

## ACUTE TOXICITY TO AQUATIC INVERTEBRATES (ACARTIA TONSA)

### TEST SUBSTANCE

**Identity:** A mixture containing perfluorooctanesulfonate, which may also be referred to as PFOS, FC-95, or as a component of FC-602. (1-Octanesulfonic acid) (CAS # 2795-39-3).

**Remarks:** The 3M production lot number was not noted. The test sample is FC-602. Current information indicates it is a mixture of 1% PFOS, 12% diethylene glycol butyl ether, 61.05% water, 20% ethylene glycol, 2% Sultone foamer, 1% sodium octyl sulfate, 1% sodium decyl sulfate, 1% magnesium sulfate, 0.7% xanthan gum, 0.1% starch, 0.1% n-(3-chloroallyl)hexaminium chloride, and 0.05% tolytriazole.

***The following summary applies to a mixture with incompletely characterized concentrations of impurities. Data may not accurately reflect the toxicity of the fluorochemical component of the test sample.***

### METHOD:

**Method:** ISO/DIS 14669-1997: Water quality – Determination of acute lethal toxicity to marine copepods (Copepoda, Crustacea).

**Type:** Acute static

**GLP:** No

**Year completed:** 2000

**Species:** *Acartia tonsa*

**Supplier:** Test organisms cultivated from eggs, supplied by Marine Biological Laboratory, University of Copenhagen, Denmark.

**Analytical monitoring:** Dissolved oxygen, and pH

**Exposure period:** 48-hours

**Test organism age:** Large copepodites and adults.

**Statistical method:** LC<sub>50</sub> values calculated by PROBIT Analysis, National Swedish Environmental Protection Board (Version 2.3, 1990). Calculation of NOEC is by single factor ANOVA followed by Bonferroni procedure.

**Test conditions:**

**Dilution water:** Filtered natural seawater (34 ppt salinity) from an unpolluted site in Byfjord, Norway.

**Dilution water chemistry:** Not given.

**Lighting:** A daily photoperiod of 16 hours light and 8 hours dark was maintained throughout the testing period.

**Stock and test solution preparation:** A 1000 mg/L primary stock solution was prepared by diluting 0.9998 g of test substance in 1 L of water. Aliquots were then added directly to water in test vessels to create test solutions.

**Exposure vessels:** 28 mL rolled rim vials containing 25 mL of test solution

**Number of replicates:** 4  
**Number of organisms per replicate:** 5  
**Number of concentrations:** five plus a blank control  
**Water chemistry during the study:**  
    **pH range (0-48 hours):**  
        8.2 – 8.2 (control exposure)  
        8.0 – 8.2 (1000 mg/L exposure)  
    **Temperature range:** 20 ± 1 °C  
    **Dissolved oxygen range (0-48 hours):**  
        7.3 – 7.4 mg/L (control exposure)  
        5.7 – 7.4 mg/L (1000 mg/L exposure)

## **RESULTS**

**Nominal concentrations:** Bk control, 10, 32, 100, 320, and 1000 mg/L.  
Reference substance (3,5-dichlorophenol) at 1.0 mg/L

**Element values:** 24-hour LC<sub>50</sub> = 350 (250 - 490) mg/L  
48-hour LC<sub>50</sub> = 200 (140 – 270) mg/L  
48-hour NOEC = 100 mg/L

Element values based on nominal concentrations

**Remarks:** Testing was conducted on a mixture as described in the Test Substance Remarks field. The values reported apply to that mixture and not the fluorochemical proportion alone.

## **CONCLUSIONS**

The FC-602 48-hour LC<sub>50</sub> was determined to be 200 mg/L with a 95% confidence interval of 140 to 270 mg/L. The 48-hour No Observed Effect Concentration (NOEC) was 100 mg/L.

Validity criteria fulfilled. Reference substance in normal range.

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

## **DATA QUALITY**

**Reliability:** Klimisch ranking = 2. This study meets the criteria for quality testing. However, the study lacks information on purity of the test substance and it lacks analytical confirmation of the amount of fluorochemical proportion in the solution.

## **REFERENCES**

Test was conducted by RF Rogaland Research, of Stavanger, Norway at the request of 3M Norge, Lab reference number 99312-3, 2000.

OTHER

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**Last changed:** 6/26/00



## "FC-602 Light Water Brand ATC plus" Toxicity tests

Report RF-2000/003

|                                  |                               |                                                    |
|----------------------------------|-------------------------------|----------------------------------------------------|
| Lab. ref. no.:<br><b>99312-3</b> | Author:<br><b>Elin Horve</b>  | Version No. / date:<br><b>Vers. 1 / 07.01 2000</b> |
| No. of pages:<br><b>31</b>       | Client(s):<br><b>3M Norge</b> | Research Program:                                  |
| ISBN:                            | Distribution restriction:     | Open from (date):                                  |

### Summary:

The following test results were obtained with "FC-602 Light Water Brand ATC plus":

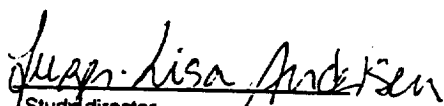
|                                       |                       |                      |       |
|---------------------------------------|-----------------------|----------------------|-------|
| Toxicity: <i>Skeletonema costatum</i> | 72 h EC <sub>50</sub> | (mg/l) :             | ~78   |
| <i>Acartia tonsa</i>                  | 48 h LC <sub>50</sub> | (mg/l) :             | 200   |
| <i>Corophium volutator</i>            | 10 d LC <sub>50</sub> | (mg/kg dry weight) : | >3070 |

The results relate to the product as supplied by Novatech.

### Key-words:

Toxicity, *Skeletonema costatum*, *Acartia tonsa*, *Corophium volutator*.

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Study director  
Inger Lisa Andersen

  
for RF - Rogaland Research  
Kåre Netland

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## **PREFACE:**

*Ecotoxicological tests were performed on "FC-602 Light Water Brand ATC plus" in agreement with Novatech. The sample is a concentrate that normally will be used in a 3% AFFF / 6% AR solution. Tests were conducted in accordance with the "Harmonised Offshore Chemical Notification Format" (OSPARCOM 1995 / SFT 1998).*

*The project was carried out at RF - Rogaland Research for 3M Norge. All the tests were performed by RF - Miljølab. Study director was Senior Engineer Inger Lisa Andersen.*

*The test results are presented in separate sections. The results relate to the product as supplied by Novatech.*

*This test report is issued by a laboratory accredited by Norwegian Accreditation (NA). The accreditation states that the laboratory meets the NA requirements concerning competence, equipment and working procedures for all the test methods contained in the accreditation. It also states that the laboratory has a satisfactory quality assurance system, which includes internal quality control schemes, participation in interlaboratory comparisons, and the use of certified reference materials and secondary reference materials.*

*The tests performed are covered by the accreditation.*

*This test report may not be reproduced in any form other than in full, without the permission in writing by RF - Miljølab.*

## **TEST FOR TOXICITY**

**Marine alga: *Skeletonema costatum***

## TEST REPORT

### GROWTH INHIBITION TEST WITH THE MARINE ALGA *Skeletonema costatum*



**TEST SUBSTANCE:** "FC-602 Light Water Brand ATC plus"

#### TEST RESULT:

The 72 hours EC<sub>50</sub> was calculated to ~78 mg/l.

The test substance was supplied by Novatech, and the test results relate to this product.

#### TEST DETAILS:

**METHOD:** NS-EN ISO 10253, 1998: Water quality - Marine algal growth inhibition test with *Skeletonema costatum* and *Phaeodactylum tricornutum*.

**TEST ORGANISM:** *Skeletonema costatum*, strain NIVA BAC 1. A stock culture of the test organism is kept at RF - Rogaland Research.

**PREPARATIONS:** Natural seawater (salinity: 34 ‰) from an unpolluted site in Byfjord was used as basis for the growth medium. The water was filtered through a GF/C filter, and briefly heated to about 75°C prior to use. The seawater was enriched with nutrients according to ISO 10253, and recommendations from the Paris Commission.

Test solutions were prepared from a stock solution. A stock solution of 102.4 mg/l was prepared by stirring 0.1024 grams of the product in 1 litre of growth medium. Other concentrations were prepared from this stock solution.

**INCUBATION:** Test cultures of 50 ml were incubated in 100 ml flat-bottomed flasks on an orbital shaker, 3 replicates for each concentration. Test cultures were inoculated to about 2000 cells/ml from an exponentially growing inoculum culture. The test was run under continuous light ( $> 50 \mu\text{E}/\text{m}^2\cdot\text{sek}$ ) from fluorescent tubes of universal natural white type, at a temperature of  $20 \pm 2^\circ\text{C}$ .

The test was run for about 72 hours, and subsamples of 5 ml were taken from the test flasks each day for growth measurements. Algal growth was measured by fluorescence. pH measurements were performed as indicated on data sheet.

## DATA ANALYSIS:

**CALCULATIONS:** Growth rates were calculated by log linear regression on biomass (fluorescence) versus time, as described in NS-EN ISO 10253.

**$E_rC_{50}$ :** The inhibitory effect on the growth of *Skeletonema costatum* is expressed as the concentration of a product giving 50% reduction of growth rate ( $E_rC_{50}$ ). This effect concentration was calculated by interpolation between 32mg/l and 102.4mg/l..

**NOEC:** Calculation of NOEC (No Observed Effect Concentration) is done by single-factor ANOVA followed by Bonferroni's procedure for comparing each concentration mean with the control mean.

**TEST RESULTS:** Table 1. EC and NOEC values obtained with *Skeletonema costatum*.

| Test substance                      | $E_rC_{10}$ | $E_rC_{50}$ | $E_rC_{90}$ |
|-------------------------------------|-------------|-------------|-------------|
| "FC-602 Light Water Brand ATC plus" | -           | ~78         | >102.4      |

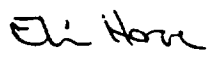
NOEC: 32

Values indicate concentrations giving 10%, 50% and 90% inhibition of growth rate. Units in mg/l. Values are calculated by interpolation. NOEC are calculated by using the computer programme GraphPad InStat 3.0.

**COMMENTS:** The results are based on growth rates for the time span 0 - 72 h, the period during which the growth is considered to be exponential in the control cultures (see growth curves).

**VALIDATION:** The validity criteria given in the test protocol are fulfilled, in that the control cell density increased by a factor of more than 16 in the test period (corresponding to a growth rate of more than 0,9 d<sup>-1</sup>), the control pH did not vary by more than 1,0 units during the test and the 72 hours test results with 3,5-dichlorophenol was in the range normally found.

Lab. ref. no.: 99312-3  
Sample received.: 20.09.99  
Test period: 22-25.11.99  
Report date: 07.01.2000

  
Elin Horve  
Engineer  
Analytical technician

  
Åge Molversmyr  
Senior Research Scientist  
Quality Assurance

Enclosed: Data sheets

**PRIMARY DATA: Growth inhibition test with *Skeletonema costatum***

Test substance: "FC-602 Light Water Brand ATC plus"

Lab. ref.: 99312-3

Start date: 22.11.99

Conc. unit: mg/l

Measurement: The biomass was measured by fluorescence; values in fluorescence units

| Concentration | Time:             |                   |                   |                   |
|---------------|-------------------|-------------------|-------------------|-------------------|
|               | 22.11.99<br>13:40 | 23.11.99<br>11:50 | 24.11.99<br>13:20 | 25.11.99<br>14:45 |
| 0             | 0.06              | 0.32              | 1.5               | 8.2               |
| 0             | 0.06              | 0.23              | 1.7               | 9.3               |
| 0             | 0.06              | 0.46              | 3                 | 11                |
| 0             | 0.07              | 0.46              | 2.15              | 11                |
| 0             | 0.07              | 0.35              | 1.9               | 9                 |
| 0             | 0.12              | 0.4               | 2.35              | 11.5              |
| 0.32          | 0.07              | 0.42              | 2.4               | 11.5              |
| 0.32          | 0.09              | 0.55              | 2.5               | 12.5              |
| 0.32          | 0.07              | 0.5               | 2.65              | 12                |
| 1             | 0.08              | 0.66              | 3.4               | 14.5              |
| 1             | 0.07              | 0.64              | 3                 | 13                |
| 1             | 0.09              | 0.5               | 2.7               | 12.5              |
| 3.2           | 0.08              | 0.58              | 3.4               | 15                |
| 3.2           | 0.09              | 0.45              | 3                 | 13                |
| 3.2           | 0.09              | 0.38              | 2.95              | 13                |
| 10            | 0.1               | 0.35              | 3.1               | 15                |
| 10            | 0.1               | 0.43              | 3.1               | 14.5              |
| 10            | 0.07              | 0.43              | 2.6               | 14                |
| 32            | 0.09              | 0.5               | 2.7               | 14.5              |
| 32            | 0.08              | 0.46              | 2.1               | 11                |
| 32            | 0.09              | 0.43              | 2.9               | 13                |
| 102.4         | 0.1               | 0.13              | 0.2               | 0.43              |
| 102.4         | 0.07              | 0.08              | 0.18              | 0.43              |
| 102.4         | 0.09              | 0.1               | 0.2               | 0.73              |
|               |                   |                   |                   |                   |

| Growth rate day -1 | Correlation | pH at start of test | pH at end of test |
|--------------------|-------------|---------------------|-------------------|
| 1.61               | 0.999       | 8.4                 | 8.3               |
| 1.66               | 0.999       |                     |                   |
| 1.71               | 0.992       |                     |                   |
| 1.66               | 0.997       |                     |                   |
| 1.59               | 0.999       |                     |                   |
| 1.50               | 0.999       |                     |                   |
| 1.68               | 0.998       | 8.4                 | 8.2               |
| 1.62               | 0.998       |                     |                   |
| 1.69               | 0.996       |                     |                   |
| 1.71               | 0.993       | 8.4                 | 8.2               |
| 1.72               | 0.991       |                     |                   |
| 1.62               | 0.999       |                     |                   |
| 1.72               | 0.996       | 8.4                 | 8.2               |
| 1.63               | 0.998       |                     |                   |
| 1.63               | 0.998       |                     |                   |
| 1.65               | 0.997       | 8.4                 | 8.2               |
| 1.63               | 0.999       |                     |                   |
| 1.74               | 0.999       |                     |                   |
| 1.67               | 0.999       | 8.4                 | 8.3               |
| 1.62               | 0.998       |                     |                   |
| 1.63               | 0.999       |                     |                   |
| 0.48               | 0.979       | 8.4                 | 8.3               |
| 0.60               | 0.971       |                     |                   |
| 0.69               | 0.944       |                     |                   |
|                    |             |                     |                   |

Reference substance (3,5-dichlorophenol):

|          |      |      |      |      |
|----------|------|------|------|------|
| 1.5 mg/l | 0.1  | 0.16 | 0.48 | 1.1  |
| 1.5 mg/l | 0.07 | 0.18 | 0.44 | 1.4  |
| 1.5 mg/l | 0.1  | 0.15 | 0.38 | 1.15 |

|      |       |     |     |
|------|-------|-----|-----|
| 0.79 | 0.993 | 8.3 | 8.2 |
| 0.98 | 0.999 |     |     |
| 0.80 | 0.987 |     |     |

Mean values:

|                  |      |      |     |     |
|------------------|------|------|-----|-----|
| 0                | 0.07 | 0.4  | 2   | 10  |
| 0.32             | 0.08 | 0.5  | 3   | 12  |
| 1                | 0.08 | 0.6  | 3   | 13  |
| 3.2              | 0.09 | 0.5  | 3   | 14  |
| 10               | 0.09 | 0.4  | 3   | 15  |
| 32               | 0.09 | 0.5  | 3   | 13  |
| 102.4            | 0.09 | 0.1  | 0   | 1   |
| Reference subst. | 0.09 | 0.16 | 0.4 | 1.2 |

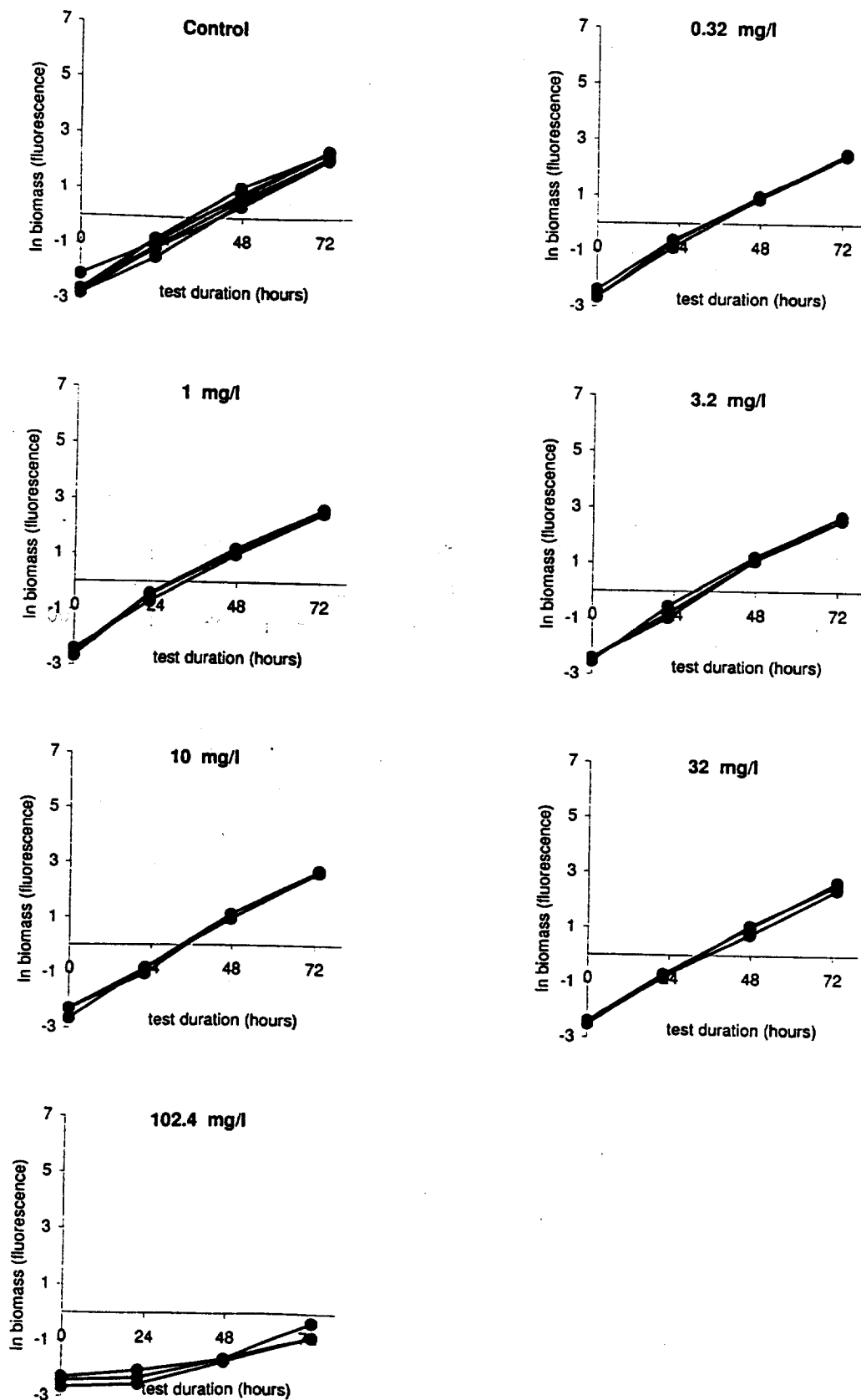
|      |       |
|------|-------|
| 1.62 | 0.999 |
| 1.66 | 0.997 |
| 1.68 | 0.995 |
| 1.66 | 0.998 |
| 1.67 | 0.999 |
| 1.64 | 0.999 |
| 0.59 | 0.964 |
| 0.86 | 0.996 |

The result of the reference substance (53% inhibition) is within the range normally found (20-80%)

# GROWTH CURVES: Growth inhibition test with *Skeletonema costatum*

Test substance: "FC-602 Light Water Brand ATC plus"

Lab. ref.: 99312-3



Inhibition of the growth of *Skeletonema costatum*  
with:

mg/l (FC-602 Light Water Brand ATC plus)

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Experimental data:

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| Concentration in<br>FC-602 Light Water Brand ATC plus | Growth rate | Inhibition<br>in percent |
|-------------------------------------------------------|-------------|--------------------------|
| Control 1                                             | 1.61        | -                        |
| Control 2                                             | 1.66        | -                        |
| Control 3                                             | 1.71        | -                        |
| Control 4                                             | 1.66        | -                        |
| Control 5                                             | 1.59        | -                        |
| Control 6                                             | 1.50        | -                        |
| Control mean :                                        | 1.62        | 0                        |
| 0.32                                                  | 1.68        | 0.0                      |
| 0.32                                                  | 1.62        | 0.1                      |
| 0.32                                                  | 1.69        | 0.0                      |
| 1.00                                                  | 1.71        | 0.0                      |
| 1.00                                                  | 1.72        | 0.0                      |
| 1.00                                                  | 1.62        | 0.1                      |
| 3.20                                                  | 1.72        | 0.0                      |
| 3.20                                                  | 1.63        | 0.0                      |
| 3.20                                                  | 1.63        | 0.0                      |
| 10.00                                                 | 1.65        | 0.0                      |
| 10.00                                                 | 1.63        | 0.0                      |
| 10.00                                                 | 1.74        | 0.0                      |
| 32.00                                                 | 1.67        | 0.0                      |
| 32.00                                                 | 1.62        | 0.1                      |
| 32.00                                                 | 1.63        | 0.0                      |
| 102.40                                                | 0.48        | 70.4                     |
| 102.40                                                | 0.60        | 63.0                     |
| 102.40                                                | 0.69        | 57.5                     |

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# **TEST FOR TOXICITY**

## **Marine herbivore: *Acartia tonsa***

## TEST REPORT

### ACUTE TOXICITY TEST WITH THE MARINE COPEPOD *Acartia tonsa*



**TEST SUBSTANCE:** "FC-602 Light Water Brand ATC plus"

#### TEST RESULT:

The 48 hours LC<sub>50</sub> was calculated to 200 mg/l.

The test substance was supplied by Novatech, and the test results relate to this product.

#### TEST DETAILS:

**METHOD:** ISO/DIS 14669 - 1997: Water quality - Determination of acute lethal toxicity to marine copepods (Copepoda, Crustacea).

**TEST ORGANISM:** *Acartia tonsa* (Dana), supplied by the Marine Biological Laboratory, University of Copenhagen.

**CULTIVATION:** The test organisms were supplied as eggs, and were cultivated in accordance with the "Paris Commission - Ring Test Protocol" (VKI). Large copepodites and adults were used in the test.

**PREPARATIONS:** Natural seawater (salinity: 34 ‰) from an unpolluted site in Byfjord was used as basis for the dilution water. The water was filtered through a GF/C filter prior to use.

Test solutions were prepared from a stock solution. A stock solution of 1000 mg/l was prepared by stirring 0.9998 grams of the product in 1 litre of dilution water. Other concentrations were prepared from this stock solution.

**INCUBATION:** The test was run in glass containers (28 ml rolled rim vials) each containing 25 ml of test solution and 5 animals, 4 replicates for each concentration. The vials were kept under a 16h/8h light/dark photoperiod at a temperature of  $20 \pm 1$  °C. pH and oxygen measurements were performed as indicated on the data sheet.

## DATA ANALYSIS:

**CALCULATIONS:** The effect on the survival of *Acartia tonsa* is expressed as the concentration of a product lethal to 50% of the test animals (LC<sub>50</sub>). The combined mortality per test concentration were used for calculation. The 24 hours and 48 hours LC<sub>50</sub> values and the 95% confidence limit were calculated by using the standard procedure PROBIT Analysis, National Swedish Environmental Protection Board (Version 2.3, 1990). This programme also calculate test concentrations lethal to 10% and 90% of the test animals.

**NOEC:** Calculation of NOEC (No Observed Effect Concentration) is done by single-factor ANOVA followed by Bonferronis procedure for comparing each concentration mean with the control mean.

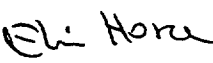
**TEST RESULTS:** Table 1. LC and NOEC values obtained with "FC-602 Light Water Brand ATC plus"

| <i>Acartia tonsa</i> | 24 hours       | 48 hours      |
|----------------------|----------------|---------------|
| LC <sub>10</sub>     | 120 (56–190)   | 87 (42–130)   |
| LC <sub>50</sub>     | 350 (250–490)  | 200 (140–270) |
| LC <sub>90</sub>     | 970 (650–2200) | 450 (320–900) |
| NOEC:                | 100            | 100           |

*Values indicate 10%, 50% and 90% lethality after 24 and 48 hours. Units in mg/l. Values are calculated by PROBIT analysis, and 95% confidence intervals are indicated. NOEC are calculated by the computer programme GraphPad InStat 3.0.*

**VALIDATION:** The validity criteria given in the test protocol are fulfilled, in that the dissolved oxygen concentration at the end of the test was greater than or equal to 4 mg/l, the percentage mortality in the controls was less than 10%, and the 48 hours LC<sub>50</sub> of 3,5-dichlorophenol (reference) was in the range normally found.

Lab. ref. no.: 99312-3  
Sample received.: 20.09.99  
Test period: 22-25.11.99  
Report date: 07.01.2000

  
Elin Horve  
Engineer  
Analytical technician

  
Åge Molversmyr  
Senior Research Scientist  
Quality Assurance

Enclosed: Data sheets

**PRIMARY DATA: Acute toxicity test with *Acartia tonsa***

Test substance: "FC-602 Light Water Brand ATC plus"

Lab. ref.: 99312-3

Start date: 10.11.99

Measurement: Number of dead

| Concentration<br>(mg/l) | Total<br>number<br><br>Specimen<br>pr. conc. | Number of<br>specimen<br>pr. vessel | NUMBER OF DEAD |        |        |        |          |       |        |        |        |       |
|-------------------------|----------------------------------------------|-------------------------------------|----------------|--------|--------|--------|----------|-------|--------|--------|--------|-------|
|                         |                                              |                                     | 24 hours       |        |        |        | 48 hours |       |        |        |        |       |
|                         |                                              | A<br>B                              | C<br>D         | E<br>F | A<br>B | C<br>D | E<br>F   | Total | A<br>B | C<br>D | E<br>F | Total |
| Control                 | 30                                           | 5<br>4                              | 5<br>5         | 6<br>5 | 0<br>0 | 0<br>0 | 0<br>0   | 0     | 0<br>0 | 0<br>0 | 1<br>0 | 1     |
| 10                      | 20                                           | 5<br>5                              | 5<br>          | 5<br>  | 1<br>0 | 0<br>  | 0<br>    | 1     | 1<br>0 | 0<br>  | 0<br>  | 1     |
| 32                      | 20                                           | 5<br>5                              | 5<br>          | 5<br>  | 0<br>0 | 0<br>  | 0<br>    | 0     | 0<br>0 | 0<br>  | 2<br>  | 2     |
| 100                     | 20                                           | 5<br>5                              | 5<br>          | 5<br>  | 0<br>1 | 1<br>  | 0<br>    | 2     | 0<br>1 | 2<br>  | 0<br>  | 3     |
| 320                     | 20                                           | 6<br>5                              | 5<br>          | 4<br>  | 4<br>2 | 1<br>  | 0<br>    | 7     | 4<br>4 | 4<br>  | 3<br>  | 15    |
| 1000                    | 20                                           | 5<br>5                              | 6<br>          | 4<br>  | 5<br>5 | 5<br>  | 4<br>    | 19    | 5<br>5 | 6<br>  | 4<br>  | 20    |
|                         |                                              |                                     |                |        |        |        |          |       |        |        |        |       |
|                         |                                              |                                     |                |        |        |        |          |       |        |        |        |       |

Reference substance (3,5-dichlorophenol):

|          |    |                |                |   |                |   |
|----------|----|----------------|----------------|---|----------------|---|
| 1.0 mg/l | 30 | 5 5 5<br>6 4 5 | 1 1 0<br>0 0 1 | 3 | 3 3 1<br>0 1 1 | 9 |
|----------|----|----------------|----------------|---|----------------|---|

The result with the reference substance is within the range normally found.

**Test substance:** "FC-602 Light Water Brand ATC plus"

Lab. ref.: 99312-3

Start date: 10.11.99

**Measurements of oxygen and pH.**

| Concentration<br>(mg/l) | Start            |         | 24 hours         |         | 48 hours         |         |
|-------------------------|------------------|---------|------------------|---------|------------------|---------|
|                         | Oxygen<br>(mg/l) | pH<br>- | Oxygen<br>(mg/l) | pH<br>- | Oxygen<br>(mg/l) | pH<br>- |
| Control                 | 7.3              | 8.2     |                  |         | 7.4              | 8.2     |
| 10                      | 7.6              | 8.2     |                  |         | 7.3              | 8.2     |
| 32                      | 7.6              | 8.2     |                  |         | 7.2              | 8.2     |
| 100                     | 7.6              | 8.2     |                  |         | 7.1              | 8.2     |
| 320                     | 7.6              | 8.2     |                  |         | 6.7              | 8.1     |
| 1000                    | 7.4              | 8.2     |                  |         | 5.7              | 8.0     |
|                         |                  |         |                  |         |                  |         |
|                         |                  |         |                  |         |                  |         |

**Reference substance (3,5-dichlorophenol):**

|          |     |     |  |     |     |
|----------|-----|-----|--|-----|-----|
| 1.0 mg/l | 7.3 | 8.2 |  | 7.4 | 8.2 |
|----------|-----|-----|--|-----|-----|

**TEST FOR TOXICITY**  
**Marine Amphipode: *Corophium volutator***

## TEST REPORT

ACUTE TOXICITY SEDIMENT TEST WITH THE  
MARINE AMPHIPOD *Corophium volutator*



**TEST SUBSTANCE:** "FC-602 Light Water Brand ATC plus"

### TEST RESULT:

The 10d LC<sub>50</sub> was calculated to >3070 mg kg<sup>-1</sup> dry weight sediment.

The test substance was supplied by Novatech, and the test results relate to this product.

### TEST DETAILS:

**METHOD:** ASTM E1367-90, Standard Guide For Conducting 10 day Static Sediment Toxicity Tests with Marine and Estuarine Sediments.

**TEST ORGANISM:** *Corophium volutator*, from an unpolluted site near Trondheim.

**CULTIVATION:** The test organisms were supplied as adults (4-8 mm in size) and were held in aerated seawater at 15°C. A small amount of natural seaweed was used for feeding.

**PREPARATION:** Natural seawater (salinity: 34 ‰) from an unpolluted site in Byfjorden outside Stavanger was used for dilution water. Sediment collected at an unpolluted site was used for preparing test sediments. The sediment is a muddy sand and was analysed for organic content and proportion silt for each test.

Each test concentration was prepared by adding the product in 600 grams of damp sediment in a plastic bucket. 200 ml of seawater was added and the bucket was shaken for 3 hours. The sediment was divided into three beakers, 400 ml of seawater was added to each, and the beakers were aerated over night. 10 animals were then randomly selected for each beaker. A sample of the damp sediment was analysed for water content, and all concentrations are calculated as mg kg<sup>-1</sup> sediment dry weight.

**INCUBATION:** The test was run in glass containers (600 ml) each containing 200 g of test sediment, app. 400 ml of seawater and 10 animals, 3 replicates for each concentration. The beakers were kept under continuous aeration at a temperature of 15 ± 1°C. pH and oxygen measurements were performed as indicated on the data sheet.

## DATA ANALYSIS:

**CALCULATIONS:** The effect on the survival of *Corophium volutator* is expressed as the concentration of a product lethal to 50% of the test animals (LC<sub>50</sub>). The combined mortality per test concentration were used for calculation. The 10 day LC<sub>50</sub> value and the 95% confidence limit are calculated by using the standard PROBIT Analysis, National Swedish Environmental Protection Board (Version 2.3, 1990). This programme also calculate test concentrations lethal to 10% and 90% of the test animals.

**NOEC:** Calculation of NOEC (No Observed Effect Concentration) is done by single-factor ANOVA followed by Bonferroni procedure for comparing each concentration mean with the control mean.

**TEST RESULTS:** Table 1. LC and NOEC values obtained with "FC-602 Light Water Brand ATC plus".

| <i>Corophium volutator</i> | 10 days |
|----------------------------|---------|
| LC <sub>10</sub>           | 1750    |
| LC <sub>50</sub>           | >3070   |
| LC <sub>90</sub>           | >3070   |
| NOEC:                      | 3070    |

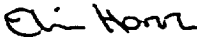
Values indicate 10%, 50% and 90% lethality after 10 days. Units in mg kg<sup>-1</sup> sediment dry weight. Values are calculated by PROBIT analysis. NOEC are calculated by the computer programme GraphPad InStat 3.0.

**VALIDATION:** The validity criteria given in the test protocol are fulfilled, in that the dissolved oxygen concentration at the end of the test was greater than or equal to 60 %, the percentage mortality in the controls were less than 15% and a test with Fluorantene (reference) was in the range normally found. The sediment used is found to be within accepted limits for organic content but the silt fraction is recommended higher .

Table 2. Characteristics of the sediment used for testing

| Organic content (%) | Silt fraction (%) |
|---------------------|-------------------|
| 0.7                 | 0.8               |

Lab. ref. no.: 99312-3  
Sample received.: 20.09.99  
Test period: 03-12.12.99  
Report date: 07.01.2000

  
Elin Horve  
Engineer  
Analytical technician

  
Åge Molversmyr  
Senior Research Scientist  
Quality Assurance

Enclosed: Data sheets

**PRIMARY DATA: Acute toxicity test with *Corophium volutator***

Test substance: "FC-602 Light Water Brand ATC plus"

Lab. ref.: 99312-3  
Start date: 03.12.99  
Measurement: Number of dead

| Concentration<br>(mg/kg dry weight) | Total<br>number<br><br>Specimen<br>pr. conc. | Number of<br>specimen<br>pr. vessel | NUMBER OF DEAD |                |       |  |                |       |  |
|-------------------------------------|----------------------------------------------|-------------------------------------|----------------|----------------|-------|--|----------------|-------|--|
|                                     |                                              |                                     | 5 days         |                |       |  | 10 days        |       |  |
|                                     |                                              |                                     | A C E<br>B D F | A C E<br>B D F | Total |  | A C E<br>B D F | Total |  |
| Control                             | 60                                           | 10 10 10<br>10 10 10                |                |                |       |  | 0 0 0<br>0 0 0 | 0     |  |
| 257                                 | 30                                           | 10 10 10                            |                |                |       |  | 1 0 0          | 1     |  |
| 478                                 | 30                                           | 10 10 10                            |                |                |       |  | 0 1 0          | 1     |  |
| 1050                                | 30                                           | 10 10 10                            |                |                |       |  | 3 1 0          | 4     |  |
| 3070                                | 30                                           | 10 10 10                            |                |                |       |  | 2 0 1          | 3     |  |
|                                     |                                              |                                     |                |                |       |  |                |       |  |
|                                     |                                              |                                     |                |                |       |  |                |       |  |
|                                     |                                              |                                     |                |                |       |  |                |       |  |

Reference substance (fluoranthene):

|      |    |          |  |  |       |   |
|------|----|----------|--|--|-------|---|
| 20.3 | 30 | 10 10 10 |  |  | 3 2 2 | 7 |
|------|----|----------|--|--|-------|---|

The result with the reference substance is within the range normally found.

**Test substance: "FC-602 Light Water Brand ATC plus"**

Lab. ref.: 99312-3  
Start date: 03.12.99

**Measurements of oxygen and pH.**

| Concentration<br>(mg/kg dry weight) | Start         |         | 5 days        |         | 10 days       |         |
|-------------------------------------|---------------|---------|---------------|---------|---------------|---------|
|                                     | Oxygen<br>(%) | pH<br>- | Oxygen<br>(%) | pH<br>- | Oxygen<br>(%) | pH<br>- |
| Control                             | 94            | 8.1     | 91            | 8.1     | 91            | 8.0     |
| 257                                 | 93            | 8.1     | 92            | 8.1     | 82            | 8.1     |
| 478                                 | 93            | 8.1     | 91            | 8.1     | 81            | 8.1     |
| 1050                                | 95            | 8.1     | 92            | 8.0     | 90            | 8.1     |
| 3070                                | 96            | 8.1     | 88            | 7.9     | 89            | 8.1     |
|                                     |               |         |               |         |               |         |
|                                     |               |         |               |         |               |         |
|                                     |               |         |               |         |               |         |

**Reference substance (fluoranthene):**

|      |    |     |    |     |    |     |
|------|----|-----|----|-----|----|-----|
| 20.3 | 95 | 8.1 | 90 | 8.1 | 90 | 8.1 |
|------|----|-----|----|-----|----|-----|

## DATA SHEETS

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HMS-DATABLAD (Helse-, Miljø- og Sikkerhetsdatablad)

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Dokumentnr.: 07-2573-9 Utgitt : 10/11/99 Versjon : 05.00  
 Erstatte : 08/10/97 Skrevet ut : 11/11/98 Side 1 av 11

HMS-databladet er utarbeidet av Miljøavdelingen ved 3M Norge A/S.  
 Telefon: 63 84 75 00 / Telefax: 63 84 17 88

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1 IDENTIFIKASJON AV KJEMIKALIET OG ANSVARLIG FIRMA.

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Importør: 3M Norge A/S

Handelsnavn:

FC-201AF LIGHT WATER (TM) 1% AFFF (FREEZE PROTECTED)

Deklarasjonsnummer, Produktregisteret:

-

Telefon, Giftinformasjonssentralen:

22 59 13 00

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2 OPPLYSNINGER OM KJEMISK SAMMENSETNING.

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Informasjon om enkeltkomponenter, faresymbol(er) og risikosetninger

| STOFFNAVN                                                     | CAS-nr       | VEKT-PROSENT |
|---------------------------------------------------------------|--------------|--------------|
| VANN                                                          | 7732-18-5    | 35.0 - 39.0  |
| 2-(2-BUTOKSYETOKSY)-ETANOL /<br>(DIETYLENGLYKOLMONOBUTYLETER) | 112-34-5     | 17.0 - 21.0  |
| Faresymboler/risikosetninger: Xi; R:36                        |              |              |
| 1,2-ETANDIOL                                                  | 107-21-1     | = 14.0       |
| Faresymboler/risikosetninger: Xn; R:22                        |              |              |
| AMFOTER FLUOROALKYLAMID-DERIVAT                               | Trade Secret | 5.0 - 10.0   |
| ALKYL-SULFAT-SALTER                                           | Trade Secret | 14.0 - 16.0  |
| TRIETANOLAMIN                                                 | 102-71-6     | = 3.0        |
| PERFLUOROALKYL-SULFONAT-SALTER                                | Trade Secret | 1.0 - 5.0    |
| RESTER AV ORGANISKE FLUORKJEMIKALIER                          | Trade Secret | Ikke kjent   |

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### 3 VIKTIGSTE FAREMOMENTER.

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Viktigste skadevirkninger

Helsefare:

IRRITERENDE (Xi) Irriterer øynene.

Sikkerhet:

-

Miljøfare:

-

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### 4 FØRSTEHJELPSTILTAK.

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Tiltak øyne:

Skyll straks øynene grundig med rikelige mengder vann i minst 15 minutter. Kontakt lege umiddelbart. Skylling under transport.

Tiltak hud:

Skyll straks huden med såpe og rikelige mengder vann. Fjern tilsølt tøy. Hvis symptomer oppstår, kontakt lege. Vask tilsølt tøy før det brukes igjen og kast tilsølt skotøy.

Tiltak innånding:

Hvis symptomer oppstår, bring vedkommende bort fra eksponeringskilden. Sørg for frisk luft. Hvis symptomene vedvarer, kontakt lege.

Tiltak svelging:

Kontakt lege umiddelbart. Fremkall brekninger kun i samråd med medisinsk personell. Gi aldri noe gjennom munnen til en bevisstløs person.

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### 5 TILTAK VED BRANNSLUKNING.

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Egnet brannslukningsmiddel:

Produktet er et brannslukkingsmiddel.

Ikke egnet brannslukningsmiddel:

-

Eksponeringsrisiko ved brann:

-

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Forbrenningsprodukter ved brann:

Prosedyrer ved slukking av brann:

6 TILTAK VED UTILSIKTET UTSLIPP.

Personlige vernetiltak:

Se vernetiltak under andre punkter i dette HMS-databladet.

Tiltak ved utilsiktet utslipp:

Ventiler området. Spill avgrenses umiddelbart. Dekk til med et absorberende materiale. Spill samles opp umiddelbart. Rengjør området med vann. Plasseres i en egnet beholder med lokk.

Fjerning av kjemikalieavfall:

Se punkt 13, Fjerning av kjemikalieavfall.

7 HÅNDTERING OG OPPBEVARING.

Betingelser for sikker oppbevaring:

Må ikke lagres i områder hvor produktet kan komme i kontakt med mat eller legemidler. Lagres ved temperatur under 49 grader celsius. Lagres ved temperaturer over 0 grader celsius. Hold beholderen tett lukket når produktet ikke er i bruk.

Uforenelige materialer:

Ventilasjon:

Oppbevar emballasjen på et godt ventilert sted.

Sikkerhetstiltak for å forhindre brann:

Sikkerhetstiltak for å forhindre eksplosjon:

Ikkebrennbar.

Sikkerhetstiltak for å forhindre statisk elektrisitet:

Forholdsregler ved bruk:

Hold emballasjen tett lukket. Røyking forbudt: Under bruk av produktet kan røyking forårsake forurensning av tobakken og/eller røyken og farlige dekomponeringsprodukter kan dannes. Se punkt 10, stabilitet og reaktivitet, skadelige dekomponenter.

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8 EKSPONERINGSKONTROLL OG PERSONLIG VERNEUTSTYR.

Øyevern:

Unngå å få damp, spray eller tåke i øynene. Bruk tette vernebriller med ventiler.

Håndvern:

Bruk egnede vernehansker av hensiktsmessig materiale ved håndtering av produktet. Vernehansker av følgende materiale(r) anbefales: Butylgummi.

Annet hudvern enn håndvern:

Unngå hudkontakt.

Åndedrettsvern:

Unngå innånding av luftbåret materiale. Basert på konsentrasjonen av luftforurensninger i arbeidsatmosfæren velges en av følgende type(r) godkjent åndedrettsvern: halvmaske med filter mot organiske damper og væskeformige partikler: A/P2SL.

Svelging:

Det må ikke spises, drikkes eller røykes under arbeid med produktet. Vask utsatte områder grundig med såpe og vann. Vask hendene etter håndtering og før spising.

Anbefalt ventilasjon:

Hvis utsugningsventilasjon ikke er tilstrekkelig, må egnet godkjent åndedrettsvern benyttes. Sørg for tilstrekkelig ventilasjon slik at dampkonsentrasjonene holdes under anbefalte administrative normer og/eller kontroller spray eller tåke.

Adm. normer for forurensning i arbeidsatmosfære, Februar 1996:

VANN (7732-18-5)

Anmerkninger: Ingen adm. norm.

2-(2-BUTOKSYETOKSY)-ETANOL / (DIETYLENGLYKOLMONOBUTYLETER) (112-34-5)

8-timers verdi ppm: 35

Anmerkninger: Amerikansk grenseverdi anbefalt av produsenten.  
(Ingen norsk adm. norm).

1,2-ETANDIOL (107-21-1)

8-timers verdi ppm: - (støv)

8-timers verdi mg/m<sup>3</sup>: 10 (støv)

Takverdi ppm: 25 (damp)

Takverdi mg/m<sup>3</sup>: - (damp)

AMFOTER FLUOROALKYLAMID-DERIVAT (Trade Secret)

Anmerkninger: Ingen adm. norm.

ALKYL-SULFAT-SALTER (Trade Secret)

Anmerkninger: Ingen adm. norm.

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~~PERFLUOROALKYL-SULFONAT-SALTER (102-71-6)~~

8-timers verdi ppm: -

8-timers verdi mg/m<sup>3</sup>: 5

PERFLUOROALKYL-SULFONAT-SALTER (Trade Secret)

8-timers verdi mg/m<sup>3</sup>: 0,1

Anmerkninger: Amerikansk grenseverdi anbefalt av produsenten.  
(Ingen norsk adm. norm).

RESTER AV ORGANISKE FLUORKJEMIKALIER (Trade Secret)

8-timers verdi mg/m<sup>3</sup>: 0,1 Grenseverdi anbefalt av 3M.

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9 FYSISKE OG KJEMISKE EGENSKAPER.  
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|                                        |                                     |
|----------------------------------------|-------------------------------------|
| Tilstandsform, farge, lukt:            | Klar ravfarget væske.               |
| pH:                                    | 7.5 - 8.5                           |
| Kokepunkt/-intervall:                  | = 100 C (Begynnende kokepunkt)      |
| Smeltepunkt/-intervall:                | Ikke relevant                       |
| Flammepunkt:                           | > 100 C (Miniflash)                 |
| Selvantennelighet:                     | Ikke relevant                       |
| Eksplosjonsgrenser, nedre:             | Ikke relevant                       |
| Eksplosjonsgrenser, øvre:              | Ikke relevant                       |
| Damptrykk:                             | = 16 mmHg (Kalkulert v/20 C)        |
| Løselighet i vann:                     | Blandbar                            |
| Spesifikk vekt:                        | = 1.10 (vann=1)                     |
| Damptetthet:                           | = 1.0 (luft=1) (Kalkulert v/20 C)   |
| Flyktige organiske forbindelser (VOC): | = 359 g/l SCAQMD (g/l av produktet) |
| Fordampningshastighet:                 | < 1 (butylacetat=1)                 |
| Viskositet:                            | = 18 centipoise                     |

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10 STABILITET OG REAKTIVITET.  
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Forhold som skal unngås:

Materialer som skal unngås:  
Ikke kjent.

Farlige spaltningsprodukter:  
Karbonmonoksid og karbondioksid. Hydrogenfluorid. Giftige damper, gasser eller partikler. Termisk dekomponering av bruksferdig blanding forventes ikke å representere noen risiko.

Stabilitet og reaktivitet:  
Stabilt. Farlig polymerisasjon vil ikke forekomme.

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11 OPPLYSNINGER OM HELSEFARE.  
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Effekter øyne:  
Moderat øyeirritasjon: symptomer kan være rødhet, hevelse, smerter, tårer og uklart syn.

Effekter hud:  
Moderat hudirritasjon (etter langvarig eller gjentatt kontakt): symptomer kan være rødhet, hevelse, kløe og tørrhet.

Langvarig eller gjentatt eksponering kan føre til:

Allergisk hudreaksjon: symptomer kan være rødhet, hevelse, blærer og kløe.

Effekter innånding:  
En enkelt overeksponering som overstiger anbefalte administrative normer, kan føre til:

Påvirkning av sentralnervesystemet: symptomer kan være hodepine, ørhet, søvnighet, manglende koordinasjonsevne, nedsatt reaksjonsevne, sløret tale, svimmelhet og i ekstreme tilfeller bevisstløshet.

Irritasjon (øvre luftveier): symptomer kan være sårhet i nese og svelg, hosting og nysing.

Effekter svelging:  
Dyreforsøk utført med organiske fluorkjemikalier, som finnes i dette produktet, viser effekter som leverforstyrrelser, vekttap, manglende appetitt, sløvhets samt effekter som påvirker neurologi, bukspytt, binyre og hematologi. Det foreligger ingen kjente helseeffekter for mennesker fra eksponering overfor organiske fluorkjemikalier når de brukes som forutsatt og i henhold til

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veiledning.

Svelging kan føre til:

Påvirkning av nyrene: symptomer kan være redusert urinmengde, blod i urinen og ryggsmertter.

Aspirasjonspneumoni (Lungebetennelse som skyldes at fremmedlegemer kommer ned i lungene. En alminnelig årsak til tilstanden er oppkast.): symptomer kan være hosting, pustevansker, gispning, hoste opp blod og lungebetennelse som kan være livstruende.

Informasjon om allergi, overfølsomhet:

-

Kreftfremkallende egenskaper:

-

Arvestoffskadelige egenskaper:

-

Reproduksjonsskadelige egenskaper:

-

Andre skadevirkninger, helse:

Dette produktet inneholder en eller flere organiske fluorkjemikalier, som muligens kan absorberes og lagres i kroppen over lengre tid, enten som utgangsmolekylet eller som nedbrytningsstoffer (metabolitter), og kan akkumuleres ved gjentatte eksponeringer. Det foreligger ingen kjente helseeffekter for mennesker fra eksponering overfor organiske fluorkjemikalier når de brukes som forutsatt og i henhold til veiledning.

Forekomsten av organiske fluorkjemikalier i blodet til den generelle befolkningen og underpopulasjoner som arbeidere, har vært publisert siden 1970 årene. 3Ms epidemiologiske studier av egne arbeidere viser ingen skadelige effekter.

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12 OPPLYSNINGER OM MILJØFARE.  
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Persistens/Biologisk nedbrytbarhet:

Dette produktet inneholder en eller flere organiske fluorkjemikalier som muligens ikke er nedbrytbare og forblir i miljøet (persistente).

Andre skadevirkninger, miljø:

Nedbrytning:

COD (Chemical Oxygen Demand) = 1 710 000 mg/kg;  
BOD 20 dager (Biochemical Oxygen Demand) = 494 000 mg/kg;  
BOD20/COD = 29%.

Akvatisk giftighet:

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96 timers LC50 for fisk (Fathead minnow (Pimephales promelas)) = 310 mg/l;  
48 timers EC50 for daphnia (Water flea (Daphnia magna)) = > 1000 mg/l;  
96 timers IC50 for alge = > 1000 mg/l;  
30 minutters EC50, Microtox (Photobacterium phosphoreum) = 63 mg/l;  
3 timers EC50, Activated Sludge Respiration Inhibition = > 1000 mg/l.

Sørg for avfallshåndtering iht. gjeldende forskrifter.

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13 FJERNING AV KJEMIKALIEAVFALL.

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Metoder for fjerning av kjemikalieavfall:

Spesialavfall. Lever avfall til en offentlig godkjent innsamler, mottaks- eller behandlingsanlegg for spesialavfall.

Anbefalte avfallsgrupper:

HOVEDKATEGORI 07: AVFALL FRA ORGANISKE PROSESSER.

UNDERKATEGORI 07 06: Avfall fra PBDB av fettstoffer, såpe, rengjøringsmidler, desinfeksjonsmidler og kosmetikk.

EAK-kode 07 06 03: Halogenerte organiske løsemidler, vaskevasker og moderlut.

Avfallstoffnummer: 7151 Organisk avfall med halogen.

Spesielle komponenter: fluorforbindelser.

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14 OPPLYSNINGER OM TRANSPORT.

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|              |   |
|--------------|---|
| ADR-klasse:  | - |
| siffer:      | - |
| bokstav:     | - |
| margnummer:  | - |
| CEFIC-kort:  | - |
| UN-nummer:   | - |
| ICAO-klasse: | - |
| IMDG-klasse: | - |

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IMDG-side: -

EMS-nr.: -

MFAG: -

Øvrige opplysninger:

Ikke transportfarlig gods.

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15 OPPLYSNINGER OM LOVER OG FORSKRIFTER.  
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Merkeetikett:

Symbol(er):

HELSESKADELIG (Xn)

Inneholder:

2-(2-butoksyetoksy)-etanol 19 %

Etylenglykol 14 %

R-setninger:

Farlig ved svelging. Irriterer øynene.

S-setninger:

Unngå innånding av damp/sprøytetåke. Unngå kontakt med øynene og langvarig kontakt med huden. Får man stoffet i øynene; skyll straks grundig med store mengder vann og kontakt lege. Etter hudkontakt, vask med såpe og vann. Ved svelging, kontakt lege omgående og vis denne beholderen eller etiketten.

YL-gruppe:

00

Korr. yrkeshyg. luftbehov:

0-30 m3/l

Øvrige opplysninger om merkeetiketten:

Ovennevnte merking er basert på tidligere merkeforskrifter og vil være å finne på produktet en tid fremover. Merkingen vil imidlertid erstattes av følgende merking, som er basert på reviderte merkeforskrifter av januar 1998.

Symbol: IRRITERENDE (Xi)

Inneholder: 2-(2-butoksyetoksy)-etanol, 1,2-etandiol

Irriterer øynene. Unngå innånding av damp/sprøytetåke. Unngå kontakt med øynene. Unngå langvarig eller gjentatt kontakt med huden. Får man stoffet i øynene; skyll straks grundig med store mengder vann og kontakt lege. Etter hudkontakt, vask med såpe og vann. Ved svelging, drikk to glass vann og kontakt lege umiddelbart.

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YL-gruppe:  
00

Spesielle lover og bestemmelser:

1. Forskrift om utarbeidelse og distribusjon av Helse-, Miljø- og Sikkerhetsdatablad for farlige kjemikalier.
2. Forskrift om klassifisering og merking av farlige kjemikalier.
3. Forskrift om klassifisering, merking m.v. av stoff som kan medføre miljøfare.
4. Forskrift om stoffkartotek.
5. Forskrift om spesialavfall.
6. Etc.

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16 ANDRE OPPLYSNINGER AV BETYDNING FOR BRUKERNES SIKKERHET OG HELSE.  
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Anvendelsesområder:

Filmdannende skumkonsentrat for slukking av brann i hydrokarboner.

Viktigste kilde(r) ved utarbeidelsen av HMS-databladet:

Datablad fra 3M General Offices, St. Paul, Minnesota, USA.

Årsak til oppdatering:

Hele databladet er revidert. Tilpasset nye merke- og HMS-databladforskrifter, fastsatt i januar 1998. Etc.

Egne opplysninger:

Informasjonen på dette HMS-databladet er i henhold til våre nåværende opplysninger og beste oppfatning angående riktig bruk og håndteringen av dette produktet under normale forhold. Enhver bruk av produktet som ikke er i samsvar med dette HMS-databladet, eller som medfører bruk av produktet i kombinasjon med andre produkter eller enhver annen prosess er brukerens ansvar.

FC-201AF LIGHT WATER (TM) 1% AFFF (FREEZE PROTECTED)

FØLGENDE PRODUKTER DEKKES AV DETTE HMS-DATABLADET:

|           |                                                                                    |
|-----------|------------------------------------------------------------------------------------|
| 3M ID-nr. | : ZF-0002-0842-9<br>3M Light Water 1% AFFF Fire<br>Fighting Foam, FC-201AF, 200 L  |
| 3M ID-nr. | : ZF-0002-0841-1<br>3M Light Water 1% AFFF Fire<br>Fighting Foam, FC-201AF, 1000 L |
| 3M ID-nr. | : XF-0008-0205-8<br>3M Light Water 1% AFFF Fire<br>Fighting Foam, FC-201AF, Bulk   |
| 3M ID-nr. | : XF-0008-0203-3<br>3M Light Water 1% AFFF Fire<br>Fighting Foam, FC-201AF, 1000 L |
| 3M ID-nr. | : XF-0008-0202-5<br>3M Light Water 1% AFFF Fire<br>Fighting Foam, FC-201AF, 200 L  |
| 3M ID-nr. | : XF-0008-0200-9<br>3M Light Water 1% AFFF Fire<br>Fighting Foam, FC-201AF, 20 L   |

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