Study Title

Physical and Chemical Characteristics of FRD-902: State of the Substance, Melting/Freezing Point, Boiling Point, Relative Density, Surface Tension, Flash Point, Auto-Ignition Temperature and Viscosity

Data Requirement

EC 1907/2006 :
Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Study Director

David J. Sinning

Amended Final Report Date

May 5, 2008

Testing Facility

Case Consulting Laboratories, Inc.
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Sponsor

DuPont Haskell Global Centers for Health and Environmental Sciences
S315/1364
P.O. Box 30
Newark, DE 19714-0030
Tel. 302-451-3339
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STATEMENT OF NO DATA CONFIDENTIALITY CLAIMS

No claim of confidentiality is made for any information contained in this study on the basis of its falling within the scope of FIFRA § 10(d)(1)(A), (B) or (C).

Sponsor

DuPont Haskell Global Centers for Health and Environmental Sciences
P.O. Box 30
Newark, DE 19714-0030

Company Representative

Charles R Powley

Charles Powley, Ph.D.
Manager, Regulatory Analytical Chemistry

20 May 2008
Date

COMPLIANCE STATEMENT

The study, "Physical and Chemical Characteristics of FRD-902," reported herein was conducted in compliance with the Good Laboratory Practice Standards as set forth in Title 40 Part 160 of the Code of Federal Regulations of the United States of America.

Test substance stability, synthesis and additional characterization data are held by the Sponsor. Case Consulting Laboratories, Inc. does not know if these data conform to FIFRA GLPs.

Study Director:

David J. Sinning
Case Consulting Laboratories, Inc.

5/5/08
Date

Sponsor/Submitter:

Charles Powley, Ph.D.
Manager, Regulatory Analytical Chemistry
DuPont Haskell Global Centers for Health and Environmental Sciences

28 May 2008
Date

QUALITY ASSURANCE STATEMENT

This study was inspected/audited by Quality Assurance according to Case Consulting's Standard Operating Procedures and EPA's Good Laboratory Practice Standards (40 CFR § 160) and all findings were reported to the Study Director and Management. It was concluded that the Amended Final Report accurately reflects the raw data for this study.

Date of Audit	Date Reported to Study Director and Management	Type of Audit
1/15/08	1/15/08	Protocol Review
3/6/08	3/6/08	Freezing Point
3/19/08	3/19/08	Data and Final Report Review
5/5/08	5/5/08	Amended Final Report Review

Robert L. Barnes

Robert L. Barnes
Quality Assurance Manager
Case Consulting Laboratories, Inc.

5/5/08

Date

1. OBJECTIVE

To determine the state of the substance, melting/freezing point, boiling point, relative density, surface tension, flash point, auto-ignition temperature and viscosity of one lot of FRD-902.

2. CONDUCT OF STUDY

This work was conducted by Case Consulting Laboratories, Inc. under the direction of David J. Sinning as Study Director with analyses performed by Brian Roe, David Sinning, Bruce Sanchez and Charles Willis, Chemists.

This study was initiated on January 16, 2008 and completed on May 5, 2008.

3. TEST SUBSTANCE

Name:	FRD-902
Lot No's;:	E113181-8 and E1131181-19-B
Haskell No's.:	H-28308 and H-28397
Active Ingredient:	2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)propionic acid, ammonium salt, 86%
Common Name:	HFPO Dimer Acid Ammonium Salt
CAS Number:	62037-80-3.

4. TEST METHODS

State of the Substance

A brief description of the state of the test substance at 20°C and 101.3 kPa was based upon a visual observation.

Melting/Freezing Point

The freezing point of the test substance was determined by the method described in OECD guideline number 102.

A portion of the test substance was placed in a test tube. A thermocouple was placed in the test tube and the sample was placed in an ethanol/dry ice bath. Temperature readings were recorded at regular intervals.

Plotted a graph of temperature vs. time (Figure 1). The freezing point is where the temperature remained constant for a few readings.

Boiling Point

The boiling point of the test substance was determined per CCL SOP 10.14. This method is based on the American Society for Testing and Materials (ASTM), Method D 1120.

Relative Density

The relative density of the test substance at 21°C was determined using CCL SOP 10.16. This method is based on ASTM Method No. D 891, Method B.

Surface Tension

The surface tension of the test substance at 23°C was determining using procedures and principles presented in OECD Guideline 115, paragraph 8. The measurement was made on a 1 g/L solution of the test substance in deionized water using a DuNOUY tensiometer.

Flash Point

The flash point of the test substance was determined using a method based on the American Society for Testing and Materials (ASTM) Method D 92 (Cleveland Open Cup).

Auto-Ignition Temperature

The auto-ignition temperature of the test substance was determined using ASTM method E 659-78 (Reapproved 2000) *Standard Test Method for Autoignition Temperature of Liquid Chemicals*.

Equipment

- Lindberg/Blue M, Model 56622 crucible furnace
- Becton Dickinson 250µL syringe
- 500-mL round bottom flask

Procedure

A 500-mL round bottom flask was placed in the furnace. Thermocouples were attached to the inside center of the flask and on the top, middle and bottom of the outside of the flask. The furnace was set to the desired temperature and 100-µL of test substance was injected into the flask. The contents of the flask were observed in a dark room for 10 minutes following injection of the sample, or until autoignition occurred. The temperature was varied until the lowest temperature at which ignition occurred was found as evidenced by the sudden appearance of flame inside the flask and by a sharp rise in the temperature as determined by the thermocouple in the inside center of the flask.

Viscosity

The kinematic viscosity of the test substance at 22°C was determined using methods presented in ASTM Method No's. D 445 and D 446. A Ubbelohde Viscometer, Size 2, was used for the determination. Two replicate runs were made and the values averaged.

5. STATISTICAL METHODS

No statistics were employed.

6. RETENTION OF RECORDS

The original raw data, amended final report, protocol and facility records are stored in the archives of Case Consulting Laboratories, Inc.

7. DISCUSSION OF RESULTS

State of the Substance

The state of the substance observation was made at 21°C and 771 mmHg. It is the opinion that the observation would be identical at 20°C and 101.3 kPa.

Auto-Ignition Temperature

The test substance did not exhibit a cool-flame or auto-ignition at temperatures up to 616°C. The reaction threshold temperature was observed as low as 552°C.

7. STATEMENT OF RESULTS

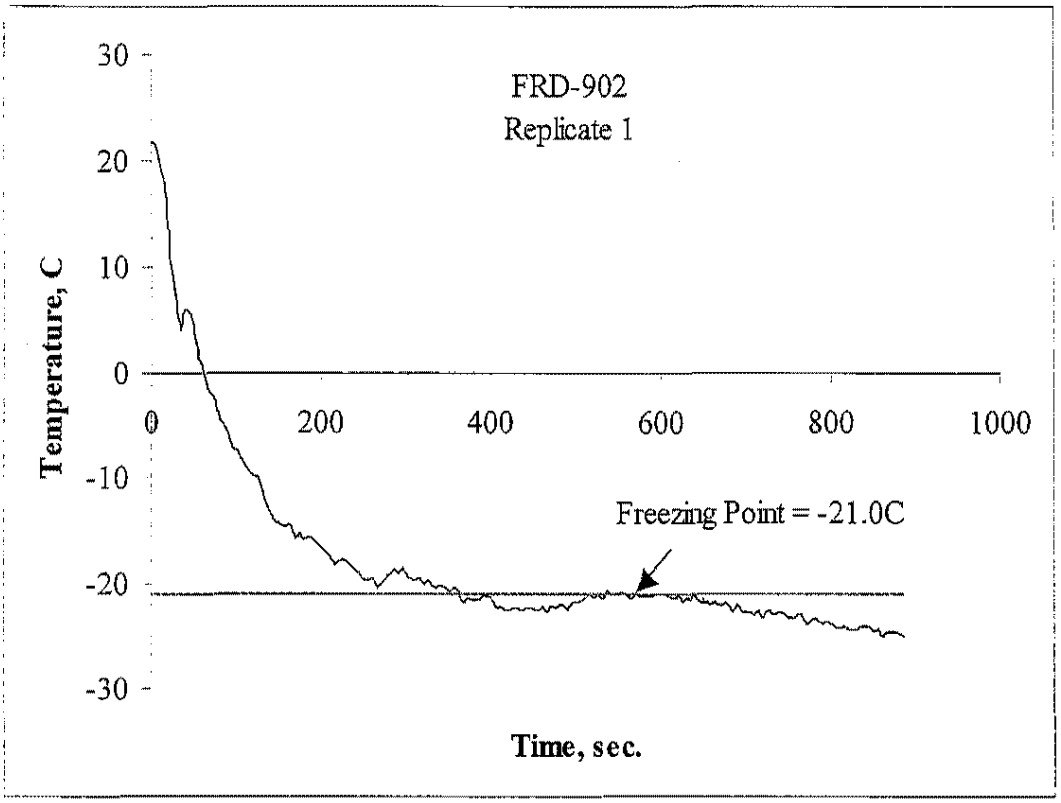
Test Substance: FRD-902
Lot No's.: E113181-8 and E1131181-19-B
Haskell No.: H-28308 and H-28397

Test	Lot No. E113181-8	E1131181-19B
State of the Substance (20°C, 101.3 kPa)	Clear, colorless liquid	
Freezing Point	Replicate 1: -21.0°C Replicate 2: -21.0°C Average: -21.0°C	
Boiling Point		108°C
Relative Density (21°C)	1.569	
Surface Tension (23°C)	66.3 mN/m	
Flash Point	None when heated to boiling	
Auto-Ignition Temperature	No auto-ignition up to 616°C	
Viscosity (22°C)	Replicate 1: 18.67 mm^2/s (cSt) Replicate 2: 18.66 mm^2/s (cSt) Average: 18.67 mm^2/s (cSt)	

David J. Sinning
Study Director
Case Consulting Laboratories, Inc.

3/5/08
Date

Figure 1. Freezing Point Curve Replicate 1



FINAL REPORT AMENDMENTS

The following is a list of amendments made to the Final Report for Study No. 3280-40: "Physical and Chemical Characteristics of FRD-902: State of the Substance, Melting/Freezing Point, Boiling Point, Relative Density, Surface Tension, Flash Point, Auto-Ignition Temperature and Viscosity."

Amendment No. 1

Page 1

Change from: Final Report Date
Change to: Amended Final Report Date
Reason: Amendments to Final Report necessary.

Change from: March 24, 2008
Change to: May 5, 2008
Reason: Amendments to Final Report necessary.

Page 4

Quality Assurance Statement

Change from: It was concluded that the Final Report accurately reflects the raw data for this study.

Change to: It was concluded that the Amended Final Report accurately reflects the raw data for this study.

	Date of Audit	Date Reported to Study Director and Management	Type of Audit
Add:	5/5/08	5/5/08	Amended Final Report Review

Reason: Amendment review.

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2. CONDUCT OF STUDY

Change from: This work was conducted by Case Consulting Laboratories, Inc. under the direction of David J. Sinning as Study Director with analyses performed by Brian Roe, David Sinning and Charles Willis, Chemists.

Change to: This work was conducted by Case Consulting Laboratories, Inc. under the direction of David J. Sinning as Study Director with analyses performed by Brian Roe, David Sinning, Bruce Sanchez and Charles Willis, Chemists.

Reason: Additional chemist conducted work on this study.

FINAL REPORT AMENDMENT CONT'D.

Study No.: 3280-40

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2. CONDUCT OF STUDY

Change from: This study was initiated on January 16, 2008 and completed on March 24, 2008.
Change to: This study was initiated on January 16, 2008 and completed on May 5, 2008.
Reason: Amendments to Final Report necessary.

3. TEST SUBSTANCE

Change from: Lot No.: E113181-8
Change to: Lot No's.: E113181-8 and E1131181-19-B
Reason: Additional lot of test substance was evaluated.

Change from: Haskell No.: H-28308
Change to: Haskell No's.: H-28308 and H-28397
Reason: Additional lot of test substance was evaluated.

Page 6

Boiling Point

Change from: The boiling point of the test substance was determined using a method based on the method according to Siwoloboff described in EC A.2. The sample was placed in a capillary tube and heated using a heating block. The boiling point was when the fluid suddenly started rising in the capillary.

Change to: The boiling point of the test substance was determined per CCL SOP 10.14. This method is based on the American Society for Testing and Materials (ASTM), Method D 1120.

Reason: Sponsor request.

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6. RETENTION OF RECORDS

Change from: The original raw data, final report, protocol and facility records are stored in the archives of Case Consulting Laboratories, Inc.

Change to: The original raw data, amended final report, protocol and facility records are stored in the archives of Case Consulting Laboratories, Inc.

Reason: Amendments to Final Report necessary.

FINAL REPORT AMENDMENT CONT'D.

Study No.: 3280-40

Page 8

Change from:

7. STATEMENT OF RESULTS

Test Substance: FRD-902
Lot No.: E113181-8
Haskell No.: H-28308

Test	Result
State of the Substance (20°C, 101.3 kPa)	Clear, colorless liquid
Freezing Point	Replicate 1: -21.0°C Replicate 2: -21.0°C Average: -21.0°C
Boiling Point	124°C
Relative Density (21°C)	1.569
Surface Tension (23°C)	66.3 mN/m
Flash Point	None when heated to boiling
Auto-Ignition Temperature	No auto-ignition up to 616°C
Viscosity (22°C)	Replicate 1: 18.67 mm^2/s (cSt) Replicate 2: 18.66 mm^2/s (cSt) Average: 18.67 mm^2/s (cSt)

FINAL REPORT AMENDMENT CONT'D.

Study No.: 3280-40

Page 8

Change to:

7. STATEMENT OF RESULTS

Test Substance: FRD-902
Lot No's.: E113181-8 and E1131181-19-B
Haskell No's.: H-28308 and H-28397

Test	Lot No. E113181-8	E1131181-19B
State of the Substance (20°C, 101.3 kPa)	Clear, colorless liquid	
Freezing Point	Replicate 1: -21.0°C Replicate 2: -21.0°C Average: -21.0°C	
Boiling Point		108°C
Relative Density (21°C)	1.569	
Surface Tension (23°C)	66.3 mN/m	
Flash Point	None when heated to boiling	
Auto-Ignition Temperature	No auto-ignition up to 616°C	
Viscosity (22°C)	Replicate 1: 18.67 mm^2/s (cSt) Replicate 2: 18.66 mm^2/s (cSt) Average: 18.67 mm^2/s (cSt)	

Reason: Sponsor request.

All Pages

Change from: Page 1 of 9

Change to: Page 1 of 14

Reason: Addition of these five pages.

FINAL REPORT AMENDMENT CONT'D.

Study No.: 3280-40

Note

Pages 3, 4 and 8 of the Final Report were originally signed by Case Consulting Laboratories personnel on 3/24/08 and have been resigned due to the necessity of issuing an Amended Final Report.

David J. Sinning
Study Director
Case Consulting Laboratories, Inc.

5/5/08
Date