INVESTIGATIVE SCIENCE INCORPORATED
Scientists and Technical Consultants
An ISO 9001 Registered Company

REPORT
PHYSICAL/CHEMICAL TESTS BY OECD METHODS FOR REGULATORY NOTIFICATION

Test Item: Polychlorotrifluoroethylene; CASRN: 9002-83-9

Submitted to:

Brandon Morris, Ph.D.

Honeywell Performance Materials and Technologies
115 Tabor Road
Morris Plains, NJ, USA
07950

ISI Job #: 2023-16
ISI Document #: 2023-16 report-1.docx
Study Monitor: Intertek Chemicals & Materials, Allentown
Date: May 15, 2023

5205 Harvester Rd., Unit 2, Burlington, Ontario, Canada L7L 6B5
Tel. [redacted] • www.investigativescience.com

SPONSOR

Honeywell Performance Materials and Technologies
115 Tabor Road
Morris Plains, NJ, 07950
USA

PRINCIPAL INVESTIGATOR

Sira Shahrzad, Ph.D.

5205 Harvester Road, Unit 2
Burlington, Ontario, L7L 6B5
Canada

[redacted]@investigativescience.com

STUDY DATES

Initiation: March 15, 2023 Completion: May 15, 2023

TEST FACILITY

Investigative Science Incorporated
5205 Harvester Road, Unit 2
Burlington, Ontario, L7L 6B5
Canada

Technical Assistance: Sira Shahrzad
[redacted]

STUDY MONITOR

Jean Baldwin, Ph.D.
Intertek Chemicals & Materials, Allentown
7001 Hamilton Blvd., RD1 Dock 5
Trexlertown, PA, USA
18087

STUDY NUMBER(S)

Investigative Science Incorporated: Job No. 2023-16
Intertek Chemicals & Materials, Allentown LIMS 137117

EXECUTIVE SUMMARY

The Test Item Polychlorotrifluoroethylene was tested by Investigative Science Incorporated (ISI) for one parameter according to Organisation for Economic Co-operation and Development (OECD) methods. The test was requested by Intertek Chemicals & Materials, on behalf of Honeywell Performance Materials and Technologies, Morris Plains, NJ. The test results are summarized below.

Results Summary for Polychlorotrifluoroethylene, Batch G23HP0376

Test	OECD #	Result	Report Section
Solution/Extraction Behavior of Polymers in Water	120	Solubility: < 5 mg/L Extractability: <0.05% based on a 10 g/L loading	7.0

S Shahrzad

May 15, 2023

Sira Shahrzad, Ph.D.
Principal Investigator
Investigative Science Incorporated

Date

TABLE OF CONTENTS

1.0 Statement of Compliance with Regulatory Standards 5
2.0 Study Dates 6
3.0 Test Item 6
4.0 Test Facility and Study Team 8
5.0 Requested Tests 9
6.0 OECD Test No. 120: Water Solubility / Extractability 10
7.0 Record Retention 15
8.0 References 16
9.0 Investigative Science Incorporated Disclaimer 17

APPENDICES

Appendix 1: Image of Test Item Container and Label 19
Appendix 2: Test Item Certificate of Analysis 21
Appendix 3: OECD Test No. 120. Water Solubility/Extractability Raw Data 23

1.0 STATEMENT OF COMPLIANCE WITH REGULATORY STANDARDS

Investigative Science Incorporated (ISI) has been continuously registered to ISO 9001 (Certificate Number: 6E531-IS8) since 1996. All projects conducted at ISI fall under the scope of our registration. ISI holds a Health Canada Establishment Licence (101391-A) for pharmaceutical testing.

Study-specific instructions were provided to project personnel describing laboratory work in detail, and all laboratory investigations were completed in accordance with ISI's Quality Management System and Standard Operating Procedures.

S. Shahrzad — May 15, 2023

Sira Shahrzad, Ph.D. — Date
Principal Investigator
Investigative Science Incorporated

2.0 STUDY DATES

Test Item Received: March 14, 2023

Experimental Start Date: March 15, 2023
Experimental Completion Date: March 30, 2023

Draft Reporting Date: May 15, 2023
Final Reporting Date: May 15, 2023

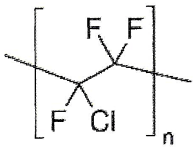
3.0 TEST ITEM

Polychlorotrifluoroethylene is the Test Item that was submitted for testing.

Information on the Test Item is listed in Table 1, and specifics for the sample received at the Test Facility are in Table 2.

The Sponsor is responsible for any necessary characterization of the Test Item related to chemical composition, purity, strength, stability and other data required by current OECD methods.

Table 1. Test Item Information

General Characterization	
Common Name[1]	Polychlorotrifluoroethylene
Chemical Name[1]	Polychlorotrifluoroethylene
CAS Number[1]	9002-83-9
Chemical Family[1]	Fluoropolymer
Chemical Formula[1]	
Physical/Chemical Characteristics	
Colour	White
State at Room Temperature	Solid
Molecular Weight	Not specified

Note 1: Information taken from ISI form 124 for Polycholorotrifluoroethylene provided with sample from Jean Baldwin, March 14, 2023

Table 2. Test Item Received at the Test Facility

Parameter	Value
Common Name[1]	Polychlorotrifluoroethylene
Source	Honeywell Performance Materials and Technologies
Purity[1]	100%
Container Label	See Appendix 1
Date Received at Test Facility	March 14, 2023
Expiry Date[1]	N/A
Certificate of Analysis[1]	See Appendix 2
Storage Instructions[1]	Ambient

Note 1: Information taken from ISI form 124 for Polycholorotrifluoroethylene provided with sample from Jean Baldwin, March 14, 2023

3.1 Special Handling

None

3.2 Reference Item

None

4.0 TEST FACILITY AND STUDY TEAM

Table 3. Study Team and Test Facility

Facility	
Investigative Science Incorporated 5205 Harvester Rd., Unit 2, Burlington, Ontario, Canada L7L 6B5 T: [redacted]	
Study Team	**Name, Title, e-mail**
Principal Investigator	Sira Shahrzad, Ph.D. Principal, Laboratory Director [redacted]@investigativescience.com
Technical Staff	Cheryl Sagara, B.Sc. Senior Chemist [redacted]@investigativescience.com Oksana Korol, M.Sc. Chemist [redacted]@investigativescience.com Sira Shahrzad, Ph.D. Principal, Laboratory Director [redacted]@investigativescience.com

5.0 REQUESTED TESTS

The requested test to be performed on Polychlorotrifluoroethylene was:

- OECD 120 Solution/Extraction Behaviour of Polymers in Water

The test method is described in an individual section with details, materials, methods and test results. Raw data are included in the Appendices.

6.0 OECD TEST NO. 120: WATER SOLUBILITY / EXTRACTABILITY

6.1 Method Source

Organisation for Economic Co-operation and Development, OECD Guideline for the Testing of Chemicals. Test No. 120: Solution/Extraction Behaviour of Polymers in Water. January 21, 2000.

6.2 Experimental

6.2.1 Equipment Information

Table 4. Equipment Information

Item	Description
Thermometer	Extech digital thermometer
Oven	Stabil-Therm Laboratory Oven, Blue M Electric Company, Blue Island, Illinois, USA
Rotary Evaporator	Brinkman Buchi Rotavapor-R
Constant temperature, shaking water bath	New Brunswick Scientific Co. Ltd., Model G76D
Analytical balances	Sartorius Secura 125-1S (5 decimal) Sartorius ED2200S (2 decimal)
Mortar and Pestle	Coors USA
Sieve	US Standard Sieve Series, ASTM E11, Sieve #60, 0.250 mm
Round bottom flasks	250 mL
Graduated cylinders	100 mL
Mixed Cellulose Acetate (MCE) syringe filters	0.45 µm syringe filters, lot M0410192907, ChemScience
pH paper	Hydrion pH paper Range 1 - 12

6.2.2 Reagent Information

Table 5. Reagent Information

Reagent	Specifications	Source
Water	HPLC grade	HPLC grade, Caledon Laboratories Ltd., Georgetown, Ontario

6.2.3 Test Item

The purity of the Test Item, as provided by the client, was 100%. No correction for purity was required. The test was conducted at neutral pH, as the Test Item has no practicable ionisable groups that would present at pH 2 or pH 9.

Ideally, the test is conducted on material of a particle size between 0.125 and 0.25 mm (as determined by using the appropriate sieves). At room temperature the Test Item is in the form of solid white pellets. The Test Item was ground to a fine powder using a mortar and pestle, then passed through a US Standard Sieve # 60 to get a particle size less than 0.25 mm for OECD 120.

6.2.4 Test Flasks Prepared

The Test Item was weighed into triplicate flasks in the ratio of 1 g Test Item to 1 L water and 10 g Test Item to 1 L water.

Table 6. Preparation Details of Test Flasks

Number of Flasks prepared	Test Item Concentration	Reagent	Condition	Test Item to Water Ratio
3	0.3 g	300 mL Type 1 water	pH 6.5, neutral	1 g/L
3	3 g	300 mL Type 1 water	pH 6.5, neutral	10 g/L
1	0	300 mL Type 1 water	pH 6.5, neutral	0 g/L

6.2.5 Definitive Test Measurements and Analytical Method Details

Table 7. Details of Test Measurements

Item	Used in testing
Sartorius Secura 125-1S, 5 decimal balance	Gravimetric determination
pH of final test flasks	Neutral: 6.5
Temperature Range of Water Bath during incubation	20.1 ± 0.1 °C

6.2.6 Definitive Test

The Flask Method was used for the solubility determination.

The flasks were agitated on a shaking water bath at a speed of 130 RPM and a nominal temperature of 20 °C. After 24 hours an aliquot was removed from each flask for analysis.

6.2.7 Definitive Test Observations

After 24 hours of incubation, the test flasks were observed to contain a white material that floated on top of a clear aqueous phase in the middle and a small portion of white precipitate at the bottom of the container. A picture of flasks is included in Appendix 3.

6.2.8 Analytical Measurements

There was no suitable analytical method for Polychlorotrifluoroethylene in water. The solubility of the Test Item was determined gravimetrically, The samples were removed from the water bath at the 24-hour mark. A sample was taken from the clear aqueous phase. It was passed through a 0.45 µm MCE syringe filter into a 100 mL graduate cylinder to the 100 mL mark. The aqueous solution was then transferred to a pre-weighed 250 mL round bottom flask. This was repeated for each sample. The water was evaporated off, using a Buchi Rotovapor-R with the water bath set at 55 °C. The samples were placed in an oven at 55 °C overnight to remove any remaining water. The flasks were placed in a desiccator to cool down, then weighed and the amount soluble was determined.

6.2.9 Extractability Calculation

The water extractability is calculated according to the following formula:

$$Water\ Extractability\ (\%) = \frac{(Solubility, mg/L)(Sample\ Volume, L)(Dilution)(100\%)}{(Sample\ Weight, g)(1000\ mg/g)}$$

6.3 Results

The results of the test at 10 g/L are summarized in Table 8. The detailed calculations and calibration may be found in Appendix 3.

The testing at 1 g/L will not be reported. Results were all less than the method detection limit and the less than value for extractability will only be reported on the larger sample size.

Table 8. Solubility / Extractability of Polychlorotrifluoroethylene In water – 10 g/L Test Item Loading

Sample ID	Solubility (mg/L)	Water Extractability (mg/g)	Water Extractability (%)	pH of Sample at Experiment End
Blank sample	< 5	n/a (blank)	n/a (blank)	n/a
Replicate #1	< 5	< 0.5	< 0.05	6.5
Replicate #2	< 5	< 0.5	< 0.05	6.5
Replicate #3	< 5	< 0.5	< 0.05	6.5
Mean of replicates	< 5	< 0.5	< 0.05	
Standard Deviation	N/A	N/A	N/A	
Relative Standard Deviation (%)	N/A	N/A	N/A	

The solubility of the TI at 20.0 °C with a 10 g/L loading was < 5 mg/L. The extractability was < 0.05% of the original starting material.

6.4 Conclusions

The solubility of Polychlorotrifluoroethylene at a ratio of 10 g/L was < 5 mg/L and the water extractability was < 0.05% of the original starting material at neutral pH.

7.0 RECORD RETENTION

ISI will dispose of any remaining sample when the Final Report has been accepted.

ISI will retain the following records for ten years:

Copies of Laboratory Notebook pages
Sample Log Books
Stock Chemical/Standard Records
Calibration Records
Copies of Methods
The Final Report
Study Team Qualifications
All original raw data and machine outputs

After ten years some of this documentation may be securely shredded and discarded.

8.0 REFERENCES

Environment Canada. Guidance Document for the New Substance Notification Regulation (Chemicals and Polymers), Version 1.0, 2022.

Organisation for Economic Co-operation and Development, OECD Principles on Good Laboratory Practice. ENV/MC/CHEM(98)17, Paris, January 26, 1998.

Organisation for Economic Co-operation and Development, OECD Guideline for the Testing of Chemicals. Test No. 120: Solution/Extraction Behaviour of Polymers in Water. January 21, 2000.

9.0 INVESTIGATIVE SCIENCE INCORPORATED DISCLAIMER

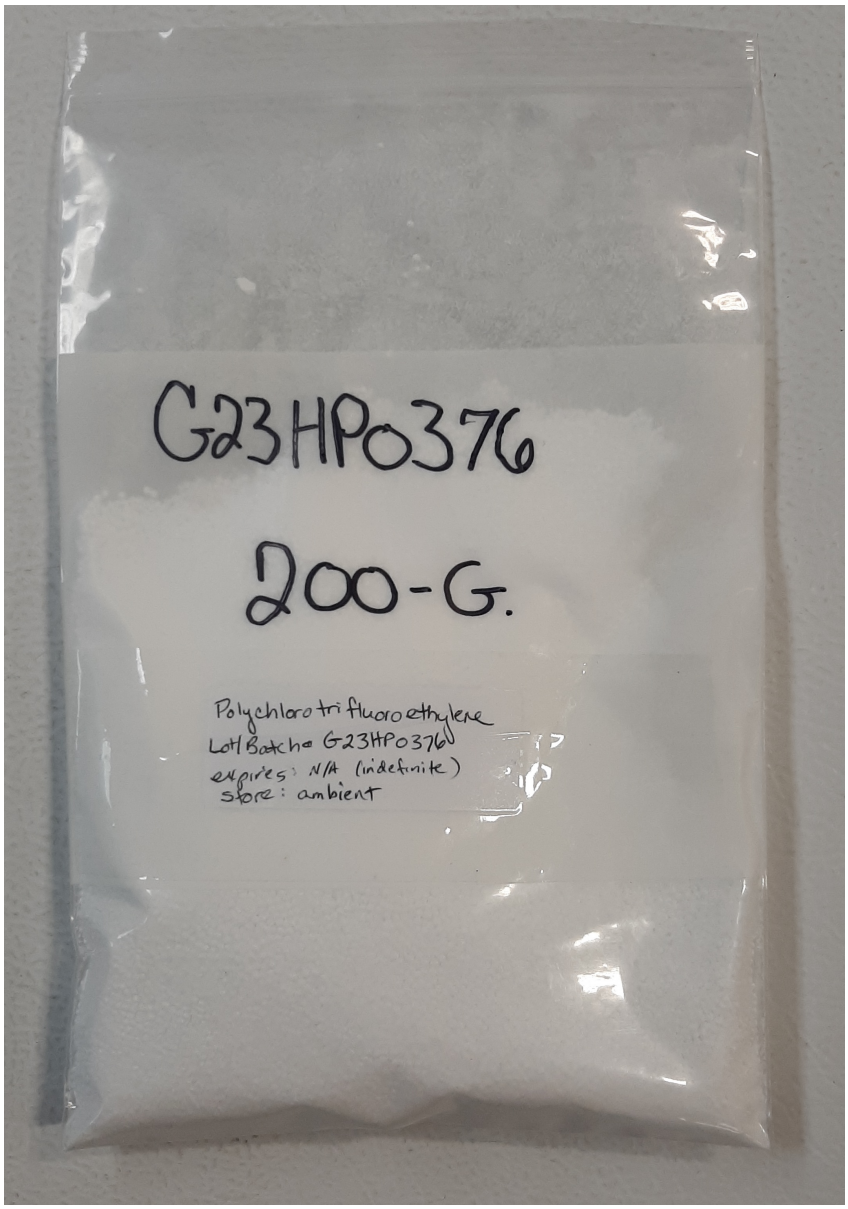
This report has been prepared by Investigative Science Incorporated for Honeywell Performance Materials and Technologies and is intended for use only by Honeywell Performance Materials and Technologies with respect to regulatory notification.

Neither this report, nor any information contained in it, is intended for use by any other person, corporation, or entity or for any other purpose.

Investigative Science Incorporated will not be liable to anyone for any injury or damages: suffered as a result of any use of, or reliance upon, this report, or any information contained in it: by anyone other than those for whom it has been prepared; or suffered by anyone as a result of any use or reliance upon, this report, or any information contained in it, for any purpose other than that for which it was originally intended.

APPENDICES

Appendix 1: Image of Test Item Container and Label


G23HP0376
200-G.
Polychlorotrifluoroethylene
Lot/Batch# G23HP0376
expires: N/A (indefinite)
store: ambient

Appendix 2: Test Item Certificate of Analysis

2023-16
Rec'd Mar. 14/2023

Information for Intertek Samples
LIMS 137117

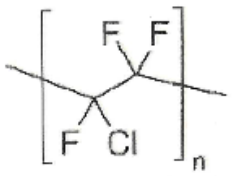
Customer info for report below.

Attn: Brandon Morris, PhD
Honeywell Performance Materials and Technologies
115 Tabor Rd
Morris Plains, NJ 07950

Sample info:

Chemical Name	Polychlorotrifluroethylene
Commercial Name	Aclon Homopolymer Resin
Physical State	Solid
CAS #	9002-83-9
EC #	Not provided
Manufacturer	Honeywell
Batch #/Lot #	G23HP0376
Purity (if known)	100%

Structure:



Appendix 3: OECD Test No. 120. Water Solubility/Extractability Raw Data

Gravimetric Data and Calculations for Test Item (dried sample) of 2023-16

Sample Number	Total Test Item Weight (g)	Water Volume (mL)	Total Test Item Concentration (g/L)	Tare Weight (g)	Tare Weight (g)	Average Tare Weight (g)	Gross Weight (g)	Gross Weight (g)	Average Gross Weight (g)	Dissolved Test Item Weight (mg)	Reported Test Item Weight
183-132-1	0.30	300.0	1	108.91079	108.9108	**108.91080**	108.9109	108.91092	**108.91091**	0.00011	<MDL
183-132-2	0.30	300.0	1	107.42178	107.42181	**107.42180**	107.42199	107.42201	**107.422**	0.00020	<MDL
183-132-3	0.30	300.0	1	109.18888	109.18890	**109.18889**	109.18913	109.18910	**109.189115**	0.00023	<MDL
						Mean (Blank deducted)				**-0.00007**	**<MDL**
183-132-4	3.00	300.0	10	104.58300	104.58297	**104.58299**	104.58318	104.58321	**104.583195**	0.00021	<MDL
183-132-5	3.00	300.0	10	99.089460	99.08947	**99.08947**	99.08959	99.08962	**99.089605**	0.00014	<MDL
183-132-6	3.00	300.0	10	104.99885	104.99883	**104.99884**	104.99906	104.99908	**104.99907**	0.00023	<MDL
						Mean (Blank deducted)				**-0.00006**	**<MDL**
183-132-BLK	0.00	100.0	0	102.60818	102.60820	**102.60819**	102.60846	102.60843	**102.608445**	0.00025	<MDL

Notes: For Sequra 125-15, MDL for the balance is 0.00001*50= 0.0005 g or 0.5 mg.
The solubility is <5 mg/L and Extractability <0.05 % or <0.5 mg/g based on the prescribed 10 g/L loading for OECD 120.

2023-16 OECD 120.xlsx


183-132-1 1 g/L Test Item in Water
183-132-4 10 g/L Test Item in Water
183-132-BLK Blank water