Certificates

version: 2.3

F-Exx® 1.5 F / 3.o F (Fire-Ex 1.5 F / 3.o F)

of

Tectro SMT GmbH
Thrasoltstrasse 46
54439 Saarburg
Germany

Phone: + (49) 6581 / 912 - 0
Telefax: + (49) 6581 / 912 - 410

www.tectro.de

feuerloescher@tectro.de

Noatec GmbH (patents and licenses)

Tectro SMT GmbH (developer and producer)

contents

1 Certificate – producer

1.1 Environmental Verifier ISO 14001:2004

Environmental Verifier - Dr. Ulrich Hommelsheim

Certificate

No.: P14179Tectro

By an environmental audit, February 28, 2014
evidence was given that

Tectro SMT GmbH
At the site:
Thrasoltstrasse 46 - D-54439 Saarburg

has implemented and operates an Environmental Management System
in compliance with the requirements of the Environmental Management Standard

ISO 14001:2004

Scope of certification comprises:
Development, construction, manufacturing, assembly and marketing of technical plastic parts and tools without responsibility for the product development

This Certificate is valid until: March 4, 2017

Aachen, March 4, 2014

D - V - 0117

Umweltgutachter
Dr. Ulrich Hommelsheim
Zulassungs-Nr.: DE-V-0117
Am Weißenberg 39 - D-52074 Aachen

1.2 **ISO-TS 16949:2009**

Certificate

Standard **ISO / TS 16949:2009**
(3rd edition, 2009-06-15)

Certificate Registr. No. 01 111 080034
IATF Certificate No. 0202349

Certificate Holder: **TECTRO SMT GmbH**
Thrasoltstraße 40
D - 54439 Saarburg

Scope: Production and assembly of plastic parts and complete units

Proof has been furnished by means of an audit that the requirements of ISO / TS 16949:2009 are met.

Issue date/Expiry date: The certificate is valid from 2015-01-27 until 2018-01-26.

Release date: 2015-02-02

TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln
Germany

2-IAO-QMC 01003

1 / 1

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Precisely Right.

2 Certificate – extinguishing agent

2.1 EG Safety data sheet

Flame Guard BV, Nederland

SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006 and 453/2010 Version 4.0/EN
HCA BLUS V Revision date 24/10/2014

1 1. Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier
HCA BLUS-V; Article No. FG-ART00222

1.2 Relevant identified uses of the substance or mixture and uses advised against
Fire extinguishing liquid specifically applicable for fat fires
Relevant identified uses
The product is intended for industrial use and for professionals only.
Uses advised against
-

1.3 Details of the supplier of the safety data sheet
Flame Guard Sales Nijmegen B.V.
P.O. Box 6572
6503 GB Nijmegen
The Netherlands
Telephone: +31(0)24 3789581
E-Mail : info@flameguard.nl

1.4 Emergency telephone number
Telephone: +31(0)24 3789581(only available during office hours-09.00-17.00- UTC+1)
Emergency telephone no.: +31 (0)30–2748888, only for the doctor.

2 Hazards identification

2.1 Classification of the substance or mixture

2.1.1 Classification according to Regulation (EC) No 1272/2008
This product does not meet the criteria for classification in any hazard class according to Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures.

2.1.2 Classification according to Directive 1999/45/EC
This mixture does not meet the criteria for classification as dangerous accordance to Directive 1999/45/EC and amendments.

2.1.3 Additional information
-

2.2 Label elements
Labelling according Directive 1999/45/EC
This mixture is not labelled according to Directive 1999/45/EC

2.3 Other hazards
According to the present state of knowledge provided this product is handled correctly, there is no danger to humans or the environment.

3 Composition / Information on ingredients.

3.1 Substances

3.2 Mixtures
Chemical characterization
Aqueous solution of alkaline salts.

Page 1 of 6

4 First aid measures.

4.1 Description of first aid measures

General notes

No adverse effects are expected during normal use of the substance, however if any effects do appear the following recommendations apply:

Following inhalation

Remove to fresh air. If necessary, consult a doctor.

Following skin contact

Rinse with plenty of water for at least 15 minutes. Remove any contaminated clothing or contact lenses.

Following eye contact

Remove possible contact lenses. Contamination of the eyes must be treated by thorough irrigation with water for 15 minutes, with the eyelids held open. Do not rub or scratch eyes. If necessary, consult a doctor.

Following ingestion

If swallowed, wash out mouth with plenty of water. Do not induce vomiting. Keep at rest and seek medical advice.

4.2 Most important symptoms and effects, both acute and delayed

No typical symptoms and effects known. If symptoms persists, seek medical advice.

4.3 Indication of any immediate medical attention and special treatment needed

No additional information available.

5 Fire fighting measures

5.1 Extinguishing media

Suitable extinguishing media

Product itself is an extinguishing agent. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

None

5.2 Special hazards arising from the substance or mixture

Under certain conditions incomplete combustion may produce hazardous gases. Do not inhale fumes of fire.

5.3 Advice for fire fighters

Product itself does not burn. Fire fighters have to wear self-contained breathing apparatus.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel

Wear suitable protective equipment to prevent contamination of skin, eyes and personal clothing.

6.1.2 For emergency responders

No special measures

6.2 Environmental precautions

Small amounts can be diluted and entered into ground water system

6.3 Methods and materials for containment and cleaning up

6.3.1 For containment

Contaminated equipment must be cleaned with water.

6.3.2 For cleaning up

Material spillage must be taken up with absorbent material (e.g. sand, silica gel, acid binder, sawdust).

6.3.3 Other information

Observe local disposal regulations.

6.4 Reference to other sections

-

7 Handling and storage

7.1 Precautions for safe handling

According to the composition of this product no special precaution rules are necessary for this product. When handling observe the usual industrial precautionary measures. Use hand gloves, protective clothes and safety glasses

7.2 Conditions for safe storage, including any incompatibilities

Technical measures and storage conditions

Store in original packaging between -30°C and +60°C. When stored in original packaging at normal temperature(20°C) results in shelf life of > 5 years. Storage at extreme temperatures e.g. -30°C or +60°C shorted the shelf life to approx. 1year and results in changed physical properties e.g. viscosity. Product is hygroscopic; prevent contact with other liquids.

7.3 Specific end use(s)

No data available

8 Exposure controls/personal protection

8.1 Control parameters

Contains no substances with occupational limit values

8.2 Exposure controls

8.2.1 Appropriate engineering controls

-

8.2.2 Personal protective equipment

8.2.2.1 Eye and face protection

Safety glasses are recommended

8.2.2.2 Skin protection

Hand protection

For prolonged or repeated handling, nitrile, neoprene or latex rubber gloves are recommended

Other

Avoid contact with eyes and skin. Wash hands before breaks and after work. Use barrier skin cream. Do not eat, drink or smoke at work.

8.2.2.3 Respiratory protection

Suitable respiratory protective device recommended

8.2.2.4 Thermal hazards

-

8.2.3 Environmental exposure controls

No special environmental precautions required

9 Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance
Transparent liquid
Odour
Like acetic acid
pH(ISO 787-9)
Ca. 9
Freeze point
Ca. -30°C
Specific gravity(ISO 2811)
Ca. 1.3 kg/l
Solid content(ISO 3251)
Ca. 53%
Conductivity(ISO 7888)
110 ± 20 mS/cm
Solubility in water
Completely soluble.
Boiling point
Ca. 110°C
Explosive properties
The product is not explosive.
Thermal decomposition
> 150°C

9.2 Other information

-

10 Stability and reactivity

10.1 Reactivity
No dangerous reaction known under conditions of normal use.

10.2 Chemical stability
The product is stable under standard storage conditions.

10.3 Possibility of hazardous reactions
No hazardous reaction known.

10.4 Conditions to avoid
Keep away from strong oxidisers, strong alkali and strong acid materials to prevents exothermic reaction

10.5 Incompatible materials
Not determined

10.6 Hazardous decomposition products
Possible decomposition are carbon monoxide, carbon dioxide, oxygen of nitrogen.

11 Toxicological information

11.1 Information on toxicological effects
There are no data available on the preparation itself
Acute toxicity

LD50 > 5000 mg/kg(Information is not based on tests, but on ATE_{mix} calculation)

Irritation

Based on the available data the classification criteria are not met

Corrosivity

No data available

Sensitisation

No data available

Repeated dose toxicity

No data available

Carcinogenicity

There is no hint for any carcinogenic potential

Mutagenicity

The product is not considered to mutagenic

Toxicity for reproduction

No indication of reproductive toxicity

11.2 Other information

The information is based on the substances, not on the preparation itself

12 Ecological information

12.1 Toxicity

There is no data available on the preparation itself.

12.2 Persistence and degradability

There is no data available on the preparation itself.

12.3 Bio-accumulative potential

There is no data available on the preparation itself.

12.4 Mobility in soil

There is no data available on the preparation itself.

12.5 Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB

12.6 Other adverse effects

There is no data available on the preparation itself.

12.7 Additional information

-

13 Disposal considerations

13.1 Waste treatment methods

The mixture is not classified as hazardous waste according to Directive 2008/98/EC. Waste should be disposed of according to local regulation. Completely emptied packaging may be given for recycling.

14 Transport information

14.1 UN Number

NOT DANGEROUS GOODS

14.2 UN proper shipping name

Transport by land according to ADR/RID

Not applicable

Marine transport in accordance with IMDG

Not applicable

Air transport in accordance with AITA

Not applicable

14.3 Transport hazard class

Product is not classified as dangerous goods.

14.4 Packaging group

Not applicable

14.5 Environmental hazards

Product is not classified dangerous for the environment.

14.6 Special precautions for user

Relevant information under section 6 to 8

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

15 Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulation

Regulation (EC) No 1907/2006; REGULATION (EC) No 1272/2008; Directive 1999/45/EC; Regulation 453/2010; Directive 2008/98/EC.

Other EU regulations

VOC-Guideline 1999/13/CE and/or 2004/04/EC: Not applicable

Candidate List of Substances of Very High Concern for Authorisation

This product does not contain substances of very high concern

15.2 Chemical Safety Assessment

No Chemical Safety Assessment has been carried out for this mixture by the supplier

16 Other information

16.1 Indication of changes

Date of previous issue	03/04/2012
Version	3.0

16.2 Abbreviations and acronyms

-

16.3 Key literature references and sources for data

Regulations, databases, literature, own research

16.4 Relevant R-, H- and EUH-phrases (number and full text)

None

16.5 Training advice

Technical Documentation of HCA BLUS-V is available on request.

16.6 Further information:

The information contained in this Safety Data Sheet corresponds to our level of knowledge at the time of publication. The purpose of this Safety Data Sheet is to describe the products in terms of their safety requirements. The data does not signify any warranty with regard to the product's properties. In all cases, it is the responsibility of the user to determine the applicability of such information and recommendations and the suitability of any products for its own particular purpose. All warranties are excluded. Our most current General Sales Conditions shall apply.

2.2 **Certificate of Compliance**

Flame Guard b.v.
Hulsenweg 10-20 | 6534 AM Nijmegen | The Netherlands
P.O. Box 6572 | 6503 GB Nijmegen | The Netherlands
T +31 (0)24 37 89 581 | F +31 (0)24 37 87 583
info@flameguard.nl | www.flameguard.nl

ABN-AMRO 24.47.30.865 | IBAN: NL38FTSB0244730865 | SWIFT: FTSBNL2RXXX
BTW nr: NL 818074164B01 | KvK 09171908

Certificate of Compliance
Unbedenklichkeitserklärung

4/4/2012

The Undersigned hereby declares/ Der Unterzeichnende erklärt:

HCA BLUS-V is a fire extinguishing liquid specially developed for cooking fat fires.
HCA BLUS-V ist ein Feuerlösch-Flüssigkeit speziell für das Kochen Fettbrände entwickelt.

The product exists of the following raw materials:
Das Produkt besteht aus folgenden Rohstoffen:

Name	CAS No.	Weight %	Classification
[redacted]			Not classified
			Not Classified
			Not Classified
1,2,3-Benzotriazole	95-14-7	≤ 0.25%	X_n, R20/22, R36, R52/53

The product HCA BLUS-V does not have to be classified as dangerous according to Regulation 1907/2006 (REACH) and Directive 67/548/EC or 1999/45/EC.
Das Produkt ist nach der Entsprechend von Verordnung (EG) Nr. 1272/2008 [CLP] und EG-Richtlinien 67/548/EWG bzw. 1999/45/EG nicht kennzeichnungspflichtig.

Possible Hazards:
No specific dangers known, if the regulations / instructions for storage and handling are considered.
Mögliche Gefahren:
Keine besonderen Gefahren bekannt, wenn die Vorschriften/Hinweise für Lagerung und Umgang beachtet werden.

B.Sc./ Dipl. Ing M. T. van Dreumel
Head of Laboratory/ Laborleiter
FLAME GUARD B.V.

FLAME GUARD B.V.
Postbus 6572
6503 GB NIJMEGEN

member of AFG GROUP

3 Certificates – F-Exx 1.5 F / 3.o F system

The following investigation reports from the MPA Dresden refer to the DIN SPEC 14411, which is similar in content to the EN3. The objects on fire to determine the extinguishing performance, and the determination of electrical conductivity largely correspond to those of the EN3-7.

Quote: DIN German Institute for Standardization (registered association):

Household aerosol fire extinguishers quickly help put out small fires. DIN SPEC is the basis for a European Standard

(2013-08-02) DIN SPEC 14411 "Extinguishing aerosol dispensers" specifies the properties and extinguishing capacity of disposable aerosol fire extinguishers, while also laying down the relevant test methods. Extinguishing aerosol dispensers according to DIN SPEC 14411 are mainly intended for domestic and private use. The requirements apply to products with less than 1 kg or 1 l of extinguishing medium. These are lighter and easier to handle than conventional fire extinguishers. They are about the same size as hair spray or spray paint aerosol cans, and are usually operated in the same way. The extinguishing medium, whether foam or dry powder, is sprayed onto the fire from a distance of approximately one metre.

The DIN SPEC, developed in accordance with the prestandard procedure, took only six months from initiation to publication, being able to draw on the work by the European working group on the same topic. In turn, the specification is now being used to speed up the development of a European Standard.

Firefighting and other technical associations in Germany were in favour of developing the DIN SPEC to meet their demands for higher safety and quality for aerosol fire extinguishers. The rising number of dangerous incidents with aerosol fire sprays (for instance there have been cases where they have burst) and recalls (of which there were two in 2011 alone), show that there is a need for unified provisions to ensure greater safety in this area.

http://www.din.de/cmd?level=tpl-artikel&cmstextid=203636&bcrumblevel=1&languageid=en

3.1 F-Exx 1.5 F - Fire Extinguishing asset class F (electrical testing see 3.2)

Test, Supervisory and Certification Body Recognized by the Construction Inspectorate
Testing body for fire extinguishing media and equipment
DIN EN ISO/IEC 17025: D-PL-17819-01-00; DIN EN 45011: D-ZE-17819-01-00
DIN EN ISO/IEC 17020: D-IS-17819-01-00
ZLS-GS-0099
Notified Body no. 0787

MPA Dresden

MPA Dresden GmbH • Fuchsmühlenweg 6F • D-09599 Freiberg

Tectro SMT GmbH
Thrasoltstraße 46
D-54439 Saarburg

Freiberg, 18 November 2014
Author: Mr. Bauer
Telephone: +49-(0)3731- 2 03 93 164
Fax: +49-(0)3731- 2 03 93 110
Email: t.bauer@mpa-dresden.de

Your commission of 23 October 2014

Investigation Report No. 20141462-2

Propellant-free fire extinguisher made of plastic, filled with 150 ml of aqueous solution, product designation **FIRE-EX 1.5 F (F-Exx® 1.5 F)**

- Examination of the extinguishing capacity on standardised test fires of Fire Classes F according to DIN EN 2

Customer:	Tectro SMT GmbH Thrasoltstraße 46 D-54439 Saarburg
Subject of the investigation:	FIRE-EX 1.5 F (F-Exx® 1.5 F)
Examination procedure:	Performance of tests as described in the relevant standards for fire extinguishers (see Section 4).
Laboratory:	MPA Dresden GmbH Officially recognised testing body for fire extinguishing media and equipment Fuchsmühlenweg 6F, D-09599 Freiberg, Germany
Test samples received:	05.11.2014, 6 pieces
Report:	This investigation report consists of 8 pages.

1. Order and instigation

The company Tectro SMT GmbH Saarburg has commissioned MPA Dresden GmbH to conduct selected tests on the fire extinguisher of type FIRE-EX 1.5 F (F-Exx® 1.5 F) as described in the relevant standards for fire extinguishers (see item 2 of the present report).

Tectro SMT GmbH supplied several samples of a propellant-free fire extinguisher with the designation FIRE-EX 1.5 F (F-Exx® 1.5 F) for examination.

2. Basis for the investigation

2.1. Test of extinguishing capacity for Fire Classes F according to

- Section 7.6.4, Annex G.5 (Fire Class F), DIN SPEC 14411: 2013-07

3. Subject of the investigation

3.1. *Propellant-free fire extinguisher*

Material:	plastic
Components:	elastic accumulator, actuator with spray nozzle, overcap, outer shell
Declared contents:	150 ml
Range of the extinguishing spray jet:	up to 2 m

(photo of the test sample see Annex 1)

3.2. *Fire extinguishing medium*

Designation:	HCA BLUS V
Extinguishing agent / type:	aqueous solution with organic salts

(chemical-physical characteristics of the fire-extinguishing agent see Annex 2)

Prüfen • Überwachen • Zertifizieren • MPA Dresden GmbH •

4. Investigation procedure

The extinguishing capacity was determined using the set-ups for fire extinguishing tests as described in Section 7.6.4 and Annex G.5 of the standard DIN SPEC 14411: 2013-07.

By definition, the experimental set-ups of the standard referred to are applicable to fire extinguishing spray cans (DIN SPEC 14411: 2013-07).

Due to its construction, the fire extinguishing device to be investigated does not fall directly within the scope of applicability of this test standard. It is however based on a comparable operating principle – a device that contains an extinguishing agent to be discharged by internal pressure and directed at a fire source. The investigation procedure selected is therefore basically suitable for assessing the fire extinguishing capacity of the FIRE-EX 1.5 F (F-Exx® 1.5 F) product.

The fire extinguishing capacity studies carried out on the samples submitted represent only a part of the tests on spray cans for extinguishing fires according to the stated standards.

5. Results of the investigation

5.1 Extinguishing capacity for test fires of Class F

Extinguishing capacity for test fires of Class F (Section 7.6.4 of DIN SPEC 14411 : 2013-07)

Test No.		1	2	3
Test fire size according to G.5.2 of Annex G		5 F		
Measured ambient temperature	(°C)	10	10	-
Permissible ambient temperature	(°C)	0 to 30		
Measured time to autoignition of oil	(h:min)	01:33	01:30	-
Max. permissible time to autoignition of oil	(h:min)	≤ 3:30		
Measured autoignition temperature	(°C)	351	348	-
Permissible autoignition temperature	(°C)	330 to 380		
Complete discharge of the entire contents without interruption	(yes/no)	Yes	Yes	-
Test fire extinguished	(yes/no)	Yes	Yes	-
Flammable material ejected	(yes/no)	No	No	-
Re-ignition or overflow of fuel within 20 min after complete discharge	(yes/no)	No	No	-
Remaining oil in the tray at the end of the test	(yes/no)	Yes	Yes	-
Enlargement of flames observed	(yes/no)	No	No	-
Achieved test fire rating - Fire Class F		**5 F**		

6. Summary and conclusions

The company Tectro SMT GmbH Saarburg has commissioned MPA Dresden GmbH to conduct selected tests on the fire extinguisher of type FIRE-EX 1.5 F (F-Exx® 1.5 F) as described in the relevant standards for fire extinguishers (see item 2 of the present report).

The extinguishing capacity was examined using the samples submitted and the measurement set-ups according to Section 7.6.4 and Annex G.5 of the DIN SPEC 14411: 2013-07 with positive results.

The results of the fire extinguishing tests carried out correspond to the following classifications of the fire extinguishing capacity:
5 F (DIN SPEC 14411 : 2013-07)

The extinguishing performance achieved is comparable with that of fire extinguisher spray cans according to the test standard referred to (see item 2 of the present report).

7. Special Information:

Due to its construction, the fire extinguishing device FIRE-EX 1.5 F (F-Exx® 1.5 F) cannot be directly classified into the scope of application of the standards for conventional fire extinguishing devices: DIN SPEC 14411 and EN 3-7.
FIRE-EX 1.5 F (F-Exx® 1.5 F) is a novel, propellant-free fire extinguishing device, filled with 150 ml of extinguishing agent solution.

The studies carried out serve for comparative assessment of the fire extinguishing performance of the FIRE-EX 1.5 F (F-Exx® 1.5 F), using the normal test procedures for such devices as described in the standards 2 referred to above.

The results of the investigation are not a proof of conformity (no proof of compliance) of the fire extinguishing device FIRE-EX 1.5 F (F-Exx® 1.5 F) with the requirements of the standards for fire-fighting equipment.

8. General notes:

Only the equipment and materials given in this report were used in the investigations. The results of the investigation refer only to the samples tested.

Extracts from the report may not be reproduced without the written agreement of MPA Dresden GmbH.

Publications of reports and references to investigations for advertising purposes require the written permission of MPA Dresden GmbH in each individual case.

Each page of this report bears the stamp of MPA Dresden GmbH.

04 December 2013

(Signature in german original)

Dipl.-Ing. Jürgen Dittrich
Head of the Testing Laboratory

(Signature in german original)

Dipl.-Ing. Bauer
Processor

Annex 1: **FIRE-EX 1.5 F (F-Exx® 1.5 F)**
Illustration (photograph) of the sample studied

Figure 1

Figure 2

Figure 3

Annex 2: Characteristics of the fire-extinguishing agent

Commercial name:	HCA BLUS V		
Characteristics	Manufacturer's specifications	Sample (Measurement)	Within specification (yes/no)
Density at 20°C (kg/dm³)	1.29 ± 0.02	1.281	Yes
Viscosity at 20°C (mm² s)	–	4.43	–
pH at 20°C	9 ± 1	9.16	Yes
Refractive index at 20	–	1.3941	–

3.2 F-Exx 3.o F - Fire Extinguishing asset class A and F, electrical testing

Test, Supervisory and Certification Body Recognized by the Construction Inspectorate
Testing body for fire extinguishing media and equipment
DIN EN ISO/IEC 17025: D-PL-17819-01-00; DIN EN 45011: D-ZE-17819-01-00
DIN EN ISO/IEC 17020: D-IS-17819-01-00
ZLS-GS-0066
Notified Body no. 0767

MPA Dresden

MPA Dresden GmbH • Fuchsmühlenweg 6F • D-09599 Freiberg

Tectro SMT GmbH
Thrasoltstraße 46
D-54439 Saarburg

Freiberg, 18 November 2014
Author: Mr. Bauer
Telephone: +49-(0)3731- 2 03 93 164
Fax: +49-(0)3731- 2 03 93 110
Email: t.bauer@mpa-dresden.de

Your commission of 23 October 2014

Investigation Report No. 20141462-1

Propellant-free fire extinguisher made of plastic, filled with 300 ml of extinguishing agent solution, product designation **FIRE-EX 3.0 F (F-Exx® 3.o F)**

- Examination of the extinguishing capacity on standardised test fires of Fire Classes A and F according to DIN EN 2
- Measurement of the electrical non-conductivity and conductivity respectively of the spray from the product FIRE-EX 3.o F in a standardised test set-up

Customer:	Tectro SMT GmbH Thrasoltstraße 46 D-54439 Saarburg
Subject of the investigation:	FIRE-EX 3.0 F (F-Exx® 3.o F)
Examination procedure:	Performance of tests as described in the relevant standards for fire extinguishers (see Section 4).
Laboratory:	MPA Dresden GmbH Officially recognised testing body for fire extinguishing media and equipment Fuchsmühlenweg 6F, D-09599 Freiberg, Germany
Test samples received:	05.11.2014, 10 pieces
Report:	This investigation report consists of 10 pages.

1. Order and instigation

The company Tectro SMT GmbH Saarburg has commissioned MPA Dresden GmbH to conduct selected tests on the fire extinguisher of type FIRE-EX 3.0 F (F-Exx® 3.o F) as described in the relevant standards for fire extinguishers (see item 2 of the present report).

Tectro SMT GmbH supplied several samples of a propellant-free fire extinguisher with the designation FIRE-EX 3.0 F (F-Exx® 3.o F) for examination.

2. Basis for the investigation

2.1. Section 4.7 and Annex G, extinguishing effect fire source *solid*, standard NF S 61-804 : 1998 Aerosol Generator with extinguishing function

2.2. Section 7.6.4 and Annex G.5, test of extinguishing capacity for Fire Class F, standard DIN SPEC 14411: 2013-07 fire extinguishing spray can

2.3. Section 5.8 and Annex H, test of electrical conductivity, standard DIN SPEC 14411: 2013-07 fire extinguishing spray can

2.4 Measurement of electrical conductivity at the test laboratory of MPA Dresden GmbH in Freiberg on 10 August 2012.

2.5 DIN VDE 0132: 2008, Firefighting and technical assistance in or near electrical installations

3. Subject of the investigation

3.1. *Propellant-free fire extinguisher*

Material:	plastic
Components:	elastic accumulator, actuator with spray nozzle, overcap, outer shell
Declared contents:	300 ml
Range of the extinguishing spray jet:	up to 3 m

(photo of the test sample see Annex 1)

3.2. *Fire extinguishing medium*

Designation:	HCA BLUS V
Extinguishing agent / type:	aqueous solution with organic salts

(chemical-physical characteristics of the fire-extinguishing agent see Annex 2)

4 Investigation procedure

The extinguishing capacity was determined using the set-ups for fire extinguishing tests as described in Section 4.7 and Annex G, standard NF S 61-804 : 1998 as well as Section 7.6.4 and Annex G.5, standard DIN SPEC 14411: 2013-07.

The measurement of electrical non-conductivity and electrical conductivity was determined using the set-up for a test as described in Section 5.8, Annex H, standard DIN SPEC 14411: 2013-07.

The extinguisher nozzle was selected as the connection point on the extinguisher for measuring the level of current. The test standard also requires that at least one metallic connection must exist between the extinguishing medium and one of the connection points. As all the extinguisher components are made from plastic, such a connection had to be created. This was done by inserting a copper wire into the extinguisher nozzle on the valve head and also connected in series with the connection point.

The conditions for the measurement procedure were completely in accordance with those given in the test standard above.

By definition, the experimental set-ups of the standard referred to are applicable to fire extinguishing spray cans (DIN SPEC 14411: 2013-07, NF S 61-804).

Due to its construction, the fire extinguishing device to be investigated does not fall directly within the scope of applicability of this test standard. It is however based on a comparable operating principle – a device that contains an extinguishing agent to be discharged by internal pressure and directed at a fire source. The investigation procedure selected is therefore basically suitable for assessing the fire extinguishing capacity of the FIRE-EX 3.0 F (F-Exx® 3.0 F) product.

The fire extinguishing capacity studies carried out on the samples submitted represent only a part of the tests on spray cans for extinguishing fires according to the stated standards.

5. Results of the investigation

5.1. Extinguishing capacity for test fires of Fire Class A

Extinguishing effect fire source *solid* (Section 4.7 of NF S 61-804)

Test No.		1	2	3
Test object		Annex G.1 NF S 61-804		
Moisture content of test fire wood: measured average	(%)	15	15	-
Permissible average moisture content of fire wood	(%)	10 to 15		
Measured temperature inside test chamber before ignition	(%)	9	9	-
Permissible temperature inside test chamber before ignition	(°C)	0 to 30		
Measured air speed inside test chamber before ignition	(ms^{-1})	0	0	-
Maximum permissible air speed before ignition	(ms^{-1})	draft-free room		
Test fire extinguished	(yes/no)	Yes	Yes	-
Measured time to extinction of test fire	(min:s)	2:58	2:49	-
Re-ignition after extinction	(yes/no)	No	No	
Achieved test fire size – Fire Class A		**fire source *solid***		

5.2. Extinguishing capacity for test fires of Class F

Extinguishing capacity for test fires of Class F (Section 7.6.4 of DIN SPEC 14411 : 2013-07)

Test No.		1	2	3
Test fire size according to G.5.2 of Annex G			25 F	
Measured ambient temperature	(°C)	10	11	-
Permissible ambient temperature	(°C)		0 to 30	
Measured time to autoignition of oil	(h:min)	1:01	1:14	-
Max. permissible time to autoignition of oil	(h:min)		≤ 3:30	
Measured autoignition temperature	(°C)	360	358	-
Permissible autoignition temperature	(°C)		330 to 380	
Complete discharge of the entire contents without interruption	(yes/no)	Yes	Yes	-
Test fire extinguished	(yes/no)	Yes	Yes	-
Flammable material ejected	(yes/no)	No	No	-
Re-ignition or overflow of fuel within 20 min after complete discharge	(yes/no)	No	No	-
Remaining oil in the tray at the end of the test	(yes/no)	Yes	Yes	-
Enlargement of flames observed	(yes/no)	No	No	-
Achieved test fire rating - Fire Class F			**25 F**	

5.3. Test of electrical conductivity

Test of electrical conductivity (Section 5.8 of DIN SPEC 14411 : 2013-07)

Test No.		1	2
Current at 35 kV alternating voltage			
Before discharge of extinguishing media	(mA)	0,090	0,086
Maximum during discharge of extinguishing media	(mA)	0,109	0,103
Maximum permissible current	(mA)	≤ 0,5	
Compliance with clause 5.8		Yes	

6 Summary and conclusions

The company Tectro SMT GmbH Saarburg has commissioned MPA Dresden GmbH to conduct selected tests on the fire extinguisher of type FIRE-EX 3.0 F (F-Exx® 3.0 F) as described in the relevant standards for fire extinguishers (see item 2 of the present report).

The extinguishing capacity was examined using the samples submitted and the measurement set-ups according to Section 4.7 and Annex H, standard NF S 61-804, as well as Section 7.6.4 and Annexes G.5 of standard DIN SPEC 14411: 2013-07 with positive results.

The results of the fire extinguishing tests carried out correspond to the following classifications of the fire extinguishing capacity:

fire source *solid*	(NF S 61-804 : 1998), (also designated as 2A – without specification)
25 F	(DIN SPEC 14411 : 2013-07)

The extinguishing performance achieved is comparable with that of fire extinguisher spray cans according to the test standard referred to (see item 2 of the present report).

In addition the measurement of the electrical non-conductivity and electrical conductivity of the fire extinguishing medium spray in accordance with the test set-up described in Section 5.8, Annex H of of standard DIN SPEC 14411: 2013-07 were performed.

Two tests using the measurement arrangement above were carried out on the samples submitted and gave positive results.

The electrical current that flowed via the extinguishing medium spray during the discharge of medium did not exceed the maximum allowable current level of 0.5 mA.

From the positive measurement results, it can be concluded that the spraying of the FIRE-EX 3.0 F (F-Exx® 3.0 F) product in the region of live electrical equipment, assuming that the specified minimum distances and maximum voltage levels are observed, does not produce an electrical current exceeding the permitted level that flows to the user of the extinguisher via the spray.

Information on the recommended minimum distances and maximum voltage levels in fighting fires in electrical equipment is given in the standards DIN SPEC 14411: 2013-07, Section 5.8, Annex H and DIN VDE 0132.

7. Special Information:

Due to its construction, the fire extinguishing device FIRE-EX 3.0 F (F-Exx® 3.0 F) cannot be directly classified into the scope of application of the standards for conventional fire extinguishing devices: DIN SPEC 14411 and EN 3-7.
FIRE-EX 3.0 F (F-Exx® 3.0 F) is a novel, propellant-free fire extinguishing device, filled with 300 ml of extinguishing agent solution.

The studies carried out serve for comparative assessment of the fire extinguishing performance and the non-conductivity respectively electrical conductivity of the FIRE-EX 3.0 F (F-Exx® 3.o F), using the normal test procedures for such devices as described in the standards 2 referred to above.

The results of the investigation are not a proof of conformity (no proof of compliance) of the fire extinguishing device FIRE-EX 3.0 F (F-Exx® 3.0 F) with the requirements of the standards for fire-fighting equipment.

8. General notes:

Only the equipment and materials given in this report were used in the investigations.
The results of the investigation refer only to the samples tested.

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Each page of this report bears the stamp of MPA Dresden GmbH.

18 November 2014

(Signature in german original)

Dipl.-Ing. Jürgen Dittrich
Head of the Testing Laboratory

(Signature in german original)

Dipl.-Ing. Bauer
Processor

Annex 1: **FIRE-EX 3.0 F (F-Exx® 3.o F)**
Illustration (photograph) of the sample studied

Figure 1

Figure 2

Figure 3

Annex 2: Characteristics of the fire-extinguishing agent

Commercial name:	HCA BLUS V		
Characteristics	Manufacturer's specifications	Sample (Measurement)	Within specification (yes/no)
Density at 20°C (kg/dm³)	1.29 ± 0.02	1.284	Yes
Viscosity at 20°C (mm² s)	–	4.45	–
pH at 20°C	9 ± 1	9.23	Yes
Refractive index at 20	–	1.3960	–

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3.3 **Expert's report compliance F-Exx / EN 3-7:2004+A1:2007**

SACHVERSTÄNDIGENBÜRO EISNER

Guntram Eisner
Publicly appointed and sworn assessor
(Koblenz Chamber of Industry and
Commerce) for fire extinguishers

Sachverständigenbüro Eisner, Am Güterbahnhof 5-7, 56070 Koblenz

Am Güterbahnhof 5-7,
56070 Koblenz

Company
Tectro SMT GmbH
Thrasoltstrasse 40

D-54439 Saarburg

Tel. 0261/85540
Fax 0261/869338
e-mail: sv@eisner.de

Your sign	Your message from	Our sign	Date
		GE/KA	08.05.2014

Report No. 368/14

comprising of **2 pages**
36 appendices

Client:
Company
Tectro SMT GmbH
Trasolatstrasse 40
D-54439 Saarburg

Reference: Commission of 05/05/2014

Transaction: Conformity f-Exx/EN 3-7

Referenced documents: refer to appendices

Task formulation:

The appraiser should determine the conformity of the products with Din EN 3-7 using the documentation provided and own measurements and investigations.

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Specifications, standards and technical ruled referenced:	DIN EN 3-7
Day of the test:	08/05/2014
Location of examination:	Saarburg
Present at the test:	Dipl.-Ing. Peter Schneider

Assessment:

The measurements and investigations accompanied by me verify conformity to the DIN EN 3-7 and in accordance with this standard.

The low deviations are due to the innovative design and in no way impair the performance and capability to use the products.

Many measurement values even surpass the minimum DIN specifications.

This assessment was made impartially and to my knowledge and belief.

Sworn assessor

Guntram Eisner

EN 3-7:2004+A1:2007

Expert's Report Compliance F-Exx / EN 3-7:2004+A1:2007

reg. Chapter: 4.1.2, 4.2, 4.3, 4.6,
5,
6.2,
7.1.1, 7.1.2, 7.2, 7.3, 7.4.2,
8.1.2, 8.2, 8.3,
9.2,
10.1, 10.2, 10.3, 10.4, 10.6.1, 10.6.2,
and 13

Guntram Eisner Publicly appointed and sworn assessor to the Koblenz Chamber of Industry and Commerce for fire extinguishers
Am Güterbahnhof 5 – 7, 56070 Koblenz, Germany
May 2014

Compliance F-Exx / EN3-7

EN 3-7:2004+A1:2007, Summary

Evaluation group	Chapter EN3-7	Comment / verification of appraiser G. Eisner
conforms to the requirements of the EN 3-7:2004+A1:2007	4.1.2	The measurements and investigations accompanied by me verify conformity to the EN 3-7:2004+A1:2007 and in accordance with this standard. The low deviations are due to the innovative design and in no way impair the performance and capability to use the products. Many measurement values even surpass the DIN specifications. The appraisal was carried out to the best of my knowledge and belief.
	4.2	
	4.3	
	7.1.1	
	7.1.2	
	7.3	
	8.3	
	10.1	
	10.2	
	10.3	
	13	
conforms to the requirements of the EN 3-7:2004+A1:2007 and is already verified by the MPA report	5	
	7.4.2	
	9.2	
due to innovative design, requirements of the EN 3-7:2004+A1:2007 are complied with in accordance	4.6	
	6.2	
	7.2	
	8.1.2	
	8.2	
	10.4	
	10.6.1	
	10.6.2	

Compliance F-Exx / EN3-7 — EN 3-7:2004+A1:2007, Test Plan I

Tectro SMT GmbH: Series F-Exx — Test in accordance with EN 3-7:2004+A1:2007 — May 2014

Colour coding:
- contents to be verified
- Criterion applicable due to the design in accordance with the standard
- Carry out test / test results submitted
- The report must indicate that the requirements are complied with and are attestable

Sources:
- Extinguishing medium: Safety datasheets from the manufacturer, certificates of compliance, MPA investigation reports
- System: Drawings from the manufacturer Tectro SMT GmbH, individual parts and assembly
- Report: Sachverständigenbüro Eisner, MPA Dresden
- Other documentation: Safety datasheets, product datasheets, other reports and certificates

Pos.	Chapter	Specification DIN EN 3-7:2004+A1:2007	Criteria (briefly)	Series 800 ml with handle (only extinguishing medium is different)				Series of spray nozzles		Actions	refer to Page	Comment / verification of appraiser G. Eisner
				F-Exx 8.0 S	F-Exx 8.0 C	F-Exx 8.0 G	F-Exx 8.0 F	F-Exx 3.0 F	F-Exx 1.5 F			
1	4.1.2	A portable fire extinguisher comprising of the following parts	a) Extinguishing medium container	applicable, container made from synthetic material						Assembly and individual parts provided	7, 8	OK
			b) Equipping parts	applicable, interruption device, extinguishing nozzles, closing part, activating device								OK
			c) Extinguishing medium	applicable, aqueous extinguishing medium								OK
2	4.2	Interruption device	Automatically-closing interruption device	applicable, aerosol valve						Valves provided	9	OK
3	4.3	Function position	Must function without it being placed upside down	Series 800 ml: Function test				Series of spray nozzles: Function test		1 extinguisher of each series	10	OK
4	4.6	Continuous pressure extinguisher	Have fixture to test presence of pressure (except CO_2)	Due to the design, determination of the fill quantity is carried out by weighing. Fill volume and pressure are inseparably coupled. Thus, weighing replaces the pressure measurement, as with carbon dioxide extinguisher (also refer to 8.1.2)						Design drawings and all individual parts provided	11	OK
5	5	Testing portable fire extinguishers	Gen. information without evaluation criteria	Measurement room 20°C, cooling equipment and oven for increased temperature conditions; MPA report about function temperature, refer to 7.4.2						MPA report provided	12	Report reviewed, OK
6	6.2	Reliable deviations for the fill quantity	Fill tolerance 0 - 5%; refer to 7.2	Due to the system, the fill quantity exceeded the nominal fill quantity (relative deviation with + tolerance), because residue remains in the system after extinguishing. Dimensioning the fill quantity is determined by the spray quantity are residual quantity, in accordance with Ch. 7.2						Individual parts provided, verify the logic of the argumentation	13	Argumentation comprehensible, OK
7	7.1.1	Minimum function duration	minimum 6 seconds	Sample 1:	16,5		37,7	13,4		Measurement, 3 extinguishers per fill quantity	14	Spraying times significantly more than the minimum function duration required; OK
				Sample 2:	14,6		35,4	14,3				
				Sample 3:	15,8		33,0	16,6				
				Mean values:	**15,6**		**35,4**	**14,8**				
			Compression procedure	Due to design, is not applicable, because liquid (incompressible) extinguishing medium								
8	7.1.2	Dispersion of the measurements	±15% of the mean value	Measurement values in the appendix						Measurements, 6 sample per series	15	Dispersion of the measurement values is within the permitted dispersion range; OK
			Compression procedure	Due to design, is not applicable, because liquid (incompressible) extinguishing medium								
9	7.2	Residual amount	not more than 10% of the nominal fill quantity	Due to the design, the residual quantity can be somewhat greater, thus, substitute for measuring the residual amount: Spray mass > 90% of the nominal fill mass						Verify the logic of the argumentation	16	Argumentation is technically and factually comprehensible; OK
				Measurement values in the appendix						Measurements, 6 sample per series		The measurements are within the permitted tolerance range; OK
			Compression procedure	Due to design, is not applicable, because liquid (incompressible) extinguishing medium								
10	7.3	Begin of extinguishing medium discharging	For all fire extinguishers, discharge of the extinguishing medium must begin within 4 s after opening the interruption device	When activated, the extinguishing medium immediately discharges. There is no perceptible delay.						Measurements, e.g. 1 sample per series	17	Immediate discharge without measurable delay; OK
			Compression procedure	Due to design, is not applicable, because liquid (incompressible) extinguishing medium								

Compliance F-Exx / EN3-7

EN 3-7:2004+A1:2007, Test Plan II

Tectro SMT GmbH: Series F-Exx | Test in accordance with EN 3-7:2004+A1:2007 | May 2014

Colour coding:
- contents to be verified
- Criterion applicable due to the design in accordance with the standard
- Carry out test / test results submitted
- The report must indicate that the requirements are complied with and are attestable

Sources:
- Extinguishing medium: Safety datasheets from the manufacturer, certificates of compliance, MPA investigation reports
- System: Drawings from the manufacturer Tectro SMT GmbH, individual parts and assembly
- Report: Sachverständigenbüro Eisner, MPA Dresden
- Other documentation: Safety datasheets, product datasheets, other reports and certificates

Pos.	Chapter	Specification DIN EN 3-7:2004+A1:2007	Criteria (briefly)	Series 800 ml with handle (only extinguishing medium is different)				Series of spray nozzles		Actions	refer to Page	Comment / verification of appraiser G. Eisner
				F-Exx 8.0 S	F-Exx 8.0 C	F-Exx 8.0 G	F-Exx 8.0 F	F-Exx 3.0 F	F-Exx 1.5 F			
11	7.4.2	Fire extinguisher must function at temperatures between Tmin and Tmax	System: -20°C for frost protection, 20°C, 60°C	F-Exx 8.0 C is tested by MPA at -20°C, 20°C, 60°C. Other F-Exx 8.0 extinguishers of same design, other extinguishing medium.				Significantly the same design as F-Exx 8.0		Ratings, MPA report submitted	18, 19, 20	Report reviewed, **OK**
			Release of extinguishing medium for:	0 °C to 50 °C	-20 °C to 60 °C	0 °C to 40 °C	-20 °C to 50 °C	-20 °C to 50 °C		Safety datasheets provided		Temperature range in accordance with manufacturer specifications reviewed, **OK**
12	8.1.2	Weighing	The fill quantities must be able to be checked by weighing the: – Propellant bottles and CO2 fire extinguisher.	Due to the design, determination of the fill quantity is carried out by weighing. Fill volume and pressure are inseparably coupled. Thus, weighing replaces the pressure measurement, as with carbon dioxide extinguisher (refer to 4.6). Before the minimum shelf-life date expires, the extinguishers are maintenance-free and require no further checking.						Verify the logic of the argumentation	21	Argumentation comprehensible, **OK**
13	8.2	Acceptance requirements	b) For fire extinguishers and propellant bottles that are checked by weighing, a mass loss of 5 % of the nominal fill quantity per year; a) and c) are not applicable	Series 8.0 with handle: some measurements for mass loss over 36 months						Measurement for mass loss over 36 months provided	22	Measurement protocols reviewed, mass losses below the tolerance limit, **OK**
14	8.3	Leak check during production	Sampling plan	View fill system / transmitted light test / flushing and drying system						View fill system	23, 24	Fill system and leak check have been viewed and presented as functioning; sample plan: 100% check ensured; **OK**
15	9.2	Requirement	0.5 mA test. The test must be carried out in accordance with Appendix C.	MPA report available	MPA report available	up to now, no report	MPA report available	MPA report available		MPA report provided	25	Report reviewed, **OK** (except F-Exx 8.0 G - gel extinguisher)
16	10.1	General	With the exception of the safety elements according to 10.3, no devices are permitted on the portable fire extinguisher that must be first installed or removed before or during commissioning.	Series 8.0 with handle				Aerosol series without handle		Extinguisher of the series provided	26	**OK**
17	10.2	Activation devices	Activation force by the finger < 100 N	Measurements by the manufacturer are available, mean activation force at full valve stroke: **34 N**. All values are significantly less than the max. permitted activation forces.				Mean activation force at full valve stroke: **22 N**		Presentation of the measurements, Co. Coster	27, 28	Measurement protocol from the manufacturer reviewed, activation forces significantly less than 100 N, **OK**
18	10.3	Safeguards	Operating elements of the fire extinguisher must be secured by a safeguard against inadvertent activation. Releasing must be separate from activation and must require an activation force of between 20 N and 100 N	Series 8.0 with handle: Value from the MPA report + own measurements				Aerosol series without handle: Carry out measurements		Carry out 8 samples per series (spring balance)	29, 30, 31	The activation forces of the activating device is within the permitted range; **OK**
				Measurement values in the appendix								

Compliance F-Exx / EN3-7

EN 3-7:2004+A1:2007, Test Plan III

Tectro SMT GmbH: Series F-Exx | Test in accordance with EN 3-7:2004+A1:2007 | May 2014

Colour coding:
- contents to be verified
- Criterion applicable due to the design in accordance with the standard
- Carry out test / test results submitted
- The report must indicate that the requirements are complied with and are attestable

Sources:
- Extinguishing medium: Safety datasheets from the manufacturer, certificates of compliance, MPA investigation reports
- System: Drawings from the manufacturer Tectro SMT GmbH, individual parts and assembly
- Report: Sachverständigenbüro Eisner, MPA Dresden
- Other documentation: Safety datasheets, product datasheets, other reports and certificates

Pos.	Chapter	Specification DIN EN 3-7:2004+A1:2007	Criteria (briefly)	Series 800 ml with handle (only extinguishing medium is different)				Series of spray nozzles		Actions	refer to Page	Comment / verification of appraiser G. Eisner
				F-Exx 8.0 S	F-Exx 8.0 C	F-Exx 8.0 G	F-Exx 8.0 F	F-Exx 3.0 F	F-Exx 1.5 F			
19	10.4	Sieve for portable fire extinguisher with aqueous extinguishing medium	Emission for portable fire extinguishers with aqueous extinguishing medium must be through a screen	Extinguishing medium are prepared using distilled water; it is filled through the valve; particle filter on the fill unit 80 µm						Inspect the fill system; view the datasheet from the filter manufacturer	32	Fill system was inspected and function demonstrated; sieve not possible due to design; long term monitoring of the extinguishing medium in accordance with the specifications from the manufacturer of the device indicate no negative changes regarding forming of particles; thus, a sieve is viewed as unnecessary; in addition, pretreatment of the extinguishing medium through a particle filter (refer to Appendix); **OK**
20	10.6.1	Automatically-closing interruption device	Interruption of the jet of extinguishing medium -> Measurements documented in 10.6.2	Series 8.0 with handle: test interrupted activation: weigh, spray for 1.5 sec., weigh, wait 5 min., weigh, spray empty, weigh				Aerosol series: Measurement as for 8.0		6 samples per series	33, 34, 35	The measurement values indicate a clear linear correlation between spraying duration and spraying mass. Thus, the requirements of the automatically-closing interruption devices are fully complied with; **OK**
21	10.6.2	Pressure at repeat activation	not less than 80% mass after 10% of the activation time									
22	13.	Bracket for portable fire extinguisher	Easy removal	Series 8.0 with handle: Demonstrate removal, load test using an extinguisher				Aerosol series: no wall bracket		1 samples per series	36	Specifications complied with without problem; **OK**
			Remaining deformation when loaded with double the weight	Series 8.0 with handle: Load test using 2 extinguishers						1 samples per series		

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SYNTHETIC MATERIAL TECHNOLOGY

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no aerosol technology

Annex: Measurement values and figures

Compliance F-Exx / EN3-7

EN 3-7:2004+A1:2007

Followed by 30 pages with measured data and images