



Test Report - Fire Extinguishing Media to EN 1568-3:2008 Specification

Office: **Helsingborg**

Date: **03 December 2009**

This certificate is issued to **NARFOAMKAR**

to certify that at their request the undersigned Surveyor to this society did attend their designated test facilities for the purpose of selecting samples of **NKF 65** to confirm that the properties were within the technical specifications and were in accordance with EN 1568-3: 2008(E).

The necessary tests were witnessed and the results obtained were all within the limits given in the manufacturer's specification, and the requirements of EN 1568-3:2008(E).

Report:

Tolerance to Freezing and thawing (Annex E)

No stratification or non-homogeneity could be detected in the sample;

Sediment (Annex C)

Before ageing of the sample = <0.1%
 After ageing of the sample = <0.1%
 (24 hours at 60 °C)

Viscosity at 20 °C = 3 mPa.s

pH of the concentrate at 20 °C = 7.80

Surface Tension, Interfacial Tension and spreading coefficient (Annex F)

	<u>Surface Tension</u> Dynes/cm	<u>Interfacial Tension</u> Dynes/cm	<u>Spreading Coefficient</u> Dynes/cm
Before Conditioning	18.2	1.8	5.6
After Conditioning			
Top Sample	18.2	1.6	5.2
Bottom Sample	18.1	1.3	5.6
at -30 °C for 24 hrs			
followed by 48 hrs at 20 °C			
and at 60 °C for 7 days			
followed by 2 days at 20 °C			

Expansion and Drainage (Annex G)

	Fresh water		Sea water	
Before Conditioning of the sample				
Expansion	7.45		8.15	
25% drainage time	2' 15"		2' 28"	
50% drainage time	4' 10"		4' 42"	
After Conditioning of the sample				
In accordance with Annex E				
Expansion	7.56	7.62	8.03	8.07
25% drainage time	2' 40"	2' 28"	2' 50"	2' 54"
50% drainage time	4' 36"	4' 52"	5' 00"	5' 00"

Lloyd's Register, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as the 'Lloyd's Register Group'. The Lloyd's Register Group assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register Group entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.

Fire Tests (Annex H)

A) Forceful application in accordance with EN 1568-3

Fire Tests carried out in accordance with Annex H1 and H3 using:-

Fresh water and Sea water	
Pre burn time	60 seconds
Foam application	180 seconds
Wait after foam application	300 seconds
Fire tray	144B (4.5 m ²)
Fuel	Commercial Heptane on water bed
Air Temperature (°C)	11 °C
Water Temperature (°C)	17 °C
Fuel Temperature (°C)	17 °C
Foam Temperature (°C)	17 °C
Wind speed (m/sec.)	< 0.5

	<u>Fresh water</u>	<u>Sea water</u>	<u>Fresh water</u>
90% Control	0' 55"	0' 45"	0' 53"
99% Control	1' 15"	1' 01"	1' 14"
100% Extinction	1' 36"	1' 33"	1' 43"
25% Burnback time	N/A	N/A	N/A

B) Gentle application in accordance with EN 1568-3

Fire Tests carried out in accordance with Annex H1 and H2 using:-

Fresh water and Sea water	
Pre burn time	60 seconds
Foam application	300 seconds
Wait after foam application	300 seconds
Fire try	144B (4.5 m ²)
Fuel	Commercial Heptane on water bed
Air Temperature (°C)	11 °C
Water Temperature (°C)	17 °C
Fuel Temperature (°C)	17 °C
Foam Temperature (°C)	17 °C
Wind speed (m/sec.)	< 0.5

	<u>Fresh water</u>	<u>Sea water</u>	<u>Fresh water</u>
90% Control	0' 56"	1' 01"	1' 12"
99% Control	1' 23"	1' 13"	2' 35"
100% Extinction	1' 50"	1' 40"	3' 12"
25% Burnback time	16' 01"	16' 10"	16' 40"

From the above test results it is confirmed that **NKF 65**

is a film forming foam concentrate suitable for use at 3% concentration with potable water and sea water.

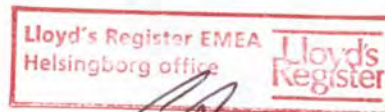
NKF 65 has tolerance to freezing and thawing (annex E). The product is suitable for storage above -30 °C. The fire extinguishing performance is **Class I** and the burnback level is **B** using potable water and sea water.

Performance level achieved:

Extinguishment **Class I**

Burnback resistance level **B**.

Client: **NARFOAMKAR**



Peter Andersson for Gerhard A Kucer
 Surveyor to Lloyd's Register EMEA

A member of the Lloyd's Register Group



Test Report - Fire Extinguishing Media to EN 1568-3:2008 Specification

Office: Helsingborg

Date: 03 December 2009

This certificate is issued to **NARFOAMKAR**

to certify that at their request the undersigned Surveyor to this society did attend their designated test facilities for the purpose of selecting samples of **NKF 60** to confirm that the properties were within the technical specifications and were in accordance with EN 1568-3: 2008(E).

The necessary tests were witnessed and the results obtained were all within the limits given in the manufacturer's specification, and the requirements of EN 1568-3:2008(E).

Report:

Tolerance to Freezing and thawing (Annex E)

No stratification or non-homogeneity could be detected in the sample;

Sediment (Annex C)

Before ageing of the sample	=	<0.1%
After ageing of the sample (24 hours at 60 °C)	=	<0.1%

Viscosity at 20 °C	=	3 mPa.s
--------------------	---	---------

pH of the concentrate at 20 °C	=	7.94
--------------------------------	---	------

Surface Tension, Interfacial Tension and spreading coefficient (Annex F)

	<u>Surface Tension</u> Dynes/cm	<u>Interfacial Tension</u> Dynes/cm	<u>Spreading Coefficient</u> Dynes/cm
Before Conditioning	18.1	2.2	4.7
After Conditioning			
Top Sample	18.2	2.0	4.8
at -30 °C for 24 hrs			
Bottom Sample	18.1	2.0	4.9
followed by 48 hrs at 20 °C and at 60 °C for 7 days followed by 2 days at 20 °C			

Expansion and Drainage (Annex G)

Before Conditioning of the sample	Fresh water		Sea water	
Expansion	7.18		6.89	
25% drainage time	1' 32"		1' 32"	
50% drainage time	3' 29"		3' 21"	
After Conditioning of the sample	Fresh Water		Sea Water	
In accordance with Annex E	Top	Bottom	Top	Bottom
Expansion	6.83	6.92	7.25	7.38
25% drainage time	1' 29"	1' 20"	1' 46"	1' 48"
50% drainage time	3' 05"	4' 00"	3' 38"	3' 38"

Lloyd's Register, its affiliates and subsidiaries and their respective officers, employees or agents are, individually and collectively, referred to in this clause as the 'Lloyd's Register Group'. The Lloyd's Register Group assumes no responsibility and shall not be liable to any person for any loss, damage or expense caused by reliance on the information or advice in this document or howsoever provided, unless that person has signed a contract with the relevant Lloyd's Register Group entity for the provision of this information or advice and in that case any responsibility or liability is exclusively on the terms and conditions set out in that contract.

Fire Tests (Annex H)

A) Gentle application in accordance with EN 1568-3

Fire Tests carried out in accordance with Annex H1 and H2 using:-

Fresh water and Sea water

Pre burn time	60 seconds
Foam application	300 seconds
Wait after foam application	300 seconds
Fire tray	144B (4.5 m ²)
Fuel	Commercial Heptane on water bed
Air Temperature (°C)	11 °C
Water Temperature (°C)	17 °C
Fuel Temperature (°C)	17 °C
Foam Temperature (°C)	18 °C
Wind speed (m/sec.)	< 0.5

	<u>Fresh water</u>	<u>Sea water</u>	<u>Fresh water</u>
90% Control	1' 15"	1' 40"	1' 53"
99% Control	2' 15"	2' 00"	3' 00"
100% Extinction	2' 49"	2' 24"	3' 55"
25% Burnback time	15' 29"	17' 10"	16' 19"

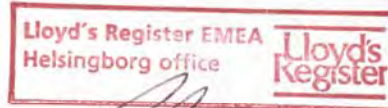
From the above test results it is confirmed that **NKF 60** is a film forming foam concentrate suitable for use at 3% concentration with potable water and sea water.

NKF 60 has tolerance to freezing and thawing (annex E). The product is suitable for storage above -30 °C. The fire extinguishing performance is **Class III** and the burnback level is **B** using potable water and sea water.

Performance level achieved:

Extinguishment **Class III**
Burnback resistance level **B**.

Client: **NARFOAMKAR**



Peter Andersson for Gerhard A Kucer
Surveyor to Lloyd's Register EMEA

A member of the Lloyd's Register Group