MSDS Number: **P5752** * * * * * *Effective Date:* ***11/02/01*** * * * * * *Supercedes:* ***11/17/99***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

J.T.Baker ®

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. And Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

POTASSIUM FERRICYANIDE

1. Product Identification

Synonyms: Potassium ferricynate; tripotassium hexacyanoferrate; Ferrate (3-), hexacyano, tripotassium
CAS No.: 13746-66-2
Molecular Weight: 329.25
Chemical Formula: K3Fe(CN)6
Product Codes: 3104

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Potassium Ferricyanide	13746-66-2	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE

IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT
Storage Color Code: Orange (General Storage)

Potential Health Effects

Information on the human health effects from exposure to this substance is limited. Used information for a related compound, potassium ferrocyanide, as a guide. Potassium ferrocyanide is apparently benign and does not decompose to cyanide in the body.

Inhalation:
May cause irritation to the respiratory tract. Symptoms may include coughing and shortness of breath.
Ingestion:
Large doses may cause gastrointestinal upset with nausea, vomiting, diarrhea, and possible cramping.
Skin Contact:
May cause irritation with redness and pain.
Eye Contact:
May cause irritation, redness and pain.
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
No information found.

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4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention if irritation develops.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention if irritation persists.

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. May emit toxic and flammable fumes of cyanide if involved in a fire.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Protect from light. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
For conditions of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R

or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear protective gloves and clean body-covering clothing.

Eye Protection:
Safety glasses. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

Appearance:
Bright red, crystalline powder.

Odor:
Odorless.

Solubility:
Slowly soluble in 2.5 parts cold water

Specific Gravity:
1.85 @ 17C/4C

pH:
No information found.

% Volatiles by volume @ 21C (70F):
0

Boiling Point:
No information found.

Melting Point:
No information found.

Vapor Density (Air=1):
No information found.

Vapor Pressure (mm Hg):
No information found.

Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. The aqueous solution decomposes slowly on standing.

Hazardous Decomposition Products:
When heated to decomposition or comes in contact with acid or acid fumes it emits toxic fumes of cyanides. Emits toxic fumes of cyanide and oxides of nitrogen when heated to decomposition.

Hazardous Polymerization:
Will not occur.

Incompatibilities:
Ammonia, chromium trioxide + heat, cupric nitrate, sodium nitrite + heat, acids and acid

fumes.
Conditions to Avoid:
Light, heat, incompatibles.

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11. Toxicological Information

Oral mouse LD50: 2970 mg/kg. Investigated as a mutagen.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Potassium Ferricyanide (13746-66-2)	No	No	None

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12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

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14. Transport Information

Not regulated.

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia

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  Potassium Ferricyanide (13746-66-2)               Yes  Yes   Yes      Yes

  --------\Chemical Inventory Status - Part 2\---------------------------------
                                                          --Canada--
  Ingredient                                          Korea  DSL   NDSL  Phil.
  ------------------------------------------------    -----  ---   ----  -----
  Potassium Ferricyanide (13746-66-2)                  Yes   Yes   No     Yes

  --------\Federal, State & International Regulations - Part 1\----------------
                                             -SARA 302-    ------SARA 313------
  Ingredient                                 RQ    TPQ     List  Chemical Catg.
  ----------------------------------------   ---   -----   ----  --------------
  Potassium Ferricyanide (13746-66-2)        No    No      No          No

  --------\Federal, State & International Regulations - Part 2\----------------
                                                         -RCRA-    -TSCA-
  Ingredient                                 CERCLA      261.33     8(d)
  ----------------------------------------   ------      ------    ------
  Potassium Ferricyanide (13746-66-2)        No          No         No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: No   Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
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Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
CAUTION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Avoid breathing dust.
Keep container closed.
Use with adequate ventilation.
Label First Aid:
If inhaled, remove to fresh air. Get medical attention for any breathing difficulty. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists. If swallowed, give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.
Product Use:

Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 8.
Disclaimer:
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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MATERIAL SAFETY DATA SHEET

1 IDENTIFICATION OF SUBSTANCE & COMPANY

MATERIAL No: LT 16588 GB

Name	**ES COMPLEAT/EG CONCENTRATE (ETHYLENE GLYCOL BASED COOLANT)**
Synonyms	ETHYLENE GLYCOL BASED COOLANT
Product Code	CC2820, CC2821, CC2822, CC2822C, CC2823, CC2847 etc
Company	FLEETGUARD
Registered Office	FLEETGUARD EUROPE, BLARENBERGLAAN 4, INDUSTRIEPARK NOORD 2 2800 MECHELEN - BELGIUM
Telephone	(32) 15-28-93-11
Fax No.	(32) 15-28-93-00
UK Office	CAVALRY HILL INDUSTRIAL PARK, WEEDON, NORTHAMPTON NN7 4TD-ENGLAND Tel : (44) 1327 344200 Fax : (44) 1327 349074
French Office	ZONE INDUSTRIELLE DU GRAND GUELEN, 29556 – QUIMPER – FRANCE TEL : (33) 2 98-76-49-49 FAX : (33) 2 98-76-49-50
Emergency Telephone No.	France : Orfila : 01 45 42 59 59 UK : 020 7955 5095 International/ USA Chemical Transportation Emergency Center : 202 483 7616

2 COMPOSITION/INFORMATION ON INGREDIENTS

INGRDIENTS	%	CAS No.	EEC No	SUPPLY CLASSIFICATION
ETHYLENE GLYCOL	90 – 95	107-21-1	203-473-3	Xn, R22; S2
DIETHYLENE GLYCOL	0 – 5	111-46-4		

3 HAZARDS IDENTIFICATION

Classification	Xn – HARMFUL
Human Effects	THIS IS A BLUE COLOURED VISCOUS LIQUID. INGESTION CAN BE FATAL. OVER EXPOSURE MAY CAUSE NEUROLOGICAL SIGNS AND SYMPTOMS. MAY CAUSE KIDNEY DAMAGE. VERY TOXIC IN PARTICULATE FORM UPON INHALATION. IF INGESTED, INDUCE VOMITING **ONLY** UNDER THE ADVICE OF A DOCTOR OR POISON CONTROL CENTRE. IRRITATING TO THE EYES AND THE SKIN. LETHAL DOSE FOR HUMANS REPORTED TO BE 100ML.
Environmental Effects	NOT YET DETERMINED

4 FIRST AID MEASURES

Skin Contact	AFTER CONTACT WITH THE SKIN, WASH IMMEDIATELY WITH PLENTY OF SOAP AND WATER. SEEK MEDICAL ATTENTION IF IRRITATION DEVELOPS OR PERSISTS DECONTAMINATE ANY CLOTHING AND ACCESSORIES BEFORE RE-USE
Eye Contact	IRRIGATE WITH COPIOUS QUANTITIES OF WATER. SEEK MEDICAL ATTENTION. (note to physicians: stain for evidence of corneal abrasion or injury)
Inhalation	REMOVE TO FRESH AIR. IF SYMPTOMS OCCUR SEEK MEDICAL ATTENTION.
Ingestion	TOXIC BY INGESTION. IF SWALLOWED INDUCE VOMITING IMMEDIATELY BUT ONLY UNDER THE ADVICE OF MEDICAL PERSONNEL OR POISON CONTROL CENTRE. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. SEEK MEDICAL ATTENTION IMMEDIATELY. (note to physicians: delayed treatment may result in fatality)

5 FIRE FIGHTING MEASURES

Incompatibility	ETHYLENE GLYCOL IS COMBUSTIBLE WHEN EXPOSED TO HEAT OR FLAME CAN REACT VIGOUROUSLY WITH OXIDANTS. MODERATE EXPLOSION HAZARD IN FORM OF VAPOUR WHEN EXPOSED TO HEAT OR FLAME
Decomposition	CARBON MONOXIDE, CARBON DIOXIDE AND ACRID SMOKE
Measures	ALCOHOL RESISTANT FOAM, CARBON DIOXIDE, DRY POWDER OR WATER SPRAY
Equipment	FIREFIGHTERS SHOULD USE SELF CONTAINED BREATHING APPARATUS

6 ACCIDENTAL RELEASE MEASURES

After Spillage/Leakage	CONTAIN SPILT LIQUID WITH SAND, EARTH OR NON-COMBUSTIBLE ABSORBENT MATERIAL. ELIMINATE ALL IGNITION SOURCES, USE PLASTIC SHOVEL TO TRANSFER TO SUITABLE CONTAINER AND DISPOSE OF TO LICENSED WASTE CONTRACTOR
Personal Precautions	OPERATIVES SHOULD USE EYE PROTECTION WHEN CLEARING UP ANY SPILLS. THE USE OF LONG PVC GLOVES ARE RECOMMENDED
Environmental Precautions	DO NOT ALLOW TO ENTER ANY DRAIN OR WATERCOURSE

7 HANDLING AND STORAGE

Storage	KEEP CONTAINER CLOSED WHEN NOT IN USE AND OUT OF THE REACH OF CHILDREN, KEEP AWAY FROM STRONG ACIDS. STORE IN A COOL DRY PLACE AVOID EXTREME TEMPERATURES **DO NOT FREEZE**
Ventilation	ENSURE ADEQUATE VENTILATION WHEN DECANTING
Handling	WASH THOROUGHLY AFTER HANDLING. WEAR PROTECTIVE CLOTHING, GLOVES AND EYE PROTECTION. AVOID BREATHING MIST.

8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE REQUIREMENTS	Ingredient	Type	8 hr TWA	10 min STEL
	ETHYLENE GLYCOL	OES vapour Particulates	60 mg/m³ 10 mg/m³	125mg/m³
Control Measures	AVOID SKIN OR EYE CONTACT. AVOID BREATHING THE MIST; USE ADEQUATE MECHANICAL VENTILATION			
Monitoring	NOT NORMALLY NECESSARY			
Eye Protection	GOGGLES SHOULD BE USED WHEN HANDLING THE PRODUCT TO PREVENT EYE CONTACT			
Hand Protection	USE IMPERVIOUS GLOVES			
Respiratory Protection	ONLY NECESSARY IF THE WORKPLACE ATMOSPHERIC CONCENTRATIONS EXCEED THE OCCUPATIONAL EXPOSURE STANDARD (OES). REFERENCE TO HSE GUIDANCE IS RECOMMENDED.			
Body Protection	IF DISPENSING USE AN IMPERVIOUS APRON			
General Precautions	OBSERVANCE OF GOOD HOUSEKEEPING RULES WILL ENSURE GENERAL SAFETY			
Hygiene	DO NOT EAT OR DRINK WHILE HANDLING THE PRODUCT. WASH HANDS AFTER USE.			

9 PHYSICAL AND CHEMICAL PROPERTIES

Molecular Weight	NOT DETERMINED
Appearance	THE SUBSTANCE IS A BLUE COLOURED VISCOUS LIQUID
Odour	MILD CHEMICAL SMELL
pH	9.4 – 10.0 @ 100%; 10.2 – 10.8 @ 50%
Boiling Point	195°C
Flash Point	121°C
Flammability	NOT APPLICABLE
Autoflammability	NOT DETERMINED
Explosive Properties	NIL
Oxidising Properties	NOT APPLICABLE
Vapour Pressure	0.05 @ 20°C
Density	S.G. = 1.11 – 1.14
Solubility	100% IN WATER

10 STABILITY AND REACTIVITY

Stability	STABLE; BUT MODERATE EXPLOSION HAZARD EXISTS WHEN EXPOSED TO FLAMES
Conditions to Avoid	AVOID STRONG OXIDISING AGENTS. GLYCOL GROUPED CHEMICALS ARE INCOMPATIBLE WITH SULPHURIC ACID, NITRIC ACID, CAUSTICS AND ALIPHATIC AMINES
Thermal Decomposition	ACRID SMOKE AND IRRITATING FUMES
Hazardous Decomposition Products	CARBON MONOXIDE AND CARBON DIOXIDE

11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY	NO DATA AVAILABLE
Inhalation	VERY TOXIC IN PARTICULATE FORM. HUMAN SYSTEMIC EFFECTS BY INHALATION ARE EYE LACRIMATION, GENERAL ANAESTHESIA, HEADACHE, COUGH, RESPIRATORY STIMULATION, NAUSEA OR VOMITING, PULMONARY, KIDNEY AND LIVER DAMAGE.
Ingestion	HARMFUL IF SWALLOWED, HUMAN SYSTEMIC EFFECTS BY INGESTION ARE EYE LACRIMATION, GENERAL ANAESTHESIA, HEADACHE, COUGH, RESPIRATORY STIMULATION, NAUSEA OR VOMITING, PULMONARY, KIDNEY AND LIVER DAMAGE. IF INGESTED IT CAUSES INITIAL CENTRAL NERVOUS SYSTEM STIMULATION FOLLOWED BY DEPRESSION. LATER IT CAUSES POTENTIALLY LETHAL KIDNEY DAMAGE. HUMAN POISON BY INGESTION.
Skin Contact	SKIN IRRITANT
Eye Contact	EYE IRRITANT

12 ECOLOGICAL INFORMATION

Bioaccumulation Potential	NOT YET DETERMINED
Aquatic Toxicity	NOT YET DETERMINED
Sewage	DO NOT ALLOW RUNOFF INTO SEWERS

13 DISPOSAL CONSIDERATION

Solid	NOT APPLICABLE
Liquid	DISPOSE OF TO A LICENSED WASTE CONTACTOR; RECYCLING RECOMMENDED
Contaminated Packaging	DISPOSE OF TO A LICENSED WASTE CONTRACTOR

14 TRANSPORT INFORMATION

Un Number	Not applicable
ADR/IRD	Not subject to transport regulations.
IMDG	Not subject to transport regulations
IATA	Not subject to transport regulations

15 REGULATORY INFORMATION

Preparation Classification	HARMFUL
Hazard Pictogram	
Risk Phrases	R22 – HARMFUL IF SWALLOWED
Safety Phrases	S2 - KEEP OUT OF REACH OF CHILDREN

16 RELEVANT REGULATIONS

OTHER INFORMATION	THE INFORMATION CONTAINED HEREIN IS BASED ON THE DATA AVAILABLE TO US AND, IS TO THE BEST OF OUR KNOWLEDGE AND BELIEF, ACCURATE. HOWEVER, SINCE THE CONDITIONS OF HANDLING AND USE ARE BEYOND OUR CONTROL, WE ASSUME NO LIABILITY FOR DAMAGES INCURRED BY USE OF THIS MATERIAL. ALTHOUGH CERTAIN HAZARDS ARE DESCRIBED HEREIN, WE CANNOT GUARANTEE THAT THESE ARE THE ONLY HAZARDS WHICH MAY EXIST. USERS OF THIS PRODUCT SHOULD SATISFY THEMSELVES THAT THE CONDITIONS AND METHODS OF USE ASSURE THE PRODUCT IS USED SAFELY. IT IS THE RESPONSIBILITY OF THE USER TO COMPLY WITH ANY AND ALL EUROPEAN, NATIONAL OR LOCAL LAWS AND REGULATIONS WHICH MAY EXIST. ADDITIONAL ADVICE ON SPECIFIC QUESTIONS CAN BE OBTAINED FROM FLEETGUARD

MATERIAL SAFETY DATA SHEET

PRODUCT RELATED HEALTH DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: LUBRICATING OIL
Binks Part No. 17611-102
MSDS #: MSDS-22
REVISION #: 2.1
DATE REVISED: 09/13/2003 DATE PREPARED: 01/01/2003

ITW Industrial Finishing - Binks
195 Internationale Blvd.
Glendale Heights, IL 60139
Emergency Number - INFOTRAC
EMERGENCY PHONE (24 HOURS):
1-8OO-535-5053
630-237-5000
GENERAL USE: LUBRICATING OIL

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENTS CAS REG NO.	WGT . %	ACGIH TLV	ACGIH STEL	OSHA PEL	OSHA STEL	UNITS
Oil Mist in Air (Not encountered in Normal Use)		5 mg/cubic meter		5 mg/cubic meter		

3. HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS
PRIMARY EXPOSURE ROUTES: Skin – Eyes – Inhalation – Ingestion
ACUTE EFFECTS
Eye: Eye contact may result in irritation.
Skin: Prolonged or repeated skin contact may cause skin irritation.
Ingestion: Minute amounts aspirated into the lungs during ingestion may cause mild to severe pulmonary injury.
Inhalation: Vapor pressure is very low and inhalation at room temperature is not a problem. If overcome by vapor from a hot product mild to severe pulmonary injury may occur.
CHRONIC EFFECTS
Eye: No long-term adverse effects are known.
Skin: No long-term adverse effects are known.
Ingestion: This product has a low order of acute oral toxicity, but minute amounts aspirated into the lungs during ingestion may cause mild to severe pulmonary injury.
Inhalation: If overcome by vapor from a hot product mild to severe pulmonary injury may occur.
CARCINOGENICITY: Not listed as a carcinogen or potential carcinogen by the NTP, IARC, and OSHA.
TARGET ORGAN EFFECTS: None known.
MEDICAL CONDITIONS AGGRAVATED by LONG-TERM EXPOSURE: No known medical conditions are aggravated by exposure to solution.

4. FIRST AID MEASURES

EYE CONTACT: In case of contact, flush eyes with plenty of water for at least 15 minutes or until irritation subsides. Physician should be contacted should irritation persist.
SKIN CONTACT: Remove any contaminated clothing and wash skin with soap and warm water. If injected by high pressure under skin, regardless of the appearance or its size, contact a physician IMMEDIATELY. Delay may cause loss of affected part of the body.
INGESTION: If ingested call a physician immediately. Do not induce vomiting.

INHALATION: Vapor pressure is very low and inhalation at room temperature is not a problem. If overcome by vapor from hot product, immediately remove from exposure and call a physician.

5. FIRE FIGHTING MEASURES

FLASH POINT (method): 415 - 475 deg F (COC)
FLAMMABLE LIMITS
LOWER EXPLOSION LIMIT: 0.9 %
UPPER EXPLOSION LIMIT: 7.0 %
FLAMMABILITY CLASS: None
EXTINGUISHING MEDIA: Foam, Dry Chemical, Carbon Dioxide or Water Spray (Fog)
HAZARDOUS COMBUSTION PRODUCTS: Sulphur Dioxide and Carbon Monoxide.
UNUSUAL FIRE AND EXPLOSION HAZARDS: Do not mix with strong oxidants. Empty containers retain residue. Do not cut, drill, grind, or weld, as they may explode.
FIRE-FIGHTING INSTRUCTIONS/EQUIPMENT: Cool exposed containers with water. Firefighters are to wear Full Bunker Gear and Self Contained Breathing Apparatus (SCBA).
HMIS RATING: See Section 15.

6. ACCIDENTAL RELEASE MEASURES

Steps to be taken in case material is released or spilled: Scrape up grease, wash remainder with suitable petroleum solvent or add absorbent. Keep petroleum products out of sewers and water courses. Advise authorities if product has entered or may enter sewers and water courses.

7. HANDLING AND STORAGE

HANDLING PRECAUTIONS: Keep containers closed when not in use.
STORAGE REQUIREMENTS: Do not handle or store near heat, sparks, flame, or strong oxidants. Store in cool dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EYE and FACE PROTECTION: Safety Glasses with Side Shields as good industrial practice. If chance of eye contact, wear goggles.
SKIN and HAND PROTECTION: Use oil-resistant gloves, if needed. Use oil-resistant apron if needed.
RESPIRATORY PROTECTION: Normally not needed.
OTHER PERSONAL PROTECTIVE EQUIPMENT: Not required.
ENGINEERING CONTROLS: Local exhaust (Mechanical) should be used to capture fumes and vapors.
ADMINISTRATIVE CONTROLS: Keep this and other chemicals out of reach of children: minimize body contact with this product as well as all chemicals in general.
OTHER INFORMATION: Remove oil-soaked clothing and launder before use. Use normal hygiene practice. Wash hands thoroughly before eating, drinking, smoking and using restroom after contact. Keep away from children.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Transparent amber oil.
PHYSICAL STATE: Liquid/Oil.
ODOR: Mineral oil odor
ODOR THRESHOLD (PPM): Not established
SPECIFIC GRAVITY (H2O=1): 0.87 - 0.90
SOLUBILITY IN WATER (20 C) : Negligible
SOLUBILITY IN FAT: Not Determined.
COEFFICIENT of WATER/OIL SOLUBILITY: Not Determined.
PARTITION COEFFICIENT (n-octanol/water): Not Determined.
pH: No data.
MELTING POINT: Liquid.
BOILING POINT: > 550 deg F.
EVAPORATION RATE (Butyl Acetate=1): < 0.01
V.O.C.: No Data.
Vapor Density (Air=1): > 5
Vapor Pressure (mm Hg): < 0.01
FLASH POINT: / AUTOIGNITION TEMPERATURE: / FLAMMABILITY CLASSIFICATION: /
UNUSUAL FIRE or EXPLOSION HAZARDS: See Section 5
OXIDIZING PROPERTIES: None Known.

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable.
HAZARDOUS POLYMERIZATION: Will Not Occur.
CONDITIONS TO AVOID: High Temperatures.
CHEMICALS TO AVOID: Avoid contact with strong oxidants like liquid chlorine, concentrated oxygen.
HAZARDOUS DECOMPOSITION PRODUCTS (non-thermal): None known.

11. TOXICOLOGICAL INFORMATION

SENSITIZATION TO PRODUCT: Not known.
IRRITANCY OF PRODUCT: Not Known.
REPRODUCTIVE TOXICITY: Not known.
TERATOGENICITY: Not known.
MUTAGENICITY: Not known.

12. ECOLOGICAL INFORMATION

MOBILITY: Not Determined.
DEGRADABILITY: Not Determined.
ACCUMULATION: Not Determined.
ECOTOXICITY: Not Determined.
OTHER ADVERSE EFFECTS: Not Determined.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of absorbed material at an approved waste disposal facility or site. Disposal should be made in accordance with federal, state and local regulations.

14. TRANSPORT INFORMATION

U.S. D.O.T. PROPER SHIPPING NAME: Not Regulated.
HAZARD CLASS or DIVISION: NONE
I.D. NUMBER: None

15. REGULATORY INFORMATION

OSHA HAZARD STATUS: None.
EPA SARA Sec. 311/ 312 HAZARD CATEGORIES: None.
WHMIS – Canada: Not a controlled product.
TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.
SARA Title III, Section 313, CHEMICALS: Zinc Compounds < 2%
CALIFORNIA Safe Drinking Water and Toxic Enforcement Act Substances List: NONE
NEW JERSEY RIGHT-TO-KNOW HAZARDOUS SUBSTANCES LIST: Not on List.
MASSACHUSETTS RIGHT-TO-KNOW SUBSTANCE LIST: Not on List.
PENNSYLVANIA HAZARDOUS SUBSTANCES LIST: Not on List.
HMIS RATING: HEALTH 1, FLAMMABILITY 1, REACTIVITY 0

16. OTHER INFORMATION

MSDS PREPARED BY: Director of Chemical Safety
The information contained herein is based on data available to us and is accurate and reliable to the best of our knowledge and belief. However, ITW Industrial Finishing Binks makes no representations as to its completeness or accuracy. Information is supplied on condition that persons receiving such information will make their own determination as to its suitability for their purposes prior to use. In no event will ITW Industrial Finishing – Binks be responsible for damages of any nature whatsoever resulting from the use of or reliance upon the information contained herein.

*** END OF MSDS ***

MSDS

INDEX

MCS®-2361 Fire Resistant Hydraulic Fluid

1. IDENTIFICATION

Product Name: **MCS®-2361 Fire Resistant Hydraulic Fluid**
Reference Number: 0000000000140
Company Information:: **United States**
Solutia Inc.
575 Maryville Center Drive, P.O. Box 66760
St. Louis, MO 63166-6760
Emergency telephone: Chemtrec: 1-800-424-9300
Non-Emergency telephone: 1-314-674-6661
Canada
Solutia Canada Inc.
6800 St. Patrick Street
LaSalle, PQ H8N 2H3
Emergency telephone: CANUTEC: 1-613-996-6666
Non-Emergency telephone: 1-314-674-6661
Mexico
Solutia MEXICO, S. DE R.L. DE C.V.
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2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS No.	Avgerage Concentration	Concentration Range	Units
2-ethylhexyl diphenyl phosphate	1241-94-7		>90.0	%
bis(2-ethylhexyl) phenyl phosphate	16368-97-1		<5.0	%
triphenyl phosphate	115-86-6		<5.0	%

3. HAZARDS IDENTIFICATION

Emergency Overview
Form: Liquid
Colour: Clear to blue
Odour: Odourless

Warning Statements
WARNING!
Causes skin irritation
Elevated processing temperatures may cause release of toxic vapours which are harmful if inhaled.

Potential Health Effects
Likely routes of exposure: Inhalation
Eye and skin contact
Eye contact: No more than slightly irritating to eyes.

Skin contact:	Highly irritating to skin. No more than slightly toxic if absorbed.
Inhalation:	Elevated processing temperature may cause release of vapours which are harmful if inhaled.
Ingestion:	No more than slightly toxic if swallowed. Significant adverse health effects are not expected to develop if only small amounts (less than a mouthful) are swallowed.

4. FIRST AID MEASURES

If in eyes:	Immediate first aid is not likely to be required. This material can be removed with water.
If on skin:	Immediately flush the area with plenty of water. Remove contaminated clothing. Get medical attention. Wash clothing before reuse.
If inhaled:	Remove patient to fresh air. If not breathing, give artificial respiration. If breathing is difficult give oxygen. Remove material from eyes, skin and clothing.
If swallowed:	Immediate first aid is not likely to be required. A physician or Poison Control Center can be contacted for advise. Wash heavily contaminated clothing before reuse.

5. FIRE FIGHTING MEASURES

Flash point: 229°C	Cleveland Open Cup
Fire point: 244°C	Cleveland Open Cup
Hazardous products of combustion:	Carbon monoxide (CO); Carbon Dioxide; Soot; Smoke; Phosphorus oxides (PxOy)
Extinguishing media:	Water spray, foam, dry chemical, or carbon dioxide
Unusual fire and explosion hazards:	Non known
Fire fighting equipment:	Firefighters and others exposed wear self-contained breathing apparatus. Equipment should be thoroughly decontaminated after use.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protection recommended in section 8.
Environmental precautions:	Keep out of drains and water courses.
Methods for cleaning up:	Contain large spills with dikes and transfer the material to appropriate containers for reclamation or disposal. Absorb remaining material or small spills with an inert material and then place in a chemical waste container.

Refer to Section 13 for disposal information and Sections 14 and 15 for reportable quantity information.

7. HANDLING AND STORAGE

Handling

Avoid contact with eyes, skin and clothing.
Avoid breathing vapour or mist.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

Emptied containers retain vapour and product residue. Observe all recommended safety precautions until container is cleaned, reconditioned or destroyed. Do not reuse this container.

Storage
Temperature: 0-79°C
General: Store in a cool dry place, away from foodstuffs and acids.
Stable under normal conditions of handling and storage.

8. *EXPOSURE CONTROLS/PERSONAL PROTECTION*

Eye protection:	Does not cause significant eye irritation or eye toxicity requiring special protection. Use good industrial practice to avoid eye contact.
Hand protection:	Wear chemical resistant gloves. Consult the glove/clothing manufacturer to determine the appropriate type of glove/clothing for a given application.
Body protection:	Wear suitable protective clothing. Wear full protective clothing if exposed to splashes. Consult the glove/clothing manufacturer to determine the appropriate type of glove/clothing for a given application. Wash contaminated skin promptly. Launder contaminated clothing and clean protective equipment before reuse. Wash thoroughly after handling. Have safety shower available at locations where skin contact can occur.
Respiratory protection:	Avoid breathing vapour or mist. Use approved respiratory protection equipment when airborne exposure limits are exceeded. Consult the respirator manufacturer to determine the appropriate type of equipment for a given application. Observe repirator use limitations specified by the manufacturer.
Ventilation:	Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits.
Airborne exposure limits:	(ml/m3 = ppm)
MCS®-2361	No specific occupational exposure limit has been established.
Triphenyl phosphate	ACGIH TLV 3 mg/m3; ; 8-hr TWA OSHA PEL 3 mg/m3; ; 8-hr TWA Mexican OEL 3 mg/m3; ; 8-hr TWA Mexcan OEL 5 mg/m3; ; 15-min STEL

Components referred to herein may be regulated by specific Canadian provincial legislation. Please refer to exposure limits legislated for the province in which the substance will be used.

9. *PHYSICAL AND CHEMICAL PROPERTIES*

Specific Gravity:	1.085-1.095 @ 25°C
Boiling point:	375°C @ 1,013 hPa
Vapour pressure:	0.002 hPa @ 93°C
Water solubility:	negligible
Viscosity:	9.8 - 10.6 mPa.s @ 38°C
Vapour density (air=1):	>1

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

10. ***STABILITY AND REACTIVITY***

Conditions to avoid:	Elevated temperatures
Materials to avoid:	Contact with strong oxidizing agents
Hazardous reactions:	Hazardous polymerization does not occur
Decomposition:	Decomposition occurs at elevated temperatures
Decomposition temperature:	79°C
Hazardous decomposition products:	Phosphorus oxides (PxOy)

11. ***TOXICOLOGICAL INFORMATION***

This product has not been tested for toxicity, but data obtained on similar products are summarized below:

Acute animal toxicity data:

Oral:	LD50, rat, >15,800 mg/kg, practically nontoxic following oral administration.
Dermal:	LD50, rabbit, >7,940 mg/kg, practically nontoxic after skin application in animal studies.
Inhalation:	LC50, mouse, 3 mg/l vapour LC50, rat, >4.8 mg/l
Eye irritation:	Rabbit, practically non-irritating to eyes, 24 h
Skin irritation:	Rabbit, slightly irritating to skin, 24h
Skin sensitization:	Human experience, predictive patch testing on human volunteers produced primary irritation but no allergic skin reactions.
Repeat dose toxicity:	Dog, diet, 52 weeks produced effects on body weight, serum enzymes and/or organ weights in repeat dose studies.
Neurotoxicity:	Chicken, gavage, acute, no adverse treatment related effects.
Developmental toxicity:	Rat, diet, no effects on offspring observed in laboratory animals in the presence of maternal toxicity.
Mutagenicity:	The active ingredient generally produced no genetic changes in standard tests using animal, bacterial or yeast cells.

Components:

Data from Solutia studies and/or the available scientific literature on the components of this material which have been identified as hazardous chemicals under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200) or the Canadian Hazardous Products Act are discussed below.

2-ethylhexyl diphenyl phosphate	Practically nontoxic following oral administration. Practically nontoxic after skin application in animal studies. Practically non irritating to eyes (rabbit). Practically non irritating to skin (rabbit). Practically nontoxic based on animal inhaliation exposure studies. Predictive patch testing on human volunteers did not produce irritation or sensitization. Produced effects on body weight, serum enzymes and/or organ weights in repeat dose studies. No delayed neurotoxicity was observed in animal models. No effects on offspring observed in laboratory animals in the presence of maternal toxicity. The weight of the evidence indicates that this material is not mutagenic in in-vitro assays. The weight of the evidence indicates that this material is not mutagenic in in-vivo assays.
triphenyl phosphate	Practically nontoxic following oral administration. Practically nontoxic after skin application in animal studies. Practically non irritating to eyes (rabbit). Practically non irritating to skin (rabbit). No delayed neurotoxicity was observed in animal models. Not carcinogenic. No birth defects were noted in rats given the active ingredient orally during pregnancy. The weight of the evidence indicates that this material is not mutagenic in in-vitro assays. Produced cholinesterase inhibition (brain, blood cell, and/or plasma) without signs of overt enzyme inhibition.

12. *ECOLOGICAL INFORMATION*

Solutia has not conducted environmental toxicity or biodegradation studies with this material.

13. *DISPOSAL CONSIDERATIONS*

US EPA RCRA Status:	This material when discarded may be a hazardous waste as that term is defined by the Resource Conservation and Recovery Act (RCRA), 40 CFR 261.24 due to its toxicity characteristic. This material should be analyzed in accordance with Method 1311.
Disposal considerations:	Recycle Incineration
Miscellaneous advice:	This product meets the criteria for a synthetic used oil under the U.S. EPA Standards for the Management of Used Oil (40 CFR 279.) Those standards govern recycling and disposal in lieu of 40 CFR 260-272 of the Federal hazardous waste program in states that have adopted these used oil regulations. Consult your attorney or appropriate regulatory official to be sure these standards have been adopted in your state. Recycle or burn in accordance with the applicable standards. This product should not be dumped, spilled, rinsed or washed into sewers or public waterways.

14. *TRANSPORT INFORMATION*

The data provided in this section is for information only. Please apply the appropriate regulations to properly classify your shipment for transportation.

US DOT

Proper shipping name:	Environmentally Hazardous Substance, Liquid, N.O.S. triphenyl phosphate
Hazard Class:	9
Hazard Identification number:	UN3082
Packing Group:	Packing Group III
Transport Label:	Class 9
Special Provisions:	This material meets the definition of a marine pollutant.
Other:	Applies ONLY to shipments in bulk or via inland water transportation.

Canadian TDG

Special provisions:	This material meets the definition of a marine pollutant.
Other:	Not regulated for transport.

15. *REGULATORY INFORMATION*

All components are on the following inventories:	U.S. TSCA, EU EINECS, Canadian DSL, Australian AICS
Canadian WHMIS class.:	D2(B)-Materials Causing Other Toxic Effects
SARA hazard Notification:	Hazard Categories Under Title III Rules (40 CFR 370): Immediate Section 302 Extremely Hazardous Substance Section 313 Toxic Chemical
CERCLA Reportable Quantity:	Not applicable

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulation and the MSDS contains all the information required by the Canadian Controlled Products Regulation. Refer to Section 11 for OSHA/HPA Hazardous Chemical(s) and Section 13 for RCRA classification.

16. *OTHER INFORMATION*

Product use:	Hydraulic fluids and additives
Reason for revision:	New software implementation.
Suggested NFPA Rating:	Health 1; Fire 1; Reactivity 0
Suggested HMIS Rating:	Health 1; Fire 1; Reactivity 0; Additional Information G

Prepared by the Solutia Hazard Communication Group. Please consult Solutia if further information is needed.

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Canadian Centre for Occupational Health and Safety

CHEMINFO Chemical Profiles Created by CCOHS

Please Note:
The following information relevant to Poisons Centres has been extracted from the CHEMINFO database produced by CCOHS. Complete CHEMINFO records also contain comprehensive hazard control and regulatory information. For more information about the complete CHEMINFO database contact CCOHS.

SECTION 1. CHEMICAL IDENTIFICATION

CHEMINFO Record Number: 612
CCOHS Chemical Name: Jet B

Synonyms:

Aviation kerosene (non-specific name)
Jet B aviation turbine fuel
Jet fuel (non-specific name)
Jet fuel B
Jet fuel F-40
Jet fuel type B
Turbine engine aviation fuel (non-specific name)
Turbo fuel B
Turbo fuel F-40
Wide-cut jet fuel (non-specific name)
Wide-cut type aviation turbine fuel (non-specific name)

CAS Registry Number:	Not available. Complex hydrocarbon mixture.
UN/NA Number (s):	1863
Chemical Family:	Mixed hydrocarbons / petroleum hydrocarbons / petroleum hydrocarbon distillate / aviation turbine fuel
Molecular Formula:	Complex hydrocarbon mixture
Structural Formula:	Complex hydrocarbon mixture

SECTION 2. DESCRIPTION

Appearance and Odour:

Colourless to pale-yellow liquid with a hydrocarbon or petroleum odour.(11,12)

Odour Threshold:

Not available

Warning Properties:

Information not available for evaluation.

Composition/Purity:

The most important aspect of evaluating the hazards of any petroleum distillate is accurate definition of the material in question. The source of the crude petroleum, the

boiling range of the distillate and all of the processing and refining steps influence the composition and hazards of the resulting petroleum distillate. The composition of commercial aviation fuels has been established by the American Society for Testing and Materials (ASTM) in consultation with manufacturers and users. The specifications are based primarily on performance characteristics. There is no standard formula for Jet B. Jet B is a naphtha-type fuel made by blending straight-run kerosene streams with lower boiling distillate to meet the requirements of ASTM specification D 1655. (13) It is called a wide-cut fuel because it is produced from a broad distillation temperature range and contains a wide array of carbon chain- lengths, from 4-16 carbons long (basically a mixture of naphtha and kerosene). According to the specification, the maximum allowed levels of aromatic hydrocarbons (e.g. toluene, xylene) are 25% (by volume) and 3% naphthalenes (by volume). Benzene, which is present in wide-cut fuels, is usually present below 0.5%. Total sulfur (0.3% by weight) and mercaptan sulfur (0.003% by weight) are present as impurities. According to the specification, the maximum temperature for 50% recovery of Jet B is 190 deg C (374 deg F). The physical properties given in this review are either from the specification or for specific products. ASTM specification D 1655 lists a number of additives that may be used in jet fuels. Typical additives include an antioxidant (e.g. 2,6-di-tert-butylphenol and tert- and tri-tert-butylphenols), a metal deactivator (e.g. N,N-disalicylidene-1,2-propanediamine), an electrical conductivity additive (e.g. Stadis 450), a static inhibitor, a fuel system icing inhibitor (e.g., diethylene glycol monomethyl ether), a corrosion of steel inhibitor, a lubrication improver, a biocide, a fuel lubricity additive, and a thermal stability improver.(13) The presence of additives can contribute significantly to the overall hazards of a product. Consult the manufacturer/supplier of your specific product for additional information.

Uses and Occurrences:

Used as an commercial aviation fuel in severe cold (arctic) areas.(14)

SECTION 3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

Colourless to pale-yellow liquid with a petroleum odour. EXTREMELY FLAMMABLE LIQUID AND VAPOUR. May accumulate static charge by flow or agitation. Vapour is heavier than air and may travel a considerable distance to a source of ignition and flash back to a leak or open container. Vapour can spread along the ground and accumulate in low-lying areas or confined spaces, resulting in a toxicity, flammability and explosion hazard. Liquid can float on water and may travel to distant locations and spread fire. During a fire, irritating and toxic gases, such as sulfur and nitrogen oxides, may be generated. High vapour concentrations may cause headache, nausea, dizziness, drowsiness, incoordination and confusion. Very high concentrations may cause unconsciousness and death. May cause skin irritation. Aspiration hazard. Swallowing or vomiting may result in aspiration (inhalation of the liquid) into the lungs. May contain TOXIC n-hexane, CARCINOGENIC benzene and hazardous additives.

POTENTIAL HEALTH EFFECTS

Effects of Short-Term (Acute) Exposure

Inhalation:

Wide cut jet fuels, such as Jet B, readily evaporate at room temperature forming high vapour concentrations. High concentrations of vapour can cause central nervous system depression.(1) Symptoms of central nervous system

(CNS) depression include dizziness, headache, nausea, fatigue, vomiting and incoordination. Severe exposures may result in unconsciousness and death. There is no specific information available for Jet B, but other jet fuels have caused CNS effects.

Skin Contact:

There is no specific information available for Jet B. Animal studies for a similar jet fuel (JP-4) indicates that it may be a moderate to severe skin irritant.

Animal evidence for JP-4 indicates that it is probably only minimally absorbed through the skin and harmful effects are not expected by this route of exposure.

Eye Contact:

There is no specific information available for Jet B. An animal study for JP-4 indicates it is probably not irritating to the eyes.

Ingestion:

There is no specific information available for Jet B. In animal studies, the oral toxicity of other jet fuels is very low. There are no reported cases of human ingestion of jet fuels, but the accidental ingestion of petroleum distillates, primarily in children, has been frequently reported in the literature. Often in these cases, the petroleum distillate has been aspirated (inhaled into the lungs during ingestion or vomiting). Severe lung damage and deaths have resulted. It is expected that jet fuels would also be easily aspirated. Ingestion is not a typical route of occupational exposure.

Effects of Long-Term (Chronic) Exposure

Jet fuels are complex mixtures which can have variable composition (see "Composition/Purity" above). In addition, there is only a small amount of information available about the potential long-term health effects of jet fuels available and often there are serious limitations to the studies. Therefore, it is not possible to draw any firm conclusions about the potential long-term health effects of jet fuels.

SKIN: Repeated skin contact with jet fuels would likely result in dry, cracked, red skin (dermatitis).(1)

EFFECTS ON THE NERVOUS SYSTEM: It is not possible to draw any firm conclusions from the available studies because of the small number of employees studied, poor or no exposure information and the possibility that other exposures could have caused the observed effects.

Studies of a small number of employees (29-30) with long-term exposure to jet fuel concentrations which may have been as high as 3000 ppm reported psychiatric symptoms (e.g. anxiety or mental depression), poorer performance in some psychological tests and reduced sensorimotor speed. These employees also reported significant short-term health effects.(2,3) Another study reported memory problems, fatigue, moodiness, unsteadiness, and headache in 9 employees exposed to jet fuel for 15 to 41 years.(4) Another study showed a relationship between changes in postural balance in 27 subjects and exposure to jet fuels (average duration 12 years).(5)

A single case report describes symptoms of polyneuropathy such as pain, tingling, and numbness in the feet, legs, hands and arms in a man who had been exposed to jet fuel and other fuels for 30 years. The authors attribute these effects to exposure to n-hexane, a possible component of some jet fuels. Estimated exposure concentrations were up to 100 mg/m3 in the first 10 years, then lower.(6) It is not possible to draw conclusions from this single case report.

EFFECTS ON THE LIVER: It is not clear from the one study available that jet fuel exposure was responsible for the observed effect. In this study, 91 fuel filling attendants exposed to jet fuel showed increased liver metabolism during exposure compared to after summer vacation (unexposed for 2 or 4 weeks). A similar but smaller effect was observed in unexposed office workers.(7)

Carcinogenicity:

The International Agency for Research on Cancer (IARC) has concluded that there is inadequate evidence for the carcinogenicity of jet fuels in humans.(8) However, wide cut jet fuels, like Jet B, contain up to 0.5% benzene, a known carcinogen.

A study of 2176 employees with long-term exposure to jet fuels, as well as other fuels and chemicals, found no increase in the frequency of cancers even when duration of employment, latency, occupation or type of exposure were considered. This study was limited by the rather short follow-up (10 years). (8,9)

A study of 3726 cancer patients related their exposure to petroleum-derived liquids to the incidence of cancer by specific site. An association was observed between jet fuel exposure and kidney cancer.(8,10) However, this was a very preliminary study and no firm conclusions can be drawn.

There is no specific information available for Jet B, but some other jet fuels have caused skin tumours in animals following dermal application of doses that caused severe skin irritation and ulceration.

The International Agency for Research on Cancer (IARC) has concluded that this chemical is not classifiable as to its carcinogenicity to humans (Group 3).

(Jet Fuel)

The American Conference of Governmental Industrial Hygienists (ACGIH) has no listing for this chemical.

The US National Toxicology Program (NTP) has not listed this chemical in its report on carcinogens.

Teratogenicity and Embryotoxicity:

There is no human information available. In a small number of animal studies, other jet fuels have not caused harmful effects in the unborn in the absence of maternal toxicity.

Reproductive Toxicity:

There is no human or animal information available.

Mutagenicity:

No human or animal in vivo studies have been reported.

Toxicologically Synergistic Materials:

There is no information available.

Potential for Accumulation:

There is no information available on the absorption, distribution, metabolism and excretion of Jet B.

SECTION 4. FIRST AID MEASURES

Inhalation:

Remove source of contamination or move victim to fresh air. If breathing has stopped, properly trained personnel should begin artificial respiration or cardiopulmonary resuscitation (CPR) immediately. Obtain medical attention immediately.

Skin Contact:

As quickly as possible, remove contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Quickly and gently blot or brush away excess chemical. Wash gently and thoroughly with water and non-abrasive soap for 20 minutes or until the chemical is removed. Obtain medical attention immediately. Completely decontaminate clothing, shoes and leather goods before re-use or discard.

Eye Contact:

Quickly and gently blot away excess chemical. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 5 minutes or until the chemical is removed, while holding the eyelid(s) open. Obtain medical advice immediately.

Ingestion:

NEVER give anything by mouth if the victim is rapidly losing consciousness, is unconscious or is convulsing. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 ozs) of water to dilute material in the stomach. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Repeat administration of water. Obtain medical attention immediately.

First Aid Comments:

Provide general supportive measures (comfort, warmth, rest).
Consult a doctor and/or the nearest Poison Control Centre for all exposures except minor instances of inhalation or skin contact.
All first aid procedures should be periodically reviewed by a doctor familiar with the material and its conditions of use in the workplace.

SECTION 5. FIRE FIGHTING MEASURES

Flash Point:

No flash point is given in the specification. -23 to -1 deg C (-10 to 30 deg F) (closed cup) (15)

Lower Flammable (Explosive) Limit (LFL/LEL):

1.3% (11)

Upper Flammable (Explosive) Limit (UFL/UEL):

7.6% (11)

Autoignition (Ignition) Temperature:

240 deg C (464 deg F) (11)

Sensitivity to Mechanical Impact:

Probably not sensitive. Stable compounds.

Sensitivity to Static Charge:

Like other petroleum distillates, Jet B probably has a low electrical conductivity and therefore can accumulate static charge by flow or agitation.(16) Electrical conductivity additives can be added to dissipate charge more rapidly. Vapours, at concentrations in the flammable range, can be ignited by a static discharge.(16)

Combustion and Thermal Decomposition Products:

Thermal decomposition products are highly dependent on combustion conditions and the type of additives and impurities present. A complex mixture of airborne material (solid, liquid, and gas) will evolve during pyrolysis or combustion. Sulfur and nitrogen oxides, as well as unidentified organic compounds may be formed upon combustion. (11)

Fire Hazard Summary:

Extremely flammable liquid. Material will readily ignite at room temperature. Vapour is heavier than air and may travel a considerable distance to a source of ignition and flash back to a leak or open container. Vapour can spread along the ground and accumulate in low-lying areas or in confined spaces, resulting in a toxicity, flammability and explosion hazard. Liquid can float on water and may travel to distant locations and/or spread fire. During a fire, irritating, toxic and/or hazardous gases, such as sulfur and nitrogen oxides and unidentified organic compounds, may be generated. Closed containers may rupture violently when exposed to the heat of a fire or excessive heat for a sufficient period of time.

Extinguishing Media:

Carbon dioxide, dry chemical powder, alcohol foam or polymer foam. Water may be ineffective because it will not cool Jet B below its flash point. Fire fighting foams are the extinguishing agent of choice for most flammable liquid fires.

Fire Fighting Instructions:

Evacuate area and fight fire from a safe distance or protected location. Approach fire from upwind to avoid toxic decomposition products. Stop leak before attempting to stop the fire. If the leak cannot be stopped, and if there is no risk to the surrounding area, let the fire burn itself out. If the flames are extinguished without stopping the leak, vapours could form explosive mixtures with air and reignite. Water can extinguish the fire if used under favourable conditions and when hose streams are applied by experienced firefighters trained in fighting all types of flammable liquid fires. If possible, isolate materials not yet involved in the fire, and move containers from fire area if this can be done without risk, and protect personnel. Otherwise, fire-exposed containers or tanks should be cooled by application of hose streams and this should begin as soon as possible (within the first several minutes) and should concentrate on any unwetted portions of the container. If this is not possible, use unmanned monitor nozzles and immediately evacuate the area. If a leak or spill has not ignited, use water spray in large quantities to disperse the vapours and to protect personnel attempting to stop a leak. Water spray can be used to dilute spills to nonflammable mixtures and flush spills away from ignition sources. Solid streams of water may be ineffective and spread material. For a massive fire in a large area, use unmanned hose holder or monitor nozzles; if this is not possible withdraw from fire area and allow fire to burn. Stay away from ends of tanks, but be aware that flying material from ruptured tanks may travel in any direction. Withdraw immediately in case of rising sound from venting safety device or any discolouration of tank due to fire. Do not enter without wearing specialized protective equipment suitable for the situation. Firefighter's normal protective equipment (Bunker Gear) may not provide adequate protection. Chemical resistant clothing (e.g.

chemical splash suit) and positive pressure self-contained breathing apparatus (MSHA/NIOSH approved or equivalent) may be necessary.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) HAZARD IDENTIFICATION

NFPA - Health:	1 - Exposure would cause significant irritation, but only minor residual injury.
NFPA - Flammability:	3 - Liquids and solids that can be ignited under almost all ambient temperature conditions.
NFPA - Instability:	0 - Normally stable, even under fire conditions, and not reactive with water.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Molecular Weight: Complex hydrocarbon mixture

Conversion Factor:

Not available

Melting Point:	FREEZING POINT: -50 deg C max (-58 deg F max) (13)
Boiling Point:	DISTILLATION RANGE: 145-245 deg C maximum (293 deg F-473 deg F) (20%-90% recovered) (13)
Relative Density (Specific Gravity):	0.751-0.802 at 15 deg C (water = 1) (13)
Solubility in Water:	Practically insoluble.(12)
Solubility in Other Liquids:	Soluble in all proportions with many organic solvents.
Coefficient of Oil/Water Distribution (Partition Coefficient):	Not available.
pH Value:	Not applicable.
Viscosity-Kinematic:	Not given in specification. Less than 7 mm2/s (less than 7 centistokes) at 38 deg C (11)
Vapour Density:	3.5-4 (air = 1) (11,12)
Vapour Pressure:	21 kPa max (157.5 mm Hg max) at 38 deg C (100 deg F) (13)
Saturation Vapour Concentration:	Approximately 207300 ppm (20.73%) at 38 deg C (calculated)
Evaporation Rate:	0.7-1.2 (n-butyl acetate = 1) (11)
Critical Temperature:	Not available

Other Physical Properties:

NOTE: Some petroleum products are treated with mineral acid or caustic, or both, as part of the refining process. Any residual acid or caustic is not desirable, neither is likely to be present in the final product.(13)

SECTION 10. STABILITY AND REACTIVITY

Stability:

Thermally stable at temperature as high as 149 deg C (300 deg F). Stable in storage. (13)

Hazardous Polymerization:

Does not occur.

Incompatibility - Materials to Avoid:

STRONG OXIDIZING AGENTS (e.g. peroxides, nitric acid, perchlorates, chlorine and fluorine) - risk of fire and explosion.(11,16)

Hazardous Decomposition Products:

None reported.

Conditions to Avoid:

Open flames, heat, static discharge, sparks and other ignition sources.

Corrosivity to Metals:

Specific information is not available. According to specification D 1655, Jet B must pass the copper strip test (ASTM test method D 130) to ensure that the fuel will not corrode copper or any copper-base alloys in various parts of the fuel system.(13) Jet fuels may corrode steel, but no corrosion rates are available.(16) In order to prevent this corrosion, additives are added to Jet B.(13)

SECTION 11. TOXICOLOGICAL INFORMATION

No specific animal toxicity information was located for Jet B.

SECTION 16. OTHER INFORMATION

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Information on chemicals reviewed in the CHEMINFO database is drawn from a number of publicly available sources. A list of general references used to compile CHEMINFO records is available in the database Help.

Review/Preparation Date: 1998-12-30

Revision Indicators:

Emergency overview	1999-01-01
Bibliography	2003-04-18
Boiling point	2003-05-12
WHMIS disclosure list	2003-07-09
WHMIS classification comments	2003-07-09
Resistance of materials for PPE	2004-04-09
Bibliography	2004-04-09

MSDS
Definition of terms

Material Safety Data Sheet for #2 Diesel

1. Chemical Product

MSDS Number: U7770

MSDS Date: 01-31-99

Product Name: #2 Diesel Fuel

24 Hour Emergency Phone: (210) 979-8346
Transportation Emergencies: Call Chemtrec at 1-800-424-9300
MSDS Assistance: (210) 592-4593

Distributors Name and Address:

T.W. Brown Oil Co., Inc.
1857 Knoll Drive
Ventura, California 93003

Chemical Name: #2 Diesel Fuel **Cas Number:** 68476-34-6

Synonyms/Common Names: This Material Safety Data Sheet applies to the following product descriptions for Hazard Communication purposes only. Technical specifications vary greatly depending on the product, and are not reflected in this document. Consult specification sheets for technical information.

California Air Resources Board (Carb) Diesel Fuel- On-road, Off-Road, Tax Exempt blends
Premium Diesel Fuel- Low-Sulfur, High-sulfur, On-Road, Off-Road, Tax Exempt blends
#2 Distillate- Low-Sulfur, High-sulfur, On-Road, Off-Road, Tax Exempt blends
#2 Diesel Fuel- Low-Sulfur, High-sulfur, On-Road, Off-Road, Tax Exempt blends
#2 Fuel Oil- Low-Sulfur, High-sulfur, On-Road, Off-Road, Tax Exempt blends

2. Composition, Information On Ingredients

Product Use: This product is intended for use as a fuel in engines and heaters designed for diesel fuels, and for use in engineered processes. Use in other applicatiions may result in higher exposures and require additional controls, such as local exhaust ventilation and personal protective equipment.

Description: #2 Diesel is a complex mixture of hydrocarbons from a variety of chemical processes blended to meet standardized product specifications. Composition varies greatly and includes C9 to C20 hydrocarbons with a boiling range of about 325-675 degrees F. The following is a non-exhaustive list of common components, typical percentage ranges in product, and occupational exposure limits for each.

Component or Material Name	%	CAS Number	ACGIH Limits TLV -- STEL -- Units	OSHA Exposure Limits PEL -- STEL -- C/P -- Units
Cat cracked distillate, light	0-100	64741-59-9	100 -- NA -- mg/m3	N/A -- N/A -- N/A -- N/A
Hydrotreated distillate, middle	0-100	64742-46-7	100 -- NA -- mg/m3	N/A -- N/A -- N/A -- N/A

Hydrotreated distillate, light	0-100	64742-47-8	100 -- NA -- mg/m3	N/A -- N/A -- N/A -- N/A
Gas oil, light	0-100	64741-44-2	100 -- NA -- mg/m3	N/A -- N/A -- N/A -- N/A

3. Hazards Identification

Health Hazard Data:

1. The major effect of exposure to this product is giddiness, headache, central nervous system depression; possible irritation of eyes, nose, and lungs; and dermal irritation. Signs of kidney and liver damage may be delayed. Pulmonary irritation secondary to exhalation fo solvent.

2. NIOSH recommends that whole diesel engine exhaust be regarded as a potential occupational carcinogen. Follow OSHA and NSHA rules where diesel engine exhaust fumes may be generated.

3. A life time skin painting study by the American Petroleum Institute has shown that similar naphtha products with a boiling range of 350-700 degrees F usually produce skin tumors and/ or skin cancers in laboratory mice. Only a weak to moderate response occurred. The effect to humans has not been determined.

4. Positive results at 2.0 ml/kg and 6.0 ml/kg noted in mutagenesis studies via in-vivo bone marrow cytogenetics assay in rats.

5. Kerosene is classified as a severe skin irritant. Mutation data has been reported for kerosene products. Hydrotreated kerosene is listed as being probably carcinogenic to humans with limited evidence in humans and sufficient evidence in experimental animals.

Hazards of Combustion Products: Carbon monoxide and carbon dioxide can be found in the combustion products of this product and other forms of hydrocarbon combustion. Carbon monoxide in moderate concentrations can cause symptoms of headache, nausea, vomiting, increased cardiac output, and confusion. Exposure to higher concentrations of carbon monoxide can cause loss of consciousness, heart damage, brain damage, and/or death. Exposure to high concentrations of carbon dioxide can cause simple asphyxiation by displacing available oxygen. Combustion of this and other similar materials should only be carried out in well ventilated areas.

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