
Solubility Estimate of FC-95 by use of Xertex TOC
Analyzer

WATER SOLUBILITY (BY ANALYSIS OF TOC)

TEST SUBSTANCE

Identity: Perfluorooctanesulfonate; may also be referred to as PFOS or FC-95. (1-Octanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptafluoro-, potassium salt, CAS # 2795-39-3)

Remarks field: The test substance is a white powder (3M Lot 583) of uncharacterized purity.

The following is abbreviated due to the fact that this study has been superceded by a more recent test.

METHOD

Method: Procedure developed by 3M Company

GLP (Y/N): No

Year (study performed): 1982

Remarks field: The two samples submitted for testing were duplicate filtrates of a mixture of the test substance dispersed in water at a concentration of 0.25%. Undissolved material was noted in the mixtures. The mixtures were stored in an incubator at $20 \pm 1^\circ\text{C}$ from 11-24-80 until filtered through a Whatman glass fiber filter prior to TOC analysis on 6/16/82.

RESULTS

Values using the TOC Analyzer DC-80:

Sample 1: 9 ppm TC

Sample 2: 9 ppm TC

Values using the TOC Analyzer DC-52 High Temperature (800°C) method:

Sample 1: 195 ppm TC

Sample 2: 195 ppm TC

Remarks: Results for the DC-80 UV-Persulfate Analyzer indicated there was no breakdown of the C-F bond, so it was determined that this was an unacceptable method. It is noted that the test author felt the DC-52 analysis was accurate. Therefore using the molecular weight of Perfluorooctanesulfonate (538), a solubility of 1090 mg/L can be calculated.

Description of solubility (e.g., miscible to soluble to not soluble):
Slightly soluble.

DATA QUALITY

Reliability: Klimisch ranking = 3. This study does not meet criteria for quality testing. Actual concentrations were not measured. The value was determined by indirect measurement. Additionally, this study lacks sufficient characterization of the test substance purity.

REFERENCES

This study was conducted by XERTEX, Dohrmann Division of Santa Clara, California, 1980 on the request of 3M Company.

OTHER

Submitter: 3M Company, Environmental Laboratory, P.O. Box 33331, St. Paul, Minnesota, 55133

Last changed: 5/3/00

XERTEX

DOHRMANN DIVISION

3240 SCOTT BOULEVARD, SANTA CLARA, CALIFORNIA 95050
TELEPHONE (408) 727-6000 • TELEX 346395

FC-95
Solubility

June 29, 1982

Wade Scheil
3M/Environmental Lab
Box 33331, Bldg. 2-3E-09
St. Paul, MN 55133

Dear Mr. Scheil:

We have completed the analysis of your samples, Project No. 1653. The results are summarized in the attached Application Report.

As we discussed over the telephone, your perfluorinated organic samples were analyzed for Total Carbon using two TOC methods: the DC-80 UV-Persulfate Analyzer and the DC-52 High Temperature Analyzer. It is apparent from the results that the UV-Persulfate Oxidation does not breakdown the C-F bond so it is not an acceptable method. Since you already have a DC-52 but need to analyze for trace carbon, I suggest that you push it to its lowest detection limit possible by using the TC mode and keeping the system very clean.

If you have any questions concerning these results, please feel free to contact us directly.

Sincerely,



John T. Martin
Applications Group Leader

JTM/rad

cc: Phil Brown
Fred Harper

APPLICATION PROJECT REPORT
REPORT NO. 1653

SYSTEM USED: Total Organic Carbon Analyzer DC-80

INSTRUMENTAL CONDITIONS: As per equipment manual

SAMPLE TREATMENT: The two samples were analyzed for total carbon by injecting 200ul aliquots.

DATA:	1653-1	9ppm TC
	1653-2	9ppm TC

COMMENTS: Your perfluorinated organic was not completely oxidized by the UV-persulfate reactor. The real TC in both samples as analyzed by the high temperature (800°C) method on the DC-52 is 195ppmC. — FC-95's MW is = To 538
if this is correct

RECOMMENDATIONS: Unfortunately the DC-80 TOC Analyzer can not be used to analyze perfluorinated organics.

∴ This = a solubility

for FC-95 of 2

1090 mg/l

EQUIPMENT REQUIRED FOR THIS ANALYSIS

Instrumentation: Total Organic Carbon Analyzer DC-80

P/N 832-210

Sample Description:

The samples submitted to Dohrmann were duplicate filtrates of a mixture of FC-95, LOT-5B3 which was dispersed in water at a concentration of 0.25%. There was noticeable undissolved FC-95 in the mixture. The mixture was stored in an incubator @ $20 \pm 1^\circ\text{C}$ since 11-24-80 and filtered through Whatman GF/F glass fiber filter on 1-11-82

Interoffice

Memo

3M

To JOHN MARTIN

From WADE SCHEIL

DOHRMANN, R & A DEPT.

3M/ENVIRONMENTAL LAB

APPLICATIONS GROUP

BOX 33331, BLDG. 2-3E 09

ST. PAUL, MN 55133

Recipient: This 2-way form was used for our mutual convenience. If a reply is needed, please keep the original and return the pink.

Subject

TOC ANALYSIS OF PERFLUORINATED ORGANICS

Date

6-16-82

Message

ENCLOSED IS AN AQUEOUS SAMPLE CONTAINING APPROX. 190 mg/l OF ORGANIC CARBON, THE SOURCE OF WHICH IS A PERFLUORINATED ORGANIC MATERIAL.

PLEASE ANALYZE THE SAMPLE USING THE LOW-TEMP. UV PROMOTED CHEMICAL OXIDATION PRINCIPLE (DC-80).

PLEASE ADVISE IF THE DC-80 COULD BE USED FOR THIS TYPE OF

SAMPLE

THANK YOU.

Signature

Date