SAFETY DATA SHEET

Issue Date 07-Oct-2018 **Revision Date** 18-Jan-2019 **Version** 1.3

1. Identification

Product identifier

Product Name Monochlor F™ Reagent

Other means of identification

Product Code(s) 2802246

Recommended use of the chemical and restrictions on use

Recommended Use Determination of monochloramine and ammonia.

Details of the supplier of the safety data sheet

Manufacturer Address
Hach Company P.O.Box 389 Loveland, CO 80539 USA +1(970) 669-3050

Emergency telephone number

Emergency Telephone +1(303) 623-5716 - 24 Hour Service

2. Hazards identification

Classification

Acute toxicity - Oral	Category 4 - (H302)
Skin corrosion/irritation	Category 1 Sub-category A - (H314)
Serious eye damage/eye irritation	Category 1 - (H318)

Label elements

Signal word - Danger

Hazard statements
H302 - Harmful if swallowed
H314 - Causes severe skin burns and eye damage

Exclamation mark

Corrosion

Precautionary statements
P270 - Do not eat, drink or smoke when using this product
P501 - Dispose of contents/ container to an approved waste disposal plant
P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301 + P330 + P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower]
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor
P363 - Wash contaminated clothing before reuse
P405 - Store locked up

Other Hazards Known
Not applicable

3. Composition/information on ingredients

Substance

Not applicable.

Mixture

Chemical name	CAS No.	Synonyms	Percent Range
Butanedioic acid, 2,3-dihydroxy-[R-(R*,R*)]-, disodium salt	868-18-8	No information available	20 - 30%
Lithium hydroxide monohydrate	1310-66-3	No information available	5 - 10%
Sodium nitroferricyanide	14402-89-2	No information available	1 - 5%

4. First aid measures

Description of first aid measures

General advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Inhalation Remove to fresh air. If breathing has stopped, give artificial respiration. Get medical attention immediately. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If breathing is difficult, (trained personnel should) give oxygen. Delayed pulmonary edema may occur. Get immediate medical advice/attention.

Eye contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Do not rub affected area. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

Skin contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get immediate medical advice/attention.

Ingestion Do NOT induce vomiting. Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Get immediate medical advice/attention.

Self-protection of the first aider Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Avoid contact with skin, eyes or clothing. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Wear personal protective clothing (see section 8).

Most important symptoms and effects, both acute and delayed

Symptoms Burning sensation.

Indication of any immediate medical attention and special treatment needed

Note to physicians 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.

5. Fire-fighting measures

Suitable Extinguishing Media 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.

Specific hazards arising from the chemical The product causes burns of eyes, skin and mucous membranes. Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous combustion products May emit acrid smoke and fumes.

Explosion data
Sensitivity to mechanical impact None.
Sensitivity to static discharge None.

Special protective actions for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal precautions Attention! Corrosive material. Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

Other information Refer to protective measures listed in Sections 7 and 8.

Environmental precautions

Environmental precautions Prevent further leakage or spillage if safe to do so. Should not be released into the environment. Do not allow to enter into soil/subsoil. Prevent product from entering drains.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

7. Handling and storage

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. In case of insufficient ventilation, wear suitable respiratory equipment. Handle product only in closed system or provide appropriate exhaust ventilation. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place. Keep out of the reach of children. Protect from moisture. Store locked up. Store away from other materials.

8. Exposure controls/personal protection

Control parameters

Exposure Limits Based on NOM-010-STPS-2014.

Chemical name	TWA	STEL	Ceiling Limit Value
Sodium nitroferricyanide 14402-89-2	1 mg/m^3 5 mg/m^3	2 mg/m^3	-

Appropriate engineering controls

Engineering controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face protection Face protection shield.

Hand protection Wear suitable gloves. Impervious gloves.

Skin and body protection Wear suitable protective clothing. Long sleeved clothing. Chemical resistant apron.

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

General hygiene considerations Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Contaminated work clothing should not be allowed out of the workplace. Regular cleaning of equipment, work area and clothing is recommended. Wash hands before breaks and immediately after handling the product.

9. Physical and chemical properties

Information on basic physical and chemical properties

Physical state	Solid		
Appearance	powder	**Color**	light yellow
Odor	None	**Odor threshold**	No data available

Property	Values	Remarks • Method
Molecular weight	No data available	
pH	No data available	
Melting point/freezing point	No data available	
Boiling point / boiling range	No data available	
Evaporation rate	Not applicable	
Vapor pressure	Not applicable	
Vapor density (air = 1)	Not applicable	
Specific gravity (water = 1 / air = 1)	0.7660	
Partition Coefficient (n-octanol/water)	log K_{ow} ~ 0.58	
Soil Organic Carbon-Water Partition Coefficient	log K_{oc} ~ 0.05	
Autoignition temperature	No data available	
Decomposition temperature	No data available	
Dynamic viscosity	Not applicable	
Kinematic viscosity	Not applicable	

Solubility(ies)

Water solubility

Water solubility classification	Water solubility	Water Solubility Temperature
No information available	No data available	No information available

Solubility in other solvents

Chemical Name	Solubility classification	Solubility	Solubility Temperature
None reported	No information available	No data available	No information available

Other Information

Metal Corrosivity

Steel Corrosion Rate Not applicable
Aluminum Corrosion Rate Not applicable

Volatile Organic Compounds (VOC) Content
Not applicable

Chemical name	CAS No.	Volatile organic compounds (VOC) content	CAA (Clean Air Act)
Butanedioic acid, 2,3-dihydroxy-[R-(R*,R*)]-, disodium salt	868-18-8	No data available	-
Lithium hydroxide monohydrate	1310-66-3	No data available	-
Sodium nitroferricyanide	14402-89-2	No data available	-

Explosive properties

Upper explosion limit	No data available
Lower explosion limit	No data available

Flammable properties

Flash point	Not applicable

Flammability Limit in Air

Upper flammability limit	No data available
Lower flammability limit	No data available

Oxidizing properties	No data available.
Bulk density	No data available

10. Stability and reactivity

Reactivity	No information available.
Chemical stability	Stable under normal conditions.
Possibility of Hazardous Reactions	None under normal processing.
Conditions to avoid	Exposure to air or moisture over prolonged periods.
Incompatible materials	Acids. Bases. Oxidizing agent.
Hazardous Decomposition Products	Contact with acids/acid fumes releases toxic cyanide gas. Cyanide. Nitrogen oxides. Sodium oxides.

11. Toxicological information

Information on Likely Routes of Exposure

Product Information

Inhalation	Corrosive by inhalation. Inhalation of corrosive fumes/gases may cause coughing, choking, headache, dizziness, and weakness for several hours. Pulmonary edema may occur with tightness in the chest, shortness of breath, bluish skin, decreased blood pressure, and increased heart rate. Inhaled corrosive substances can lead to a toxic edema of the lungs. Pulmonary edema can be fatal.
Eye contact	Causes burns. Corrosive to the eyes and may cause severe damage including blindness. Causes serious eye damage. May cause irreversible damage to eyes.
Skin contact	Corrosive. Causes severe burns. Avoid contact with skin and clothing.
Ingestion	Causes burns. Ingestion causes burns of the upper digestive and respiratory tracts. May cause severe burning pain in the mouth and stomach with vomiting and diarrhea of dark blood. Blood pressure may decrease. Brownish or yellowish stains may be seen around the mouth. Swelling of the throat may cause shortness of breath and choking. May cause lung damage if swallowed. May be fatal if swallowed and enters airways.
Symptoms	Redness. Burning. May cause blindness. Coughing and/ or wheezing.

Acute toxicity

Based on available data, the classification criteria are not met

Product Acute Toxicity Data
No data available.

Ingredient Acute Toxicity Data
Test data reported below.

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (20 - 30%) CAS#: 868-18-8	Mouse LD_{50}	4360 mg/kg	None reported	None reported	EPA (United States Environmental Protection Agency)
Lithium hydroxide monohydrate (5 - 10%) CAS#: 1310-66-3	Rat LD_{50}	225 mg/kg	None reported	None reported	IUCLID (The International Uniform Chemical Information Database)
Sodium nitroferricyanide (1 - 5%) CAS#: 14402-89-2	Rat LD_{50}	99 mg/kg	None reported	None reported	LOLI
Chemical name	**Endpoint type**	**Reported dose**	**Exposure time**	**Toxicological effects**	**Key literature references and sources for data**
Lithium hydroxide monohydrate (5 - 10%) CAS#: 1310-66-3	Rat LC_{50}	0.96 mg/L	4 hours	None reported	IUCLID (The International Uniform Chemical Information Database)

Unknown acute toxicity
0.01 % of the mixture consists of ingredient(s) of unknown toxicity.

0.01 % of the mixture consists of ingredient(s) of unknown acute oral toxicity
0.01 % of the mixture consists of ingredient(s) of unknown acute dermal toxicity
0.01 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (dust/mist)
0.01 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (vapor)
0.01 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (gas)

Acute Toxicity Estimations (ATE)

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	1,652.00
ATEmix (dermal)	No information available
ATEmix (inhalation-dust/mist)	11.40
ATEmix (inhalation-vapor)	No information available
ATEmix (inhalation-gas)	No information available

Skin corrosion/irritation
Causes severe burns.

Product Skin Corrosion/Irritation Data
No data available.

Ingredient Skin Corrosion/Irritation Data
No data available.

Chemical name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Lithium hydroxide monohydrate	Existing human experience	Human	None reported	None reported	Corrosive to skin	ERMA (New Zealands Environmental Risk

(5 - 10%) CAS#: 1310-66-3						Management Authority)

Serious eye damage/eye irritation

Classification based on data available for ingredients. Causes burns. Risk of serious damage to eyes.

Product Serious Eye Damage/Eye Irritation Data

No data available.

Ingredient Eye Damage/Eye Irritation Data

No data available.

Chemical name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (20 - 30%) CAS#: 868-18-8	None reported	Human	None reported	None reported	Not corrosive or irritating to eyes	ECHA (The European Chemicals Agency)

Respiratory or skin sensitization

Based on available data, the classification criteria are not met.

Product Sensitization Data

No data available.

Ingredient Sensitization Data

No data available.

Chemical name	Test method	Species	Results	Key literature references and sources for data
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (20 - 30%) CAS#: 868-18-8	None reported	Human	Not confirmed to be a skin sensitizer	ECHA (The European Chemicals Agency)
Chemical name	**Test method**	**Species**	**Results**	**Key literature references and sources for data**
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (20 - 30%) CAS#: 868-18-8	None reported	Human	Not confirmed to be a skin sensitizer	ECHA (The European Chemicals Agency)

STOT - single exposure

Based on available data, the classification criteria are not met.

Product Specific Target Organ Toxicity Single Exposure Data

No data available.

Ingredient Specific Target Organ Toxicity Single Exposure Data

No data available.

STOT - repeated exposure

Based on available data, the classification criteria are not met.

Product Specific Target Organ Toxicity Repeat Dose Data

No data available.

Ingredient Specific Target Organ Toxicity Repeat Exposure Data

No data available.

Carcinogenicity

Based on available data, the classification criteria are not met.

Product Carcinogenicity Data
No data available.

Ingredient Carcinogenicity Data
No data available.

Chemical name	CAS No.	ACGIH	IARC	NTP	OSHA
Butanedioic acid, 2,3-dihydroxy-[R-(R*,R*)]-, disodium salt	868-18-8	-	-	-	-
Lithium hydroxide monohydrate	1310-66-3	-	-	-	-
Sodium nitroferricyanide	14402-89-2	-	-	-	-

Legend

ACGIH (American Conference of Governmental Industrial Hygienists)	Does not apply
IARC (International Agency for Research on Cancer)	Does not apply
NTP (National Toxicology Program)	Does not apply
OSHA (Occupational Safety and Health Administration of the US Department of Labor)	Does not apply

Germ cell mutagenicity
Based on available data, the classification criteria are not met.

Product Germ Cell Mutagenicity *invitro* **Data**
No data available.

Ingredient Germ Cell Mutagenicity *invitro* **Data**
No data available.

Product Germ Cell Mutagenicity *invivo* **Data**
No data available.

Ingredient Germ Cell Mutagenicity *invivo* **Data**
No data available.

Reproductive toxicity
Based on available data, the classification criteria are not met.

Product Reproductive Toxicity Data
No data available.

Ingredient Reproductive Toxicity Data
No data available.

Aspiration hazard
Based on available data, the classification criteria are not met.

12. Ecological information

Ecotoxicity .

Unknown aquatic toxicity 0.01% of the mixture consists of components(s) of unknown hazards to the aquatic environment.

Product Ecological Data

Aquatic Acute Toxicity
No data available.

Aquatic Chronic Toxicity
No data available.

Ingredient Ecological Data

Aquatic Acute Toxicity
No data available.

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (20 - 30%) CAS#: 868-18-8	96 hours	None reported	LC_{50}	612000 mg/L	Estimation through ECOSARS v1.11 part of the Estimation Programs Interface (EPI) Suite™
Chemical name	**Exposure time**	**Species**	**Endpoint type**	**Reported dose**	**Key literature references and sources for data**
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (20 - 30%) CAS#: 868-18-8	48 Hours	None reported	LC_{50}	263000 mg/L	Estimation through ECOSARS v1.11 part of the Estimation Programs Interface (EPI) Suite™
Chemical name	**Exposure time**	**Species**	**Endpoint type**	**Reported dose**	**Key literature references and sources for data**
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (20 - 30%) CAS#: 868-18-8	96 hours	None reported	EC_{50}	623770 mg/L	Estimation through ECOSARS v1.11 part of the Estimation Programs Interface (EPI) Suite™

Aquatic Chronic Toxicity
No data available.

Persistence and degradability

Product Biodegradability Data
No data available.

Bioaccumulation

Product Bioaccumulation Data
No data available.

Partition Coefficient (n-octanol/water) $\log K_{ow} \sim 0.58$

Mobility

Soil Organic Carbon-Water Partition Coefficient $\log K_{oc} \sim 0.05$

Other adverse effects
Contains a substance with an endocrine-disrupting potential.

Chemical name	EU - Endocrine Disrupters Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Endocrine disrupting potential
Sodium nitroferricyanide (1 - 5%) CAS#: 14402-89-2	Group III Chemical	-	-

13. Disposal considerations

Waste treatment methods

Waste from residues/unused products	Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.
Contaminated packaging	Do not reuse empty containers.

14. Transportation information

MEX

UN/ID no	UN2680
Proper shipping name	Lithium hydroxide
Hazard Class	8
Packing Group	II
Description	UN2680, Lithium hydroxide, 8, II

Note: No special precautions necessary.

TDG

UN/ID no	UN2680
Proper shipping name	Lithium hydroxide
Hazard Class	8
Packing Group	II
Description	UN2680, Lithium hydroxide, 8, II

U.S. DOT

UN/ID no	UN2680
Proper shipping name	Lithium Hydroxide
Hazard Class	8
Packing Group	II
Special Provisions	IB8, IP2, IP4, T3, TP33
Description	UN2680, Lithium hydroxide, 8, II
Emergency Response Guide Number	154

ICAO (air)

UN/ID no	UN2680
Proper shipping name	Lithium hydroxide
Hazard Class	8
Packing Group	II
Description	UN2680, Lithium hydroxide, 8, II

IATA

UN/ID no	UN2680
Proper shipping name	Lithium hydroxide
Hazard Class	8
Packing Group	II
ERG Code	8L

IMDG

UN/ID no	UN2680
Proper shipping name	Lithium hydroxide
Hazard Class	8
Packing Group	II
EmS-No	F-A, S-B

RID

UN/ID no	UN2680
Proper shipping name	Lithium hydroxide
Hazard Class	8
Packing Group	II
Classification code	C6

Description	UN2680, Lithium hydroxide, 8, II

ADR

UN/ID no	UN2680
Proper shipping name	Lithium hydroxide
Hazard Class	8
Packing Group	II
Classification code	C6
Tunnel restriction code	(E)
Description	UN2680, Lithium hydroxide, 8, II, (E)
Labels	8

ADN

Proper shipping name	Lithium hydroxide
Hazard Class	8
Packing Group	II
Classification code	C6
Description	UN2680, Lithium hydroxide, 8, II
Hazard label(s)	8
Limited quantity (LQ)	1 kg

Additional information

There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is not in a reagent set or kit, the classification given above applies.
If the item is part of a reagent set or kit the classification would change to the following:
UN3316 Chemical Kit, Hazard Class 9, Packing Group II or III.
If the item is not regulated, the Chemical Kit classification does not apply.

15. Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

International Regulations

The Montreal Protocol on Substances that Deplete the Ozone Layer Not applicable

The Stockholm Convention on Persistent Organic Pollutants Not applicable

The Rotterdam Convention Not applicable

International Inventories

TSCA	Complies.
DSL/NDSL	Complies.
EINECS/ELINCS	Complies.
ENCS	Contact supplier for inventory compliance status.
IECSC	Complies.
KECL	Complies.
PICCS	Complies.
AICS	Complies.

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** 0	**Physical and chemical properties** -
HMIS	**Health hazards** 3	**Flammability** 0	**Physical hazards** 0	**Personal protection** X

Key or legend to abbreviations and acronyms used in the safety data sheet

Legend Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	SKN*	Skin designation

Key literature references and sources for data used to compile the SDS

Agency for Toxic Substances and Disease Registry (ATSDR)
U.S. Environmental Protection Agency ChemView Database
European Food Safety Authority (EFSA)
EPA (Environmental Protection Agency)
Acute Exposure Guideline Level(s) (AEGL(s))
U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act
U.S. Environmental Protection Agency High Production Volume Chemicals
Food Research Journal
Hazardous Substance Database
International Uniform Chemical Information Database (IUCLID)
Japan GHS Classification
Australia National Industrial Chemicals Notification and Assessment Scheme (NICNAS)
NIOSH (National Institute for Occupational Safety and Health)
National Library of Medicine's ChemID Plus (NLM CIP)
National Library of Medicine's PubMed database (NLM PUBMED)
National Toxicology Program (NTP)
New Zealand's Chemical Classification and Information Database (CCID)
Organization for Economic Co-operation and Development Environment, Health, and Safety Publications
Organization for Economic Co-operation and Development High Production Volume Chemicals Program
Organization for Economic Co-operation and Development Screening Information Data Set
RTECS (Registry of Toxic Effects of Chemical Substances)
World Health Organization

Prepared By Hach Product Compliance Department.

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Revision Note None

NOM-018-STPS-2015

The information is believed to be accurate, but it is not exhaustive and must be used only as guidance. It is based on the current state of knowledge of the chemical substance or mixture and is applicable to the appropriate safety precautions for the product.

Disclaimer

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

End of Safety Data Sheet