Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

CONTROLLED DOCUMENT
IF STAMPED IN RED

Product Name	**Ferric Chloride Anhydrous**
Synonyms	Iron (III) Chloride
UN/ID No.	UN1773
Item #	10242
Revision Date	May-20-2020
Safety Data Sheet	0236
Recommended Use	Water treatment chemical, Catalyst
Uses advised against	Consumer uses: Private households (= general public = consumers).

Company Name
PVS Technologies, Inc.
10900 Harper Ave.
Detroit, MI 48213
(313) 571-1100
24 Hour Emergency Phone Number CHEMTREC 1-800-424-9300

2. HAZARDS IDENTIFICATION

Classification

Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 1
Serious eye damage/eye irritation	Category 1
May be corrosive to metals	Category 1

Emergency Overview

DANGER

Hazard statements

Harmful if swallowed
Causes severe skin burns and eye damage

Precautionary statements

Prevention

- Wash face, hands and any exposed skin thoroughly after handling
- Do not eat, drink or smoke when using this product
- Do not breathe dust/fume/gas/mist/vapors/spray
- Wear protective gloves/protective clothing/eye protection/face protection

Response

- Immediately call a POISON CENTER or doctor/physician
- Specific treatment (see section 4 on this Safety Data Sheet)

Eyes — IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing Immediately call a POISON CENTER or doctor/physician

Skin — IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower Wash contaminated clothing before reuse

Inhalation — IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for

	breathing Immediately call a POISON CENTER or doctor/physician
Ingestion	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell Rinse mouth Do NOT induce vomiting
Storage	• Store locked up
Disposal	• Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)	Material is hygroscopic, reacts with water and generates alot of heat. When rinsing, use large amounts of water to quickly flush product off of skin to avoid thermal and chemical burns.
Other Information	
Other hazards	• Toxic to aquatic life with long lasting effects • Toxic to aquatic life
Unknown Acute Toxicity	1% of the mixture consists of ingredient(s) of unknown toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	EC No.	Weight-% *
Iron trichloride	7705-08-0	231-729-4	98-100
Zinc chloride	7646-85-7	231-592-0	0-0.15
Chromium Chloride	10025-73-7	233-038-3	0.0-0.15
Nickel(II) chloride	7718-54-9	231-743-0	0-0.1

4. FIRST AID MEASURES

General advice

• Immediate medical attention is required

Eye contact

• Immediate medical attention is required
• Do not rub affected area
• Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes
• Keep eyes wide open while rinsing

Skin contact

• Immediate medical attention is required
• Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes
• Wash off immediately with soap and plenty of water

Inhalation

• Remove to fresh air
• Call a physician or poison control center immediately
• If not breathing, give artificial respiration
• If breathing is labored, administer oxygen

Ingestion

• Immediate medical attention is required
• Do NOT induce vomiting
• Drink plenty of water
• Never give anything by mouth to an unconscious person
• Remove from exposure, lie down
• Clean mouth with water and drink afterwards plenty of water
• Call a physician or poison control center immediately

Note to physician

• Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Do not give chemical antidotes. Asphyxia from glottal edema may occur. Marked decrease in blood pressure may occur with moist rales, frothy sputum, and high pulse pressure
• Treat symptomatically

Self-protection for first aid personnel	• Use personal protective equipment as required • Avoid contact with skin, eyes or clothing

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	• Carbon dioxide (CO2) • Dry chemical • Use extinguishing measures that are appropriate to local circumstances and the surrounding environment
Unsuitable extinguishing media	• Caution: Use of water spray when fighting fire may be inefficient • Water reactive • Contact with water generates heat and toxic fumes.
Specific hazards arising from the chemical	• The product causes burns of eyes, skin and mucous membranes • Thermal decomposition can lead to release of irritating and toxic gases and vapors • In the event of fire and/or explosion, do not breathe fumes
Protective equipment and precautions for firefighters	• Wear a self-contained breathing apparatus and chemical protective clothing
Flammable properties	• No information available
Explosive properties	• No information available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	• Evacuate personnel to safe areas • Use personal protective equipment as required • Avoid contact with skin, eyes or clothing • Keep people away from and upwind of spill/leak
Environmental precautions	• For small spills, absorb material with clay absorbent or other compatible material. Dispose of the waste material according to local, state and governmental requirements. • For large spills, contain the material using barriers of absorbent pigs, clay absorbent or earth dams. • This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261) • US regulations require reporting spills of this material that could reach any surface waters. The toll-free phone number for the US Coast Guard National Response Center is 1-800-424-8802
Methods for cleaning up	• Take up mechanically, placing in appropriate containers for disposal • Clean contaminated surface thoroughly • Use personal protective equipment as required • Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry • Avoid creating dust • Soak up with inert absorbent material • Dam up • After cleaning, flush away traces with water
Other Information	• Spills exceeding the Reportable Quantity (RQ) of 1000 pounds or more must be reported to the National Response Center, (800) 424-8802.

7. HANDLING AND STORAGE

Advice on safe handling	• Use personal protective equipment as required • Avoid contact with skin, eyes or clothing • Ensure adequate ventilation, especially in confined areas • In case of insufficient ventilation, wear suitable respiratory equipment • Use only with adequate ventilation and in closed systems
Storage Conditions	• Keep container tightly closed in a dry and well-ventilated place • Keep out of the reach of children

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- Keep containers tightly closed in a cool, well-ventilated place
- Keep containers tightly closed in a dry, cool and well-ventilated place
- Keep in properly labeled containers

Incompatible materials Incompatible with oxidizing agents, strong bases, water, metals, Incompatible with strong acids and bases, Incompatible with oxidizing agents

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Iron trichloride 7705-08-0	TWA: 1 mg/m³ Fe		TWA: 1 mg/m³ Fe
Chromium Chloride 10025-73-7		TWA: 0.5 mg/m³ Cr	IDLH: 25 mg/m³ Cr(III) TWA: 0.5 mg/m³ Cr
Zinc chloride 7646-85-7	STEL: 2 mg/m³ fume TWA: 1 mg/m³ fume	TWA: 1 mg/m³ fume	IDLH: 50 mg/m³ fume TWA: 1 mg/m³ fume STEL: 2 mg/m³ fume
Nickel(II) chloride 7718-54-9	TWA: 0.1 mg/m³ Ni inhalable particulate matter	TWA: 1 mg/m³ Ni	IDLH: 10 mg/m³ Ni TWA: 0.015 mg/m³ except Nickel carbonyl Ni

Exposure Guidelines .

Engineering Controls Precautions should be taken to prevent the formation of dusts in concentrations above flammable, explosive or occupational exposure limits. Ensure adequate ventilation, especially in confined areas.

Individual protection measures, such as personal protective equipment

Respiratory protection
- A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant the use of a respirator.

Eye/Face protection
- Tight sealing safety goggles
- Face protection shield

Skin and body protection
- Wear suitable protective clothing
- Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact

General Hygiene Considerations
- When using do not eat, drink or smoke
- Wash contaminated clothing before reuse
- Keep away from food, drink and animal feeding stuffs
- Contaminated work clothing should not be allowed out of the workplace
- Regular cleaning of equipment, work area and clothing is recommended
- Avoid contact with skin, eyes or clothing
- Take off all contaminated clothing and wash it before reuse
- Wear suitable gloves and eye/face protection

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Solid
Appearance	crystalline
Color	Dark green to black
Odor	Slight Iron acidic
Odor threshold	No information available

Property	Values	Remarks • Method
pH	<1	solution (20 %) @ 20 °C
Melting point/Freezing Point	304 °C / 579 °F	
Boiling point / boiling range	315 °C / 599 °F	
Flash point	No information available	

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Evaporation rate	< 1	n-Butyl acetate =1
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit (%)	No information available	
Lower flammability limit (%):	No information available	
Vapor pressure	1 mbar	@20 ◦ C
Vapor density	No information available	
Specific Gravity	2.85	
Water solubility	Soluble in water	500 g/L
Solubility in other solvents	No information available	
Partition coefficient	-4	
Autoignition temperature	No information available	
Decomposition temperature	200 °C	Chlorine
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point °C	No information available
Molecular weight	No information available
VOC Content (%)	No information available
Density	No information available
Bulk density	65 Pounds per cubic foot (lbs/ft^3)

10. STABILITY AND REACTIVITY

Stability
- Stable under recommended storage conditions

Conditions to avoid
- Hygroscopic
- Protect from moisture
- Keep away from water or moist air
- Exposure to air or moisture over prolonged periods

Incompatible materials
Incompatible with oxidizing agents, strong bases, water, metals, Incompatible with strong acids and bases, Incompatible with oxidizing agents

Hazardous Decomposition Products
- Thermal decomposition can lead to release of irritating and toxic gases and vapors

Possibility of Hazardous Reactions
- Explosive reaction with cyanides

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation	Vapor, dust.
Ingestion	Solid, dust.
Skin contact	May cause skin irritation and/or dermatitis.
Eye contact	Contact with eyes may cause irritation.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Iron trichloride 7705-08-0	= 316 mg/kg (Rat) = 450 mg/kg (Rat)	>2000 mg/kg (rat)	
Zinc chloride 7646-85-7	= 1100 mg/kg (Rat)		<= 1975 mg/m^3 (Rat) 10 min
Chromium Chloride 10025-73-7	= 1870 mg/kg (Rat) = 440 mg/kg (Rat)		
Nickel(II) chloride 7718-54-9	= 175 mg/kg (Rat)		

Information on toxicological effects

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Symptoms No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization No information available.
Germ cell mutagenicity No information available.
Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical Name	ACGIH	IARC	NTP	OSHA
Chromium Chloride 10025-73-7		Group 3		
Nickel(II) chloride 7718-54-9		Group 1	Known	X

Reproductive toxicity No information available.
STOT - single exposure No information available.
STOT - repeated exposure No information available.
Chronic toxicity Chronic exposure to corrosive fumes/gases may cause erosion of the teeth followed by jaw necrosis. Bronchial irritation with chronic cough and frequent attacks of pneumonia are common. Gastrointestinal disturbances may also be seen. Avoid repeated exposure. Possible risk of irreversible effects. May cause adverse liver effects.
Target Organ Effects Eyes, Gastrointestinal tract (GI), Liver, Respiratory system, Skin.
Aspiration hazard No information available.

Numerical measures of toxicity - Product Information

Unknown Acute Toxicity 1% of the mixture consists of ingredient(s) of unknown toxicity
The following values are calculated based on chapter 3.1 of the GHS document .
Oral LD50 319 mg/kg

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity Toxic to aquatic life with long lasting effects
0.875% of the mixture consists of components(s) of unknown hazards to the aquatic environment

Chemical Name	Algae/aquatic plants	Fish	Crustacea
Iron trichloride 7705-08-0		20.95 - 22.56: 96 h Pimephales promelas mg/L LC50 semi-static 20.26: 96 h Lepomis macrochirus mg/L LC50 semi-static 75.6: 96 h Gambusia affinis mg/L LC50 static	27.9: 48 h Daphnia magna mg/L EC50 9.6: 48 h Daphnia magna mg/L EC50 Static
Nickel(II) chloride 7718-54-9	0.0063 - 0.0125: 96 h Pseudokirchneriella subcapitata mg/L EC50 static 0.66: 72 h Pseudokirchneriella subcapitata mg/L EC50	1.9 - 4: 96 h Pimephales promelas mg/L LC50 18.1 - 25.5: 96 h Lepomis macrochirus mg/L LC50 flow-through 2.02 - 6.88: 96 h Lepomis macrochirus mg/L LC50 static 2.02 - 6.88: 96 h Pimephales promelas mg/L LC50 static 2.83 - 5.99: 96 h Poecilia reticulata mg/L LC50 static 29.76 - 43.57: 96 h Poecilia reticulata mg/L LC50 semi-static 6.63 - 9.15: 96 h Oncorhynchus mykiss mg/L LC50 static 6.7 - 9.7: 96 h Oncorhynchus mykiss mg/L LC50 flow-through 1.3: 96 h Cyprinus carpio mg/L LC50 semi-static 25: 96 h Pimephales promelas mg/L LC50 flow-through 6.9: 96 h Cyprinus carpio mg/L LC50 static 9.65: 96 h Poecilia reticulata mg/L LC50 flow-through 100: 96 h Brachydanio rerio mg/L LC50 static	0.51: 48 h Daphnia magna mg/L EC50 Static 6.68: 48 h Daphnia magna mg/L EC50

Persistence and degradability No information available
Bioaccumulation No information available

Chemical Name	Partition coefficient
Iron trichloride	-4

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7705-08-0	

Other adverse effects No information available

13. DISPOSAL CONSIDERATIONS

Disposal of wastes
- Dispose of in accordance with federal, state and local regulations
- This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261)
- Dispose of waste in a RCRA licensed facility

Contaminated packaging
- Do not reuse container

US EPA Waste Number
- D002

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California Hazardous Waste Status
Iron trichloride 7705-08-0	Toxic Corrosive
Zinc chloride 7646-85-7	Toxic Corrosive
Chromium Chloride 10025-73-7	Toxic Corrosive Ignitable

14. TRANSPORT INFORMATION

DOT

Proper shipping name	Ferric chloride, anhydrous
Hazard Class	8
UN/ID No.	UN1773
Packing Group	III
RQ (lbs)(dry)	Ferric chloride: RQ kg= 454.00
Description	UN1773, Ferric chloride, anhydrous, 8, III, RQ
Special Provisions	IB8, IP3, T1, TP33
Emergency Response Guide Number	157

Transport Canada

UN/ID No.	UN1773
Proper shipping name	Ferric chloride, anhydrous
Hazard Class	8
Packing Group	III
Description	UN1773, Ferric chloride, anhydrous, 8, III

IATA

UN/ID No.	UN1773
Proper shipping name	Ferric chloride, anhydrous
Hazard Class	8
Packing Group	III
ERG Code	8L
Special Provisions	A803

IMDG

UN/ID No.	UN1773
Proper shipping name	Ferric chloride, anhydrous
Hazard Class	8
Packing Group	III
EmS-No.	F-A, S-B

15. REGULATORY INFORMATION

US Federal Regulations

SARA 311/312 Hazard Categories

Acute health hazard	Yes

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Chronic Health Hazard	Yes
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	Yes

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

U.S. - TSCA (Toxic Substances Control Act) - Section 5(a)(2) - Chemicals with Significant New Use Rules (SNURs)

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Iron trichloride 7705-08-0	1000 lb			X
Zinc chloride 7646-85-7	1000 lb	X		X
Chromium Chloride 10025-73-7		X		
Nickel(II) chloride 7718-54-9		X		X

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs	CERCLA/SARA RQ	RQ (lbs)(dry)
Iron trichloride 7705-08-0	1000 lb		RQ 1000 lb final RQ RQ 454 kg final RQ
Zinc chloride 7646-85-7	1000 lb		RQ 1000 lb final RQ RQ 454 kg final RQ
Chromium Chloride 10025-73-7		1 lb	
Nickel(II) chloride 7718-54-9	100 lb		RQ 100 lb final RQ RQ 45.4 kg final RQ

Canada

WHMIS Classification

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the CPR

WHMIS Classification

Non-controlled

WHMIS

US State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals

Chemical Name	California Proposition 65
Nickel(II) chloride - 7718-54-9	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Iron trichloride 7705-08-0	X	X	X
Chromium Chloride 10025-73-7	X	X	X
Zinc chloride 7646-85-7	X	X	X

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Nickel(II) chloride 7718-54-9	X	X	X

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

16. OTHER INFORMATION

NFPA	**Health hazards** 3	**Flammability** 0	**Instability** 1	**Physical and Chemical Properties**
HMIS	**Health hazards** 3	**Flammability** 0	**Physical hazards** 1	**Personal protection** D

Item #	**10242**
Safety Data Sheet	**0236**
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Version	3
Revision Note	*** Updated value on SDS.

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End of Safety Data Sheet