Very dangerous in case of eye contact (irritant). Slightly dangerous to dangerous in case of skin contact (irritant), of ingestion, of inhalation. This product is an eye irritant. This product may irritate eyes and skin upon contact. Inflammation of the eye is characterized by redness, watering, and itching.
Potential Chronic	Very dangerous in case of eye contact (irritant). Slightly dangerous to dangerous in case of skin contact (irritant), of ingestion, of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC

Health Effects

EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. Toxicity of the product to the reproductive system: Not available.

Section 4. First Aid Measures

Eye Contact

Check for and remove any contact lenses. IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. DO NOT use an eye ointment. Seek medical attention.

Skin Contact

If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical touches the victim's exposed skin, such as the hands: Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. COLD water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Hazardous Skin Contact

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation

Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Hazardous Inhalation

No additional information.

Ingestion

Remove dentures if any. Watch for an obstruction in the victim's mouth. Remove if possible what is causing the obstruction but do not force fingers or a hard object between the victim's teeth. Have conscious person drink several glasses of water or milk. INDUCE VOMITING by sticking finger in throat. Seek immediate medical attention.

Hazardous Ingestion

No additional information.

Section 5. Fire and Explosion Data

Flammability of the Product Combustible.

Auto-Ignition Temperature Not available.

Flash Points Not available.

Flammable Limits Not available.

Products of Combustion	Not available.
Fire Hazards in Presence of Various Substances	No specific information is available in our database regarding the flammability of this product in presence of various materials.
Explosion in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. No specific information is available in our database regarding the product's risks of explosion in the presence of various materials.
Fire Fighting Media and Instructions	SMALL FIRE: Use DRY chemicals, CO2, water spray or foam. LARGE FIRE: Use water spray, fog or foam. DO NOT use water jet.
Special Remarks on Fire Hazards	No additional remark.
Special Remarks on Explosion Hazards	No additional remark.

Section 6. Accidental Release Measures

Small Spill	Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.
Large Spill	Our database contains no additional information in case of a spill and/or a leak of the product. Use a shovel to put the material into a convenient waste disposal container.

Section 7. Handling and Storage

Precautions	Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. DO NOT ingest. DO NOT breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.
Storage	Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Personal Protection	Splash goggles. Lab coat. Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Gloves (impervious). Wear appropriate respirator when ventilation is inadequate.
Personal	Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus

**Protection in
Case of a
Large Spill**

sufficient; consult a specialist BEFORE handling this product.

**Exposure
Limits**

TWA: 1 CEIL: 2 (mg/m3) Consult local authorities for acceptable exposure limits.

Section 9. Physical and Chemical Properties

Physical state and appearance	Solid.	Odor	Not available.
Molecular Weight	Not available.	Taste	Not available.
pH (1% soln/water)	Not available.	Color	Not available.
Boiling Point	Not available.		
Melting Point	Decomposes.		
Critical Temperature	Not available.		
Specific Gravity	Not available.		
Vapor Pressure	Not available.		
Vapor Density	Not available.		
Volatility	Not available.		
Odor Threshold	Not available.		
Evaporation rate	Not available.		
Viscosity	Not available.		
Water/Oil Dist. Coeff.	Not available.		
Ionicity (in Water)	Not available.		
Dispersion Properties	See solubility in water.		
Solubility	Soluble in cold water.]		

Section 10. Stability and Reactivity Data

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	No additional remark.
Incompatibility with Various Substances	No specific information is available in our database regarding the reactivity of this material in presence of various other materials.
Corrosivity	No specific information is available in our database regarding the corrosivity of this product in presence of various materials.
Special Remarks on Reactivity	No additional remark.
Special Remarks on Corrosivity	No additional remark.

Section 11. Toxicological Information

Routes of Entry	Ingestion. Inhalation.
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Section 15. Other Regulatory Information and Pictograms

Federal and State Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires emergency planning based on Threshold Planning Quantities (TPQs) and release reporting based on Reportable Quantities (RQs) in 40 CFR 355 (used for SARA 302, 304, 311 and 312). Components present in this product at a level which could require reporting under the statute are:

NONE

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires submission of annual report release of toxic chemicals that appear in 40 CFR 372 (used for SARA 313). This information must be included in all MSDSs that are copied and distributed for this material. Components present in this product at a level which could require reporting under the statute are:

NONE

Pensylvania Right-To-Know, Hazardous substance List, Hazardous Substances and Special hazardous Substances on the list must be identified when present in products. Components present in this product at a level which could require reporting under the statute are:

Ferric ammonium citrate

Massachusetts Right-To-Know, Substance List (MSL) Hazardous Substances and Extraordinarily Hazardous Substances on the MSL must be identified when present in products. Components present in this product at a level which could require reporting under the statute are:

Ferric ammonium citrate

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center of release of quantities of Hazardous Substances equal or greater than the reportable quantities (RQs) in 40 CFR 302.4. Components present in this product at a level which could require reporting under the statute are:

Ferric ammonium citrate

WARNING: This product contains a chemical known to the State of California to cause cancer. Chemical ingredient(s) requiring this warning:

NONE

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Chemical ingredient(s) requiring this warning: NONE

Other Classifications

WHMIS (Canada)

WHMIS CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC)

R36- Irritating to eyes.

Toxicity to Animals

LD50: Not available. LC50: Not available.

**Chronic Effects
on Humans**

Toxicity of the product to the reproductive system: Not available.

**Other Toxic
Effects on Humans**

Very dangerous in case of eye contact (irritant). Slightly dangerous to dangerous in case of skin contact (irritant), of ingestion, of inhalation.

**Special Remarks on
Toxicity to Animals**

No additional remark.

**Special Remarks
on Chronic Effects
on Humans**

No additional remark.

**Special Remarks
on other Toxic
Effects on Humans**

No additional remark.

Section 12. Ecological Information

Ecotoxicity

Not available.

BOD5 and COD

Not available.

**Products of
Biodegradation**

Not available.

**Toxicity of the
Products of
Biodegradation**

The products of degradation are more toxic.

**Special Remarks on
the Products of
Biodegradation**

No additional remark.

Section 13. Disposal Considerations

Waste Disposal

Recycle to process, if possible. Consult your local or regional authorities.

Section 14. Transport Information

DOT Classification

Not a DOT controlled material (United States).

Identification

NA9118 III

**Special Provisions
for Transport**

Not applicable.

DOT (Pictograms)

Other Classifications

WHMIS (Canada)

WHMIS CLASS D-2B: Material causing other toxic effects (TOXIC).

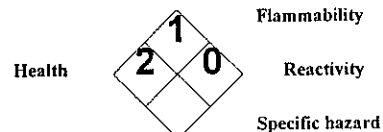
DSCL (EEC)

R36- Irritating to eyes.

HMIS (U.S.A.)

Health Hazard	2
Fire Hazard	1
Reactivity	0
Personal Protection	

National Fire Protection Association (U.S.A.)



Personal Protective Equipment



Protective Gloves (impervious).



Lab coat.



Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

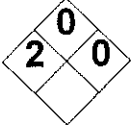



Splash goggles.

Section 16. Other Information**References** Not available.**Catalog Number(s)** F1000, F1001, FE105**Other Special Considerations** No additional remark.**Validated by** E. Brull on 12/17/96.**Verified by** E. Brull.
Name**Emergency Phone:** (310)516-8000

Notice to Reader All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum Chemical Mfg. Corp. assumes no responsibility for the completeness or accuracy of the information contained herein.

Material Safety Data Sheet

NFPA	HMIS	Personal Protective Equipment						
	<table border="1"> <tr> <td>Health Hazard</td> <td align="center">2</td> </tr> <tr> <td>Fire Hazard</td> <td align="center">0</td> </tr> <tr> <td>Reactivity</td> <td align="center">0</td> </tr> </table>	Health Hazard	2	Fire Hazard	0	Reactivity	0	 See Section 15.
Health Hazard	2							
Fire Hazard	0							
Reactivity	0							

Section 1. Chemical Product and Company Identification	
Common Name/ Trade Name	Potassium dichromate
Manufacturer	SPECTRUM CHEMICAL MFG. CORP. 14422 SOUTH SAN PEDRO STREET GARDENA, CALIFORNIA 90248-9985
Commercial Name(s)	Not available.
Synonym	Not available.
Chemical Name	Not available.
Chemical Family	Not available.
Chemical Formula	K ₂ Cr ₂ O ₇
Supplier	SPECTRUM QUALITY PRODUCTS 14422 S. SAN PEDRO STREET GARDENA, CA 90248-9985
Code	P4280
CAS#	7778-50-9
RTECS	HX7680000
TSCA	On the TSCA list.
CI#	Not available.
In case of emergency CHEMTREC (24hr) 800-424-9300 Emergency phone: (310) 516-8000	

Section 2. Composition and Information on Ingredients					
		Exposure Limits			
Name	CAS#	TWA (mg/m ³)	STEL (mg/m ³)	CEIL (mg/m ³)	% by Weight
Potassium dichromate	7778-50-9				100
Toxicological Data on Ingredients	Potassium dichromate:				

Section 3. Hazards Identification	
Potential Acute Health Effects	Very dangerous in case of skin contact (irritant), of eye contact (irritant), of ingestion. Slightly dangerous to dangerous in case of inhalation. Very slightly to slightly dangerous in case of skin contact (corrosive, permeator). This product may irritate eyes and skin upon contact. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.
Potential Chronic	CARCINOGENIC EFFECTS: Classified A1 by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. The substance is toxic to lungs, mucous membranes. Toxicity of the

Health Effects

product to the reproductive system; Not available. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4. First Aid Measures

Eye Contact

Check for and remove any contact lenses. IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. DO NOT use an eye ointment. Seek medical attention.

Skin Contact

If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical touches the victim's exposed skin, such as the hands: Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. COLD water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Hazardous Skin Contact

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation

Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Hazardous Inhalation

No additional information.

Ingestion

Remove dentures if any. Have conscious person drink several glasses of water or milk. INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. NEVER give an unconscious person anything to ingest. Seek medical attention.

Hazardous Ingestion

No additional information.

Section 5. Fire and Explosion Data

Flammability of the Product Non-flammable.

Auto-Ignition Temperature Not applicable.

Flash Points Not applicable.

Flammable Limits Not applicable.

Products of Combustion	Not applicable.
Fire Hazards in Presence of Various Substances	Not applicable.
Explosion in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. No specific information is available in our database regarding the product's risks of explosion in the presence of various materials.
Fire Fighting Media and Instructions	Non-flammable.
Special Remarks on Fire Hazards	No additional remark.
Special Remarks on Explosion Hazards	No additional remark.

Section 6. Accidental Release Measures	
Small Spill	Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.
Large Spill	Our database contains no additional information in case of a spill and/or a leak of the product. Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7. Handling and Storage	
Precautions	Keep locked up. DO NOT ingest. DO NOT breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles as reducing agents, combustible materials, organic materials.
Storage	Carcinogenic, teratogenic or mutagenic materials should be stored in a separate locked safety storage cabinet or room.

Section 8. Exposure Controls/Personal Protection	
Engineering Controls	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Personal Protection	Splash goggles. Lab coat. Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Gloves (impervious). Wear appropriate respirator when ventilation is inadequate.
Personal	Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus

Protection in
Case of a
Large Spill

sufficient; consult a specialist BEFORE handling this product.

Exposure
Limits

TWA: 0.05 (mg/m) from ACGIH Consult local authorities for acceptable exposure limits.

Section 9. Physical and Chemical Properties

Physical state and appearance	Solid.	Odor	Not available.
Molecular Weight	294.2	Taste	Not available.
pH (1% soln/water)	Not available.	Color	Not available.
Boiling Point	Decomposes. (500 .C or 932.F)		
Melting Point	398.C (748.4.F)		
Critical Temperature	Not available.		
Specific Gravity	2.676 (Water = 1)		
Vapor Pressure	Not available.		
Vapor Density	Not available.		
Volatility	Not available.		
Odor Threshold	Not available.		
Evaporation rate	Not available.		
Viscosity	Not available.		
Water/Oil Dist. Coeff.	Not available.		
Ionicity (in Water)	Not available.		
Dispersion Properties	See solubility in water.		
Solubility	Soluble in cold water, hot water.]		

Section 10. Stability and Reactivity Data

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	No additional remark.
Incompatibility with Various Substances	Slightly reactive to reactive with reducing agents, combustible materials, organic materials.
Corrosivity	Non-corrosive in presence of glass.
Special Remarks on Reactivity	No additional remark.
Special Remarks on Corrosivity	No additional remark.

Section 11. Toxicological Information

Routes of Entry Ingestion. Inhalation.

Toxicity to Animals LD50: Not available. LC50: Not available.

Chronic Effects on Humans CARCINOGENIC EFFECTS: Classified A1 by ACGIH. The substance is toxic to lungs, mucous membranes. Toxicity of the product to the reproductive system: Not available.

Other Toxic Effects on Humans Very dangerous in case of skin contact (irritant), of eye contact (irritant), of ingestion. Slightly dangerous to dangerous in case of inhalation. Very slightly to slightly dangerous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals No additional remark.

Special Remarks on Chronic Effects on Humans Passes through the placental barrier in animal.

Special Remarks on other Toxic Effects on Humans No additional remark.

Section 12. Ecological Information

Ecotoxicity Not available.

BOD5 and COD Not available.

Products of Biodegradation Some metallic oxides.

Toxicity of the Products of Biodegradation The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation No additional remark.

Section 13. Disposal Considerations

Waste Disposal Recycle to process, if possible. Consult your local or regional authorities.

Section 14. Transport Information

DOT Classification DOT CLASS 5.1: Oxidizer.

Identification Oxidizing solid, n.o.s. (Potassium dichromate) UN1479 III

Special Provisions for Transport No additional remark.

DOT (Pictograms)



Section 15. Other Regulatory Information and Pictograms

**Federal and
State Regulations**

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires emergency planning based on Threshold Planning Quantities (TPQs) and release reporting based on Reportable Quantities (RQs) in 40 CFR 355 (used for SARA 302, 304, 311 and 312). Components present in this product at a level which could require reporting under the statute are:

NONE

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires submission of annual report release of toxic chemicals that appear in 40 CFR 372 (used for SARA 313). This information must be included in all MSDSs that are copied and distributed for this material. Components present in this product at a level which could require reporting under the statute are:

Potassium dichromate

WARNING: This product contains a chemical known to the State of California to cause cancer. Chemical ingredient(s) requiring this warning:

Potassium dichromate

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Chemical ingredient(s) requiring this warning: NONE

Other Classifications

WHMIS (Canada)

WHMIS CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC)

R39- Danger of very serious irreversible effects.
R42- May cause sensitization by inhalation.

Other Classifications

WHMIS (Canada)

WHMIS CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC)

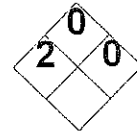
R39- Danger of very serious irreversible effects.
 R42- May cause sensitization by inhalation.
 R45- May cause cancer.
 R36/37/38- Irritating to eyes, respiratory system and skin.

HMIS (U.S.A.)

Health Hazard	2
Fire Hazard	0
Reactivity	0
Personal Protection	0

National Fire Protection Association (U.S.A.)

Health



Flammability
 Reactivity
 Specific hazard

Personal Protective Equipment



Protective Gloves (impervious).



Lab coat.



Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.



Splash goggles.

Section 16. Other Information

References Not available.

Catalog Number(s) P1281, P1282, P1283

Other Special Considerations No additional remark.

Validated by E. Brull on 12/17/96.

Verified by E. Brull.
Name

Emergency Phone: (310)516-8000

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