

WATER SOLUBILITY (BY ANALYSIS OF TOC)

TEST SUBSTANCE

Identity: Perfluorooctanesulfonyl fluoride; may also be referred to as POSF, or FX-8. (1-Octanesulfonyl fluoride, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptafluoro-, CAS # 307-35-7).

Remarks field: The test substance is a clear liquid of uncharacterized purity.

METHOD

Method: Solubility screening procedure developed by 3M Company

GLP (Y/N): No

Year (study performed): 1984

Sample preparation: FX-8 was added to water in three different glass containers to obtain nominal concentrations of 10, 30, and 100 mg/L. The containers were sealed, and mixed for > 6 hours. After mixing, the containers were allowed to settle overnight.

Sampling: Samples taken from just below the surface of each bottle and completely filled sample vials.

TOC analyses: TOC measured within 24 hours of sampling, and again on samples taken 1-2 weeks after the mixing containers were prepared. The 1-2 weeks samples were stored at room temperature.

RESULTS

Values using the TOC analyzer within 24-hours of sampling:

Sample 1 (nominal 10 mg/L): < 2 mg/L TOC

Sample 2 (nominal 30 mg/L): < 2 mg/L TOC

Sample 3 (nominal 100 mg/L): < 2 mg/L TOC

Values for TOC 1-2 weeks after preparation: Not available.

Remarks: This study was only a screen for solubility.

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 the 3M Company, Environmental Laboratory, St Paul, MN, Lab Request Number B1498-2.

OTHER

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

Last changed: 5/18/00

Comments on

612
RESTRICTED

"Solubility of FC-43 and FX-8" Environmental Laboratory Request No. B1498, Completed May 11, 1984.

The solubility results for FC-43 (perfluorotributylamine) of less than 2 mg/l are somewhat surprising. In addition to my previous comments, I might remark that this compound has an appreciable vapor pressure. One sample which I have taken data on had a vapor pressure which, if the solubility results are taken at face value, would indicate that the molar concentration in the vapor phase would be substantially higher than that in water. If this is the case then an appreciable danger exists for volatilization/adsorption of the amine vapor from a water sample. This sample should be definitely remeasured with proper precautions against vapor loss.

The solubility results for FX-8 of less than 2 mg/l are also surprising. This compound is identified as a perfluorooctane sulfonate and is presumably closely related to FC-95 which has a substantially higher apparent solubility.

Both sets of results are identified as approximate so it is difficult to assess their reliability. More detailed experiments should be performed.

Edwin E. Tucker

Edwin E. Tucker, Ph. D.
1305 Aladdin St.
Norman, OK 73072
March 1, 1993

5-11-84

ENVIRONMENTAL LABORATORY FINAL REPORT

LAB REQUEST NO. B1498

REQUESTER NAME: EAR/MTE
 EPT: 0535
 PROJECT NO: 9972512600
 DATE RECEIVED: 4-16-84
 ESC: DETERMINE SOLUBILITY OF FC-43 (APPROX.)

CONTRACT LAB:
 CONTRACT LAB COST: 0
 3M E-L HOURS: 8
 EST CMPLT DATE: 5-11-84
 DATE COMPLETED: 5-11-84

USE THE FC-43 SAMPLE ALREADY IN LABORATORY FOR CHRONIC DAPHNIA TESTING.

SAMPLE	DATE	CODE	DESCRIPTION	TEST	RESULT
1		FC-43	LOT 1053	H2O-SOL TOC	COMPLETE <2 MG/L
2		FX-8	(PDSF)	H2O-SOL TOC	COMPLETE <2 MG/L

* = CONTRACT LAB

APPROVED AND SUBMITTED BY

DATED

5-14-84

This study gives only approximate solubility because it is not known if the six hours of mixing plus the overnight sitting of the sample was adequate to bring the water to saturation. The attached data shows that TOC is probably an appropriate analytical procedure for these compounds. A small enough sample of the liquids could not be added to get exact TOC but the data shows that a high Temp TOC analyzer does degrade the compounds. Work done previously on aqueous solutions of FC-95 (LR 53728) show that the high temperature TOC of FC-95 gave accurate results. The theoretical TOC for a 250 mg/L solution of FC-95 was 44.5. The measured TOC values were 43.2, 43.6, 45.2, 45.4, 44.5. The average was 44.4.

Work feels there are conservative detection limits. Detection limits may be better than 2 mg/L. Work plans to talk to Jim Geyman to determine how the detection limits should be set. Moving TOC unit in 2/3 weeks.
 7/3/84

EAR 4/4/84

PROCEDURE FOR DETERMINING APPROXIMATE WATER SOLUBILITY OF FC-43

1. Add an accurately measured volume of water to almost fill 2 sealable glass containers.
2. Add sufficient FC-43 to these 2 containers so that if the FC-43 were water miscible its concentrations would bring the FC-43 concentration to 250 mg/l and 500 mg/l, respectively.
3. Seal the containers.
4. Separate the containers from magnetic stirrers using styrofoam sheets, and stir at a slow rate for >6 hours.
5. Turn off the stirrers and let the contents settle over night.
6. Pipette 2 samples from just below the surface of each container to completely fill small sample vials, and seal. Keep vials at room temperature.
7. Analyze the samples by TOC within 24 hours of sampling. Quickly reseal the sample vials. Record temperature of sample storage location. *24°C start of stirring 23°C right before TOC analysis for both FK-8 & FC-43*
8. Let the vial samples sit undisturbed at room temperature for 1-2 weeks. Then, without shaking or mixing reanalyze the TOC. Again record temperature of sample storage location.

Filtration through .45 μ m filter may not be good to determine solubility because both of them are liquids

ANW

Environmental Lab - Work Sheet

Lab Request No. _____

Page 1 of 1

Sample Description

WATER SOLUBILITY - TOC METHOD

Date: 5-3-84Analyst: W.A. ScheilWATER PHASE - INITIAL

SAMPLE DESC.	TOC - mg/L	TC - mg/L
FX8 - 10 mg/L	< 2	-
FX8 - 30 mg/L	< 2	-
FX8 - 100 mg/L	< 2	< 2
FC43 - 250 mg/L	< 2	-
FC43 500 mg/L	< 2	< 2

STRAIGHT SAMPLE

FC-43	> 80,000 mg/L
FX8 (LR# B1229-2)	> 70,000 mg/L