FROM A. B. MC KEE
ALCOA TECHNICAL CENTER - C

TO MEMBERS, CORPORATE HAZARDOUS MATERIALS CONTROL COMMITTEE

1980 December 03

RECEIVED
DEC - 8 1980

RE: ALCOA SAFETY DATA SHEET MANUAL
For Preliminary Review and Comments
Please Respond by December 17

AMSDS NO.

156	Formic Acid
157	Stearic Acid
158	Carbon Black
159	Phthalic Anhydride
160	Dimethyl Formamide
161	Nickel Acetate
163	1-Nitropropane
164	Perchloroethylene
165	Ethyl Acetate
166	Morpholine

A. B. MC KEE

ABM:km

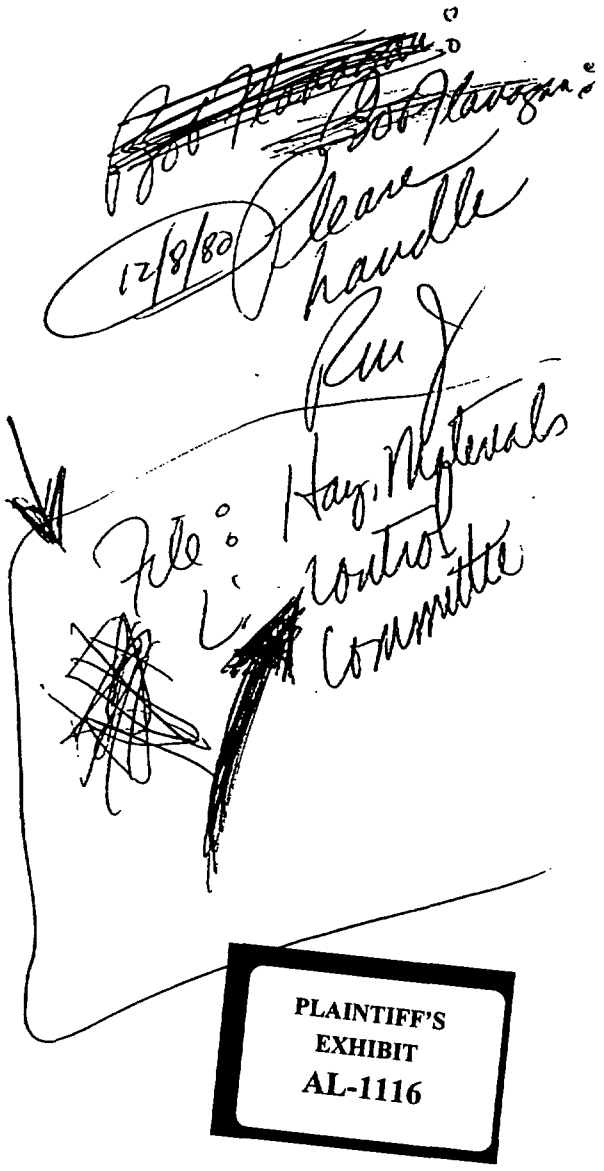
Attachment

cc: Members of Corporate Hazardous Materials Control Committee

H. P. Brueschke, Pittsburgh 19
R. L. Byers, Pittsburgh 07
A. E. Davis, Pittsburgh 24
R. E. Edgington, Pittsburgh 22
G. C. Heise, Pittsburgh 06
R. M. James, Pittsburgh 07
R. L. Miller, Pittsburgh 08
A. B. McKee, ATC-C
B. N. Peak, Pittsburgh 18
R. T. Shillinger, Pittsburgh 03
J. R. Stemler, ATC-C
D. A. Whitfield, Pittsburgh WPH3

Others

R. W. Flanagan, Pittsburgh 07



PLAINTIFF'S EXHIBIT AL-1116

411538 0199

ALCOA

MATERIAL SAFETY DATA SHEET No. 156

ALCOA

HAZARD CHARACTERISTICS			PRODUCT
☐ Flammable	☐ Combustible	*Toxic By:*	FORMIC ACID
☒ Corrosive	☐ Explosive	☐ Ingestion	
☐ Water Reactive	☐ Radioactive	☐ Inhalation	Phone No.
☐ Oxidizer	☐ Chemically Reactive	☐ Absorption	Date:

For Internal Company Use Only – Not To Be Distributed Outside The Company

Section I. MATERIAL DESCRIPTION

Chemical Name & Formula: Formic acid; HCOOH
Other Designation: Methanoic acid; hydrogen carboxylic acid

Corporate Stock No.:
Manufacturer: J.T. Baker Chemical Co., Phillipsburg, NJ 08865 — Union Carbide, New York, NY 10017

Section II. INGREDIENTS	%	HAZARD DATA
Formic acid..... Mol. Wt. 46.03	85+	OSHA PEL 5 ppm or 9 mg/m^3 ORL-Rat LD_{50}: 1.2 g/kg

Section III. PHYSICAL DATA	90%	98+% (Glacial)
Physical Form: Liquid		
Boiling Temp.:	221F (105C)	214F (101C)
Freeze-Melt Temp.:	16F (-9C)	47F (8.2C)
Vapor Pressure: @ 20C, mm Hg	∿23	∿34
Evaporation Rate:		
Specific Gravity: 20/20C	1.208	1.223
Density: Vapor (air=1)	---	1.6
"Solubility In H_2O":	Miscible	Miscible
Color: Colorless		
Odor: Pungent, penetrating odor		

Section IV. FIRE AND EXPLOSION DATA

Flashpoint	Auto-Ignition Temp. 90%	Flammability Limits In Air % by Vol.	Lower	Upper
o.c. 156F (69C) c.c. 118-141F (48-61C)	813F (434C)		18	57

Extinguishing media: Use dry chemical, "alcohol" foam, water spray or carbon dioxide. Cool fire-exposed containers with a water spray. Dilute spilled material to a non-flammable solution with water. Flush liquid away from hazardous exposures and disperse vapors with a water spray.

This combustible material is a moderate fire hazard when exposed to heat or flame. Fire fighters must use eye protection and NIOSH approved self-contained breathing equipment with full protective clothing.

Section V. REACTIVITY DATA

Glacial formic acid undergoes slow decomposition at room temperature and will build up pressure in a sealed, unvented container; 90% formic acid is acceptably stable at room temperature in a sealed container. It does not polymerize. It is combustible.

Formic acid is a strong reducing agent and rather strongly corrosive as an acid. It is incompatible with oxidizing agents and with alkaline materials. It should be handled in 316 stainless steel, glass, ceramic, rubber- or resin-lined, or similar corrosion resistant materials of construction.

Formic acid reacts with concentrated sulfuric acid to produce carbon monoxide. It has been known to react explosively with hydrogen peroxide and with furfuryl alcohol.

No. 156 FORMIC ACID

Section VI. HEALTH HAZARD INFORMATION | TLV 5 ppm or 9 mg/m3

Formic acid is a highly toxic substance which also has corrosive action on any body tissues it contacts. Eye contact with liquid or high vapor concentrations will produce irritation and conjunctivitis and may cause corneal burns. Skin contact will cause irritation and burns with possible chronic effects from repeated exposures. Excessive inhalation of vapors is irritating to the upper respiratory tract and can produce coughing, difficulty in breathing, possible bronchitis, headache, and body weakness. Ingestion causes acute local tissue damage with other effects ranging from nausea and dizziness to unconsciousness.

FIRST AID:

Eye contact: Flush with plenty of running water for 15 minutes or more, including under the eye lids. Contact a physician promptly (an opthalmologist if available).

Skin contact: Wash well with soap and water. Promptly remove contaminated clothing (under a safety shower for gross contact). Get medical help if irritation persists or if contact area was large.

Inhalation: Remove to fresh air. Call physician immediately. Inhalation of an aerosol or 5% sodium bicarbonate in water may reduce the severity of irritation of the respiratory tract.

Ingestion: Do not induce vomiting! Give milk or water to drink to dilute, plus milk of magnesia or egg white mixed with water. Contact physician promptly for gastric lavage.

Section VII. SPILL, LEAK & DISPOSAL PROCEDURES

Notify safety and environmental personnel if spill is large. Provide maximum ventilation. Eliminate ignition sources. Exclude from spill area all except assigned clean up personnel who are using protective equipment against contact with liquid or inhalation of vapors.

Contain spill and absorb on vermiculite or other suitable absorbent material; clean up and place in an approved container for disposal. Neutralize remaining traces of residue with soda ash or sodium bicarbonate and flush to drain with large amounts of water.

DISPOSAL: Burn scrap material in an approved incinerator with afterburner. Flammable solvents may be added to improve burning characteristics. Follow Federal, State and local regulations.

EPA Hazardous Waste No. U123

Section VIII. SPECIAL PROTECTION INFORMATION

Provide general ventilation and local exhaust ventilation to meet TLV requirements. The ventilation equipment used should be acid-proof and of explosion-proof design.

Use rubber or neoprene protective gloves and safety goggles or glasses with side shields to prevent contact with formic acid. Use protective impermeable clothing, aprons, boots, face shield, etc. to prevent liquid contact with the body. A full rubber suit may be needed under certain exposures.

A chemical safety shower and an eyewash station shall be located in the work area and be immediately accessible for emergency use.

Section IX. SPECIAL PRECAUTIONS & COMMENTS

Store in cool, well-ventilated area away from direct sunlight, sources of heat, sources of ignition and incompatible materials (such as oxidizing agents, alkaline materials, concentrated sulfuric acid, etc). Protect containers against freezing. Electrically bond and ground containers for liquid transfers; use nonsparking tools with 98+% acid. Glacial formic acid can rupture containers by slow decomposition at room temperature which builds up pressure. Proper venting must be established for this material.

Prevent contact of formic acid with skin, eyes or clothing. Do not breath vapors. Clothing contaminated with formic acid must be properly laundered before re-use; if shoes are contaminated discard them.

D.O.T. Requirements COMBUSTIBLE LIQUID

Section X. REFERENCES

ASTM No.: Other:

CAS No.: 000-064-186

CMA Chemical Safety Data Sheet No.:

NFPA Guides

NSC Data Sheets:

Supplier Product Literature:

411538 0201

MATERIAL SAFETY DATA SHEET No. 157

ALCOA

HAZARD CHARACTERISTICS			PRODUCT
☐ Flammable	☐ Combustible	*Toxic By:*	STEARIC ACID
☐ Corrosive	☐ Explosive	☐ Ingestion	
☐ Water Reactive	☐ Radioactive	☐ Inhalation	Phone No.
☐ Oxidizer	☐ Chemically Reactive	☐ Absorption	Date:

For Internal Company Use Only – Not To Be Distributed Outside The Company

Section I. MATERIAL DESCRIPTION

Chemical Name & Formula: Stearic aicd; $CH_3(CH_2)_{16}COOH$

Other Designation: Octadecanoic acid; PL-215, 284*, 285*, 287 (*FDA approved)

Description: A mixture of saturated fatty acids, primarily stearic and palmitic, containing significant levels of unsaturated fatty acids in the less pure grades.

Manufacturer: Emery Industries
Cincinnati, OH 45202

Section II. INGREDIENTS

Typical Compositions:	%	HAZARD DATA
Higher Purity Grades		
Stearic Acid	>95	No established TLV *
Palmitic Acid	< 5	No established TLV
"Triple Pressed" Grade		
Stearic Acid	45.5	No established TLV's for these saturated fatty acids.* See sections VI & VIII
Palmitic Acid	50	
Myristic Acid	2.5	
Margaric Acid	1.5	
Pentadecanoic Acid	0.5	
Mol. Wt. 284.5		

*OSHA nuisance dust requirements will apply. (See Sct.VI)

Section III. PHYSICAL DATA*

Physical Form: Solid (flake, crystal or powder)

Boiling Temp.: at 760 mm, decomposes above 680F (360C); at 15 mm, 450F (232C)

Freeze-Melt Temp.: 156F (69C)

Vapor Pressure: @ 174C..... 1.0 mm Hg

Evaporation Rate:

Specific Gravity: 70/4C..... 0.85

Density: (Vapor: Air=1)..... 9.8

"Solubility In H_2O": at 25C..... 0.034%

Color: White to pale yellow

Odor: Tallow-like odor

*Data represents higher purity stearic acid.

Section IV. FIRE AND EXPLOSION DATA

Flashpoint c.c.	Auto-Ignition Temp.	Flammability Limits In Air	Lower	Upper
385F (196C)	743F (395C)			

Extinguishing media: Use dry chemical, foam, or carbon dioxide. Follow procedures that are not likely to stir up dust clouds which may be flammable or explosive in air.

This combustible material can melt and flow when heated. It is a slight fire hazard when the solid material is exposed to heat or flame; but it can be a much increased hazard when dispersed into the air as dust.

Use a water spray to keep fire-exposed containers cool.

Section V. REACTIVITY DATA

This combustible material is stable when stored in a cool, well-ventilated area. It does not polymerize. As a carboxylic acid, it will react with bases.

Note! Grades of stearic acid containing unsaturated fatty acids may undergo spontaneous heat generation by oxidation in air.

Section VI. HEALTH HAZARD INFORMATION | TLV

The very low vapor pressure of stearic acid makes it a negligible airborne hazard unless it is heated, carried in a mist, or dispersed as a dust. When it is airborne, stearic acid can be irritating to the eyes and to the respiratory tract.

Stearic acid is a material of low toxicity, but intravenous injection into rats and mice has caused death at low levels, LD_{50} 22-23 mg/kg.

FIRST AID:

Eye contact: Flush eyes well with running water for at least 15 minutes. Get medical help if irritation persists.

Skin contact: Wash exposed areas with soap and water.

Inhalation: Remove to fresh air. Get medical help if irritation persists.

Section VII. SPILL, LEAK & DISPOSAL PROCEDURES

Contain spill and pick-up for reclaim or disposal under conditions that will avoid dust generation. Those involved in clean up should use approved protection against dust inhalation.

DISPOSAL: Scrap material should be disposed of by burning in an approved incinerator with afterburner, either dissolved in a flammable solvent and sprayed into the fire-box or mixed with readily flammable solids, such as paper, cardboard, etc., for burning. Follow Federal, State and local regulations.

Section VIII. SPECIAL PROTECTION INFORMATION

Provide adequate general ventilation and local exhaust ventilation to keep dust at a low level in workplace air. If the material is melted and the liquid heated, additional ventilation control of vapors may be required.

Control of stearic acid as an organic nuisance dust requires limitation to 5 mg/m^3 of respirable dust or to 15 mg/m^3 for total dust. (See OSHA Program Directive #300-11, February 2, 1978) Use of NIOSH approved dust mask and safety goggles is recommended where dusting occurs, especially above the 5 mg/m^3 level.

If this material is melted or dissolved, gloves, body protecting clothing and a face shield may also be needed.

Provide an eyewash station near the workplace, if any dust generation is possible.

Section IX. SPECIAL PRECAUTIONS & COMMENTS

Store in a clean, cool, dry ventilated area away from sources of heat or ignition. Equipping this area with explosion vents may be indicated for possible dusty conditions. Protect containers from physical damage. Use nonsparking tools in area. Good housekeeping is necessary to keep storage and use areas free from dust deposits. Use vacuum or brush, not an air hose, in cleaning up dust deposits.

D.O.T. Requirements

Section X. REFERENCES

ASTM No.:

CAS No.: 000-057-114

CMA Chemical Safety Data Sheet No.:

NFPA Guides

NSC Data Sheets:

Supplier Product Literature:

Other: 21 CFR Section 178.910(b)

MATERIAL SAFETY DATA SHEET No. 158

ALCOA

HAZARD CHARACTERISTICS		
☐ Flammable	☐ Combustible	*Toxic By:*
☐ Corrosive	☐ Explosive	☐ Ingestion
☐ Water Reactive	☐ Radioactive	☐ Inhalation
☐ Oxidizer	☐ Chemically Reactive	☐ Absorption

PRODUCT
CARBON BLACK

Phone No.
Date:

For Internal Company Use Only – Not To Be Distributed Outside The Company

Section I. MATERIAL DESCRIPTION

Chemical Name & Formula: Carbon black; C
Other Designation: Channel black; furnace black; thermal black; impingement black; soot
Description: Finely divided form of carbon made by the incomplete combustion of natural gas or other hydrocarbons.
Manufacturer: Cabot Corp.; Cities Service Co.

Section II. INGREDIENTS

	%	HAZARD DATA OSHA PEL
Carbon.....	>85	3.5 mg/m^3
Polycyclic aromatic hydrocarbon*..... (particulate)	< 0.1	0.2 mg/m^3 (as benzene solubles)

*PAH, which is also called PPAH, PPOM (particulate polycyclic organic material) and PNA's (polynuclear aromatics). It is considered to be carcinogenic or co-carcinogenic.

Rat, intravenous
LD_{50}: 120 mg/kg

Section III. PHYSICAL DATA

	Channel Black	Furnace Black	Thermal Black
Physical Form:	Solid....Particulate		
Boiling Temp.:	7592F (4200C)	7592F (4200C)	7592F (4200C)
Freeze-Melt Temp.:	6656F (3680C)	6656F (3680C)	6656F (3680C)
Volatile matter: % by Vol.....	<14	<9.6	---
Evaporation Rate:			
Specific Gravity:	1.75	1.80	1.87
Particle size:.....	10-15 μ	13-80 μ	---
"Solubility In H_2O":	Insoluble	Insoluble	Insoluble

Color: Fine black powder or dust
Odor: None

Section IV. FIRE AND EXPLOSION DATA

Flashpoint	Auto-Ignition Temp.	Flammability Limits In Air	Lower	Upper

Extinguishing media: Use media suitable for surrounding fire. Avoid methods which may stir up dust clouds.

This material is a slight fire hazard when exposed to heat or flame. When carbon black is very low in flammable volatiles, thin layers of the dust will ignite at about 900C; dust clouds can ignite on contact with an intensely heated surface, presenting a fire, more than an explosive, hazard. Increased flammable volatile content can increase the hazard. Combustion products of this material can include toxic carbon monoxide. Fire fighters should use NIOSH approved self-contained breathing apparatus when this material is involved in a fire situation.

Section V. REACTIVITY DATA

This material is stable when stored in closed containers at room temperature. It does not polymerize.

It can react with oxidizing agents and when heated in air. Carbon monoxide can be a product of oxidation, depending on conditions.

Finely divided carbon intimately mixed with an oxidizing agent can result in fire or explosion. Carbon black mixed with fatty oils or sodium sulfide can undergo spontaneous heating; with nitric acid it reacts violently.

Section VI. HEALTH HAZARD INFORMATION | TLV 3.5 mg/m³

Health hazards arise from inhalation or contact with carbon blacks. Excessive inhalation may cause both transient and permanent lung damage. Prolonged and repeated contacts with the skin can produce irritaiton and possible eczema. Eye contact is irritating and can cause conjunctivitis.

Carbon blacks may contain polycyclic aromatic hydrocarbons (PAH) which are carcinogens or co-carcinogens, such as 3,4-benzpyrene and 1,2-benzpyrene. Those blacks with over 0.1% PAH require more stringent controls in the workplace to prevent inhalation and contact. (See Sec. II).

FIRST AID:

Eye contact: Flush eyes thoroughly with running water for 15 minutes or more to remove particulate. Get medical help if irritation persists.

Skin contact: Wash contact areas thoroughly with soapy water. Get medical help if irritation persists. Report skin irritation to supervisor. Do not continue to wear carbon black impregnated clothing, especially if the black contains ≥0.1% extractables.

Inhalation: Remove to fresh air. Get medical help if irritation persists.

Section VII. SPILL, LEAK & DISPOSAL PROCEDURES

Notify safety and environmental personnel of large spills. Keep sources of ignition away. Avoid any methods of clean up which might raise dust clouds - vacuuming or wet methods preferred. Clean up personnel need personal protection against inhalation or contact and require special training.

DISPOSAL: Scrap carbon black may be disposed of in an approved landfill, provided that it is handled in a manner that is not hazardous to the surroundings. It can also be disposed of by burning, for example as a slurry in water in a specially designed incinerator. Follow Federal, State, and local regulations.

Carbon black dust, removed from the workplace by exhaust ventilation, must not be allowed to contaminate the environment by direct discharge to the outside air.

EPA Hazardous Waste No. D000

Section VIII. SPECIAL PROTECTION INFORMATION

Provide general and local exhaust ventilation to keep exposures below the TLV. Ventilation used must be designed to prevent spots of dust accummulation or recyling of carbon black dust. Provide NIOSH approved respirators for exposure above the TLV as follows: Up to 18 mg/m³ - an approved dust mask; up to 35 mg/m³ - an approved half-mask dust respirator; above 35 mg/m³ a full facepiece is required with self-contained or air-supplied breathing equipment; above 180 mg/m³ (or whenever the cyclohexane extractables of a carbon black exceed 0.1 mg/m³) - a self-contained respirator (positive pressure mode) or an air-supplied, Type C respirator (pressure-demand mode with an auxillary air supply).

Workers should wear clean, body-covering protective clothing, gloves, and chemical safety goggles (where eye irritation may occur). Facilities should be available for complete change from, and storage of, work clothing and showering at the end of each work shift before putting on separately stored street clothing.
Provide an eyewash station in areas of use or handling.

Section IX. SPECIAL PRECAUTIONS & COMMENTS

Store in a dry, ventilated area, away from sources of heat or ignition and away from oxidizing agents and other incompatibles. Use good handling techniquies and housekeeping practices to avoid spills and deposits of dust.

Prevent generation of dust clouds. Avoid breathing dust or contact with carbon black. Follow good hygiene; no eating or smoking in storage or use areas; use only with proper ventilation.

Preplacement and periodic medical exams should be provided workers extensively exposed to fine carbon particulate, directed at identifying past or present disorders from inhalation or contact exposure and also the worker's smoking and tobacco history. The possibility of pneumoconiosis is reported in the Criteria Document (NIOSH).

D.O.T. Requirements

Section X. REFERENCES

ASTM No.: D561 Other:

CAS No.: 007-440-440

CMA Chemical Safety Data Sheet No.:

NFPA Guides

NSC Data Sheets:

Supplier Product Literature:

MATERIAL SAFETY DATA SHEET No. 159

ALCOA

HAZARD CHARACTERISTICS		
☐ Flammable	☐ Combustible	*Toxic By:*
☐ Corrosive	☐ Explosive	☐ Ingestion
☐ Water Reactive	☐ Radioactive	☐ Inhalation
☐ Oxidizer	☐ Chemically Reactive	☐ Absorption

PRODUCT
PHTHALIC ANHYDRIDE

Phone No.
Date:

For Internal Company Use Only – Not To Be Distributed Outside The Company

Section I. MATERIAL DESCRIPTION

Chemical Name & Formula: Phthalic anhydride; $C_6H_4(CO)_2O$
Other Designation: 1,2 benzenedicarboxylic acid anhydride
Phthalandione

Corporate Stock No.:
Manufacturer: Allied Chemical; Chevron Chemical; Monsanto

Section II. INGREDIENTS	%	HAZARD DATA OSHA PEL
Phthalic anhydride..... Mol. Wt. 148.1	>99	2 ppm 12 mg/m^3 STEL: 4 ppm ORL, RAT LD_{50}: 4020 mg/kg ORL, CAT LD_{50}: 800 mg/kg

Section III. PHYSICAL DATA

Physical Form: Crystalline solid
Boiling Temp.:..... Sublimes at 544F (284.5C)
Freeze-Melt Temp.:..... 268F (131C)
Vapor Pressure: at 30C..... 0.001 mm Hg
Evaporation Rate:
Specific Gravity: 4/4C..... 1.527
Density: (Vapor, air=1)..... 5.1
"Solubility In H_2O":..... Slight
Color: White
Odor: Irritating, choking odor

Section IV. FIRE AND EXPLOSION DATA

Flashpoint c.c.	Auto-Ignition Temp.	Flammability Limits In Air	Lower	Upper
304F (151C)	1083F (584C)	% by Vol. 284F(140C)	1.7	10.5

Extinguishing media: Carbon dioxide or dry chemical can be used on solid or molten material. Water spray is effective on flake or dust; steam may be used on molten material.

Both vapors and dust of this combustible material may burn in air. A severe dust explosion can occur at or above 0.015 oz/ft^3 of air-dispersed particulate. The ignition temperature for the dust cloud is 1202F (650C). Inerting air with CO_2 to below 14% oxygen will prevent dust explosions.

Fire fighters must use NIOSH approved self-contained breathing apparatus and full protective gear.

Section V. REACTIVITY DATA

This material is stable in closed containers at room temperature; it is also stable in the molten condition and can be shipped in this manner. When molten it should be covered with inert gas. It does not polymerize by itself. It is combustible; and should be kept away from sources of ignition. Dust clouds of this material in air can be explosive. Prevent static sparks. Carbon monoxide can be formed on burning.

Reacts with moisture to give phthalic acid, which can corrode metals liberating hydrogen. Keep dry in storage.

Reaction with nitric acid can produce potentially explosive materials.

As an acid anhydride, it is incompatible with strong bases.

No. 159 PHTHALIC ANHYDRIDE

Section VI. HEALTH HAZARD INFORMATION | TLV 2 ppm or 12 mg/m^3

Excessive inhalation as vapor, fume or dust is primary irritant of mucous membranes and the upper respiratory tract, resulting in coughing and sneezing with burning sensation in the nose and throat (4 ppm). Excessive exposure may cause inflammation of respiratory tract, nasal bleeding and ulceration, loss of smell, hoarseness, bronchitis and blood changes. Chronic exposure by inhalation or skin contact can give allergic sensitization. Skin or eye contact with solid or vapors can be irritating. Contact with molten phthalic anhydride will produce severe thermal burns aggravated by chemical effects.

FIRST AID:

Eye contact: Flush with plenty of running water for 15 minutes. Contact physician.

Skin contact: Wash contact areas thoroughly with soap and water. Promptly remove contaminated clothing. Contact physician when large skin areas are exposed or irritation persists. If burn occurs, remove material from skin; treat for thermal burn and possible shock.

Inhalation: Remove to fresh air. Contact physician immediately. Spray or gargle with water to help relieve nasal or throat irritation. Administer oxygen if breathing is difficult or if violent coughing occurs.

Ingestion: Give lots of soapy water to drink and induce vomiting. Contact physician.

Section VII. SPILL, LEAK & DISPOSAL PROCEDURES

Notify safety and environmental personnel if large spills occur. Eliminate ignition sources; provide ventilation that will not stir up dust. Exclude from area all except clean-up personnel who are using approved protection against skin or eye contact and inhalation of dust or vapor. Contain spill; scoop up solid (or solidified melt) with nonsparking tools and place into a dry metal container for reclaim or disposal. Avoid dust generation. Neutralize trace residues or very small spills with lime-soda ash or sodium bicarbonate and water; then flush to drain with much water.

DISPOSAL: Burn scrap material in an approved incinerator with afterburner. Phthalic anhydride may be dissolved in a flammable solvent to imporve burning. Follow Federal, State, and local regulations.

EPA Hazardous Waste No.U190

Section VIII. SPECIAL PROTECTION INFORMATION

Provide general ventilation plus local exhaust ventilation to control dust, fumes or vapors below the TLV. Ventilation system and other electrical equipment must be of explosion-proof design. Where the TLV is or may be exceeded use NIOSH approved, full facepiece organic vapor-acid gas canister respirator or a self-contained or air-supplied respirator.

Use rubber, neoprene or vinyl gloves and protective clothing to prevent skin contact and safety goggles to prevent eye contact. Where solutions or molten material is haudled, rubber boots, rubber apron, impervious wear, face shield, etc. may be required for suitable protection against contact with phthalic anhydride.

Provide chemical safety shower in areas of handling and use. An eyewash station shall be located in the work area and be immediately accessible for emergency use.

Section IX. SPECIAL PRECAUTIONS & COMMENTS

Store in closed containers in a cool, dry, fire-resistant area away from sources of heat, ignition, and incompatible materials like strong oxidizing agents, alkaline materials, etc. Electrically ground handling equipment to prevent static sparks which can be generated in transfers. Blanket molten phthalic anhydride storage with inert gas; stored liquid should be kept below 300F; vent to outside area. Diking of sufficient capacity to match full tankage volume should be established.

Provide preplacement medical examinations for workers; preclude from exposure those with pulmonary or dermal disorders or who have become sensitized. Prevent skin contact & breathing dust or vapors. Follow good hygienic practices.

D.O.T. Requirements

Section X. REFERENCES

ASTM No.: D2403

CAS No.: 000-085-449

CMA Chemical Safety Data Sheet No.:

NFPA Guides

NSC Data Sheets:

Supplier Product Literature:

Other:

MATERIAL SAFETY DATA SHEET No. 160

ALCOA

HAZARD CHARACTERISTICS			PRODUCT
☐ Flammable	☒ Combustible	*Toxic By:*	DIMETHYLFORMAMIDE
☐ Corrosive	☐ Explosive	☐ Ingestion	
☐ Water Reactive	☐ Radioactive	☒ Inhalation	Phone No.
☐ Oxidizer	☐ Chemically Reactive	☐ Absorption	Date:

For Internal Company Use Only — Not To Be Distributed Outside The Company

Section I. MATERIAL DESCRIPTION

Chemical Name & Formula: N,N-Dimethylformamide; $HCON(CH_3)_2$
Other Designation: DMF or DMFA

Corporate Stock No.:
Manufacturer: DuPont

Section II. INGREDIENTS	%	HAZARD DATA OSHA PEL
Dimethylformamide.....	∿100	10 ppm (skin) or 30 mg/m^3
Mol. Wt. 73.1		Human, inhalation TCLo 20 ppm (CNS)
		ORL-Rat LD_{50} 2800 mg/m^3
		SKIN-RBT LD_{50} 5000 mg/m^3

Section III. PHYSICAL DATA

Physical Form: Liquid
Boiling Temp.: 307F (153C)
Freeze-Melt Temp.: ..... -78F (-61C)
Vapor Pressure: at 25C..... 3.7 mm
Evaporation Rate:
Specific Gravity: 25/4C..... 0.945
Density: (Vapor, air=1)..... 2.5
"Solubility In H_2O": at 25C..... Complete
Color: Clear, colorless to slightly yellow, mobile liquid
Odor: Amine-like fishy odor

Section IV. FIRE AND EXPLOSION DATA

Flashpoint	Auto-Ignition Temp.	Flammability Limits In Air	Lower	Upper
136F (58C)	833F (445C)	% by Vol. at 100C	2.2	15.2

Extinguishing media: Alcohol foam, dry chemical, carbon dioxide.
This material is a moderate fire and explosion hazard when exposed to heat and flame. Fire fighters should use NIOSH approved self-contained breathing equipment and eye and skin protection when fighting fire in which this material is involved. Thermal degradation products can include carbon monoxide.

Section V. REACTIVITY DATA

DMF is stable under normal storage and use conditions in closed containers. It does not polymerize, but it will cause methylene disisocyanate to polymerize violently.

It is a powerful solvent which can react vigorously with halogenated and other materials: DMF with CCl_4 or hexachlorobenzene reacts violently above 65C. It undergoes an iron catalyzed reaction with some halogenated hydrocarbons at moderate temperatures. DMF mixed with triethyl aluminum is explosive when heated. DMF can react violently with oxidizing agents such as chromic anhydride, magnesium nitrate, or bromine. It has temperature-dependent induction period. C&E News, 57, No. 39, pg. 4 (1979).

No. 160 DIMETHYLFORMAMIDE

Section VI. HEALTH HAZARD INFORMATION | TLV 10 ppm skin

Excessive exposure to vapors of DMF is irritating to the eyes, skin and mucous membrane. Vapor inhalation and/or prolonged skin contact can produce effects with symptoms such as abdominal pain, nausea, anorexia, and high blood pressure. Prolonged inhalation at 100 ppm has produced liver damage in animals; kidney damage in animals is also reported from DMF exposure. Dermatitis can result from skin exposure; DMF can penetrate the skin. Do not ingest.

FIRST AID:

Eye contact: Flush thoroughly with running water for 15 minutes. Get medical help if irritation persists.

Skin contact: Flush with water; wash with soap and water. Remove contaminated clothing. Get medical help if skin contact area was large or if irritation persists.

Inhalation: Remove to fresh air. Contact physician.

Ingestion: Contact physician promptly.

Note: Intolerance for alcohol can occur up to 4 days after DMF exposure; facial flushing and palpitation may last several hours after alcohol intake.

Section VII. SPILL, LEAK & DISPOSAL PROCEDURES

Notify safety and environmental personnel for large spills. Provide ventilation. Remove sources of ignition. Those involved in clean up must use protection against inhalation of vapors and contact with liquid. Absorb spill using vermiculite or other absorbent solid; pick up and place in a covered, polyethylene-lined metal container for disposal.

DISPOSAL: Burn scrap material in an approved incinerator with a scrubber to collect evolved NO_x gases. A more flammable solvent may be added to improve spraying and burning in the incinerator. Follow Federal, State and local regulations.

EPA Hazardous Waste No. D001

Section VIII. SPECIAL PROTECTION INFORMATION

Provide general and local exhaust ventilation to meet TLV requirements. Where the TLV concentration is or may be exceeded use NIOSH approved organic vapor canister masks or air-supplied or self-contained breathing equipment.

Use gloves to prevent skin contact and chemical goggles for eye protection. A face shield and other protective clothing may be needed to prevent skin contact under conditions where splashing is possible or large amounts are used. An eye wash station shall be located in the work area and be immediately accessible for emergency use.

Provide safety showers where this material is handled.

Provide clean work clothing daily to workers who regularly use this material. Provide facilities and direct workers to shower after work before changing into street clothing.

Section IX. SPECIAL PRECAUTIONS & COMMENTS

Store in well-ventilated, cool, dark area in tightly closed containers, away from sources of heat or ignition and away from oxidizing agents and reactive chemicals (See Sect. V). Storage conditions must be suitable for an OSHA Class II combustible liquid.

Avoid inhalation of vapors and prevent skin contact with liquid. Clothing contaminated with DMF should be immediately removed.

Provide preplacement and periodic medical examinations; especially evaluating liver and kidney functions and possible skin effects.

D.O.T. Requirements

Section X. REFERENCES

ASTM No.:

Other:

CAS No.: 000-068-122

CMA Chemical Safety Data Sheet No.:

NFPA Guides

NSC Data Sheets:

Supplier Product Literature:

411538 0209

MATERIAL SAFETY DATA SHEET No. 161

ALCOA

HAZARD CHARACTERISTICS		
☐ Flammable	☐ Combustible	*Toxic By:*
☐ Corrosive	☐ Explosive	☐ Ingestion
☐ Water Reactive	☐ Radioactive	☐ Inhalation
☐ Oxidizer	☐ Chemically Reactive	☐ Absorption

PRODUCT
NICKEL ACETATE

Phone No.
Date:

For Internal Company Use Only – Not To Be Distributed Outside The Company

Section I. MATERIAL DESCRIPTION

Chemical Name & Formula: Nickelous acetate; $(CH_3COO)_2Ni-4H_2O$
Other Designation:

Corporate Stock No.:
Manufacturer:

Section II. INGREDIENTS	%	HAZARD DATA
Nickel acetate Mol. Wt. 176.8 (not including water of hydration)		TLV 0.1 mg/m^3 (Ni) STEL 0.3 mg/m^3 (Ni)

Section III. PHYSICAL DATA

Physical Form:	Green crystalline powder
Boiling Temp.:	NA
Freeze-Melt Temp.:	NA – decomposes
Vapor Pressure:	NA
Evaporation Rate:	NA
Specific Gravity:	1.74
Density:	
"Solubility In H_2O":	16%
Color:	Green crystalline powder
Odor:	None

Section IV. FIRE AND EXPLOSION DATA

Flashpoint	Auto-Ignition Temp.	Flammability Limits In Air	Lower	Upper
Not flammable		NA		

This material is non-compustible. Use fire extinguishing agents appropriate for other materials burning in the fire.

Section V. REACTIVITY DATA

This material is stable and not subject to hazardous polymerization.

No. 161 Nickel acetate

Section VI. HEALTH HAZARD INFORMATION | TLV 0.1 mg/m^3 (Ni)

A suspected carcinogen. Harmful if swallowed. If swallowed, induce vomiting if victim is conscious. Call physician.

Section VII. SPILL, LEAK & DISPOSAL PROCEDURES

Carefully sweep-up and remove. Avoid breathing dust. Dispose of in an approved land fill in compliance with environmental regulations.

EPA Hazardous Waste No. D000

Section VIII. SPECIAL PROTECTION INFORMATION

Provide ventilation to meet the TLV requirements. Where the TLV concentration is or may be exceeded, use NIOSH approved respiratory protection. The selection of appropriate respiratory protection (organic vapor respirator, supplied air respirator, self-contained breathing apparatus, etc) should be based upon the actual or potential airborne concentration of the contaminant present.

Wear rubber gloves to avoid skin contact.

Section IX. SPECIAL PRECAUTIONS & COMMENTS

Store in closed containers and handle in a manner that avoids dusting or misting conditions. Avoid breathing dust or mist and avoid contact with skin, eyes or clothing.
Wash thoroughly after handling.

D.O.T. Requirements

Section X. REFERENCES

ASTM No.:
Other:
CAS No.: 373-02-4
CMA Chemical Safety Data Sheet No.:
NFPA Guides
NSC Data Sheets:
Supplier Product Literature:

MATERIAL SAFETY DATA SHEET No. 163

ALCOA

HAZARD CHARACTERISTICS			PRODUCT
☐ Flammable	☒ Combustible	*Toxic By:*	1-NITROPROPANE
☐ Corrosive	☐ Explosive	☐ Ingestion	
☐ Water Reactive	☐ Radioactive	☒ Inhalation	Phone No.
☐ Oxidizer	☐ Chemically Reactive	☐ Absorption	Date:

For Internal Company Use Only — Not To Be Distributed Outside The Company

Section I. MATERIAL DESCRIPTION

Chemical Name & Formula: 1-Nitropropane; $CH_3CH_2CH_2NO_2$
Other Designation: NiPAR S-10

Corporate Stock No.:
Manufacturer: International Minerals & Chemical Corp.
Des Plaines, IL 60016

Section II. INGREDIENTS	%	HAZARD DATA
1-Nitropropane Mol. Wt. 89.09		TLV 25 ppm

Section III. PHYSICAL DATA

Physical Form: Liquid

Boiling Temp.:	269F (132C)
Freeze-Melt Temp.:	-162F (-108C)
Vapor Pressure: at 20C	7.5 mm Hg
Evaporation Rate: (BuAc=1)	0.88
Specific Gravity: 20/20C	1.003
Density: Vapor (air=1)	3.06
"Solubility In H_2O":	1.4%
Color:	Clear colorless liquid
Odor:	Mild, sweet odor

Section IV. FIRE AND EXPLOSION DATA

Flashpoint	Auto-Ignition Temp.	Flammability Limits In Air % by Vol.	Lower	Upper
T.O.C. 120F(48.9C) 96F (35.6C) T.C.C.	789F (420C)		2.6	

Extinguishing media: CO_2, dry chemical, alcohol-type foam or water fog. Move containers from fire area if without risk. Wear full protective clothing. Overheated containers may rupture violently. Cool containers with water spray. Heavier than air vapors may travel some distance from source. Fire fighters should use NIOSH approved self-contained breathing apparatus.

Section V. REACTIVITY DATA

This chemical is stable under normal conditions and will not undergo hazardous polymerization. Avoid extreme shock under heavy confinement at high temperature. Avoid exposure to strong oxidizers, alkalies, copper and lead. Alkali or amine salts of 1-nitropropane may be explosive when dry. Burning may produce nitrogen and carbon oxides.

No. 163 - 1-nitropropane

Section VI. HEALTH HAZARD INFORMATION | TLV 25 ppm

Vapors cause irritation of the respiratory tract. Overexposure may cause headache, nausea, narcosis and possible cyanosis with liver or kidney injury. Contact of liquid or vapors with eyes or skin will cause irritaiton.

FIRST AID:

Inhalation: Remove to fresh air. If not breathing give artificial respiration or if breathing is difficult, give oxygen and call physician who may check for increased methemoglobin content.

Eyes: Immediately flush with plenty of water for at least 15 minutes.

Skin: Immediately flush generously with water.

Section VII. SPILL, LEAK & DISPOSAL PROCEDURES

Advise safety and environmental personnel. Eliminate all ignition sources. Stop leak if without risk. Use water spray to reduce vapors. Wearing suitable protective clothing, absorb small spills on vermiculite or other absorbent material. Dike large spills for later disposal. Place saturated absorbent material in fiber drums for incineration or send to a licensed disposal or recovery site.

EPA Hazardous Waste No. D001

Section VIII. SPECIAL PROTECTION INFORMATION

Provide general ventilation and local exhaust as required.
Use protective gloves and chemical safety goggles if splashing is possible.

Section IX. SPECIAL PRECAUTIONS & COMMENTS

Post no smoking signs.
Keep away from heat, sparks and open flame. Store in a cool dry area away from direct sunlight.

D.O.T. Requirements COMBUSTIBLE LIQUID

Section X. REFERENCES

ASTM No.:
Other:
CAS No.: 108-03-2
CMA Chemical Safety Data Sheet No.:
NFPA Guides
NSC Data Sheets:
Supplier Product Literature:

MATERIAL SAFETY DATA SHEET No. 164

ALCOA

HAZARD CHARACTERISTICS			PRODUCT
☐ Flammable	☐ Combustible	*Toxic By:*	PERCHLOROETHYLENE
☐ Corrosive	☐ Explosive	☐ Ingestion	
☐ Water Reactive	☐ Radioactive	☒ Inhalation	Phone No.
☐ Oxidizer	☐ Chemically Reactive	☐ Absorption	Date:

For Internal Company Use Only – Not To Be Distributed Outside The Company

Section I. MATERIAL DESCRIPTION

Chemical Name & Formula: Tetrachloroethylene $Cl_2C = CCl_2$ Mol. Wt. 165.83

Other Designation: Ethylene tetrachloride

Corporate Stock No.:

Manufacturer: Perchlor (PPG) Perk (Stauffer) Perclene (Diamond Shamrock)

Section II. INGREDIENTS

	%	HAZARD DATA
Perchloroethylene.....	99+	OSHA PEL* 100 ppm TWA 200 ppm ceiling 300 ppm 5 minute peak in 3 hrs.
Stabilizer.....	Balance	
Stabilizer usually consists of small amounts of amine or phenolic materials.		Rat inhalation LCLo, 4000 ppm/4 hrs

*NIOSH has warned or possible carcogenicity based on animal tests.

Section III. PHYSICAL DATA

Physical Form: Clear liquid

Boiling Temp.:..... 250F (121C)

Freeze-Melt Temp.:

Vapor Pressure: at 22C..... 15.8 mm Hg

Evaporation Rate: (CCl_4=1)..... 0.27

Specific Gravity: 1.623

Density: Vapor(air=1)..... 5.83

"Solubility In H_2O":..... Negligible

Color: Colorless

Odor: Pleasant, etheral odor; threshold odor level, 4.7 ppm in air.

Section IV. FIRE AND EXPLOSION DATA

Flashpoint	Auto-Ignition Temp.	Flammability Limits In Air	Lower	Upper
Not combustible	None	NA		

Extinguishing Media: Use that which is suitable for the surrounding fire. Although not combustible, perchloroethylene can be hazardous in a fire situation because of vapor generation and from thermo-oxidative degradation at high temperature to phosgene (highly toxic) and hydrogen chloride (corrosive).

Fire fighters should use NIOSH approved self-contained breathing apparatus when this material is involved in a fire situation.

Section V. REACTIVITY DATA

Perchloroethylene is considered a stable compound under normal storage and handling conditions. However, vapor exposure to high temperature or electric arcs may cause decomposition to hydrogen chloride and phosgene (highly toxic).

Avoid mixing with caustic soda or potash. Do not allow hydrochloric acid build-up to occur in degreasing tanks (stabilizer exhausted).

Prolonged exposure to sunlight (UV) can degrade unstabilized material. Can develop hazardous reaction with finely divided aluminum.

No. I64 Perchloroethylene

Section VI. HEALTH HAZARD INFORMATION | TLV 100 ppm (skin) See section II

Perchloroethylene may cause dermatitis through prolonged or repeated skin contact with liquid and irritation, lachrymation, and burning sensation of the eyes by liquid or vapor contact. Loss of coordination, narcosis, tremors, abdominal cramps, irritation of the respiratory tract, and nausea may result from inhalation of excessive airborne concentrations. (600 ppm for 10 minutes may effect the central nervous system.) Very high exposures produce unconsciousness and even death.

FIRST AID:

Eye contact: Wash eyes with copious amounts of running water to relieve irritation.
Skin contact: Remove contaminated clothes. Wash exposed skin with soap and water.
Inhalation: Remove patient to fresh air; restore breathing if necessary. Promptly contact physician. Advise doctor not to administer adrenalin.
Ingestion: If taken internally, induce vomiting. Contact physican promptly; advise doctor not to administer adrenalin.

Section VII. SPILL, LEAK & DISPOSAL PROCEDURES

Supply maximum ventilation. Confine spill to small area; do not allow run off into sewer. Those involved in clean-up need protection from liquid contact and vapor inhalation. Pick up spill on absorbent solid.

DISPOSAL: Place in covered container for disposal. Chlorinated solvents in large amounts should be burned in an approved incinerator with appropriate fume scrubbing. Also, consult licensed waste disposal company in your locality and consider recovery of perchloroethylene solvent by distillation. Scrap solvent and distillation residues must be handled as toxic waste. Follow Federal, State and local regulations for waste disposal.

EPA Hazardous Waste No. U210.

Section VIII. SPECIAL PROTECTION INFORMATION

Airborne levels should be kept below TLV levels by use of general ventilation and local exhaust ventilation. Provide floor level ventilation to remove these vapors.

For emergency and non-routine exposure above the TLV, NIOSH approved full facepiece respirators should be used - cartridge and canister types up to 500 ppm, and air-supplied or self-contained types above 500 ppm.

Neoprene, Viron, PVA or PVC coated gloves should be used to prevent skin exposure. Where splashing is possible, aprons and protective clothing may be indicated. Appropriate eye and face protection should be used. Where eye contamination is possible, and eye wash fountain should be readily available.

Section IX. SPECIAL PRECAUTIONS & COMMENTS

Store in a cool, dry, well-ventilated place in closed containers away from fire hazards. High temperature (700C) or intense UV light can decompose perchloroethylene to toxic and corrosive materials. Smoking, open flame, welding, etc. should not be permitted in area of use or storage.

It is recommended that workers with blood pressure, heart, liver, kidney or pulmonary problems, with nervous system disorders, with excessive obesity, or with alcohol consumption problems should not work in proximity to this or other chlorinated solvents.

One study has indicated possible teratogenic effects. NIOSH has recommended that this material be handled as if it were a human carcinogen.

D.O.T. Requirements

Section X. REFERENCES

ASTM No.:
CAS No.: 127-18-4
CMA Chemical Safety Data Sheet No.:
NFPA Guides
NSC Data Sheets:
Supplier Product Literature:

Other:

MATERIAL SAFETY DATA SHEET No. 165

ALCOA

HAZARD CHARACTERISTICS			PRODUCT
☒ Flammable	☐ Combustible	*Toxic By:*	ETHYL ACETATE (99%)
☐ Corrosive	☐ Explosive	☐ Ingestion	
☐ Water Reactive	☐ Radioactive	☐ Inhalation	Phone No.
☐ Oxidizer	☐ Chemically Reactive	☐ Absorption	Date:

For Internal Company Use Only — Not To Be Distributed Outside The Company

Section I. MATERIAL DESCRIPTION

Chemical Name & Formula: Ethyl acetate; $CH_3CH_2COOCH_3$
Other Designation:

Corporate Stock No.:
Manufacturer: Eastman Chemical Products, Inc.

Section II. INGREDIENTS	%	HAZARD DATA
Ethyl acetate.....	99.	OSHA PEL
(Ethyl alcohol is an impurity at about 1%)		400 ppm 1400 mg/m^3
Mol. Wt. 88.1		

Section III. PHYSICAL DATA

Physical Form: Liquid

Boiling Temp.:	168F (76C)
Freeze-Melt Temp.:	-118F (-83C)
Vapor Pressure: 20C	86 mm Hg
Evaporation Rate: (BuAc=1)	4.1
Specific Gravity:	0.901
Density: Vapor (air=1)	3.04
"Solubility In H_2O":	7.4 Wt.%

Color: Clear, volatile liquid
Odor: Fruity odor (mild, pleasant)

Section IV. FIRE AND EXPLOSION DATA

Flashpoint	Auto-Ignition Temp.	Flammability Limits In Air at 100F % by Vol.	Lower	Upper
TCC 24F (-4C) TOC 28F (-2C)	905F (485C)		2.02	10.7

Fire fighters should use alcohol foam, dry chemical, CO_2 or water spray and should wear NIOSH approved self-contained breathing apparatus and full protective clothing.

Section V. REACTIVITY DATA

Stable under normal conditions.
Not compatible with oxidizing materials; can cause vigorous reaction.
Combustion produces carbon dioxide and probably carbon monoxide.
Does not undergo hazardous polymerization.

No. 165 ETHYL ACETATE

Section VI. HEALTH HAZARD INFORMATION | TLV 400 ppm

Contact with liquid or vapor may cause eye irritaion. Prolonged or repeated skin contact may result in drying and cracking of the skin.
The vapor is irritating to mucous membranes. High vapor concentrations may produce narcotic effects.
FIRST AID:
Eye: Flush thoroughly (immediately) with water for 15 minutes; get medical attention if symptoms persist after washing.
Skin: Flush thoroughly with water.
Inhalation: Remove from exposure, treat symptomatically and get medical attention.

Section VII. SPILL, LEAK & DISPOSAL PROCEDURES

Notify safety and environmental personnel. Eliminate all ignition sources. Collect small spills with absorbent material and place in containers. Flush residue away with water spray. Avoid discharging directly into sewers and surface waters..

Dispose of wastes via licensed disposal company in compliance with Federal, State and local regulations.

EPA Hazardous Waste No. U112

Section VIII. SPECIAL PROTECTION INFORMATION

Use ventilation to meet the TLV requirement. Where the TLV concentration is or may be exceeded, use NIOSH approved respiratory protection. The selection of appropriate respiratory protection (organic vapor respirator, supplied air respirator, self-contained breathing apparatus, etc) should be based upon the actual or potential airborne concentration of the contaminant present.
Wear safety goggles in area of use. Face shields and protective clothing are required where splashing can occur.
Eyewash fountain shall be located in the work area and be immediately accessible for emergency use.

Section IX. SPECIAL PRECAUTIONS & COMMENTS

Post No Smoking signs in use and storage areas. Eliminate sources of ignition. Metal containers for dispensing shall be electrically grounded and interconnected to receiving container. Close containers when not in use. Do not use "empty" container without cleaning or reconditioning.
Use approved safety containers for handling this material.

D.O.T. Requirements FLAMMABLE LIQUID

Section X. REFERENCES

ASTM No.: D-3127-71
CAS No.: 141-78-6
CMA Chemical Safety Data Sheet No.:
NFPA Guides
NSC Data Sheets:
Supplier Product Literature:

Other: For spraying operations see 29CFR 1910.94 & 1910.134

MATERIAL SAFETY DATA SHEET No. 166

ALCOA

HAZARD CHARACTERISTICS		
☐ Flammable	☒ Combustible	*Toxic By:*
☐ Corrosive	☐ Explosive	☐ Ingestion
☐ Water Reactive	☐ Radioactive	☐ Inhalation
☐ Oxidizer	☐ Chemically Reactive	☐ Absorption

PRODUCT
MORPHOLINE

Phone No.
Date:

For Internal Company Use Only — Not To Be Distributed Outside The Company

Section I. MATERIAL DESCRIPTION

Chemical Name & Formula: Morpholine; $OCH_2CH_2NHCH_2CH_2$
Other Designation: Diethyleneimide oxide; diethylene oximide
Tetrahydro-p-oxazine; tetrahydro-2H-1,4-oxazine
Corporate Stock No.:
Manufacturer: Dow; Jefferson Chemical; Union Carbide

Section II. INGREDIENTS	%	HAZARD DATA
Morpholine.....	~99.	TLV
Mol. Wt. 87.12		Skin 20 ppm

Section III. PHYSICAL DATA

Physical Form: Oily liquid
Boiling Temp.:..... 263F (128C)
Freeze-Melt Temp.:..... 23F (-5C)
Vapor Pressure: at 23C..... 10 mm Hg
Evaporation Rate:
Specific Gravity: at 20 C..... 0.998
Density: Vapor (air=1)..... 3.0
"Solubility In H_2O":..... Miscible with water
Color: Colorless
Odor: Fishy, ammonia (amine) odor

Section IV. FIRE AND EXPLOSION DATA

Flashpoint	Auto-Ignition Temp.	Flammability Limits In Air % by Vol.	Lower	Upper
100F (38C) O.C.	590F (310C)		1.8	10.8

Fire extinguishing agents: Water fog, alcohol foam, dry chemical or CO_2. Combustion vapors are irritating. Fire fighters should wear NIOSH approved breathing apparatus and full protective clothing. Cool exposed containers with water. Flash back along vapor trail may occur.

Section V. REACTIVITY DATA

Stable under normal conditions. Does not react with water. Can react with oxidizing materials. Emits toxic fumes of NO_x when heated to decomposition.

411538 0218

Section VI. HEALTH HAZARD INFORMATION | TLV

Irritating to skin, eyes and mucous membranes. If inhaled will cause nausea, headache or difficult breathing. Has produced kidney damage in experimental animals. (Note: Use as a food additive is permitted in foods for human consumption.)

FIRST AID:

Eyes: Hold eyelids open and flush with water for 15 minutes.

Skin: Remove contaminated clothing and shoes. Flush affected areas thoroughly with water.

Inhalation: Move to fresh air. If breathing stopped, give artificial respiration. If breathing difficult, give oxygen.

Ingestion: If victim conscious, drink water or milk. If unconscious or having convulsions, do nothing except keep victim warm. Get medical aid.

Section VII. SPILL, LEAK & DISPOSAL PROCEDURES

Notify safety and environmental personnel. Stop discharge if possible. Avoid contact with liquid and vapor. Isolate discharged material. Avoid drainage into sewers and surface waters. Pickup spill on absorbent material.

DISPOSAL: Place in covered containers. Dispose via licensed disposer in compliance with Federal, State and local regulations.

EPA Hazardous waste No. D001

Section VIII. SPECIAL PROTECTION INFORMATION

Use ventilation to meet the TLV requirement. Where the TLV concentration is or may be exceeded, use NIOSH approved respiratory protection. The selection of appropriate respiratory protection (organic vapor respirator, supplied air respirator, self-contained breathing apparatus, etc) should be based upon the actual or potential airborne concentration of the contaminant present.

Section IX. SPECIAL PRECAUTIONS & COMMENTS

Avoid contact with liquid and vapor. Where splashing is possible, use eye and face protection plus rubber apron and gloves. Post no smoking signs. Eliminate sources of ignition. Effect of low concentrations on aquatic life is unknown.

D.O.T. Requirements COMBUSTIBLE MATERIAL

Section X. REFERENCES

ASTM No.:

CAS No.: 110-91-8

CMA Chemical Safety Data Sheet No.:

NFPA Guides

NSC Data Sheets:

Supplier Product Literature:

Other: CHRIS (1974)