

Association for the Promotion of Fire Research
and Safety Technology

TEST REPORT

Systems and Equipment Laboratory

APPLICANT:

TEST:

Extinguishing tests on different types of superficial fires using the inhibitor named **Mangiafuoco**



LICOF – Official Testing Laboratory
RD. 1614/1985 of August 1.
M.O. of May 21, 1991

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AFITI
LICOF

**Center for Fire Study
and Research**



**MINISTERIO
DE INDUSTRIA, TURISMO
Y COMERCIO**

Association for the Promotion of Fire Research
and Safety Technology

Tomas de la Rosa Sánchez, General Director of AFITI declares:

- That AFITI (Association for the Promotion of Fire Research and Technological Study), is a non-profit entity declared as a Public Utility by the Council of Ministers, in its meeting dated January 27, 1995.
- That LICOF (Center for Fire Study and Research) is governed by the Ministry of Industry, Tourism and Commerce, D.R. 1614/1985 and M.O. of May 21, 1991, corresponding, by agreement, the management to AFITI.
- That the test(s) that are described in this Technical Report, have been carried out at the Technical Tests Unit (LICOF).
- That the execution of said tests have been developed within the framework of the Collaboration Agreement between the Association for the Promotion of Fire Research and Safety Technology (AFITI) and the Association of Wood Research and Development of Castilla-La Mancha (A.I.M.C.M.).

May 7, 2007

Signed: Tomas de la Rosa Sánchez
General Director

Acknowledgements / Accreditations: MINISTRY OF INDUSTRY, TOURISM AND COMMERCE, MINISTRY OF PROMOTION, ENAC and IMO.

Notified Body: NOTIFIED BODY TO THE EUROPEAN COMMISSION WITH No. 1168.

Member of: AEC, AELAF, AENOR, ASELF, AIDINCO, EGOLF, ENAC, EUROLAB, FORÉTICA and the NFPA.

APPLICANT:

Application Date: 13-Feb-2007

SAMPLES SUBJECT TO THE TESTS

Information provided by the applicant

Sample: **Flame Inhibitor**
Manufacturer: Euro Spare Parts s.r.l.
Brand: Models: **Mangiafuoco**
ESP 004 8B (samples 7428A to 7428H)
ESP 005 13B (samples 7428I to 7428O)

TESTS PERFORMED

**Tests on extinguishing different types of superficial fires using
the inhibitor named Mangiafuoco**

Test procedure: P-002/07-SYE, Rev. 1

test methods defined specifically for this product

Date performed: 16-Apr-07



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The results of this Test Report make sole and exclusive reference to equipped fire extinguishers subject to this test and not to the product in general.

The information contained in this Test Report is confidential therefore the Laboratory can not make information related to this Test Report available to third parties, unless authorized by the Applicant.

The present Test Report must not be reproduced partially without the Laboratory's written approval.

1.- REPORT'S OBJECTIVE

The present report gathers results obtained from tests to extinguish different types of non-developed fires using the referenced inhibitor.

Due to not having a regulated or standardized test methodology relative to this type of product (*) a specific test procedure has been defined. This methodology has been proposed by the applicant and accepted by the laboratory and it is described further along in this report.

(*) the product can not be considered a portable fire extinguisher as is established in EN 3-7:04, "Portable fire extinguishers. Part 7: characteristics, functioning requirements and test methods".

2.- TESTS. SAMPLES and METHODOLOGY.

2.1.- TEST SAMPLE

The product to be tested, according to the documentation furnished...

... the extinguishing agent being used is composed of Potassium Nitrate, organic oxidizer and plasticizer resin; and the propellant agent is an aerosol made up of Potassium Carbonate, Ammoniac Carbonate and Potassium Bicarbonate particles.

... the activation is produced by a lighter made up of two elements, situated on opposite extremes of the product. The potassium based first element is located in the upper extreme of the article; the second element is located in the inner extreme of the article and is composed of a rubbing head situated on the phosphorous based extractable plug:

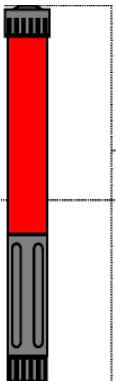


... there are different product presentations corresponding to different sizes based on the extinguishing agent's load.



... is a non-valid article to extinguish embers.

Two types of samples have been received in the laboratory:



		Types of samples	
Brand		Mangiafuoco	
Commercial reference		ESP004	ESP005
		ESP004 8B	ESP005 13B
L, Total length (*)	(mm)	266	330
Ø, diameter of the extinguishing agent's tube container(*)	(mm)	32.4	32.4
Weight before discharge (*)	(g)	312	590
Weight after discharge (*)	(g)	218	411
Extinguishing agent's load (*)	(g)	93	179

(*) Measurements made on one random sample.

From each type of sample received the laboratory randomly chose those subject to this test.

2.2.- TEST RISK AND METHODOLOGY

Five types of tests have been performed corresponding to five types of test risk:

Class B Fire → gasoline contained in trays.

Risk tested: Six trays (width × length × height) 350 mm × 400 mm × 40 mm approx. in a row are used, separated from each other by 600 mm. The total length of risk tested is around 5400 mm. approximately 1 L of water and 0.4 L of 95 octane gasoline is poured into each tray.

Ignition and pre-combustion: the trays are lighted one after another and time is allowed to elapse before extinguishing begins.

Begin discharge: after pre-combustion the sample subject to this test is put into operation by projecting the extinguishing agent onto the fire.

Extinction: the amount of time needed to extinguish the fire is measured from the beginning of the discharge.

End of the discharge: the amount of time the sample operates is measured, in other words, the amount of time that the sample discharges the extinguishing agent.

End of test: the test is considered to be completed when the extinguishing agent finishes discharging.

Residual Combustible: once the test is finished, confirmation that the combustible has been consumed is done by lighting the trays once more.

Class B Fire → gasoline spilled on the vehicle's motor

Risk tested: A complete vehicle (Renault Clio) is utilized. The hood is opened and a prefixed amount of 95 octane gasoline is poured on the motor (between 0.5 l and 1.0 l). The hood stays open during the test.

Ignition and pre-combustion: the poured gasoline is lit and a pre-established amount of time is left to pass before beginning the extinction which does not permit any other part of the vehicle to light.

Begin discharge: after pre-combustion the sample subject to this test is put into operation by projecting the extinguishing agent onto the fire.

Extinction: the amount of time needed to extinguish the fire is measured from the beginning of the discharge. Given the nature of the test, it may not be possible to precisely measure this amount of time.

End of the discharge: the amount of time the sample operates is measured, in other words, the amount of time that the sample discharges the extinguishing agent.

End of test: the test is considered to be completed when the extinguishing agent finishes discharging.

Residual Combustible: once the test is finished, confirmation that the combustible has been consumed is done by trying to light the area where the combustible was spilled.

Class B Fire → gasoline spilled on a tire.

Risk tested: A tire (Continental 185/60/R15 84 H) is placed on a tray to avoid spills. 0.5 l of 95 octane gasoline is poured on the tire.

Ignition and pre-combustion: the poured gasoline is lit and a pre-established amount of time is left to pass before beginning the extinction which does not permit the tire to be lit.

Begin discharge: after pre-combustion the sample subject to this test is put into operation by projecting the extinguishing agent onto the fire.

Extinction: the amount of time needed to extinguish the fire is measured from the beginning of the discharge. Given the nature of the test, it may not be possible to precisely measure this amount of time.

End of the discharge: the amount of time the sample operates is measured, in other words, the amount of time that the sample discharges the extinguishing agent.

End of test: the test is considered to be completed when the extinguishing agent finishes discharging.

Residual Combustible: once the test is finished, confirmation that the combustible has been consumed is done by trying to light the area where the combustible was spilled.

Class C Fire → liquid propane gas

Risk tested: Three tanks of liquid propane gas, 25 kg each. The internal diameter of the valves on the tanks is greater than 7 mm. The tanks are connected to each other by a collecting tub with an internal diameter of 25 mm. This tube contains a pressure meter, a needle-type valve with a 12.4 mm internal diameter, and a burner with a 7 mm diameter set at a distance greater than 2 m from the valve by a tube with a 22 mm internal diameter.

This mount is established (except for that related to the tanks' load and water valve) in regulation UNE 23110-5:85 (EN 3-5:84), "Portable fire extinguishers. Part 5: specifications and complementary tests" for class C home fires". This regulation was annulled in 1996.

Ignition and pre-combustion: the valve is opened $\frac{1}{4}$ turn and it lights when the propane gas begins to escape. It is not necessary to wait a preset amount of time before beginning the sample's discharge. The pressure during the test is between 6.0 bar and 6.5 bar.

Begin discharge: the sample subject to the tests is put into operation and the extinguishing agent is projected onto the risk to be extinguished.

Extinction: the amount of time that it takes to extinguish the fire from the beginning of the discharge is measured.

End of the discharge: the amount of time the sample operates is measured, in other words, the amount of time that the sample discharges the extinguishing agent.

End of test: the test is considered to be completed when the extinguishing agent finishes discharging.

Class E Fire → electrical arc

This test has been performed by another laboratory

To carry out the **testing of the dielectric** that established in paragraph. 9 from regulation EN 3-7:04 has been taken into account, "Portable fire extinguishers. Part 7: characteristics, functioning requirements and test methods". Instead of applying voltage of 35,000 V, 1000 V has been applied.

This test seeks to determine the effectiveness of the sample tested on electrical equipment subject to voltages up to 1000 V at a distance of 1 m by measuring the electrical conductivity of the extinguishing agents' stream.

3.- TESTS. RESULTS

Sample tested

Laboratory reference	7428A	7428C	7428J	7428K	7428F	7428E	7428I
Commercial reference	ESP004	ESP004	ESP005	ESP005	ESP004	ESP004	ESP005

Risk tested

Type of Combustible	95-Octane Gas					propane gas	
Quantity of Combustible (l)	2.4	0.5	1.0	0.5	0.5	-----	
Type of combustible							
	trays	spill on vehicle motor			Spill on tire	Liquid Propane Gas	

Times

Ignition (min:s)	00:00	00:00	00:00	00:00	00:00	00:00	00:00
Beginning of discharge (min:s)	00:20	00:13	00:12	00:07	00:17	00:24	00:13
Extinction (min:s)	01:04	~01:05	~01:50	~00:55	~00:29	00:29	00:21
End of discharge (min:s)	01:13	01:07	01:50	01:24	01:07	01:17	01:24
Combustible residual (Y/N)	Yes	Yes	no	Yes	Yes	-----	-----

Results

Extinction (Y/N)	Yes	Yes	no	Yes	Yes	Yes	Yes
Extinction time (min:s)	00:44	~00:52	-----	~00:48	~00:42	00:05	00:08
Duration of discharge (min:s)	00:53	00:54	01:38	01:17	00:50	00:53	01:41

For the results on the dielectric (class E fire) test consult appendix 1.

Arganda del Rey, May 7, 2007

VºBº



Signed: Diana Luengo Rojo
Technical Director of LICOF



Signed: M. Villegas Barranco
Laboratory of Systems and Equipment
Technical Assistant Director

Appendices

Appendix 1

Dielectric test

L.C.O.E. digitalized test report



L.C.O.E.
OFFICIAL CENTRAL
ELECTROTECHNICS



TEST REPORT

No. 200704350222

On a sample supplied to this Laboratory by the AFITI-LICO F, S.A. company, which communicates the following significant data:

BRAND: Mangia Fuoco

MODEL: ESP005 13B

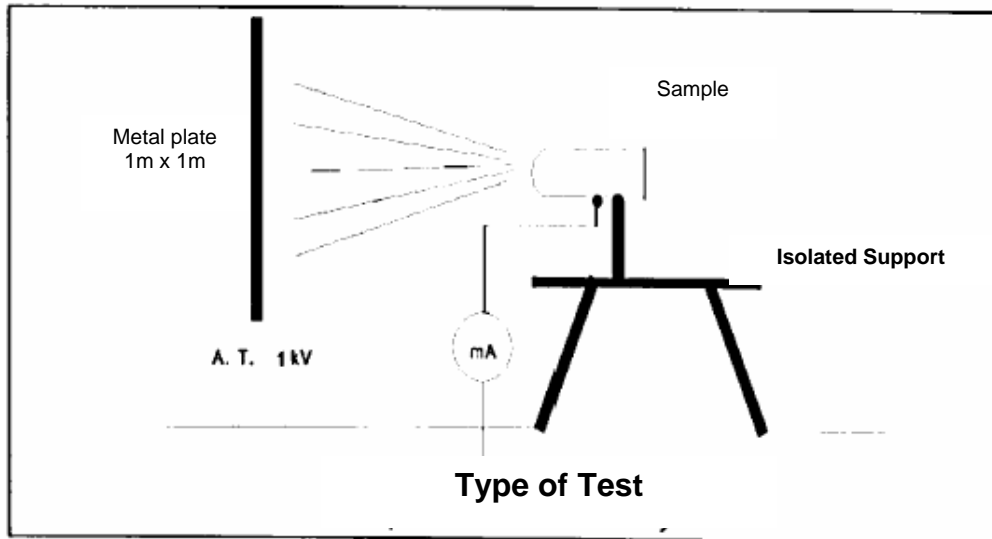
IDENTIFICATION N°: 7428 M

TEST PROCEDURE

The sample was set on an isolated support that would allow the discharge orifice to be at a distance of 1 m from the center of a square metal plate measuring 1 m x 1 m.

A voltage of 1 kV was applied to the plate and the leakage current was measured on the plate and the sample fixed to the ground when the internal substance that it contained was sprayed.

The maximum leakage current measured was 0.0127 mA, a value inferior to that specified (0.5 mA) in regulation UNE-EN 3-7:2004 Point 4 Provision A



Conclusion: SATISFACTORY.

And so that it maybe recorded, at the request of the AFITI-LICO F, S.A. company, the present is issued in Madrid, May 3, two thousand seven.

VºBº

Rafael Guirado

Realizado por:

Carlos Gallego

C/ José Gutierrez Abascal, 2 – 2006 MADRID – Tel.: 91 562 51 16 – Fax: 81 561 88 18 – www.fii.es

Appendix 2

Photographs.

Samples received in the laboratory
two models of the product named *mangiafuoco* are received



Reference: ESP004 8B



Reference: ESP005 8B

Appendix 2

Photographs.

Test on sample 7428A

Fire from gasoline contained in trays - Class B fires



Appendix 2 Photographs.



Appendix 2 Photographs.

Test on sample 74284F
fire from gasoline poured on tire – Class B fires



Appendix 2 Photographs.

