APPENDIX B: Material Safety Data Sheets (MSDS) for Tracer Compounds and Friction Reducers

*AltaRock has a portfolio of patent filings protecting its proprietary technology and methods.

SIGMA-ALDRICH

ALDRICH CHEMICAL COMPANY, INC.
P.O. BOX 355
MILWAUKEE, WISCONSIN 53201, USA

ATTN: SAFETY DIRECTOR

EMERGENCY PHONE 1-414-273-3850

DATE 09/05/96
CUST#: 484407
PO#:

PHAEDRA MC PHERSON
UNIVERSITY OF UTAH
421 WAKARA WAY SUITE 125
SALT LAKE CITY UT 84108-1210

MATERIAL SAFETY DATA SHEET

SECTION 1. - - - - - - - - - - CHEMICAL IDENTIFICATION- - - - - - - - - - -

CATALOG #: 31074-3
NAME: 1,3,(6 OR 7)-NAPHTHALENETRISULFONIC ACID, TRISODIUM SALT HYDRATE

SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - - -

CAS #:123409-01-8
MF: C10H8O9S3

SECTION 3. - - - - - - - - - - - HAZARDS IDENTIFICATION - - - - - - - - - -

DATA NOT AVAILABLE

SECTION 4. - - - - - - - - - - - FIRST-AID MEASURES- - - - - - - - - - - -

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES.
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS AMOUNTS OF WATER.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN.
WASH CONTAMINATED CLOTHING BEFORE REUSE.

SECTION 5. - - - - - - - - - - FIRE FIGHTING MEASURES - - - - - - - - - - -

EXTINGUISHING MEDIA
WATER SPRAY.
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

SECTION 6. - - - - - - - - - ACCIDENTAL RELEASE MEASURES- - - - - - - - -

WEAR RESPIRATOR, CHEMICAL SAFETY GOGGLES, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.
AVOID RAISING DUST.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. - - - - - - - - - - - HANDLING AND STORAGE- - - - - - - - - - -

CONTINUED ON NEXT PAGE

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SIGMA Aldrich Fluka SUPELCO SIGMA DIAGNOSTICS SAF BULK CHEMICALS SIGMA-ALDRICH RESEARCH

ALDRICH CHEMICAL COMPANY, INC.
P.O. BOX 355
MILWAUKEE, WISCONSIN 53201, USA

CUST#: 484407

CATALOG #: 31074-3
NAME: 1,3,(6 OR 7)-NAPHTHALENETRISULFONIC ACID, TRISODIUM SALT HYDRATE

REFER TO SECTION 8.

SECTION 8. - - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION- - - - - -

CHEMICAL SAFETY GOGGLES.
COMPATIBLE CHEMICAL-RESISTANT GLOVES.
NIOSH/MSHA-APPROVED RESPIRATOR.
SAFETY SHOWER AND EYE BATH.
MECHANICAL EXHAUST REQUIRED.
AVOID INHALATION.
AVOID CONTACT WITH EYES, SKIN AND CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.
KEEP TIGHTLY CLOSED.
STORE IN A COOL DRY PLACE.

SECTION 9. - - - - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - - - -

APPEARANCE AND ODOR
LIGHT-YELLOW POWDER

SECTION 10. - - - - - - - - - -STABILITY AND REACTIVITY - - - - - - - - -

INCOMPATIBILITIES
STRONG OXIDIZING AGENTS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE
SULFUR OXIDES

SECTION 11. - - - - - - - - - - TOXICOLOGICAL INFORMATION - - - - - - - -

ACUTE EFFECTS
MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.
MAY CAUSE EYE IRRITATION.
MAY CAUSE SKIN IRRITATION.
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

SECTION 12. - - - - - - - - - - ECOLOGICAL INFORMATION - - - - - - - - - -

DATA NOT YET AVAILABLE.

SECTION 13. - - - - - - - - - - DISPOSAL CONSIDERATIONS - - - - - - - - -

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.
OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

CONTINUED ON NEXT PAGE

SIGMA-ALDRICH

ALDRICH CHEMICAL COMPANY, INC.
P.O. BOX 355
MILWAUKEE, WISCONSIN 53201, USA

CUST#: 484407

CATALOG #: 31074-3
NAME: 1,3,(6 OR 7)-NAPHTHALENETRISULFONIC ACID, TRISODIUM SALT HYDRATE

SECTION 14. - - - - - - - - - - - TRANSPORT INFORMATION - - - - - - - - - -

CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. - - - - - - - - - - REGULATORY INFORMATION - - - - - - - - - - -

EUROPEAN INFORMATION
CAUTION: SUBSTANCE NOT YET FULLY TESTED.

SECTION 16. - - - - - - - - - - - OTHER INFORMATION- - - - - - - - - - - -

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. ALDRICH SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR ADDITIONAL TERMS AND CONDITIONS OF SALE.

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SIGMA

THE WORLD'S FOREMOST MANUFACTURER OF RESEARCH BIOCHEMICALS AND DIAGNOSTIC REAGENTS

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SAINT LOUIS, MISSOURI 63178, USA

TELEPHONE: USA/CANADA 1-800-325-3010
OUTSIDE USA/CANADA call COLLECT 314-771-5750

FAX: USA/CANADA 1-800-325-5052
OUTSIDE USA/CANADA 314-771-5757
INTERNET EMAIL: sigma@sial.com

ATTN: SAFETY DIRECTOR
THAEDRA KIBOURN
UNIVERSITY OF UTAH
HEALTH SCIENCE CTR
50 NORTH MEDICAL DRIVE
SALT LAKE CY UT 84132

EMERGENCY PHONE 1-314-771-5765
PO BOX 14508 ST LOUIS MO 63178
DATE 12/03/98
CUST#: 2-087-89113
PO#:

MATERIAL SAFETY DATA SHEET

- -

SECTION 1. - - - - - - - - - - CHEMICAL IDENTIFICATION- - - - - - - - - - -

CATALOG #: 25089-9
NAME: 1,5-NAPHTHALENEDISULFONIC ACID, DISODIUM SALT HYDRATE, 95%

SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - - -

CAS #: 1655-29-4
MF: C10H8O6S2
EC NO: 216-732-0

SECTION 3. - - - - - - - - - - - HAZARDS IDENTIFICATION - - - - - - - - - -

LABEL PRECAUTIONARY STATEMENTS
HYGROSCOPIC

SECTION 4. - - - - - - - - - - - FIRST-AID MEASURES- - - - - - - - - - - -

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES.
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS AMOUNTS OF WATER.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN.
WASH CONTAMINATED CLOTHING BEFORE REUSE.

SECTION 5. - - - - - - - - - - FIRE FIGHTING MEASURES - - - - - - - - - - -

EXTINGUISHING MEDIA
WATER SPRAY.
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

CONTINUED ON NEXT PAGE

CUST#: 2-087-89113

- -

CATALOG #: 25089-9
NAME: 1,5-NAPHTHALENEDISULFONIC ACID, DISODIUM SALT HYDRATE, 95%
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

SECTION 6. - - - - - - - - - ACCIDENTAL RELEASE MEASURES- - - - - - - - - -

WEAR RESPIRATOR, CHEMICAL SAFETY GOGGLES, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.
AVOID RAISING DUST.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. - - - - - - - - - - - HANDLING AND STORAGE- - - - - - - - - - - -

REFER TO SECTION 8.

SECTION 8. - - - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION- - - - - -

CHEMICAL SAFETY GOGGLES.
COMPATIBLE CHEMICAL-RESISTANT GLOVES.
NIOSH/MSHA-APPROVED RESPIRATOR.
SAFETY SHOWER AND EYE BATH.
MECHANICAL EXHAUST REQUIRED.
AVOID INHALATION.
AVOID CONTACT WITH EYES, SKIN AND CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.
KEEP TIGHTLY CLOSED.
HYGROSCOPIC
STORE IN A COOL DRY PLACE.

SECTION 9. - - - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - - - -

APPEARANCE AND ODOR
OFF-WHITE POWDER

SECTION 10. - - - - - - - - - -STABILITY AND REACTIVITY - - - - - - - - - -

INCOMPATIBILITIES
STRONG OXIDIZING AGENTS
PROTECT FROM MOISTURE.

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
TOXIC FUMES OF:

CONTINUED ON NEXT PAGE

CUST#: 2-087-89113

CATALOG #: 25089-9
NAME: 1,5-NAPHTHALENEDISULFONIC ACID, DISODIUM SALT HYDRATE, 95%
CARBON MONOXIDE, CARBON DIOXIDE
SULFUR OXIDES

SECTION 11. - - - - - - - - - - TOXICOLOGICAL INFORMATION - - - - - - - -

ACUTE EFFECTS
MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.
MAY CAUSE EYE IRRITATION.
MAY CAUSE SKIN IRRITATION.
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

SECTION 12. - - - - - - - - - - ECOLOGICAL INFORMATION - - - - - - - - - -

DATA NOT YET AVAILABLE.

SECTION 13. - - - - - - - - - - DISPOSAL CONSIDERATIONS - - - - - - - - -

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER. OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. - - - - - - - - - - TRANSPORT INFORMATION - - - - - - - - -

CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. - - - - - - - - - - REGULATORY INFORMATION - - - - - - - - - -

DATA NOT AVAILABLE

SECTION 16. - - - - - - - - - - OTHER INFORMATION- - - - - - - - - - - -

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Product #: S588830

Name: **1,6-NAPHTHALENEDISULFONIC ACID, DISODIUM SALT DIHYDRATE**

Material Safety Data Sheet Valid 01/2004 - 04/2004
Printed: 01/19/2004 03:30:43

Aldrich Chemical Co., Inc.
1001 West St. Paul
Milwaukee, WI 53233 USA
Phone: 414-273-3850

SECTION 1. - - - - - - - - - - CHEMICAL IDENTIFICATION- - - - - - - - - -
Name: 1,6-NAPHTHALENEDISULFONIC ACID, DISODIUM SALT DIHYDRATE
SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - - -
CAS #: (n/a)
MF: C10H8O6S2
SECTION 3. - - - - - - - - - - HAZARDS IDENTIFICATION - - - - - - - -
LABEL PRECAUTIONARY STATEMENTS
CAUTION:
AVOID CONTACT AND INHALATION.
SECTION 4. - - - - - - - - - - - FIRST-AID MEASURES- - - - - - - - - - -
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN.
IN CASE OF SKIN CONTACT, FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. REMOVE CONTAMINATED CLOTHING AND SHOES. CALL A PHYSICIAN.
IF INHALED, REMOVE TO FRESH AIR. IF BREATHING BECOMES DIFFICULT, CALL A PHYSICIAN.
IN CASE OF CONTACT WITH EYES, FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. ASSURE ADEQUATE FLUSHING BY SEPARATING THE EYELIDS WITH FINGERS. CALL A PHYSICIAN.
SECTION 5. - - - - - - - - - - FIRE FIGHTING MEASURES - - - - - - - - - -
EXTINGUISHING MEDIA
WATER SPRAY.
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
SPECIAL FIREFIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.
SECTION 6. - - - - - - - - - ACCIDENTAL RELEASE MEASURES- - - - - - - - -
WEAR PROTECTIVE EQUIPMENT.
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.
AVOID RAISING DUST.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.
SECTION 7. - - - - - - - - - - - HANDLING AND STORAGE- - - - - - - - - - -
REFER TO SECTION 8.
SECTION 8. - - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION- - - - - -
WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
MECHANICAL EXHAUST REQUIRED.
SECTION 9. - - - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - - - -
APPEARANCE AND ODOR
PHYSICAL PROPERTIES
MELTING POINT: N/A

SECTION 10. - - - - - - - - - - TOXICOLOGICAL INFORMATION - - - - - - - -

THE TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

SECTION 11. - - - - - - - - - - ECOLOGICAL INFORMATION - - - - - - - - - -

DATA NOT YET AVAILABLE.

SECTION 12. - - - - - - - - - - DISPOSAL CONSIDERATIONS - - - - - - - - - -

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SECTION 13. - - - - - - - - - - TRANSPORT INFORMATION - - - - - - - - - -

CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 14. - - - - - - - - - - REGULATORY INFORMATION - - - - - - - - - -

DATA NOT AVAILABLE

SECTION 15. - - - - - - - - - - OTHER INFORMATION- - - - - - - - - - - -

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ALDRICH CHEMICAL COMPANY, INC.
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ATTN: SAFETY DIRECTOR

EMERGENCY PHONE 1-414-273-3850

DATE 09/05/96
CUST#: 484407
PO#:

PHAEDRA MC PHERSON
UNIVERSITY OF UTAH
421 WAKARA WAY SUITE 125
SALT LAKE CITY UT 84108-1210

MATERIAL SAFETY DATA SHEET

SECTION 1. - - - - - - - - - - CHEMICAL IDENTIFICATION- - - - - - - - - - -

CATALOG #: N60-5
NAME: 2,6-NAPHTHALENEDISULFONIC ACID, DISODIUM SALT, TECH., 80%

SECTION 2. - - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - - -

CAS #: 1655-45-4
MF: C10H8O6S2
EC NO: 216-735-7

SECTION 3. - - - - - - - - - - - HAZARDS IDENTIFICATION - - - - - - - - - -

DATA NOT AVAILABLE

SECTION 4. - - - - - - - - - - - FIRST-AID MEASURES- - - - - - - - - - - -

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES.
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS AMOUNTS OF WATER.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN.
WASH CONTAMINATED CLOTHING BEFORE REUSE.

SECTION 5. - - - - - - - - - - FIRE FIGHTING MEASURES - - - - - - - - - - -

EXTINGUISHING MEDIA
WATER SPRAY.
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

SECTION 6. - - - - - - - - - ACCIDENTAL RELEASE MEASURES- - - - - - - - -

WEAR RESPIRATOR, CHEMICAL SAFETY GOGGLES, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.
AVOID RAISING DUST.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

CONTINUED ON NEXT PAGE

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CATALOG #: N60-5
NAME: 2,6-NAPHTHALENEDISULFONIC ACID, DISODIUM SALT, TECH., 80%

SECTION 7. HANDLING AND STORAGE

REFER TO SECTION 8.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CHEMICAL SAFETY GOGGLES.
COMPATIBLE CHEMICAL-RESISTANT GLOVES.
NIOSH/MSHA-APPROVED RESPIRATOR.
SAFETY SHOWER AND EYE BATH.
MECHANICAL EXHAUST REQUIRED.
AVOID INHALATION.
AVOID CONTACT WITH EYES, SKIN AND CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.
KEEP TIGHTLY CLOSED.
STORE IN A COOL DRY PLACE.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR
WHITE POWDER

PHYSICAL PROPERTIES
MELTING POINT: >300 C

SECTION 10. STABILITY AND REACTIVITY

INCOMPATIBILITIES
STRONG OXIDIZING AGENTS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE
SULFUR OXIDES

SECTION 11. TOXICOLOGICAL INFORMATION

ACUTE EFFECTS
MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.
MAY CAUSE EYE IRRITATION.
MAY CAUSE SKIN IRRITATION.
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

SECTION 12. ECOLOGICAL INFORMATION

DATA NOT YET AVAILABLE.

SECTION 13. DISPOSAL CONSIDERATIONS

CONTINUED ON NEXT PAGE

SIGMA-ALDRICH

ALDRICH CHEMICAL COMPANY, INC.
P.O. BOX 355
MILWAUKEE, WISCONSIN 53201, USA

CUST#: 484407

CATALOG #: N60-5
NAME: 2,6-NAPHTHALENEDISULFONIC ACID, DISODIUM SALT, TECH., 80%

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER. OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. - - - - - - - - - - - TRANSPORT INFORMATION - - - - - - - - - -

CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. - - - - - - - - - - REGULATORY INFORMATION - - - - - - - - - - -

DATA NOT AVAILABLE

SECTION 16. - - - - - - - - - - - OTHER INFORMATION- - - - - - - - - - - - -

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All Catalogs | ACROS Organics | Naphthalenedicarbonitrile - Naphthoflavone | 2,7-Naphthalenedisulfonic acid disodium salt, 95+% (UV-VIS) | **MSDS**

Material Safety Data Sheet
2,7-Naphthalenedisulfonic acid disodium salt, 95+% (uv-vis)

ACC# 70704

Section 1 - Chemical Product and Company Identification

MSDS Name: 2,7-Naphthalenedisulfonic acid disodium salt, 95+% (uv-vis)
Catalog Numbers: AC415230000, AC415230250, AC415232500
Synonyms:
Company Identification:
Acros Organics N.V.
One Reagent Lane
Fairlawn, NJ 07410
For information in North America, call: 800-ACROS-01
For information in Europe, call: 0032(0) 14575211
For emergencies in the US, call CHEMTREC: 800-424-9300
For emergencies outside the US, call: 0032(0) 14575299

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
1655-35-2	2,7-naphthalenedisulfonic acid, disodium salt		216-733-6

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Not available.Appearance: Not available.Not available.
Target Organs: None.

Potential Health Effects
The toxicological properties of this material have not been investigated. Use appropriate procedures to prevent opportunities for direct contact with the skin or eyes and to prevent inhalation.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids. Get medical aid immediately.
Skin: Get medical aid. Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Remove contaminated clothing and shoes.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Firefighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Use agent most appropriate to extinguish fire.
Autoignition Temperature: Not available.
Flash Point: Not available.
NFPA Rating: Not published. Explosion Limits, Lower: Not available. Upper: Not available.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Avoid contact with eyes, skin, and clothing. Avoid ingestion and inhalation.
Storage: Store in a cool, dry place. Keep container closed when not in use.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
2,7-naphthalenedisulfonic acid, disodium salt	none listed	none listed	none listed

OSHA Vacated PELs: 2,7-naphthalenedisulfonic acid, disodium salt: No OSHA

Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear chemical goggles.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators: A respiratory protection program that meets OSHA's 29 CFR '1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Not available.
Appearance: Not available.
Odor: Not available.
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate:
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point:0.00 deg C
Decomposition Temperature: Not available.
Solubility: Not available.
Specific Gravity/Density: Not available.
Molecular Formula:C10H6Na2O6S2
Molecular Weight:

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, strong oxidants.
Incompatibilities with Other Materials: Not available.
Hazardous Decomposition Products: Irritating and toxic fumes and gases.
Hazardous Polymerization: Not available.

Section 11 - Toxicological Information

RTECS#:
CAS# 1655-35-2 unlisted.
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 1655-35-2: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.

Section 12 - Ecological Information

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.
RCRA D-Series Maximum Concentration ofContaminants: None listed.
RCRA D-Series Chronic Toxicity ReferenceLevels: None listed.
RCRA F-Series: None listed.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	No information available.	Not regulated as a hazardous material.	Not regulated as a hazardous material.	Not regulated as a hazardous material.No information available.	
Hazard Class:					
UN Number:					
Packing Group:					

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 1655-35-2 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

Section 302 (RQ)
None of the chemicals in this material have an RQ.
Section 302 (TPQ)
None of the chemicals in this product have a TPQ.
Section 313
No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.

STATE
CAS# 1655-35-2 is not present on state lists from CA, PA, MN, MA, FL, or NJ. California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
Not available.
Risk Phrases:

Safety Phrases:
S 24/25 Avoid contact with skin and eyes.
WGK (Water Danger/Protection)
CAS# 1655-35-2: No information available.
Canada

None of the chemicals in this product are listed on the DSL/NDSL list. WHMIS: Not available.
CAS# 1655-35-2 is not listed on Canada's Ingredient Disclosure List.
Exposure Limits

Section 16 - Additional Information

MSDS Creation Date: 2/28/1995
Revision #1 Date: 3/04/1996

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

? help Need help with a product? Send email to Fisher's customer service or call us at 1-800-766-7000.

Material Safety Data Sheet

Issue Date: 12/6/2006

Section 1: Chemical Product and Company Identification

Cat#: 19922

Part Name: RHODAMINE WT WATER TRACING DYE

Supplier: Polysciences, Inc.
400 Valley Road
Warrington, PA 18976
Telephone #215-343-6484

Section 2: Composition/ Information on Ingredients

Item#	Name	CAS#	% in product
1	Rhodamine WT	CASRNHX19922	5
2	Water	007732185	95

OSHA (ACGIH) Exposure Limits

		TWA		STEL		CEILING	
		ppm	mg/	ppm	mg/m3	ppm	mg/m3
CAS#: 007732185	IDLH: NE						
OSHA		NE	NE	NE	NE	NE	NE
ACGIH		NE	NE	NE	NE	NE	NE
CAS#: CASRNHX1992	IDLH: NE						
OSHA		NE	NE	NE	NE	NE	NE
ACGIH		NE	NE	NE	NE	NE	NE

Section 3: Hazards Identification

Causes eye irritation.

Hazard Ratings:
These ratings are Polysciences' Inc. own assesments of the properties of the material using the ANSI/NFPA 704 Standard.
Additional information can be found by consulting in the NFPA published ratings lists (List 325 and List 49).

If no data is listed the information is not available.

Health	Flammability	Reactivity
2	0	1

Section 4: First Aid Measures

Flush eyes with flowing water for at least 15 minutes.

If breathing is difficult, contact emergency personnel.

If swallowed, induce vomiting as directed by medical personnel.

Remove contaminated clothing.

Remove to fresh air.

Wash skin with deluge of water for at least 15 minutes.

Section 5: Fire Fighting Measures

Flash point, deg F.: no data Method: no data

UEL: no data LEL: no data Autoignition temperature, deg. F.: no data

Flammability Classification: no data Flame Propagation Rate: no data

Hazardous Combustion Products: no data

Section 6: Accidental Release Measures

Any information listed below is to be considered in addition to internal guidelines for isolation of spill, containment of spill, removal of ignition sources from immediate area, and collection for disposal of spill by trained, properly protected clean up personnel.

Absorb liquids on absorbent material.

Contain spilled liquids.

Section 7: Handling and Storage

Store at room temp

Section 8: Exposure Controls/ Personal Protection

The use of eye protection in the form of safety glasses with side shields and the use of skin protection for hands in the form of gloves are considered minimum and non-discretionary in work places and laboratories. Any recommended personal protection equipment or environmental equipment is to be considered as additional to safety glasses and gloves.

Use chemical splash goggles and face shield.

Section 9: Physical and Chemical Properties

Formula:	no data	vapor pressure:	no data
Formula Weight:	no data	vapor density:	heavier than air
boiling point:	no data	Specific gravity:	0
melting point:	no data	ph:	10.5 @1.0 %
solubility:	miscible	appearance:	fluorescing red liquid

Section 10: Stability and Reactivity

Chemical Stabilit no data

Conditions to Avoid: no data

Incompatibility with other materials: no data

Hazardous Decomposition Products: no data

Hazardous Polymerization: will not occur

Section 11:Toxicological Information

Acute Data: no data

Subchronic data: no data

Section 12: Ecological Information

LC50: >320 mg/l rainbow trout (96 hour)
LC50: 170 mg/l daphnia magna
No developmental abnormalities or toxicity to oyster larvae at 100 mg/L.

Section 13: Disposal Considerations

The following chart lists the status of the chemical and its components in reference to 40 CFR Part 261.33. If the product is listed by code number the substance may be subject to special federal and state disposal regulations. If no codes are listed the material must be disposed in compliance with all Federal, State and Local Regulations.

CAS#	Waste Code	Regulated Name
007732185	not listed	not listed
CASRNHX19922	not listed	not listed

Section 14: Transportation Data

Refer to bill of lading or container label for DOT or other transportation hazard classification , if any.

Section 15: Regulatory Information

All components of this product are on the TSCA public inventory.

Prop 65 - Column A identifies those items which are known to the State of California to cause cancer. Column B identified items which are known to the State of California to cause reproductive toxicity.

CAS#	Column A	Column B
007732185	no	no
CASRNHX19922	no	no

State Regulatory Information :If a CAS# is listed below this material is subject to the listed state right-to-know requirements.

CAS#	
007732185	not listed
CASRNHX199	not listed

SARA Toxic Release Chemicals(as defined in Section 313 of SARA Title III)
This list identifies the toxic chemicals, including their de minimis concentrations for which reporting is required under Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA). The list is also referred to as the Toxics Release Inventory (TRI) List.

CAS#	Regulated name	de minimis conc. %	Rep. Thres.
007732185	not listed	not listed	not listed
CASRNHX19922	not listed	not listed	not listed

SARA Extremely Hazardous Substances and TPQs
This list includes hazardous chemicals as defined in 29 CFR 1910.1200(c); and extremely hazardous substances regulated under Section 302 of SARA Title III with their TPQs (in pounds), as listed in 40 CFR 355, Appendices A and B.

CAS#	Regulated name	TPQ (pounds)	EHS-RQ(pounds)
007732185	not listed	not listed	not listed
CASRNHX19922	not listed	not listed	not listed

CERCLA
The hazardous substances, and their reportable quantities (RQs) are listed in the federal regulations at 40 CFR Part 302, Table 302.4. Release of a CERCLA hazardous substance in an amount equal to or greater than its RQ, in any 24-hour period, must be reported to the National Response Center at (800) 424-8802.

CAS#	Regulated name	RQ (pounds)
007732185	Not listed	Not listed
CASRNHX19922	Not listed	Not listed

Section 16: Other Information

POLYSCIENCES, INC. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy.
Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular purpose. POLYSCIENCES, INC. makes no representations or warranties, either expressed or implied of merchantability, fitness for particular purposes with respect to the information set forth herein or to which the information refers. Accordingly, POLYSCIENCES, INC. will not be responsible for damages resulting from the use of or reliance upon this information.

END OF MSDS

SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 11/07/2006
Date Updated: 01/29/2006
Version 1.3

Section 1 - Product and Company Information

Product Name	FLUORESCEIN
Product Number	28802
Brand	RIEDEL
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
FLUORESCEIN	2321-07-5	No

Formula: $C_{20}H_{12}O_5$

Synonyms: Angiofluor * Benzoic acid, o-(6-hydroxy-3-oxo-3H-xanthen-9-yl) * Benzoic acid, 2-(6-hydroxy-3-oxo-3H-xanthen-9-yl) * 9-(o-Carboxyphenyl)-6-hydroxy-3-isoxanthenone * 9-(o-Carboxyphenyl)-6-hydroxy-3H-xanthen-3-one * C.I. 45350:1 * C.I. 45350A * C.I. 45350 (free acid) * C.I. Solvent Yellow 94 * D+C Yellow No. 7 * 3',6'-Dihydroxyfluoran * Dihydroxyfluorane * 3',6'-Dihydroxyspiro(isobenzofuran-1(3H),9'(9H)-xanthen)-3-one * 3,6-Dihydroxyspiro(xanthene-9,3'-phthalide) * Fluoran, 3',6'-dihydroxy- * 3',6'-Fluorandiol * Fluorescein (8CI) * Fluorescein acid * Hidacid fluorescein * Japan Yellow 201 * Japan Yellow No. 201 * Resorcinolphthalein * Soap Yellow F * Solvent Yellow 94 * Spiro(isobenzofuran-1(3H),9'-(9H)xanthen)-3-one, 3',6'-dihydroxy- (9CI) * 3H-Xanthen-3-one, 9-(o-carboxyphenyl)-6-hydroxy- * Yellow fluorescein * 11712 Yellow * Zlut kysela 73 (Czech)

RTECS Number: LM5075000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Caution: Avoid contact and inhalation. Target organ(s): Kidneys.

HMIS RATING

HEALTH: 0
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING

HEALTH: 0
FLAMMABILITY: 0
REACTIVITY: 0

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Section 5 - Fire Fighting Measures

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Avoid all contact. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed. Store in a cool dry place.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Use only in a chemical fume hood.

PERSONAL PROTECTIVE EQUIPMENT
Other: Wear appropriate government approved respirator, chemical-resistant gloves, safety goggles, other protective clothing.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling. Discard contaminated clothing and shoes.

Section 9 - Physical/Chemical Properties

Appearance	Color: Red Form: Powder

Property	Value	At Temperature or Pressure
Molecular Weight	332.31 AMU	
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	320 °C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	N/A	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Eye Contact: May cause eye irritation.
Inhalation: Material may be irritating to mucous membranes and upper respiratory tract.
Multiple Routes: May be harmful by inhalation, ingestion, or skin absorption.

TARGET ORGAN(S) OR SYSTEM(S)
Kidneys.

SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Intravenous
Mouse
300 MG/KG
LD50

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA
Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
S: 22-24/25
Safety Statements: Do not breathe dust. Avoid contact with skin and eyes.

US CLASSIFICATION AND LABEL TEXT
US Statements: Caution: Avoid contact and inhalation. Target organ(s): Kidneys.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2006 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

YICK-VIC CHEM & PHARM (HK) LTD.

MATERIAL SAFETY DATA SHEET

Section 1 - Product and Company Information

Product Name	1,3,5-NAPHTHALENETRISULFONIC ACID TRISODIUM SALT
Product Number	DIN-1957B
Brand	Yick-Vic
Company	YICK-VIC CHEM & PHARM (HK) LTD.
Street Address	RM 1006, 10/FL., HEWLETT CENTRE, 52-54 HOI YUEN RD, KWUN TON, KLN HONG KONG
Phone:	852-2541-2772
Fax:	852-2542-3444

Section 2 - Composition/Information on Ingredient

Substance Name	CAS # 6654-64-4	SARA 313
1,3,5-NAPHTHALENETRISULFONIC ACID TRISODIUM SALT		No

Formula $C_{10}H_8O_9S_3$

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Irritant.
Irritating to skin.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A
AUTOIGNITION TEMP
N/A
FLAMMABILITY
N/A

EXTINGUISHING MEDIA

Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING

User Exposure: Do not breathe dust. Avoid contact with eyes, skin, and clothing.

STORAGE

Suitable: Keep tightly closed. Store in a cool dry place.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Safety shower and eye bath. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Government approved respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash thoroughly after handling. Wash contaminated clothing before reuse.

Section 9 - Physical/Chemical Properties

Appearance	Color:	White	
	Form:	Powder	
Property	Value		At Temperature or Pressure
Molecular Weight	368.34		
pH	N/A		
BP/BP Range	N/A		
MP/MP Range	N/A		
Freezing Point	N/A		
Vapor Pressure	N/A		
Vapor Density	N/A		
Saturated Vapor Conc.	N/A		
Bulk Density	N/A		
Odor Threshold	N/A		
Volatile%	N/A		
VOC Content	N/A		
Water Content	1%		
Solvent Content	N/A		
Evaporation Rate	N/A		
Viscosity	N/A		
Surface Tension	N/A		
Partition Coefficient	N/A		
Decomposition Temp.	N/A		
Flash Point	N/A		
Explosion Limits	N/A		
Flammability	N/A		
Autoignition Temp	N/A		
Refractive Index	N/A		
Optical Rotation	N/A		
Miscellaneous Data	N/A		

Solubility Solubility in Water:Soluble.

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide,Sulfur oxides.

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.
Eye Contact: May cause eye irritation.
Inhalation: Material may be irritating to mucous membranes and upper respiratory tract.
Multiple Routes: May be harmful by inhalation, ingestion, or skin absorption.

SIGNS AND SYMPTOMS OF EXPOSURE

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA

Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION

Symbol of Danger: Xi
Indication of Danger: Irritant.
R: 38
Risk Statements: Irritating to skin.
S: 22 24/25
Safety Statements: Do not breathe dust. Avoid contact with skin and eyes.

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Irritant.
Risk Statements: Irritating to skin.
Safety Statements: Wear suitable protective clothing.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: No

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

Section 16 - Other Information

DISCLAIMER

For R&D use only by University of Utah. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. Yick-Vic Chem & Pharm (HK) Ltd, shall not be held liable for any damage
resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MATERIAL SAFETY DATA SHEET

Section 1 Company and Product Identification

Product Name	**1,3,6,8-Pyrenetetrasulfonate (PTS) Reference Marker**
Part Number	713328

Doc. ID *713328-75 AC*
Issued (year/month/day)
Revised (year/month/day) *2007/09/11*

Product Use	For Laboratory Use Only
Series Name	eCAP™
Manufacturer	Beckman Coulter, Inc. 4300 Harbor Blvd. Fullerton, CA 92835-3100, U.S.A. ECREP Address: Beckman Coulter Ireland, Inc. Mervue Business Park, Mervue, Galway, Ireland 353 91 774068
Distributor and Emergency Phone No.	Refer to attached list, Document ID: 472050, for local distributor and emergency phone numbers.

Section 2 Composition and Information on Ingredients

Hazardous Ingredients: **None**

Section 3 Hazards Identification

Emergency Overview

Yellow; Clear; Liquid; Odorless
Nonflammable aqueous solution.
Does not meet EU, OSHA or WHMIS criteria for hazardous materials.

Physical Hazards No physical hazards were determined from a review of available literature.

Potential Health Effects Summary This product does not meet EU, OSHA or WHMIS criteria for hazardous materials.

Product Hazard Classifications	**EU:**	**WHMIS:**	**US OSHA:**
	Not applicable	Not applicable	Not applicable

Beckman Coulter Safety Rating		
	Flammability (Section V): 0 **Health (Section XI):** 1 **Reactivity with Water (Section X):** 0 **Contact (Section VIII):** 1	Code 0=none 1=slight 2=caution 3=severe

Section 4 First Aid Measures

Inhalation If product is inhaled, move exposed individual to fresh air. If individual is not breathing, begin artificial respiration immediately and obtain medical attention.

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Section 4 First Aid Measures (Continued)

Eye Contact	If product enters eyes, wash eyes gently under running water for 15 minutes or longer, making sure that the eyelids are held open. If pain or irritation occur, obtain medical attention.
Skin Contact	In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. If pain or irritation occur, obtain medical attention.
Ingestion	If ingested, wash mouth out with water. If irritation or discomfort occurs, seek medical attention.

Section 5 Fire Fighting Measures

Flash Point	Not applicable
Flammable Limits	Not applicable
Autoignition Temp.	Not applicable
Extinguishing Media	Use extinguishing media suitable for surrounding fire.
Special Fire and Explosion Hazards	None identified.
Hazardous Combustion Products	No combustion products posing significant hazards are expected from this product (a dilute aqueous solution).
Protective Equipment for Firefighters	Self-contained breathing apparatus is recommended for firefighters in all chemical fire situations.

Section 6 Accidental Release Measures

Personal Precautions	Use good laboratory procedures; avoid eye contact.
Spill and Leak Procedures	Absorb spilled material with an appropriate inert, non-flammable absorbent and dispose according to local regulations.
Environmental Precautions	Contain spill to prevent migration.

Section 7 Handling and Storage

Handling Precautions	Use good laboratory procedures; avoid eye contact.
Recommended Storage Conditions	Keep away from incompatible material (see Section 10). To maintain efficacy, store according to the instructions in the product labeling.

Section 8 Exposure Controls and Personal Protection

Exposure Limits	
US OSHA:	None established
ACGIH:	None established
DFG MAK:	None established
Engineering Controls	No special engineering controls are required. Use with good general ventilation.

Section 8 Exposure Controls and Personal Protection (Continued)

Respiratory Protection	Under normal conditions, the use of this product should not require respiratory protection.
Eye Protection	Safety glasses or chemical goggles should be worn to prevent eye contact.
Skin Protection	Impervious gloves, such as Nitrile or equivalent, should be worn to prevent skin contact.

Section 9 Physical and Chemical Properties

Physical State	Liquid
Color	Yellow
Transparency	Clear
Odor	Odorless
Odor Threshold	Not applicable
pH	≈7
Boiling Point	Not available
Melting Point	Not available
Specific Gravity	≈1
Vapor Pressure	Not available
Vapor Density	Not available
Evaporation Rate	Not available
Solubility	
Water	Soluble
Organic	Not available

Section 10 Stability and Reactivity

Stability	Stable under normal temperatures and pressures.
Hazardous Incompatibilities	Strong acids Strong bases Strong oxidizers
Hazardous Decomposition Products	No decomposition products posing significant hazards would be expected from this product (a dilute aqueous solution).
Conditions to Avoid	Avoid contact with incompatible materials.

Section 11 Toxicological Information

Toxicity Data for Hazardous Ingredients	Not applicable
Primary Routes of Exposure	Eye contact, ingestion, inhalation, and skin contact.
Potential Effects of Acute Exposure	None identified.

Section 11 Toxicological Information (Continued)

Potential Effects of Chronic Exposure	None identified.
Symptoms of Overexposure	No specific symptoms identified.
Carcinogenicity	No ingredients in this product are listed as carcinogens by ACGIH, IARC, NTP, OSHA or 67/548/EEC Annex I.
Other Effects	None identified.
Conditions Aggravated by Exposure	None identified.

Section 12 Ecological Information

Ecotoxicity	No information available.
Biodegradability	No information available.
Mobility	No information available.

Section 13 Disposal Considerations

Waste Disposal	Dispose of waste product, unused product and contaminated packaging in compliance with federal, state and local regulations. If unsure of the applicable requirements, contact the authorities for information.

Section 14 Transport Information

Transportation of this product is not regulated under ICAO, IMDG, US DOT, European ADR or Canadian TDG.

Section 15 Regulatory Information

US Federal and State Regulations

SARA 313	No ingredients listed
CERCLA RG's, 40 CFR 302.4	No ingredients listed
California Proposition 65	No ingredients listed
Massachusetts MSL	No ingredients listed
New Jersey Dept. of Health RTK List	No ingredients listed
Pennsylvania RTK	No ingredients listed

EU Labeling Classification

Preparation not classified.

Section 15 Regulatory Information (Continued)

Canada

This product does not meet WHMIS criteria for hazardous materials.

PIN:	Not applicable
Ingredients on Ingredient Disclosure List:	None
Ingredients with unknown toxicological properties:	None

Section 16 Other Information

Hazardous ingredients found in Section 15 are below OSHAs and WHMIS' 1.0% w/w (0.1% for carcinogens) or EU's ingredient specific concentrations required for reporting in Section 2.
For further information, please contact your local Beckman Coulter representative.

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HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **FR-26LC**

Revision Date: 05-Jan-2009

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: FR-26LC
Synonyms: None
Chemical Family: Blend
Application: Friction Reducer

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Hydrotreated light petroleum distillate	64742-47-8	10 - 30%	200 mg/m^3	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview
May cause eye and skin irritation. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation
If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin
In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes
In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion
Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

Notes to Physician
Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined**Min:** > 200
Flash Point/Range (C):	Not Determined**Min:** > 93
Flash Point Method:	PMCC
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards Decomposition in fire may produce toxic gases. Use water spray to cool fire exposed surfaces.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 1, Flammability 1, Reactivity 0
HMIS Ratings: Health 1, Flammability 1, Reactivity 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.

Storage Information Store away from oxidizers. Store in a cool well ventilated area. Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

Respiratory Protection Organic vapor respirator.

Hand Protection Impervious rubber gloves.

Skin Protection Rubber apron.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Hazy light tan

9. PHYSICAL AND CHEMICAL PROPERTIES

Odor:	Sweet hydrocarbon
pH:	8.7
Specific Gravity @ 20 C (Water=1):	1.09
Density @ 20 C (lbs./gallon):	9.08
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	1.3
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Oxides of nitrogen. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
Skin Contact	May cause moderate skin irritation.
Eye Contact	May cause moderate eye irritation.
Ingestion	Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Slowly biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	TLM96: 100-1000 ppm (Lepomis macrochirus)
Acute Crustaceans Toxicity:	TLM96: 100-330 ppm (Crangon crangon)
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

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END OF MSDS