

**REQUEST FOR STANDARD TOXICOLOGY STUDIES
AT BUSHY RUN RESEARCH CENTER**

 BUSINESS
CONFIDENTIAL

 To: Mr. R.C. Myers
Bushy Run Research Center
RD 4 Mellon Road
Export, PA 15632

 From: Name R. J. COTTER
Sponsoring Division SPECIALTY POLYMER & COMPOSITES
Dept. R+D
Location (city) LEWIS CENTER
Charge to Account No. 25-JUL-9440
Technology Manager G. T. KWIATKOWSKI
Study Authorization: R. J. Cotter 12 JUL 1984 7/19/84
Signature Date

**COMPLETE COPIES OF THIS FORM
MUST BE SENT (BY THE SUBMITTER, TO:**

- A. Dr. Bryan Ballantyne
Technical Center (3005)
South Charleston, WV 25303
- B. Dr. W.C. Kuryla
Technical Center (3005)
South Charleston, WV 25303
- C. Dr. E.R. Homan
Bushy Run Research Center
RD 4 Mellon Road
Export, PA 15632
- D. Sponsoring Division
HS & EA Manager
Name: CELESTIA
Loc.: 25A13412K

TESTS REQUESTED (Standard procedures, other tests require specific protocols. Please contact the Corporate Applied Toxicology Dept. for advice and guidance.) **RECEIVED**

1 RANGE FINDING:

- ☐ Acute Oral ☐ Other _____
- ☐ Acute Percutaneous
- ☐ Acute Inhalation
- ☐ Skin Irritancy
- ☐ Eye Irritancy

3. IN VITRO:

- ☒ Ames (Salmonella) Test
- ☐ Gene Mutation (CHO)
- ☐ Chromosome Exchange (SCE)
- ☐ Chromosome Damage (Micronucleus)
- ☐ DNA Damage (UDS)
- ☐ Macrophage (RAM) test
- ☐ Other _____

AUG 24 1984

W. C. HENGIER

2 KNOWN PROCEDURAL REQUIREMENT (circle):

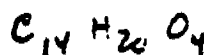
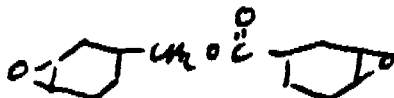
OECD, FHSA, DOT, FIFRA, TSCA, RCRA, Other _____

**PLEASE PROVIDE THE FOLLOWING INFORMATION. IT IS NEEDED IN ORDER TO
EXPEDITE WORK ON THE REQUESTED STUDIES.**
PRODUCT/COMPOSITION NAME: ECL-4221ACS NOMENCLATURE: 7-OXABICYCLO(4.1.0)HEPTANE-3-CARBOXYLIC ACID, 7-OXABICYCLO(4.1.0)HEPT-3-YL METHYL ESTERCAS NO.: 2386-87-0

CHEMICAL SYNONYMS/ALTERNATE/TRADE NAMES:

HEPT-3-YL METHYL ESTER

STRUCTURAL FORMULA OR COMPOSITION OF MIXTURES:


DISTRIBUTION OF REPORT: A standard divisional distribution list will be used unless otherwise requested (see page 4).

BRC USE)

ACKNOWLEDGEMENT OF SAMPLE RECEIPT

Date Received: July 25, 1984By: W.C. HengierBRC Sample No: 117-204UCC
062541

CHEMICAL INFORMATION

1. SAMPLE PURITY/COMPOSITION:

Commercial product. Sample is probably at least 95% of the indicated structure. Impurities would include dimeric and acetate derivatives from reaction in acetic acid.

Analytical test method employed*
*(Send copy of available data, source and location of analyses.)

Percent Composition

Amounts and identities of known impurities: _____ %

Amount of unidentified impurities: _____ %

Test material: _____ %

2. REQUIRED SAMPLE QUANTITY:Acute Tests:

1. 32 ounces for full series of tests
2. 16 ounces for chemicals with known high toxicity
3. 2 ounces for irritancy tests only

In vitro Tests: 4 ounces

NOTE: To reduce problems involving disposal of unused amounts of the sample, supply only the amount specified above

3. PHYSICAL CHARACTERISTICS: (Give all which are known):

Gas _____ Liquid ☒ Solid _____ Powder _____ Granular _____

Molecular Wt. 252 Vapor Pressure (@ 3 temp. between 15° and 150°C)

Density (liquids) 1.175 (25/25°) 1. 20.1 mm @ 20°C °C

pH (aqueous sol.) _____ 2. _____ mm @ _____ °C

Freezing point -20 °C °C 3. _____ mm @ _____ °C

Boiling point 354°C / 760 mm °C

Flash point 118 °C
(Tag, closed cup)

4. SOLUBILITY:

Solvent _____ Percent Solution _____

Water slightly at 25°C 0.05

Acetone _____

Ethanol _____

Dimethylsulfoxide _____

Vegetable Oil _____

Other (specify) _____

5. STABILITY: (Check appropriately):

Shelf Life _____ < 6 mo; ☒ > 6 mo.

Light sensitive _____ yes; ☒ no

Temp. sensitive _____ yes; ☒ no

Oxidizes _____ yes; ☒ no

Polymerizes ☒ yes; _____ no

Known solvent

Incompatibility (specify) _____

* In presence of strong acids and bases.

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HANDLING/STORAGE/DISPOSAL INFORMATION:

1. RECOMMENDED PRECAUTIONS FOR HANDLING*: KEEP AWAY FROM SKIN AND EYES

*Enclose UCC (or other company) Material Safety Data Sheet - if available.

Any unusual fire or explosion hazards: NO

Any chemical incompatibilities (materials to avoid): STRONG ACIDS AND BASES

2. SPECIAL PERSONNEL PROTECTIVE EQUIPMENT NEEDED: WASH EXPOSED AREAS
WITH SOAP AND WATER

3. RECOMMENDED INACTIVATION/DECONTAMINATION PROCEDURE(S):

4. RECOMMENDED STORAGE CONDITIONS:

Temperature (Check appropriately):

Room Temp. ☒ _____

Refrigerate _____ < 20°C

Freeze _____ < 0°C

Special Conditions Required (Check appropriately):

Under N₂ gas _____

Dessicator _____

Other _____

5. SAMPLE DISPOSAL: (Check appropriately)

☐ Return unused sample to:
(attach DOT shipping instructions)

☒ Disposal by BRRC is authorized in compliance with applicable regulations.

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OTHER PERTINENT INFORMATION

The following information will be useful in determining or confirming the necessity of specific toxicity tests.

1. Proposed use of material (circle): Industrial Intermediate Home Use Experimental

Industrial Product Food Drug Cosmetic Packaging (specify Food, Drug, Cosmetic)

Other use (specify): _____

2. Potential hazard route(s) (circle): Skin Inhalation Mouth Eye

Other (specify): _____

3. Form shipped in commerce (circle): Solid Liquid Gas Suspension or Slurry

Solvent or Vehicle composition: _____

ATTACHMENTS (TO BE PROVIDED BY SUBMITTER):

- * - Analytical data for sample.
- * - Material Safety Data Sheet of sample material (if available).
- * - DOT shipping information (if applicable).

DISTRIBUTION LIST: Unless indicated below, the standard distribution list for the sponsoring division will be used.

☐ Please use the following divisional distribution list for the final study report:



MATERIAL SAFETY DATA SHEET

EFFECTIVE DATE: January 1, 1982

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IDENTIFICATION

PRODUCT NAME:	BAKELITE Cycloaliphatic Epoxy Resin ERL-4221, ERL-4221G		
CHEMICAL NAME:	3,4-Epoxy cyclohexyl methyl- 3,4-Epoxy cyclohexyl carboxylate	CHEMICAL FAMILY:	Diepoxide
FORMULA:	$C_{14}H_{20}O_4$	MOLECULAR WEIGHT:	252.30
SYNONYMS:	--		
DEPARTMENT OF TRANSPORTATION	HAZARD CLASSIFICATION	None	
	SHIPPING NAME	None	

CAS # 2386-87-0

CAS NAME 7-Oxabicyclo[4.1.0]heptane-3-carboxylic acid, 7-oxabicyclo[4.1.0]hept-3-ylmethyl ester

II. PHYSICAL DATA

BOILING POINT, 760 mm Hg 101.325 kPa	354 °C (669 °F) Extrapolated	FREEZING POINT	Sets to glass below -20 °C (-4 °F)
SPECIFIC GRAVITY (H ₂ O = 1)	1.175 at 25/25 °C	VAPOR PRESSURE at 20 °C	<0.001 kPa <0.01 mm Hg
VAPOR DENSITY (air = 1)	8.7	SOLUBILITY IN WATER, % by wt. at 20°	0.05
PER CENT VOLATILES BY VOLUME	Nil	EVAPORATION RATE (Butyl Acetate = 1)	<0.01
APPEARANCE AND ODOR	Low viscosity liquid; characteristic odor.		

III. INGREDIENTS

MATERIAL	%	TLV (Units)	HAZARD
BAKELITE Epoxy Resin ERL-4221, ERL-4221G	100	Not established	Slight skin and eye irritant

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (test method(s))	245° F, Pensky-Martens Closed Cup 400° F, Cleveland Open Cup				
FLAMMABLE LIMITS IN AIR, % by volume		LOWER	Not determined (Nonvolatile Fluid)	UPPER	Not determined (Nonvolatile Fluid)
EXTINGUISHING MEDIA		Use water spray, carbon dioxide, dry chemical, alcohol-type or universal-type foams applied by manufacturer's recommended technique.			
SPECIAL FIRE FIGHTING PROCEDURES		Don't spray pool fires directly, a solid stream of water directed into hot burning liquid can cause frothing. Use supplied breathing air and protective clothing.			
UNUSUAL FIRE AND EXPLOSION HAZARDS		Hazardous polymerization may occur, due to heat from exposure to a fire.			

EMERGENCY PHONE NUMBER

304/744-3487

This number is available days, nights, weekends, and holidays

While Union Carbide Corporation believes that the data contained herein are factual and the opinions expressed are those of qualified experts regarding the results of the tests conducted, the data are not to be taken as a warranty or representation for which Union Carbide Corporation assumes legal responsibility. They are offered solely for your consideration, investigation, and verification. Any use of these data and information must be determined by the user to be in accordance with applicable Federal, State and local laws and regulations.

UNION CARBIDE CORPORATION • SPECIALTY CHEMICALS AND PLASTICS DIVISION
OLD RIDGEBURY ROAD, DANBURY, CT 06817

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V. HEALTH HAZARD DATA

TLV AND SOURCE: None established by ACGIH or OSHA.

ACUTE EFFECTS OF OVEREXPOSURE

SWALLOWING	Moderately toxic. May cause nausea, vomiting, and diarrhea.
SKIN ABSORPTION	None currently known.
INHALATION	None currently known.
SKIN CONTACT	May cause irritation.
EYE CONTACT	May cause irritation.
CHRONIC EFFECTS OF OVEREXPOSURE	None currently known.
OTHER HEALTH HAZARDS	None currently known.

EMERGENCY AND FIRST AID PROCEDURES:

SWALLOWING	Give two glasses of water and induce vomiting by putting finger down throat.
SKIN	Wash with soap and water.
INHALATION	No emergency care anticipated.
EYES	Flush with water.

NOTES TO PHYSICIAN

There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition.

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VI. REACTIVITY DATA

STABILITY		CONDITIONS TO AVOID	None
UNSTABLE	STABLE		
--	✓		
INCOMPATIBILITY (materials to avoid)		Acids, strong bases, amines.	
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS		Burning can produce CO and/or CO ₂ .	
HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID	Acids, strong bases, amines.
May Occur	Will not Occur		
✓	--		

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	Collect for disposal. Avoid discharge to waterways; see Section IX.
WASTE DISPOSAL METHOD	Dilute with an inert solvent and incinerate in a furnace where permitted under appropriate Federal, State, and local regulations.

VIII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)	None required in normal use.	
VENTILATION	General (mechanical) room ventilation is expected to be satisfactory.	
PROTECTIVE GLOVES	Plastic	EYE PROTECTION
OTHER PROTECTIVE EQUIPMENT	Eye bath and/or safety shower.	Safety glasses

IX. SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Avoid contact with eyes, skin, and clothing.
Wash thoroughly after handling.
Do not take internally.

FOR INDUSTRY USE ONLY

OTHER PRECAUTIONS

This product is essentially insoluble in water.
It is resistant to rapid biodegradation and may be toxic to aquatic life. Avoid discharge to natural waters.

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UNION CARBIDE CORPORATION
SPECIALTY POLYMERS & COMPOSITES DIVISION

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P.O. BOX 570, SOUND BROOK, NJ 08805
TELEPHONE (201) 356-8000

RECEIVED
SEP 12 1984
W.C. HENGLER

September 6, 1984

Mr. W. C. Hengler
Bushy Run Technical Center
RD4, Mellon Road
Export, Pennsylvania 15632

Dear Mr. Hengler:

Infrared spectra have been run on the samples of cycloaliphatic epoxides that you returned to me recently. The spectra are enclosed for your files. The spectra that were obtained on these samples were compared with standard spectra for these products. In two cases, 4205 and 4299, comparisons were made with other samples of the these products that are being utilized in current laboratory programs.

Comparison of these various spectra by the infrared experts in our Analytical Group (Dr. Clark and Mr. Lewis) led to the conclusion that the samples that you have are authentic samples of the UCC cycloaliphatic epoxides. Thus, the mutagenicity testing will be performed on valid samples of 4221, 4299, 4234, 4206 and 4205.

Very truly yours,

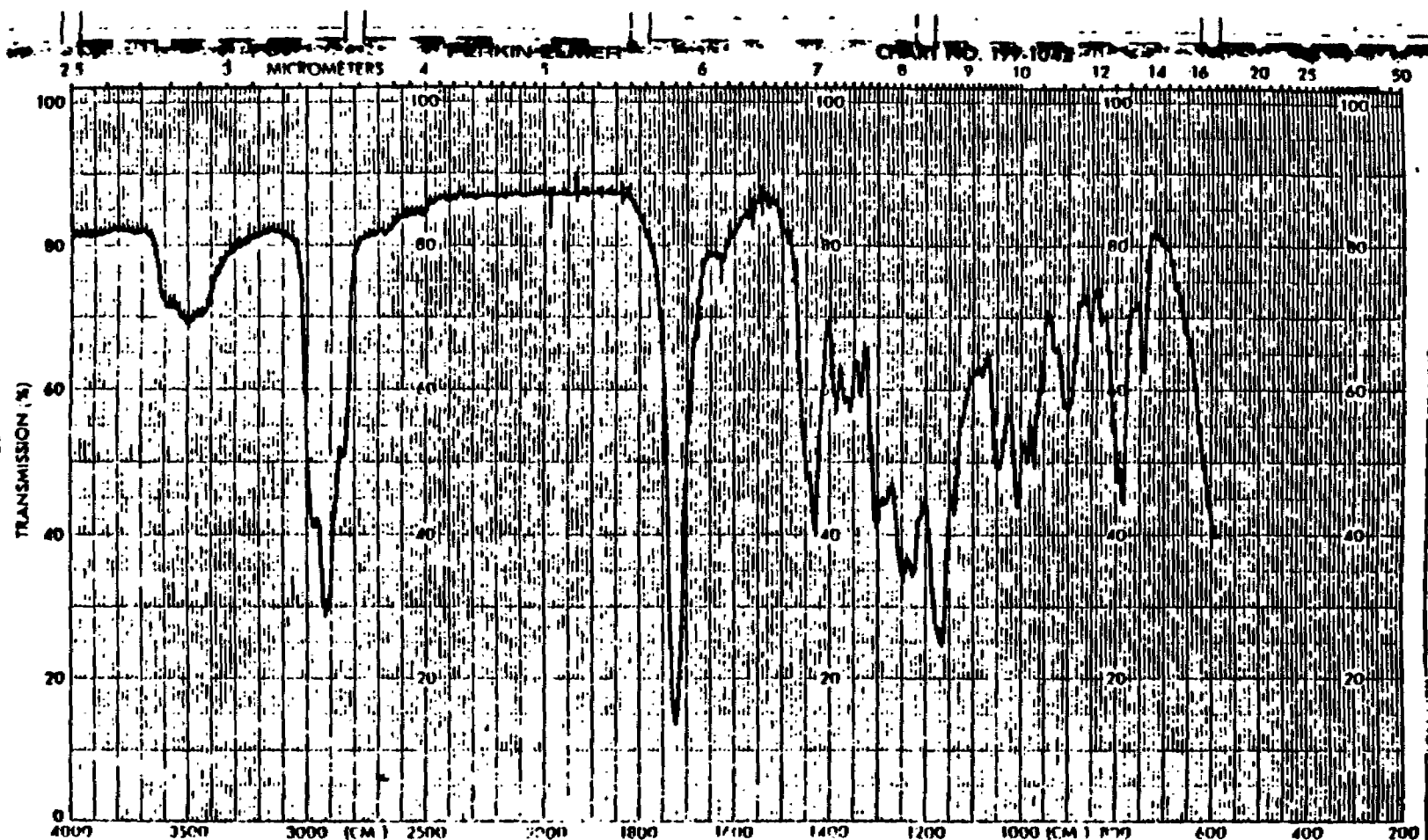
encls.

A handwritten signature in dark ink, appearing to read "R. J. Cotter".
R. J. Cotter

RJC:mjk

cc:Dr. E. M. Clark, Mr. J. Lewis, Dr. R. E. Plevan - DB

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ABSCISSA		ORDINATE		SCAN TIME	REP SCAN	SINGLE BEAM
EXPANSION		EXPANSION		MULTIPLIER	TIME DRIVE	
		% T		SLIT PROGRAM	OPERATOR	DATE
SAMPLE		REMARKS		CELL PATH		
ORIGIN				REFERENCE		
		SOLVENT		CONCENTRATION		

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APPENDIX 3

Salmonella typhimuriumA. Historical Data on Spontaneous Reversion Rates at BRRC
As of June 30, 1984

<u>Strain</u>	<u>+/-S9</u>	<u>N</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Median</u>	<u>Range</u>
TA98	-S9	98	18.2	5.02	18	7, 33
	+S9	98	25.6	7.40	26	14, 44
TA100	-S9	98	123.1	26.89	120	61, 187
	+S9	98	101.5	17.86	100	65, 137
TA1535	-S9	98	32.5	13.61	32	7, 60
	+S9	98	13.4	7.34	14	2, 35
TA1537	-S9	98	4.3	1.90	4	1, 9
	+S9	98	5.0	2.61	5	1, 13
TA1538	-S9	98	7.2	3.72	7	2, 19
	+S9	98	15.0	5.41	16	4, 29

B. Historical Data on Positive Control Values at BRRC
As of January 26, 1984

<u>Strain</u>	<u>Positive Control</u>	<u>+/-S9</u>	<u>N</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Median</u>	<u>Range</u>
TA98	NPD, 10 µg	-S9	84	877.1	166.73	870	532, 1301
	2AA, 10 µg	+S9	84	1434.2	327.54	1457	604, 2037
TA100	NZ, 10 µg	-S9	84	1621.8	277.37	1696	869, 2069
	2AA, 10 µg	+S9	84	1181.7	323.54	1201	475, 2225
TA1535	NZ, 10 µg	-S9	84	1622.0	253.42	1666	837, 2050
	2AA, 10 µg	+S9	84	99.3	30.84	98	37, 182
TA1537	9AA, 60 µg	-S9	84	140.6	130.70	82	28, 489
	2AA, 10 µg	+S9	84	122.5	45.52	120	36, 230
TA1538	NPD, 10 µg	-S9	84	1124.2	196.66	1168	573, 1582
	2AA, 10 µg	+S9	84	532.0	230.61	486	146, 1249

S9- rat liver homogenate; NPD- 4-nitrophenylenediamine; 2AA- 2-aminoanthracene;
NZ- sodium azide; 9AA- 9-aminoacridine.