Test Report

No. 2012-F-4373/Bio 02

Applicant:	BIO-EX S.A.S. Z.I. La Petite Olivière 69770 Montrottier FRANCE
Manufacturer:	BIO-EX S.A.S. Z.I. La Petite Olivière 69770 Montrottier FRANCE
Application date:	2012-09-20
Application:	Test of a foam concentrate for compliance with EN 1568-3 : 2008
Type designation:	BIO FOR N
Foam concentrate grade according to Annex A of EN 1568:	Synthetic foam concentrate (S)
Receipt of sample:	2012-10-01
Test laboratory:	MPA Dresden GmbH Official laboratory for fire extinguishing media and fire extinguishers Fuchsmühlenweg 6F 09599 Freiberg GERMANY

This report comprises 11 pages inclusive 1 annex.

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General information:

Only equipment and materials detailed in this report have been subjected to the tests. Test results apply to the tested samples only.

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Publications of test reports and information on tests for publicity purposes require the written approval of the laboratory in every isolated case.

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Summary:

The synthetic foam concentrate BIO FOR N has been tested in accordance with the standard EN 1568

- part 3 (low expansion foam for application to water immiscible liquids).

The tested foam concentrate with designation BIO FOR N meets the requirements of the standard EN 1568-3, issue 2008.

Extinguishing performance class and burnback resistance level:

EN 1568 part	By use of	
	potable water	simulated sea water
3	**III C**	**Please note the special information no. 1 below**

Information:

1. The tests with simulated sea water were not carried out.
2. Container marking of the foam concentrate has to be prepared in accordance with clause 11 of DIN EN 1568.

14th January 2013

Grad. Eng. Dittrich
Laboratory Manager

Grad. Eng. Walter
Official

1. General

Tests have been carried out in accordance with the requirements of the standard EN 1568-3 (low expansion foam/ application to water-immiscible liquids).

2. Chemical composition

The chemical composition of the foam concentrate has not been submitted by the manufacturer to the laboratory.

3. Submitted documents

/1/ Product Data sheet, dated 2008-12-23

4. Results of tests

4.1 Laboratory tests - characteristics

4.1.1 General characteristics of the foam concentrate (clauses 4 to 6 of EN 1568)

Characteristic		Requirement EN 1568	Declaration of manufacturer	Reference dimension of laboratory	Requirement met (yes/no)
pH Value	(20°C)	6,0 – 9,5	7,0 ± 1,0	7,32	Yes
Density g/cm³	(20°C)	–	1,02 ± 0,02	1,033	1)
Kin. Viscosity mm^2/s	(20°C) (0°C)	– –	– –	9,98 17,17	1)
Refraction index	n^D_{20}	–	–	1,3723	1)
Freezing point	°C	–	–	- 5	1)
Sediment before ageing after ageing	Vol %	 ≤ 0,25 ≤ 1,0	 – –	 < 0,25 < 1,0	 Yes Yes
Sample through a 180 µm - sieve dispersible	(yes/no)	Yes	–	Yes	Yes
Infrared spectrogram		–	–	Annex 1	1)

4.1.2 Temperature conditioning (annex E of EN 1568)

Is the foam concentrate adversely affected by storage at -30°C (declaration of manufacturer)	(yes/no)	No
Low temperature conditioning according to annex E.2	(yes/no)	Yes
High temperature conditioning according to annex E.3	(yes/no)	Yes
Storage of temperature conditioned samples at 20 ± 5°C minimum 48 h and maximum 72 h after conditioning According to annex E.2 / E.3	(yes/no)	Yes
Actual storage duration in days		3
Division of temperature conditioned samples according to annex E.4	(yes/no)	Yes

1) No assessment because of no requirements for these characteristics in the standard

4.1.3 Surface tension and spreading coefficient of the 1 per cent foam concentrate solution (clauses 7 and 8 of EN 1568)

Characteristic		Requirement EN 1568	Reference dimension of laboratory
Surface tension (mN/m) (procedure: with ring)	Untreated sample	–	24,50
	Sample conditioned according to annex E.2 and E.3 of EN 1568		
	Top sample	0,95 bis 1,05 times	24,40
	Bottom sample	0,95 bis 1,05 times	24,13
Requirement according to clause 7 of EN 1568 met (yes/no)			Yes
Interface tension (mN/m)	Untreated sample	–	4,76
	Sample conditioned according to annex E.2 and E.3 of EN 1568		
	Top sample	–	4,57
	Bottom sample	–	4,48
Spreading coefficient [1] (mN/m)	Untreated sample	[2]	- 3,72
	Sample conditioned according to annex E.2 and E.3 of EN 1568		
	Top sample	[2]	- 3,43
	Bottom sample	[2]	- 3,07
Requirement according to clause 8 of EN 1568 met (yes/no)			Yes

[1] Surface tension – cyclohexane T_C = 25,54 mN/m

[2] The foam concentrate isn´t declared as "film-forming". No requirement.

4.1.4 Expansion and drainage of foam (clause 9 of EN 1568-3)

By the manufacturer recommended usage concentration: 1%

Usage concentration of foam concentrate for the test: 1%

4.1.4.1 Low expansion foam

Expansion values by using of potable water

Characteristic		Reference dimension
Expansion value	Untreated sample	8,65
Sample conditioned in accordance with annex E.2 and E.3 of EN 1568-3		
Expansion value	Top sample	6,95
	Bottom sample	9,09
Requirement according to clause 9.2 a) of EN 1568-3 met [1] (yes/no)		Yes

Expansion values by using of simulated sea water

Characteristic		Reference dimension
Expansion value	Untreated sample	
Sample conditioned in accordance with annex E.2 and E.3 of EN 1568-3		
Expansion value	Top sample	
	Bottom sample	
Requirement according to clause 9.2 c) of EN 1568-3 met [1] (yes/no)		

[1] Expansion values of temperature conditioned samples are not allowed to differ more than 20% of the value obtained with the untreated sample from each other or from the value obtained with the untreated sample.

25%- drainage time by using of potable water

Characteristic			Reference dimension
25%- drainage time	(min:s)	Untreated sample	5:06
Sample conditioned in accordance with annex E.2 and E.3 of EN 1568-3			
25%- drainage time	(min:s)	Top sample	4:06
		Bottom sample	5:42
Requirement according to clause 9.2 b) of EN 1568-3 met [1)]	(yes/no)		Yes

25%- drainage time by using of simulated sea water

Characteristic			Reference dimension
25%- drainage time	(min:s)	Untreated sample	
Sample conditioned in accordance with annex E.2 and E.3 of EN 1568-3			
25%- drainage time	(min:s)	Top sample	
		Bottom sample	
Requirement according to clause 9.2 d) of EN 1568-3 met [1)]	(yes/no)		

1) The 25% drainage time of temperature conditioned samples are not allowed to differ more than 20% of the value obtained with the untreated sample from each other or from the value obtained with the untreated sample.

50%- drainage time (without assessment according to the standard)

Characteristic		**Reference dimension**
50%- drainage time (min:s) *Potable water*	Untreated sample	10:06
Sample conditioned in accordance with annex E.2 and E.3 of EN 1568-3		
50%- drainage time (min:s) *Potable water*	Top sample	8:06
	Bottom sample	9:54
50%- drainage time (min:s) *Simulated sea water*	Untreated sample	
Sample conditioned in accordance with annex E.2 and E.3 of EN 1568-3		
50%- drainage time (min:s) *Simulated sea water*	Top sample	
	Bottom sample	

4.2 Test fire performance of low expansion foam (clause 10 of EN 1568-3)

4.2.1 Test results obtained with gentle application

Characteristic		Reference dimension		
Usage concentration		1 %		
Air temperature		16 °C		
Test object size		4,52 m²		
Fuel / quantity		144 l Heptan		
Fuel temperature		16 °C		
Water temperature		18 °C		
Foam solution temperature		18 °C		
Wind speed		0 m/s		
Preburning time		60 s		
		Test 1	Test 2	Test 3
		Potable water	Potable water	
90 % control time	(min:s)	1:46	2:08	
99 % control time	(min:s)	2:34	2:50	
Extinction time	(min:s)	3:29	3:19	
Foam application time	(s)	300	300	
25 % burnback time	(min:s)	13:03	13:15	
Extinguishing performance class and burnback resistance level in accordance with clause 10 of EN 1568-3 reached [1)]	(yes/no)	Yes	Yes	

[1)] See table 1 EN 1568-3.

4.2.2 Extinguishing performance class and burnback resistance level in accordance with table 1 of EN 1568-3

Test by using of	Potable water	Simulated sea water
Extinguishing performance	III	
Burnback resistance level	C	

5. Requirements to marking

The label for container marking has not been submitted. Note the information on page 2.

Annex 1: Infrared spectrogram of foam concentrate BIO FOR N