

US EPA ARCHIVE DOCUMENT

9-22-92

DATE OUT: _____

DP BARCODE: D180157, D180109 SUBMISSION: 8420963, 420867 REREG CASE #: 3092 CHEMICAL CODE/NAME: 107103 5-chloro-2-methyl-4-isothiazolin-3-one and 107104 2-methyl-4-isothiazolin-3-one. COMMON NAME: Kathon 886F CAS #: 26172-55-4 and 2682-20-4

RD/RSB/PCRS TRANSMITTAL/PRODUCT CHEMISTRY REVIEW/PHASE IV[X], V [], OR MISCELLANEOUS DATA PACKAGE [] FOR A TGAI[X] OR EP []

Data Submitters: 000707 Rohm and Haas Company
Subm. Date: 07/24/90
SRRD PM#/NAME: 52 Linda Deluise Phone #: 308- 8065
CRM NAME: Tom Myers Phone #: 308-8074

Issues Remaining to be Resolved:

- 1. Submission of product chemistry data corresponding to Series 62-2.

Submit a new Confidential Statement of Formula for the product Kathon 886F which must include, nominal concentrations, upper and lower limits for the AI and all other components.

NOTES TO PM:

- 1. A Status Report of Product Chemistry Data Requirements is Included in the next page.
- 2. Note the conclusion 1 on page 11 and notify to the Registrant.
- 3. Contains CONFIDENTIAL MATERIAL on Pages 12 to 29

Shyam B. Mathur
Reviewer: Shyam B. Mathur, Chemist 09/21/92
Date
Don Stubbs
Section Head: Don Stubbs, Acting 9/22/92
Date

STATUS REPORT OF PRODUCT DATA REQUIREMENTS

FOR REREGISTRATION OF A TGAI [X] or MP[]

DP BARCODE #: D 180157, D180109 SUBMISSION #: S420963, 420876 REREG CASE #: 3092 DATE: 09/01/92
 CHEMICAL NAME: 107103 5-chloro-2-methyl-4-isothiazolin-3-one and 107104 2-methyl-4-isothiazolin-3-one
 CAS #: 26172-55-4 and 2682-20-4

GLR #	TITLES	Ac	Wa	NA	UP	Ga	MRID No.
Series 61-Product Identity and Composition (40CFR§158.155, 160, 162, 165 & 167)							
61-1	Product Identity & Disclosure of Ingredients	X					417414-01
61-2	Description of Starting Materials & Manuf. Process	X					417414-01
61-3	Discussion of Formation of Impurities	X					417414-01
Series 62-Analysis and Certification of Product Ingredients (40CFR§158.170, 175 & 180)							
62-1	Preliminary Analysis of Product Samples	X					417414-01
62-2	Certification of Ingredient Limits					X	417414-01
62-3	Analytical Methods to Verify Certified Limits	X					417414-01
Series 63-Physical and Chemical Characteristics (40CFR§158.190)							
63-2	Color	X					417414-01
63-3	Physical State	X					417414-01
63-4	Odor	X					417414-01
63-5	Melting Point			X			417414-01
63-6	Boiling Point	X					417414-01
63-7	Density, Bulk Density, or Specific Gravity	X					417414-01
63-8	Solubility	X					417414-01
63-9	Vapor Pressure	X					417414-01
63-10	Dissociation Constant			X			417414-01
63-11	Octanol/Water Partition Coefficient	X					417414-01
63-12	pH	X					417414-01
63-13	Stability	X					417414-01
63-17	Storage Stability			X			417414-01

EXPLANATIONS: AC = Acceptable; Wa = Waiver acceptable; NA = Not applicable; Up = Needs upgrading; Ga = Data Gap; GLR# = Guideline Reference number; TGAI = Technical grade active ingredient; PAI = Pure active ingredient; MP = Manufacturing-Use Product; EP = End-Use Product; CBI = Confidential Business Information.

1/ MP's containing TGAI(s) with or without solvents and emulsifiers.

NOTES: 62-1 Required if product is produced by an integrated system.
 62-3 EPA validated method can be referenced from published sources.
 63-5 Required if the TGAI is a solid at room temperature.
 63-6 Required if the TGAI is a liquid at room temperature.
 63-11 Required if the TGAI is organic and non-polar.
 63-12 Required if test substance is dispersible with water.

DP BARCODE: D180157, 180109 SUBMISSION: S420963, 420867 REREG.
No.: 3092

CHEMICAL NAME: 107103 5-chloro-2-methyl-4-isothiazolin-3-one,
and 107104 2-methyl-4-isothiazolin-3-one.

HISTORY:

The Registrant Rohm and Haas Co. submitted chemistry data(7/24/90) corresponding to the product commercially known as Kathon 886F(EPA Reg. No. 707-130) which is used as Industrial Microbicide. The product contains two active ingredients, 5-chloro-2-methyl-4-isothiazolin-3-one(1)[CAS No. 26172-55-4] and 2-methyl-4-isothiazolin-3-one(2)[CAS No. 2682-20-4]. According to the Applicant, the two AI's are produced as a result of a chemical reaction(no TGAI exists), they are not the result of a blending of two separately produced AI's. The reaction results in a typical production ratio of 75% of (1) and 25% of (2) on a weight percent basis. The Kathon 886F is an aqueous solution which contains, in addition to the above mentioned AI's, [REDACTED] and manufacturing by-products(the composition was approved by the Agency in June 1977, according to the Applicant). All currently registered pesticide products for the chemical case methylisothiazolinone contain the two subject AI's at the 3 to 1 ratio. The Applicant has stated that all Series 63 characterization were done using the TGAI with the exceptions of 63-9(V.P) and 63-11(Octanol/water partition coefficient), these were done using the PAI as required for the registration of Kathon 886F TGAI under 40CFR§158.190, Sec.63. In an Addendum Report from EPA Manager Tom Myers to the Registrant(06/23/92), following comments were made with regards to Series 61-1:

For a technical material consisting of an equilibrium mixture of AI's, Series 61 and 62 information must establish the relative amounts of the equilibrium components and must provide a complete description of the manufacturing process. The impurities must be quantitated down to the equivalent of 0.1% on a 100% a.i. basis. For Series 63, if isolation of the AI components would result in decomposition(generation of components not present in the original mixture) then physical/chemical properties should be conducted on the original mixture. Otherwise, series 63 should be conducted on the isolated AI components.

The Registrant gave Compliance Statement that this study was carried out by Rohm and Haas in accordance with EPA Pesticide Programs Good Laboratory Practice Standard (40CFR§160). There were no significant deviations from Good Laboratory Practice Standards which affected the quality or integrity of the study. This report reflects the raw data obtained during the study.

INERT INGREDIENT INFORMATION IS NOT INCLUDED
MANUFACTURING PROCESS INFORMATION IS NOT INCLUDED

Summarized below are several product chemistry data requirements for reregistration of the product Kathon 886F:

SERIES 61. Product Identity and Composition

61-1: Product Identity and Disclosure of Ingredients:
(MRID No. 417414-01)

The following information was provided by the Registrant Rohm and Haas Company on the product identity and disclosure of the ingredients for the product Kathon 886F:

Major Active Ingredient (AI-1)

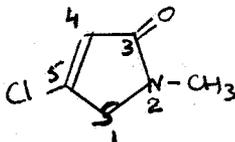
(a) Name: The chemical name of the product is 5-chloro-2-methyl-3(2H)isothiazolone

Chemical Abstract name: 5-chloro-2-methyl-4-isothiazolin-3-one

Trade Name: Methyl chloroisothiazolinone

(b) CAS No. 26172-55-4

(c) Structural formula:



(d) Molecular weight: 149.6

(e) Empirical Formula: C_4H_4ClNOS

Minor Active Ingredient (AI-2):

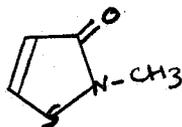
(a) Name: The chemical name of the product is 2-methyl-3(2H)isothiazolone

Chemical Abstract name: 2-methyl-4-isothiazolin-3-one

Trade Name: Methylisothiazolinone

(b) CAS No. 2682-20-4

(c) Structural formula:



(d) Molecular weight: 115.2

(e) Empirical Formula: C_4H_5NOS

The impurities of the Product Kathon 886F are discussed in 61-3.

Data submitted are adequate to satisfy data requirements of 40CFR§158.150 (Guideline Reference No. 61-1) regarding product identity and disclosure of ingredients for the Product Kathon 886F. No additional data are required for this topic.

61-2. Description of Beginning Materials and Manufacturing Process: (MRID No. 417414-01)

Information provided on the description of beginning materials and manufacturing process are CBI and they are Appended to this review (Confidential Appendix A).

Data submitted are adequate to satisfy data requirements of 40CFR§158.150 (Guideline Reference No. 61-2) regarding description of beginning materials and manufacturing process for the Product Kathon 886F. No more data are required for this topic.

61-3. Discussion of the Formation of Impurities: (MRID No. 417414-01)

Information provided on the Discussion of the Formation of Impurities are CBI and they are Appended to this review (Confidential Appendix A).

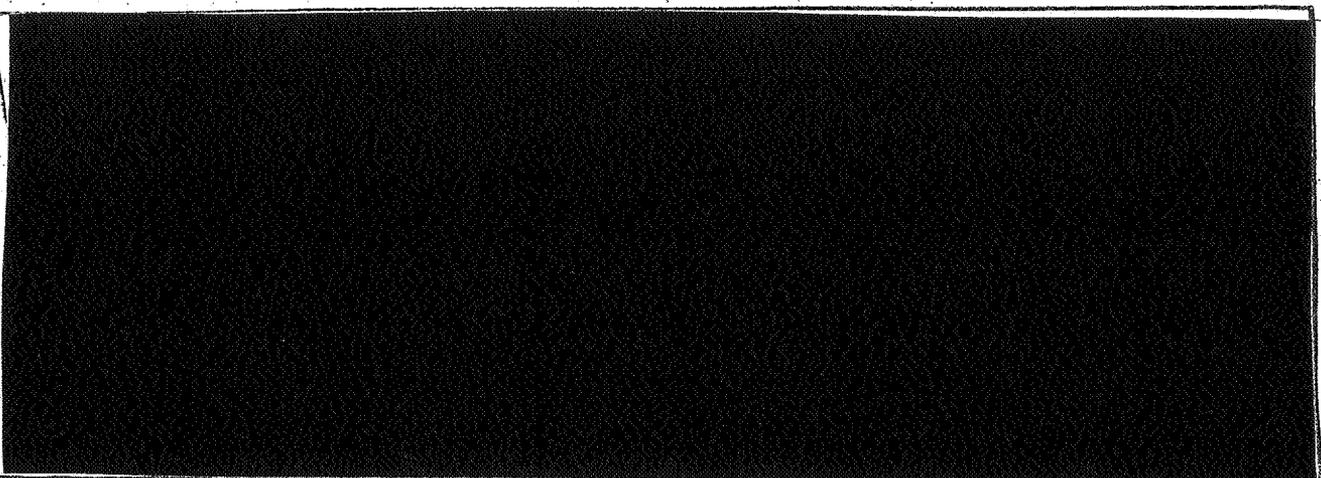
Data submitted are adequate to satisfy data requirements of 40CFR§158.150 (Guideline Reference No. 61-3) regarding discussion of the formation of impurities for chemical Kathon 886F. No more data are required for this topic.

SERIES 62. Analysis and Certification of Product Ingredients

62-1. Preliminary Analysis: (MRID No. 417414-01)

According to the Registrant Rohm and Haas Co., the chemical composition of the aqueous solution of the product Kathon 886F consisted of following composition:

(1) 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one (AI's: were determined by reverse phase HPLC with 254 nm UV detector ; mobile phase-isocratic 50/50 water/methanol; Column-Sperisorb, ODS-1, 5u).



(6) Manufacture by-products [Information provided on the names and analysis are CBI and they are Appended to this review (Confidential Appendix A). See the Series 61-3].

Data submitted are adequate to satisfy data requirements of 40CFR§158.150 (Guideline Reference No. 62-1) regarding preliminary analysis of the chemical Kathon 886F. No additional data are required for this topic.

62-2. Certification of Limits: (MRID No. 417414-01)

The Registrant did not submit the Confidential Statement of Formula for the chemical Kathon 886F, but provided information on the nominal concentration of the AI and the impurities, the information is provided in the Confidential Appendix A.

The Registrant must provide a CSF for the test chemical which must include the nominal concentrations, upper and lower limits and the purpose for all the components of the product.

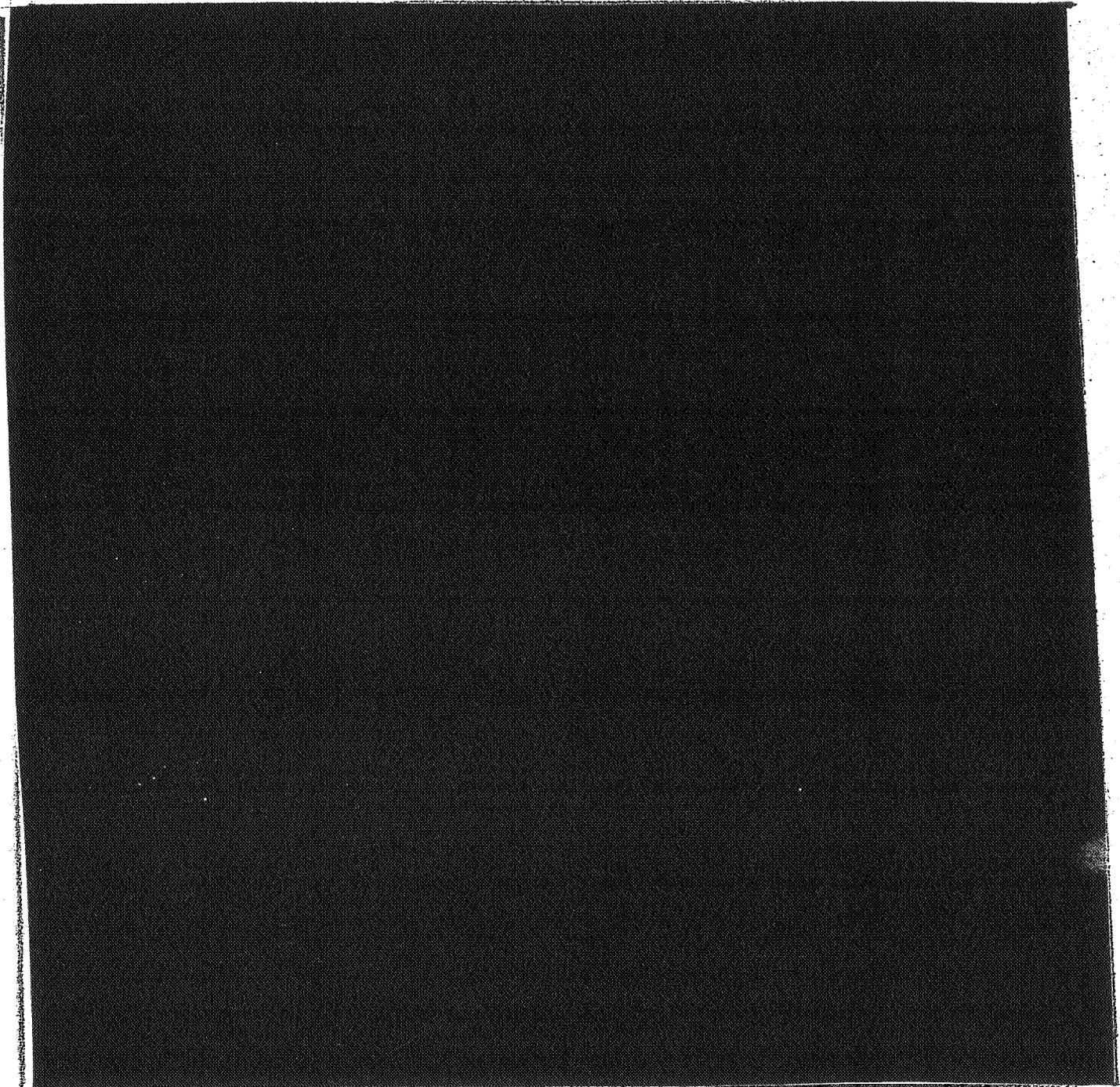
Data submitted do not satisfy data requirements of 40CFR §158.150 (Guideline Reference No. 62-2) regarding certification of limits for the chemical Kathon 886F. This is considered as a data gap.

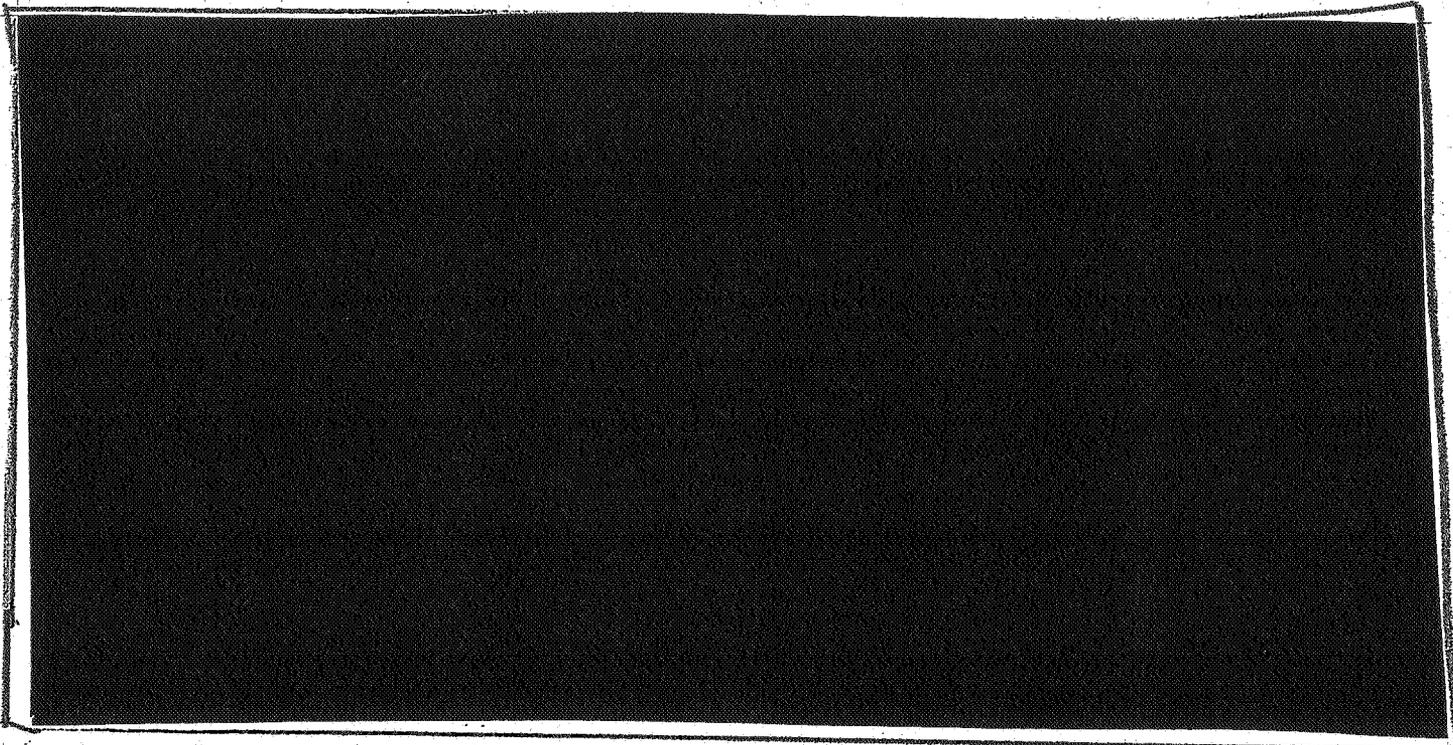
62-3. Analytical Method to Verify Certified Limits:
(MRID No. 417414-01)

The Registrant provided following information on the description of the analytical methods to verify certified limits:

Reverse Phase HPLC for Active Ingredients: This procedure was used by the Applicant for the determination of AI's of the product Kathon 886F in variety of formulations. This method can be used for the analysis of the product containing AI's in the

concentration of 0.5% to 25-30%; for samples containing more than 30% AI, the sample should be further diluted to keep the AI levels within the calibration range and for samples having concentrations less than 0.5% different method should be used.





Data submitted are adequate to satisfy data requirements of 40CFR§158.150(Guideline Reference No. 62-3) regarding analytical methods to verify certified limits for the chemical Kathon 886F. No additional data are required for this topic.

Series 63. Physical and Chemical Characteristics
(MRID No. 417414-01)

All Series 63 characterizations were done using the TGAI, with the exceptions of 63-9(V.P) and 63-11(octanol-water Partition coefficient). The TGAI test materials were analyzed for % active ingredients before Series 63 tests were performed. The % AI found were typical for the test material. The VP and K_{ow} tests were done using the pure AI, as required for the reregistration of Kathon 886F TGAI under 40CFR§158.190, Sec.63. All information pertinent to the study was recorded in Rohm and Haas research note book # 55566, research binder # 054884, or archived by the Rohm and Haas Company.

63-2. Color: Golden yellow

The Registrant described the color of the test chemical to be Golden yellow, as determined by visual observation at 25°C.

Data submitted are adequate to satisfy data requirements of 40CFR§158.150(Guideline Reference No. 63-2) regarding color of the chemical Kathon 886F. No additional data are required for this topic.

63-3. Physical State: Clear Liquid

The Physical state of the chemical Kathon 886F was described by the Registrant as Clear liquid. The Registrant reported that physical state of the test substance was determined by visual observation at 25°C.

Data submitted are adequate to satisfy data requirements of 40CFR§158.150(Guideline Reference No. 63-3) regarding physical state of the chemical Kathon 886F. No additional data are required for this topic.

63-4. Odor:

The Registrant reported that material was too hazardous to do the odor test. MSDS # 904283-1 states "Inhalation: harmful if inhaled". As per the SOP, the test was not run.

Data submitted are adequate to satisfy data requirements of 40CFR§158.150(Guideline Reference No. 63-4) regarding odor of the chemical Kathon 886F. No additional data are required for this topic.

63-5. Melting Point: N. A.

63-6. Boiling Point: 100.1 ± 0.2°C at Standard Room Pressure

The Registrant reported the average b. p. of the test chemical to be 100.1 ± 0.2 °C at Standard Room Pressure without decomposition.

Data submitted are adequate to satisfy data requirements of 40CFR§158.150(Guideline Reference No. 63-6) regarding b. p. of the chemical Kathon 886F. No additional data are required for this topic.

63-7. Density: 1.296 g/ml at 25°C

The Registrant described the density of the chemical Kathon 886F to be 1.296 g/ml at 25°C. The Registrant determined the density using the following formula:

Volume, ml = Avg. water Wt., g x 1.002961 ml/g(Conversion Factor)

$$\text{Sample Density} = \frac{\text{Average Wt. of Sample, g}}{\text{Volume, ml}}$$

Data submitted are adequate to satisfy data requirements of 40CFR§158.150(Guideline Reference No. 63-7) regarding Density of the chemical Kathon 886F.

63-8. Solubility:

The Registrant provided following information on the solubility of the test substance in water, ethyl acetate, methanol, toluene and hexane at 25°C :

<u>Solvent</u>	<u>Solubility g/100ml Solvent</u>	
	<u>AI-1</u>	<u>AI-2</u>
Water	Infinite	Infinite
Ethyl Acetate	≥ 4.31	≥ 0.19
Methanol	≥ 4.40	≥ 1.52
Toluene	≥ 4.07	≥ 0.08
Hexane	≥ 0.28	≥ 0.03

The calculations were done in following manner:

$$g \text{ Solvent} = 100 g \text{ solution} - [g \text{ AI-1} + g \text{ AI-2}]$$

$$\text{Conversion Factor (CF)} = 100 g \text{ Solution} / ((g \text{ sol.}) \times (1/\text{Density}))$$

$$g/100 \text{ ml Solvent} = g \text{ AI} / 100 g \text{ Solution} \times \text{CF}$$

The active ingredient was analyzed for its purity; the Registrant did not observe decomposition of the AI in any of the solvents tested. For more details see the MRID No. 417414-01.

Data submitted are adequate to satisfy data requirements of 40CFR§158.150 (Guideline Reference No. 63-8) regarding solubility of the chemical Kathon 886F. No additional data are required for this topic.

63-9. Vapor Pressure:

The Registrant determined the vapor pressure of the test chemical AI-1 to be 1.8×10^{-2} torr and for AI-2 to be 6.2×10^{-2} torr at 25°C. According to the Registrant vapor pressure determinations were done using pure active ingredients (PAI).

The Registrar used the GC technique which is based on the concept that gas chromatographic retention times are inversely proportional to the vapor pressures of the test compounds. But the value obtained for the VP corresponds to subcooled liquid and not that of the crystalline solid. The Registrant used the Mackay equation [Mackay, D.; Environ. Sci. Technol. 16, 1982, 274-279] to convert the liquid phase vapor pressure to that of the solid phase.

The Registrant used HP 5890 gas Chromatograph interfaced to an HP 3396 Computing Integrator and equipped with FID detector(300°C), Column[3 m J & W Co. DB-1 capillary colum(non polar dimethyl silicon) 0.53 mm i.d. with 1.5um phase thickness; Temps.: 105, 110, 120, 130 and 135 degrees C isothermal operation. The solutions of the test compound and the reference compound (diethyl phthalate) at about 500 ppm were injected into the GC machine at the five temperatures indicated above, the retention times were recorded and vapor pressure calculated(For details see the MRID No.417414-01).

Data submitted are adequate to satisfy data requirements of 40CFR§158.150(Guideline Reference No. 63-9) regarding Vapor pressure of the chemical Kathon 886F. No additional data are required for this topic.

63-10. Dissociation Constant: MRID No. 417414-01 N.A

The Registrant reported that the test material does not dissociate into ions, therefore, this test is not applicable for the test material.

Data submitted are adequate to satisfy data requirements of 40CFR§158.150(Guideline Reference No. 63-10) regarding dissociation constant of the chemical Kathon 886F. No additional data are required for this topic.

63-11. Octanol/Water Partition Co-efficient: MRID No. 417414-01

The Registrarnt determined the octanol water partition coefficients for pure active ingredients(PAI).

$$K_{ow} = 0.401 \text{ for AI-1 at } 24^{\circ}\text{C in log P or } 2.519$$

$$K_{ow} = - 0.486 \text{ for AI-2 at } 24^{\circ}\text{C in log P or } 0.326$$

The test chemicals AI-1 and AI-2 were labeled with ^{14}C in 4 and 5 positions of the isothiazolone ring, the radio purity (98.1% and 97.8% respectively) was determined by HPLC prior to the initiation of the experiments. The Registrant made the solutions of the radio labeled test chemicals AI-1 and AI-2 in nominal concentration of 50 ppm, 10 ppm and 2 ppm in n-octanol saturated with water and equilibrated by continuous mixing with water-saturated n-octanol. After 24 hrs. the two phases were resolved by centrifugation and the concentration in each phase determined by radioassay by liquid scintillation spectrometry(Packard LSS, Model 3255). The counting efficiency of each sample was determined by external standard channels ratio(ESCR) method with ^{226}Ra as the external source.

The octanol/water partition coefficient were determined by calculating the ratio of ppm in the octanol phase to that of the water phase (for detailed experimental procedure see the MRID No. 417414-01).

Data submitted are adequate to satisfy data requirements of 40CFR§158.150 (Guideline Reference No. 63-11) regarding octanol-water partition coefficient of the chemical Kathon 886F. No additional data are required for this topic.

63-12. pH: MRID No. 417414-01

The Registrant reported the value of pH for the test chemical Kathon 886F to be 1.90 (23.8 °C) and that of 5% Kathon 886F to be 3.75 at 23.8 °C as determined by the Electronic pH meter which had glass combination electrode.

Data submitted are adequate to satisfy data requirements of 40CFR§158.150 (Guideline Reference No. 63-12) regarding pH of the chemical Kathon 886F. No additional data are required for this topic.

63-13. Stability: MRID No. 417414-01

The Registrant provided following information regarding stability of the test chemical Kathon 886F:

<u>Conditions</u>	<u>Duration</u>	<u>% of AI-1 Remained</u>	<u>% of AI-2 Remained</u>
54°C	1 week	98.0	99.0%
	2 weeks	96.0	98.0
Metal Mild steel	1 week	97.0	100.0
Metal ion FeCl ₃	1 week	85.0	90.0
Sun light	24 hours	99.0	100.0
	48 hours	99.0	100.0
	72 hours	99.0	100.0

The Registrant reported that the test material was stable (<5% total AI loss) when: stored at 54°C, exposed to mild steel, and when exposed to artificial sunlight. There was about a 14% total AI lost when exposed to ferric chloride. The part of this loss (3%) was from the dilution of the test material with the ferric chloride.

Data submitted are adequate to satisfy data requirements of 40CFR§158.150(Guideline Reference No. 63-13) regarding stability of the chemical Kathon 886F.

63-14 through 63-21:

According to the Registrant, as per Pesticide Assessment Guidelines, these tests are not required for the technical grade AI.

Conclusions:

1. 62-2: The Registrant must submit a CSF for the chemical Kathone 886F which must include the nominal concentrations, lower and upper limits and the purpose for all the components of the product 886F.

KATHON

Page _____ is not included in this copy.

Pages 14 through 30 are not included.

The material not included contains the following type of information:

- Identity of product inert ingredients.
- Identity of product impurities.
- Description of the product manufacturing process.
- Description of quality control procedures.
- Identity of the source of product ingredients.
- Sales or other commercial/financial information.
- A draft product label.
- The product confidential statement of formula.
- Information about a pending registration action.
- FIFRA registration data.
- The document is a duplicate of page(s) _____.
- The document is not responsive to the request.

CONFIDENTIAL APPENDIX

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.
