Pioneer Forensics LLC
VERITATEM PER EVIDENTIA
"Truth Through Evidence"

SDS

Safety Data Sheet

1. IDENTIFICATION

Product Identifier: **DFO, Quick Dry Formula**

Product Code(s): PF30022

Synonyms: Mixture.

Recommended Use: For manufacturing, industrial, and laboratory use only. Use as a laboratory reagent.

Uses Advised Against: Not for food, drug, or household use.

Supplier:
Pioneer Forensics, LLC
4621 Technology Drive
Golden, CO 80403
Phone: (303) 762-0800

Emergency Phone Number: For health emergency, call poison control: (800) 222-1222.

2. HAZARDS IDENTIFICATION

Hazard Classifications:

Flammable Liquids	Category 2
Skin Corrosion/Irritation:	Category 2
Serious Eye Damage/Irritation:	Category 1
Specific Target Organ Toxicity (Single Exposure):	Category 1
Aspiration Hazard:	Category 1

Signal Word: DANGER

Hazard Statements:
Highly flammable liquid and vapor.
Causes skin irritation.
Causes serious eye damage.
Causes damage to organs.
May be fatal if swallowed or enters airways.

Pictograms:



Precautionary Statements:

Prevention:
Keep away from heat, sparks, open flames, and hot surfaces. No smoking.
Keep container tightly closed.
Ground or bond container and receiving equipment.
Use explosion-proof electrical, ventilating, lighting, and transportation equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves, eye protection, and face protection.
Wash thoroughly after handling.
Do not breathe fume, mist, vapor, or spray.
Do not eat, drink, or smoke when using this product.

Response:
If on skin (or hair): Take of immediately all contaminated clothing. Rinse skin with water. If skin irritation occurs: Get medical attention. Wash contaminated clothing before reuse.
In case of fire: Use water spray, dry powder, alcohol resistant foam, or carbon dioxide to extinguish.
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.
If exposed: Call a poison center or doctor.
If swallowed: Immediately call a poison center or doctor. Do NOT induce vomiting.

Storage:
Store in a well-ventilated place.
Keep cool.
Store locked up.

Disposal:
Dispose of contents and container in accordance with local, regional, national, and international regulations.

Hazards Not Otherwise Classified:
This product is toxic to humans. Primates are especially susceptible to the toxic effects of methanol, which are not reflected through toxicity data (see Section 11).
May cause adverse reproductive effects.
May be toxic to reproduction.
Excessive exposure may cause skin or respiratory sensitization and tooth decay.

Toxicity Statement:
Not applicable.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Component	Common Name / Synonyms	CAS#	Chemical Formula	% by Weight
Petroleum Ether	Ligroin; Benzin; Petroleum Naphtha; Petroleum Spirits	8032-32-4	Mixture	> 70*
Ethyl Acetate	Acetic Acid, Ethyl Ester	141-78-6	$C_4H_8O_2$	> 10*
Methanol	Methyl Alcohol	67-56-1	CH_3OH	> 10*
DFO	1,8-Diazafluoren-9-one	54078-29-4	$C_{11}H_6N_2O$	< 1*
Acetic Acid	Ethanoic Acid	64-19-7	$C_2H_4O_2$	< 5*

Trade Secret Statement:
*The specific concentrations of each component have been withheld under a trade secret. Any effects of these concentrations on the overall hazard classification of this product are considered, and health and safety information are provided where applicable.

4. FIRST AID MEASURES

First Aid Procedures:

Inhalation: Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. WARNING! It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled or ingested material is toxic, infectious, or corrosive. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician immediately.

Ingestion: Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, keep head low so that vomit does not enter lungs. Rinse mouth. If conscious and alert, give 2-3 cups of milk or water. Never give anything by mouth to an unconscious person. Immediate medical attention is required. Call a physician or poison control center immediately.

Skin Contact: Immediately remove contaminated clothing and shoes. Wash skin with plenty of water for at least 15 minutes. Wash clothing before reuse. Get medical attention if symptoms occur.

Eye Contact: Immediately flush eyes with gentle but large stream of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Check for and remove contact lenses if present and easy to do. Continue rinsing. Call a physician immediately.

General Advice: Poison information centers in each state can provide additional assistance for scheduled poisons. Ensure that medical personnel and those providing first aid are aware of the material(s) involved and take precautions to protect themselves.

Symptoms and Effects: Ingestion may cause headache, dizziness, drowsiness, nausea, vomiting, blood in vomit, diarrhea, abdominal pain, constipation, shock, decreased motor function, and blindness. Advanced stages may cause collapse, unconsciousness, coma, and possible death due to reparatory failure. Inhalation of vapors may cause coughing, headache, nausea, drowsiness, dizziness, unconsciousness, coma, suffocation, and cardiovascular effects. Aspiration may cause respiratory swelling and pneumonitis. May cause numbness in extremities. Contact with skin may cause irritation including dryness, cracking, redness, blistering, and inflammation. May aggravate existing skin disorders. Absorption through skin may cause visual disturbances and metabolic acidosis. Contact with eyes may cause irritation, redness, tearing, swelling, blurred vision, and pain. Prolonged or repeated skin contact may cause dermatitis. Chronic exposure to vapors may cause polyneuropathy. Chronic exposure may cause kidney damage. Potential cancer hazard. May affect the blood, liver, kidneys, eyes, and central nervous system.

Immediate Medical Care/ Special Treatment: If exposed or concerned, get medical attention immediately. Treat symptomatically.

5. FIREFIGHTING MEASURES

Suitable Extinguishing Media: Dry powder, alcohol resistant foam, carbon dioxide.

Unsuitable Extinguishing Media: Water may be ineffective. Material is lighter than water and insoluble in water. Do not use a solid (straight) water stream, as it may scatter and spread fire.

Hazardous Combustion Products: Carbon oxides, nitrogen oxides.

Specific Hazards: Highly flammable. Vapors may cause flash fire or ignite explosively. Can be ignited easily by heat, sparks, or flames and burns vigorously. Material may burn with an invisible flame. Sealed containers may explode when heated or involved in fire. Material is sensitive to static discharge. Vapors may travel considerable distance to source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. Liquid floats on water and may travel to a source of ignition and spread fire. Vapor may accumulate in container headspace, resulting in flammability hazard. High vapor concentration in air may cause an explosion hazard.

Special Protective Equipment/ Precautions for Firefighters: As in any fire, wear MSHA/NIOSH-approved (or equivalent), self-contained, positive-pressure or pressure-demand breathing apparatus and full protective gear. Use water spray to cool unopened containers until well after fire is out. Move containers from fire area if you can do so without risk. This material may evaporate if spilled and leave a flammable residue. In the event of fire and/or explosion, do not breathe fumes.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions and Protective Equipment: Ventilate area of leak or spill. Isolate hazard area and keep unnecessary and unprotected personnel away from the area of the leak or spill. Keep upwind. Keep out of low areas. Wear appropriate personal protective equipment (see Section 8). Remove all sources of ignition. Pay attention to flashback. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use spark-proof tools and explosion-proof equipment. Avoid contact with eyes, skin, and clothing.

Emergency Procedures: Evacuate surrounding personnel as needed. In case of chemical emergency, or if unsure how to address an accidental release, consult a professional (see Section 1).

Methods for Containment: Eliminate all sources of ignition. Keep combustibles away from spilled material. Stop the flow of material if this is without risk. Prevent entry into waterways, sewer, basements, or confined areas. Dike the spilled material, where this is possible. Product should not be released to the environment. Contain and recover waste when possible. A vapor suppressing foam may be used.

Methods for Cleanup: Absorb spill with an inert material (e.g. vermiculite, dry sand, earth, cloth, or fleece) and place in a noncombustible container for reclamation or disposal. Do not flush to sewer. Clean contaminated surface thoroughly. Never return spills in original containers for reuse. Clean up in accordance with all applicable regulations.

7. HANDLING AND STORAGE

Handling: Do not handle, store, or open near an open flame, sources of heat, or sources of ignition. Wear personal protective equipment (see Section 8). Use only in well-ventilated areas. Provide sufficient air exchange and/or exhaust in work areas. Avoid contact with skin, eyes, and clothing. Do not breathe vapors or spray mist. Do not ingest. When using, do not eat, drink, or smoke. Take precautionary measures against static discharge. To avoid ignition of vapors by static electricity discharge, all metal parts of equipment must be grounded. Keep away from incompatible materials (see Section 10). Handle in accordance with good industrial hygiene and safety practice. Wash thoroughly after handling. Containers of this material may be hazardous when empty, as they retain product residues. Observe all warnings and precautions listed for this product.

Storage: Store in a cool, dry, ventilated area. Store in a segregated and approved area away from incompatible materials (see Section 10). Store in original container. Keep containers tightly closed and upright. Keep away from food, drink, and animal foodstuffs. Keep out of the reach of children. Ground container and transfer equipment. Comply with all national, state, and local codes pertaining to the storage, handling, dispensing, and disposal of this product.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

Petroleum Ether:	ACGIH:	TWA:	300 ppm
	NIOSH:	TWA:	350 mg/m^3
	OSHA:	TWA:	300 ppm
			1350 mg/m^3
Ethyl Acetate:	OSHA:	PEL:	1400 mg/m^3
			400 ppm
	ACGIH:	TWA	400 ppm
	NIOSH:	TWA:	1400 mg/m^3
			400 ppm
Methanol:	ACGIH:	TWA:	200 ppm
		STEL:	250 ppm
		BEL:	15 mg/L
	OSHA:	PEL:	200 ppm
			260 mg/m^3
	NISOH:	STEL:	325 mg/m^3
			250 ppm
		TWA:	260 mg/m^3
			200 ppm
DFO:	No information found.		
Acetic Acid:	ACGIH:	TWA:	10 ppm
		STEL:	15 ppm
	OSHA:	PEL:	10 ppm
	NIOSH:	IDLH:	50 ppm
		TWA:	10 ppm
		STEL:	15 ppm

Engineering Controls: Ensure adequate ventilation. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal Protective Measures:

Eye/Face Protection: Wear safety glasses with side shields or goggles. Wear a face shield. Maintain approved eyewash station and accessible rinse facilities in work area.

Skin Protection: Wear appropriate chemical resistant clothing (with long sleeves) and appropriate chemical resistant gloves.

Respiratory Protection: An air-purifying, NIOSH-approved respirator with appropriate cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Use a positive-pressure, air-supplied respirator if there is any potential for an uncontrolled release, if exposure levels are unknown, or if any other circumstances exist where air-purifying respirators may not provide adequate protection.

Specific Requirements for Personal Protective Equipment: Ensure that glove material is compatible with this product. This information is available from glove manufacturers.

9. PHYSICAL AND CHEMICAL PROPERTIES

Unless otherwise indicated, all properties are given at 25 °C and standard pressure.

Appearance:	Yellow, transparent liquid.
Odor:	Pungent, gasoline smell with alcoholic and vinegar hints.
Odor Threshold:	No information found.
Formula Weight:	Mixture.
pH:	No information found.
Melting/Freezing Point:	No information found.
Boiling Point/Range:	No information found.
Decomposition Temperature:	No information found.
Flash Point:	No information found.
Auto-ignition Temperature:	No information found.
Flammability:	Highly flammable liquid and vapor.
Flammability/Explosive Limits:	No information found.
Solubility:	Insoluble in water, miscible in alcohols.
Vapor Pressure:	No information found.
Vapor Density:	No information found.
Specific Gravity:	No information found.
Evaporation Rate:	No information found.
Viscosity:	No information found.
Partition Coefficient (n-octanol/water):	No information found.

10. STABILITY AND REACTIVITY

Reactivity Data:	Highly flammable. See Section 9. May be corrosive to several materials, especially certain metals.
Chemical Stability:	Stable under normal conditions.
Conditions to Avoid:	Heat, flames, sparks, sources of ignition, incompatible materials, cold temperatures, moisture.
Incompatible Materials:	Nitrogen tetroxide, oxidizing agents, nitrates, acids, bases, metals, amines, carbonates, phosphates.
Hazardous Decomposition Products:	Carbon oxides, hydrogen.
Possibility of Hazardous Reactions:	May react vigorously, violently, or explosively if exposed to extreme thermal conditions or in contact with the incompatible materials listed above. Contact with metals may yield hazardous concentrations of hydrogen gas.
Hazardous Polymerization:	Will not occur.

11. TOXICOLOGICAL INFORMATION

Routes of Exposure: Inhalation, ingestion, skin contact, eye contact.

Acute Effects: Corrosive. Harmful or fatal if swallowed, inhaled, or absorbed through the skin or eyes. May cause central nervous system effects characterized by headache, dizziness, drowsiness, nausea, vomiting, unconsciousness, and coma if inhaled. Aspiration may cause respiratory swelling and pneumonitis. May cause numbness in extremities. May cause damage to organs by inhalation. May cause gastrointestinal irritation with nausea, vomiting, and diarrhea if swallowed. May cause central nervous system effects characterized by excitement followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma, and possible death due to respiratory failure. Causes skin irritation to include dryness, cracking, redness, and inflammation. May aggravate existing skin disorders. Causes serious eye irritation, redness, and pain. May cause visual disturbances or blindness if absorbed into the blood stream. May affect the blood, brain, urinary system, liver, spleen, eyes, kidneys, cardiovascular system, and pancreas. May cause burns and damage to the eyes, skin, respiratory tract, and gastrointestinal tract. May affect the mucous membranes, blood, brain, urinary system, liver, eyes, and kidneys.

Chronic Effects: Prolonged or repeated skin contact may cause dermatitis. Chronic exposure to vapors may cause polyneuropathy. Chronic exposure may cause kidney damage. Potential cancer hazard. May cause central nervous system effects. May cause damage to eyesight. Prolonged or repeated exposure may cause liver, kidney, brain, cardiovascular system, blood, spleen, and heart damage as well as adverse reproductive effects, birth defects, mutagenic effects, and dermatitis. Prolonged or repeated exposure may cause tooth damage, skin discoloration, respiratory irritation, mutagenic effects, skin sensitization, and adverse reproductive effects.

Toxicological Data:

Petroleum Ether:	LC_{50} Inhalation, Rat:	3400 ppm 4 h
	LD_{50} Intravenous, Mouse:	40 mg/kg
Ethyl Acetate:	LD_{50} Dermal, Rabbit:	> 18,000 mg/kg
	LC_{50} Inhalation, Rat:	58.6 mg/L 4 h
	LD_{50} Oral, Rat:	10,170 mg/kg
Methanol:	LD_{50} Oral, Rat:	5628 mg/kg
	LC_{50} Inhalation, Rat:	87.6 mg/L 6 h
	LD_{50} Dermal, Rabbit:	15,800 mg/kg
	LDL Oral, Human:	143 mg/kg
	Toxic to reproduction based on animal data.	
DFO:	No information found.	
Acetic Acid:	LD_{50} Oral, Rat:	3310 mg/kg
	LC_{50} Inhalation, Rat:	11.4 mg/L 4 h
	LD_{50} Dermal, Rabbit:	1060 mg/kg
	May cause reproductive effects based on animal data.	
	Corrosive to skin and eyes based on animal data.	

Symptoms of Exposure: Irritation, blistering, burns, unconsciousness, visual disturbances, metabolic acidosis, drowsiness, dizziness, suffocation, shortness of breath, nervous system effects, cardiovascular effects, coughing, bronchitis, nausea, vomiting, diarrhea, abdominal pain, constipation, blindness, and respiration effects.

Carcinogenic Effects: No component of this product is considered to cause cancer by IARC, ACGIH, NTP, or OSHA.

12. ECOLOGICAL INFORMATION

Ecotoxicological Data:

Petroleum Ether:	No information found.	
Ethyl Acetate:	No information found.	
Methanol:	EC_{50}, Water Flea (Daphnia magna):	> 10,000 mg/L 48 h
	LC_{50}, Fathead Minnow (Pimephales promelas):	> 100 mg/L 96 h
DFO:	No information found.	
Acetic Acid:	EC_{50}, Water Flea (Daphnia magna):	47 mg/L 24 h
	LC_{50}, Fathead Minnow (Pimephales promelas):	88 mg/L 96 h
	LC_{50}, Rainbow Trout (Oncorhynchus mykiss):	> 1000 mg/L 96 h

Persistence and Degradability: Expected to be readily biodegradable.

Bioconcentration Factor: Methanol: 1.0

Environmental Effects: May be harmful to aquatic organisms. Avoid release to the environment. May cause some oxygen depletion in aquatic systems. Low potential to affect aquatic systems, aquatic organisms, secondary waste treatment microorganisms, and the germination of some plants. Moderate potential t affect the germination and growth of some plants.

13. DISPOSAL INFORMATION

Disposal Instructions: All wastes must be handled in accordance with local, state, and federal regulations. Minimize exposure to product waste (see Section 8). Do not dispose unused waste down drains or into sewers.

Contaminated Packaging: Because emptied containers retain product residue, follow label warnings even after container is emptied. Residual vapors may explode on ignition; do not cut, drill, grind, or weld on or near product container. Offer rinsed packaging material to local recycling facilities.

Waste Codes: U112 (US RCRA Hazardous Waste U List – Ethyl acetate (I))
U154 (US RCRA Hazardous Waste U List – Methanol (I))

14. TRANSPORT INFORMATION

DOT:

UN Number: UN1993

Proper Shipping Name: Flammable liquid, n.o.s. (Petroleum ether, Methanol)

Hazard Class: 3

Packing Group: I

ERG Number: 128

Environmental Hazard Regulations: No information found.

Other Transport Precautions: Reportable Quantity: Ethyl Acetate: 5000 lb
Methanol: 5000 lb
Acetic Acid: 5000 lb

15. REGULATORY INFORMATION

U.S. Federal Regulations:

OSHA: This product is considered a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Inventory: The following components are not listed on the TSCA Inventory: DFO

U.S. EPCRA (SARA Title III):

Section 302: No information found.

Sections 311/312:

Hazard Category	List (Yes/No)
Section 311 – Hazardous Chemical	Yes
Immediate Hazard	Yes
Delayed Hazard	Yes
Fire Hazard	Yes
Pressure Hazard	No
Reactivity Hazard	No

Section 313: Methanol

CERCLA Reportable Quantities: Methanol: 5000 lb
Acetic Acid: 5000 lb

International Inventories:

Country or Region	Inventory Name	On Inventory (Yes/No)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No

*A "Yes" indicates that the listed components of this product comply with the inventory requirements administered by the governing country or region.

16. OTHER INFORMATION

Disclaimer: Pioneer Forensics, LLC provides the information in this Safety Data Sheet in the belief that it is reliable but assumes no responsibility for its completeness or accuracy. The physical properties reported in this SDS are obtained from literature and do not constitute product specifications. Pioneer Forensics, LLC makes and gives no representations or warranties with respect to the information contained herein or the product to which it refers, whether express, implied, or statutory, including without limitation, warranties of accuracy, completeness, merchantability, non-infringement, performance, safety, suitability, stability, and fitness for a particular purpose. No warranty against infringement of any patent, copyright or trademark is made or implied. This SDS is intended only as a guide to the appropriate handling of the material by a properly trained person. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. Accordingly, Pioneer Forensics, LLC assumes no liability whatsoever for the use of or reliance upon this information including results obtained, incidental or consequential damages, or lost profits.

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Reason for Revision: Not applicable.