

100 % ENVIRONMENTALLY FRIENDLY FLAME RETARDANT FIRE PROTECTION

FREE FROM PFAS - BROMINE - BOR

Table of Contents

- Page 2-5SMDS/Security Material Data SheetPage 6-13Final Reports from RISE
- Page 14-15 Guidelines
- Page 16 Partners



Proud sub-contractor to Nobel Night Cap since 2009





Section 1. IDENTIFICATION OF THE PRODUCT AND THE COMPANY

Product Name: Ecofireprotection

Catalog Code: EFP833 EFP AB has filed a patent application (PCT) for EFP833.

Product Type:

Flame retardant

Companyn Identification: Ecofireprotection AB Gamlegårdsvägen 55 S-21620 Malmö SWEDEN

Tel: +46 722 49 69 29 E-mail: info@ecofireprotection.se E-mail: www.ecofireprotection.se

Emergency Number: 112 (In Europe), if less urgent call +46 833 12 31

Section 2. HAZARDS IDENTIFICATION

No classification needed. No specific risks related to intended use.

Section 3. COMPOSITION AND INFORMATION ON INGREDIENTS

Ecofireprotection is a water solution. No classification needed for the ingredients.

Section 4. FIRST AID MEASURES

The following general first aid measures are recommended: Ingestion: Wash mouth with water. Eye Contact: Rinse eyes with water.

Section 5. FIRE FIGHTING MEASURES

General Information: The product is non-combustible.

Extinguishing Media: Use the appropriate fire extinguishing media for the material that is burning.

Section 6. ACCIDENTAL RELEASE MEASURES

Prevent spill from spreading to drains and surrounding environment.

Section 7. HANDLING AND STORAGE

Section 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits: Not available.

General Information on Protection: Keep the product away from people and animals to as large an extent as possible. Handle it as though it might be harmful.



Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: Clear colourless liquid

pH: ca 7,6 Boiling point: 100 °C Flash point: Not available Flammability: Not available Explosivity: Not available

Section 10. STABILITY AND REACTIVITY DATA

Stability: The product is stable when handled and stored as recommended.

Section 11. TOXICOLOGICAL INFORMATION

No classification needed. No information indicates that the product can cause chronic, carcinogenic, mutagenic or genetic effects. The product is not corrosive.

Section 12. ECOLOGICAL INFORMATION

This product consists of easily decomposable natural substances and is not classified as environmentally hazardous.

Section 13. DISPOSAL CONSIDERATIONS

The product is not classified as hazardous waste. Dispose of in a manner consistent with federal, state, and local regulations.

Section 14. TRANSPORT INFORMATION

The product is not classified as dangerous goods.

Section 15. REGULATORY INFORMATION

No classification or statutory label needed according to European directives.

Section 16. OTHER INFORMATION

This product can not, according to the available information, cause any serious damage to people or the environment when used as intended.

The information in this safety data sheet is believed to be accurate and represents the best informa-tion currently available to us. However, we make no warranty of merchantibility or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.



Section 1. IDENTIFICATION OF THE PRODUCT AND THE COMPANY

Product Name: Ecofireprotection

Catalog Code: EFP330 EFP AB has filed a patent application (PCT) for EFP330.

Product Type:

Flame retardant

Companyn Identification: Ecofireprotection AB Gamlegårdsvägen 55 S-21620 Malmö SWEDEN

Tel: +46 722 49 69 29 E-mail: info@ecofireprotection.se E-mail: www.ecofireprotection.se

Emergency Number: 112 (In Europe), if less urgent call +46 833 12 31

Section 2. HAZARDS IDENTIFICATION

No classification needed. No specific risks related to intended use.

Section 3. COMPOSITION AND INFORMATION ON INGREDIENTS

Ecofireprotection is a powder. No classification needed for the ingredients.

Section 4. FIRST AID MEASURES

The following general first aid measures are recommended:

Ingestion: Wash mouth with water. **Eye Contact:** Rinse eyes with water.

Section 5. FIRE FIGHTING MEASURES

General Information: The product is non-combustible.

Extinguishing Media: Use the appropriate fire extinguishing media for the material that is burning.

Section 6. ACCIDENTAL RELEASE MEASURES

Vacuum or sweep up material, avoid raising dust.

Section 7. HANDLING AND STORAGE

Section 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits: Not available.

General Information on Protection: Keep the product away from people and animals to as large an extent as possible. Handle it as though it might be harmful.



Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: White powder Solubility in water: max 7,5% (at 20 °C) Decomposition temperature: 240-280 °C Flash point: Not available Flammability: Not available Explosivity: Not available

Section 10. STABILITY AND REACTIVITY DATA

Stability: The product is stable when handled and stored as recommended.

Section 11. TOXICOLOGICAL INFORMATION

No classification needed.

No information indicates that the product can cause chronic, carcinogenic, mutagenic or genetic effects. Irritation on skin, respiratory tract or eyes may occur on prolonged or repeated exposure, especially for sensitive persons. The product is not corrosive.

Section 12. ECOLOGICAL INFORMATION

This product consists of easily decomposable natural substances and is not classified as environmen-tally hazardous.

Section 13. DISPOSAL CONSIDERATIONS

The product is not classified as hazardous waste. Dispose of in a manner consistent with federal, state, and local regulations.

Section 14. TRANSPORT INFORMATION

The product is not classified as dangerous goods.

Section 15. REGULATORY INFORMATION

No classification or statutory label needed according to European directives.

Section 16. OTHER INFORMATION

This product can not, according to the available information, cause any serious damage to people or the environment when used as intended.

The information in this safety data sheet is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantibility or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.



SP Technical Research Institute of Sweden Laboratories are accredited by the Swedish Board for Accreditation and Conformity Assessment (SWEOAC) under the terms of Swedish legislation. This report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Ignitability according to SIS 65 00 82

(2 appendices)

Product

Flame retardant treated cotton cloth. The flame retardant called "EFP" is water based. The flame retardant was applied to the cotton cloth by spraying. The non-treated cotton cloth has nominal area weight of 155 g/nl and the flame retardant treated cotton cloth hasa nominal area weight of 175 g/nl (dry weight).

Manufacturer

Ecofireprotection AB, Malmö, Sweden.

Purpose of test

Basis for technical fire classification.

Sampling

The sample was delivered by the client. It is not known to SP Fire Technology if the product received is representative of the mean production characteristics. The sample was received March 28, 2008 at SP Fire Technology.

Test results

The test results are given in appendix 1-2. The test results relate only to the behaviour of the test specimens of a product under the particular conditions of the test.

Criteria

According to the guidelines for type approval "Boverkets riktlinjer för typgodkännande, Brand-skydd, Allmänna råd 1993:2, utgåva 2" section 1.1.2 a material, thinner than or equal to 3.5 mm, is deemed difficult to ignite if the material during the test according to SIS 65 00 82 the following requirements are fulfilled for the best five out of six tests:

• The after flame time shall not exceed 2 seconds in average and not 3 seconds in any test.

• Burnt, melted or in any other way destroyed length shall not exceed 90 mm in average and not 115 mm in any test.

Assessment

The tested samples of the flame retardant treated cotton cloth meet the requirements for material difficult to ignite according to the criteria mentioned above.

The tested samples of cotton cloth, not flame retardant treated, do not meet the requirements for material difficult to ignite according to the criteria mentioned above because of too long after flame time and too long damaged length.

SP Technical Research Institute of Sweden Fire Technology - Fire Dynamics

Appendices

1-2 Test results

This is a translation from the Swedish original document. In the event of any dispute as to the content of the document, the Swedish text shall take precedence.



SP Technical Research Institute of Sweden Laboratories are accredited by the Swedish Board for Accreditation and Conformity Assessment (SWEOAC) under the terms of Swedish

legislation. This report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Test results - SIS 65 00 82, 1966

Product

Flame retardant treated cotton cloth. The flame retardant called "EFP" is water based. The flame retardant was applied to the cotton cloth by spraying. The non-treated cotton cloth has nominal area weight of 155 g/n/ and the flame retardant treated cotton cloth has a nominal area weight of 175 g/nl (dry weight).

Test results

Test results						А	verage value
Test no	1	2	(3)	4	5	6	of 5 tests
Direction	↑	1	(↑)	\rightarrow	\rightarrow	\rightarrow	
After flame time, s	0	0	(0)	0	0	0	<u>0</u>
After glow time, s	0	0	(0)	0	0	0	<u>0</u>
Damaged length, mm	68	70	(79)	67	72	69	<u>69</u>
Burning drops	No	No	(No)	No	No	No	-

Explanation of results

According to Swedish Rules, issued by Boverket (Allmänna råd 1993:2), the test with the worst result shall be ignored when calculating the average value. Test no 3 was thus excluded when the average values were calculated.

Measurecl data

Thickness 0.4 mm approximately. Area weight 175 gin/ approximately.

Conditioning

Temperature (20 - 2) °C. Relative humidity (65 ± 2) %.

Pre-treatment

Without any laundry or dry-cleaning prior to test.

Date of test

April 7, 2008.



SP Technical Research Institute of Sweden

Laboratories are accredited by the Swedish Board for Accreditation and Conformity Assessment (SWEOAC) under the terms of Swedish legislation. This report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Test results -SIS 65 00 82, 1966

Product

Not flame retardant treated cotton cloth. The cotton cloth has a nominal area weight of 155 g/nl.

Test results

Test results						A	verage value
Test no	1	2	(3)	4	5	6	of 5 tests
Direction	Ŷ	Ŷ	↑	\rightarrow	\rightarrow	\rightarrow	
After flame time, s	17	-	-	18	-	-	-
After glow time, s	0	-	-	0	-	-	-
Damaged length, mm	300	-	-	300	-	-	-
Burning drops	No	-	-	No	-	-	-

Explanation of results

According to Swedish Rules, issued by Boverket (Allmänna råd 1993:2), the test with the worst result shall be ignored when calculating the average value.

Measured data

Thickness 0.4 mm approximately. Area weight 155 g/m2 approximately.

Conditioning

Temperature (20 - 2) °C. Relative humidity (65 ± 2) %.

Pre-treatment

Without any laundry or dry-cleaning prior to test.

Date of test

April 7, 2008.



SP Technical Research Institute of Sweden Laboratories are accredited by the Swedish Board for Accreditation and Conformity Assessment (SWEOAC) under the terms of Swedish legislation. This report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Heat release and smoke production according to ISO 5660-1 and ISO 5660-2 and simulation with ConeTools software

(2 appendices)

Products

Product called "EFP", water based flame retardant. All materials in the table below were soaked for 48 hours in the flame retardant.

Sample	Marked
٨	Soft board

- A Soft board B Particle board, light
- C Plywood
- D Particle board, dark

Manufacturer

Ecofireprotection AB, Malmö, Sweden.

Purpose of test

Basis for technical fire classification.

Sampling

The samples were delivered by the client. It is not known to the Technology if the products received are representative of the mean production characteristics.

The samples were received March 28, 2008 at SP Fire Technology.

Test procedure

In the Cone Calorimeter, ISO 5666-1, specimens of 0.1 by 0.1 m are exposed to controlled levels of radiant heating. The specimen surface is therefore heated up and an external spark ignitor ignites the pyrolysis gases from the specimen. The gases are collected by a hood and extracted by an exhaust fan.

The heat release rate (HRR) is determined by measurements of the oxygen consumption derived from the oxygen concentration and the flow rate in the exhaust duct. The specimen is placed on a load cell during testing. A retainer frame covers the periphery of the specimen. Smoke production rate is measured with a laser system.



Schematic drawing of the Cone calorimeter, ISO 5660.

Test results

Detailed the results are given in appendix 1. The test parameter explanation is given in appendix 2. The test results relate only to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

Deviation from standard

Only one test on each material was carried out, instead of the thee stipulated in the standard.



Comments on the test results

All products were tested with an irradiance of 35 kW/m2

The simulation software ConeTools indicates the classification according to EN 13501-1 based on ISO 5660 test results. In table I below a summary of the test results are given including the indicated FIGRA value and classification. It shall be noted that the final classification according to EN 13501-1 is based also on smoke production and burning droplets/debris which is not taken into account by ConeTools.

Table 1					
Product	t _{ign} (s)	q _{max} (kW/m2)	FIGRA _{0.4 MJ} (W/s)	TSP (m ²)	Indicated class
Prov A	NI*	-	-	-	В
Prov B	66	203	316	3	D
Prov C	87	103	64	2	C
Prov D	157	89	27	0	В

* NI = No ignition

According to Swedish building regulations walls and ceiling surface materials in buildings of class Br2 and Br3 shall have properties C-s2,d0 or D-s2,d0. In escape ways in buildings of class Br 1 properties B-s I,d0 and C-s2,d0 are asked for.

SP Technical Research Institute of Sweden

Appendices

I Test results 2 Test parameters explanation



SP Technical Research Institute of Sweden Laboratories are accredited by the Swedish Board for Accreditation and Conformity Assessment (SWEOAC) under the terms of Swedish legislation. This report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Test results ISO 5660-1:2002 and ISO 5660-2:2002

Products

Product called "EFP", water based flame retardant. All materials in the table below were soaked for 48 hours in the flame retardant.

Sample	Marked
А	Soft board
В	Particle board, light
С	Plywood
D	Particle board, dark

Test specification

Irradiance level: 35 kW/m2. Calibration constant (C): 0.042221 m^{1/2} g^{1/2} k^{1/2} Orientation: Horizontal Backing: No other than the non-combustible required in the standard. Fastening: The product was loosely put on the backing. Note: The retainer frame was used.

Test results

Property	Name of variable	Sample A	Sample B	Sample C	Sample D
Flashing (min:s)	tflash	÷	- 1	-	÷
Ignition (min:s)	tign	NI*	01:06	01:27	02:37
All flaming ceased (min:s)	text	*1. : : /	15:49	19:54	05:23
Test time (min:s)	ttest	10:00	17:49	21:54	07:23
Heat release rate (kW/m ²)	q	See figure	1		See figure 2
Peak heat release rate (kW/m ²)	q _{max}	-**	203	103	89
Average heat release, 3 min (kW/m ²)	q180	_**	126	51	40
Average heat release, 5 min (kW/m ²)	q ₃₀₀	_**	102	49	27
Total heat produced (MJ/m ²)	THR	_**	88.7	54.4	8.1
Smoke production rate (m ² /m ² s)	SPR	See figure	3		See figure 4
Peak smoke production (m^2/m^2s)	SPRmax	0.8	1.6	0.4	1.0
Total smoke production over the non-					
flaming phase (m^2/m^2)	TSPnonft	-	21.1	12.7	34.7
Total smoke production over the flaming					
phase (m^2/m^2)	TSPn	-	289	170	44
Total smoke production (m^2/m^2)	TSP	4	310	183	79
Sample mass before test (g)	Mo	60.0	86.7	61.9	104.4
Sample mass at sustained flaming (g)	Ms		85.7	59.3	99.5
Sample mass after test (g)	Mr	37.2	18.6	13.0	83.1
Average mass loss rate (g/m ² s)	MLR _{ien-end}	-	7.5	4.3	6.4
Average mass loss rate (g/m ² s)	MLR10-90	4.4	8.9	5.7	6.4
Total mass loss (g/m^2)	TML	-	7588	5233	1855
Effective heat of combustion (MJ/kg)	ΔH _c	_**	11.7	10.4	4.4
Specific smoke production (m ² /kg)	SEA		41	35	43
Max average rate of heat emission	and the second				
(kW/m^2)	MARHE	11.5	96.0	52.8	23.1
Volume flow in exhaust duct (1/s)	V	24	24	24	24

*NI = no ignition

** No heat release data is given since the specimen did not ignite.

Note

Smoke production for product A and D is slightly under-estimated due to a measurement error (see figure 3 and 4).



SP Technical Research Institute of Sweden

Laboratories are accredited by the Swedish Board for Accreditation and Conformity Assessment (SWEOAC) under the terms of Swedish legislation. This report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.



Conditioning

Temperature (23 ± 2) °C. Relative humidity (50 ± 5) %.



Report issued by an Accredited Laboratory Handled by, department Fire Technology Date: 2008-05-20 Reference: F805018

SP Technical Research Institute of Sweden

Laboratories are accredited by the Swedish Board for Accreditation and Conformity Assessment (SWEOAC) under the terms of Swedish legislation. This report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Test results explanation - ISO 5660

Parameter	Explanation
Test start	The test specimen is subjected to the irradiance and the clock is started.
tflash	Time from test start until flames with shorter duration than 1 s.
t _{ign}	Time from test start until sustained flaming with duration more than 10 s.
T _{ext}	Time from test start until the flames have died out.
End of test	Defined as the time when both, the product has been extinguished for 2 minutes, and the mass loss is less than 150 g/m ² during 1 minute.
T _{test}	Test time. From test start until end of test.
q _{max}	Peak heat release rate during the entire test.
9180	Average heat release rate during 3 minutes from ignition. If the test is terminated before, the heat release rate is taken as 0 from the end of test.
q 300	Average heat release rate during 5 minutes from ignition. If the test is terminated before, the heat release rate is taken as 0 from the end of test.
THR	Total Heat Released from test start until end of test.
SPR _{max}	Peak Smoke Production Rate from test start until end of test.
TSP	Total Smoke Produced from test start until end of test.
Mo	Mass of specimen.
Ms	Mass of specimen at sustained flaming.
Mf	Mass of specimen at the end of the test.
MLR _{ign-end}	Mass Loss Rate. Average mass loss rate from ignition until end of test.
MLR ₁₀₋₉₀	Mass Loss Rate. Average mass loss rate between 10% and 90% of mass loss.
TML	Total mass loss from ignition until end of test.
ΔH _c	Effective heat of combustion calculated as the ratio between total energy released and total mass loss calculated from ignition until end of test.
SEA	Specific Extinction Area defined as the ratio between total smoke released and total mass loss calculated from test start until end of test.
MARHE	Maximum Average Rate of Heat Emission defined as the maximum of the function (cumulative heat release between $t = 0$ and time = t) divided by (time = t).
v	Volume flow rate in exhaust duct. Average during the test.

Guidelines for treating absorbing materials with EFP EcofireProtection

Date: 2018-01-17

Test results explanation - ISO 5660

A versatile environmentally friendly Flame Retardant solution for the fire protection of flammable fabrics, tested SIS 65 00 82

EFP is a dry powdered product that must first be mixed with water to become a Flame Re-tardant solution which is suitable for all types of absorbing materials.

To be applied by applied by spraying

EFP is water based and odourless and will not increase the moisture pick-up of fabrics, nor promote the growth of mildew.

Technical data

1Kg to be mixed with 10 litres of plain tap water at 20° C until all the powder is completely dissolved. We recommend that each mix is done to suit the actual job – don't mix more than necessary at one time. However once mixed the liquid is stable for up to 3 years if stored in a tightly sealed container away from direct sunlight at over 15° C

Before application

Make a thorough inspection of the material to be treated and the surrounding area. Be particularly aware of and stains, discolouration, wear and tear or any unusual odours. If in doubt – make the client aware of the problem and if possible take pictures for future reference. Make sure that the area is well ventilated and that all unauthorised persons are removed.

If possible remove plants. Cover fish tanks and all electronic equipment Access to the area only after the treatment has dried – this will depend upon the temperature and type of material treated.

How to apply EFP

All fabrics must be clean and dry. Apply EFP to a small piece of material to ensure dyes are water-fast and do not water mark or shrink.

By Spray

EFP can be applied using a conventional hand sprayer but for larger volumes we recommend an airless pump sprayer. Spray at a low pressure max 2 bar with a flat profile nozzle and large droplet size. Apply with the spray-head held 200 to 300 millimetres from the fabric to be treated.

If possible position the objects to be treated horizontally to reduce run off, if this is not possible such as when spraying fixed furniture, then two light sprayings are preferable to one heavy application to correct dosage.

Guidelines for treating absorbing materials with EFP EcofireProtection

Date: 2018-01-17

Coverage

Depends on absorbency and thickness of the material; apply so that the material is soaked to saturation point see reference table for m2 dosages for different materials.

Note

Try not to spray onto glass, metal or decorative surfaces. Wash with clean water.

Equipment

Run through and wash down with clean water



TeeJet® Even Flat Spray Tips



Features

- Provides uniform distribution throughout the flat spray pattern.
- Easily mounted on spray boom or planter. Available with VisiFlo color-coding in stainless steel or all stainless steel, hardened stainless steel and brass.

Registered at:

www.byggvarubedomningen.se www.sundahus.se https://www.wellcertified.com (Pending) https://www.breeam.com (Pending)

In co-op with:

www.ri.se www.kemi.se https://echa.europa.eu (CLH register) SACCNY, Swedish-American Chamber of Commerce, New York

Patent monitored and protected by

www.dennemeyer.com Mr. Udo Hinz Patent Stockholm



Ecofireprotection AB | Gamlegårdsvägen 55 | S-216 20 Malmö | SWEDEN Tel: +46 722-49 69 29 | E-mail: info@ecofireprotection.se | E-mail: www.ecofireprotection.se