DEPARTMENT OF THE NAVY
NAVAL RESEARCH LABORATORY
WASHINGTON, D.C. 20375

IN REPLY REFER TO:

6180-326:EJJ:HWC:ara
NRL Prob. No.
61-0051-B-4
MAY 2 1984

From: Commanding Officer, Naval Research Laboratory
To: Commander, Naval Sea Systems Command (Code 55Z31)

Subj: Qualification of AFFF Liquid Concentrate Fire Extinguishing Agents Manufactured by the 3M Company, Chemolite Siding, Chemolite, Minnesota; results of

Ref: (a) NAVSEASYSCOM ltr SEA 55Z31/PAP/4123/24385 Ser 1519 of 16 June 1983

Encl: (1) Two copies of subject report

1. In accordance with reference (a), equivalency testing of the subject products have been conducted in order to determine compliance with the requirements of MIL-F-24385C. A report covering the work is forwarded herewith as enclosure (1).

William M. Tolles

W. M. TOLLES
By direction

Copy to (w/1 copy encl (1))
NAVSEASYSCOM (Code 0534)
(Code 996)
(Code 05DC4)
NAVWSUPCEN (Code 304E)
NAVMAT (Code 04F)

6180-326A:EJJ:HWC:ara
16 April 1984

Subj: Qualification Testing of AFFF Liquid Concentrate Fire Extinguishing Agents Manufactured by the 3M Company, Chemolite Siding, Chemolite, Minnesota; results of

Ref: (a) Military Specification MIL-F-24385C with Amendment 2

1. AFFF concentrates manufactured by the 3M Company at Chemolite Siding, Chemolite, Minnesota and designated as FC-203CE (3%-Type) and FC-206CE (6%-Type) were tested in accordance with the procedures of reference (a).

2. The test data obtained are summarized in the attached tables.

3. Both candidate AFFF concentrates met the requirements tested for in reference (a).

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Encl (1) to NRL ltr
6180-326:EJJ:HWC:ara
NRL Prob. No.
61-0051-B-4

MIL-F-24385C Qualification Test Results

Submitted by: 3M (FC-203-CE & FC-206CE)

Para 3.3 Chemical & Physical Requirements for Concentrates

Requirement	Value	Results 203CE	Results 206CE
Refractive index, minimum 3% type	1.3630	1.3761	~~X~~
6% type	1.3580	~~X~~	1.3610
Viscosity, centistokes			
maximum, 5°C 3% Type	20	10.3	
minimum, 25°C 3% Type	2	4.7	X
maximum, 5°C 6% Type	10	X	4.3
minimum, 25°C 6% Type	2	X	2.3
Hydrogen ion concentration (pH)	7.0-8.5		
Spreading coefficient, minimum	3		
Foamability			
fresh water, minimum expansion	6.0		
minutes, minimum drain time	2.5		
sea water, minimum expansion	6.0	8.1	6.9
minutes, min drain time	2.5	5.8	4.7
Corrosion rate			
General, maximum			
steel, milli inches/yr	1.5		
Cu-Ni, milli inches/yr	1.0		
Ni-Cu, milli inches/yr	1.0		
Bronze, milligrams	100		
Localized CRES	No pits		
Total halides, ppm, maximum, 3% type	500	28.4	X
6% type	250	X	13.9
Dry chemical compatibility, seconds, minimum	360		
Environmental impact			
Toxicity, TC_{50}, mg/L, minimum			
3% type	500		
6% type	1000		
COD, mg/L, maximum, 3% type	1000K	718	X
6% type	500K	X	363
BOD/COD, minimum	0.9	>0.9	>0.9

NAVAL RESEARCH LABORATORY
FIRE SUPPRESSION SECTION
WASHINGTON, D.C. 20375

MIL-F-24385C Qualification Test Results

Submitted by: 3M (FC-203CE & FC-206CE)

Para 3.4 Fire Performance

Requirement	Value	Results 203CE	Results 206CE
28 ft^2 fire test			
extinguishing time, seconds, maximum			
fresh water, half strength	45		
full strength	30		
sea water, half strength	45		
full strength	30		
quintuple strength	55		
burnback time, seconds, minimum			
fresh water, half strength	300		
full strength	360		
sea water, half stength	300		
full strength	360		
quintuple strength	200		
50 ft^2 fire test			
extinguishing time, seconds, maximum	50	49	37
burnback time, sec, minimum	360	515	505
40-sec summation, minimum	320	320	333
FILM FORMATION - NO IGNITION		NO IGN.	NO IGN

3.3.4	Total fluorine, percent		2.13	1.17
5.1.1.1	(f) Cap removal torque, in-lbs, maximum	50		