ENVIRONMENTAL PRODUCT DECLARATION

in accordance with /ISO 14025/ and /EN 15804/

Owner of the Declaration	**Hilti AG**
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-HIL-20180154-IAA1-EN
Issue date	30.01.2019
Valid to	29.01.2024

Hilti Firestop Speed Sleeve (CP 653 / CFS-SL GA)

Hilti Aktiengesellschaft

Institut Bauen und Umwelt e.V.

www.ibu-epd.com / https://epd-online.com

1. General Information

Hilti Aktiengesellschaft

Hilti Firestop Speed Sleeve
CP 653 / CFS-SL GA

Programme holder
IBU – Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Owner of the Declaration
Hilti Aktiengesellschaft
Feldkircher Strasse 100
FL 9494 Schaan
LIECHTENSTEIN

Declaration number
EPD-HIL-20180154-IAA1-EN

Declared product / Declared unit
The declared product is a HILTI Firestop Speed Sleeve CP 653 / CFS-SL GA. The declared unit is one unit of the HILTI Firestop Speed Sleeve CP 653 / CFS-SL GA. The packaging is also included in the calculation. The declared unit is indicated in [kg]. This product is declared as a reference for a product family as it has the highest product weight of all.

This declaration is based on the Product Category Rules:
Pre-formed fire protection systems for cable and duct insulation, 03.2015
(PCR checked and approved by the SVR)

Scope
This document refers to the HILTI Firestop Speed Sleeve CP 653 / CFS-SL GA. Specific data from the HILTI manufacturing plant in Malaysia was used for generating this life cycle assessment. It is based on data from 2017 which corresponds with the annual average.

This is a manufacturer's declaration. The declaration refers to a specific product from one of the manufacturer's factories.

Issue date
30.01.2019

Valid to
29.01.2024

The owner of the Declaration shall be liable for the underlying information and evidence; IBU shall not be liable with respect to manufacturer information, Life Cycle Assessment data, and evidence.

Verification

The /EN 15804/ CEN standard serves as the core PCR.
Independent verification of the Declaration and information provided in accordance with /ISO 14025:2010/
☐ internally ☒ externally

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Dipl.-Ing. Hans Peters
(Chairman of the Board, IBU)

Angela Schindler
(Independent verifier appointed by the SVR)

2. Product

2.1 Product description / Product definition

The Hilti Firestop Speed Sleeve CP 653 / CFS-SL GA is a fire protection sleeve for wall and ceiling applications.
This document refers to the entire CP 653 / CFS-SL GA product family. The variant with the highest mass (CFS-SL GA L) was used as a basis for the calculation.

Product description:

- Fully functional immediately after installation
- Easy penetration of cables
- Quick and easy to install and inspect
- Rubber smoke gaskets eliminate the need for sealant or putty
- Individual sleeves can be ganged (using the Hilti "Gangplate" CFS-SL GP)

Directive (EU) No. 305/2011 (CPR) applies for placing the product on the market in the EU/EFTA (with the exception of Switzerland). The product requires a declaration of performance taking consideration of the /ETA no. 17-0081/, 21.06.2017, "European Technical Assessment for Hilti Firestop Sleeve CFS-SL GA" and CE marking. Use is governed by the respective national regulations.

2.2 Application

Firestop for penetrations for single cables and cable bundles

- Suitable for small to medium-sized circular openings in walls and ceilings/floors
- For use on drywall, concrete, masonry, sandwich panels, wood substrate
- Ideal solution when cable configurations are regularly changed, such as in data centres, server rooms, hospitals, event halls, production plants

2.3 Technical data

Products for use at temperatures between -5 and +50 °C, only for indoor use

Construction data

Designation	Value	Unit
Application temperature	-5 - 50	°C
Storage temperature	-5 - 50	°C
Temperature resistance	-30 - 100	°C
Reaction to fire	E	-
Halogenated flame retardants	No	-
Durability and fitness for use acc. to /EOTA TR 024/ and /ETAG 026-2/	Z2	-
Mould growth acc. to /ASTM G 21/ and /ISO 846/ (inlay)	No	-
Air permeability acc. to /EN 1026:2000/ - (10Pa - no cables)	0.24	$m^3/(h)$

Product performance values corresponding with the declaration of performance in terms of its essential characteristics according to /ETA no. 17-0081/, 21.06.2017, “European Technical Assessment for Firestop Sleeve CFS-SL GA”.

2.4 Delivery status

This document refers to the entire CP 653 / CFS-SL GA product family. The variant with the highest mass (CFS-SL GA L) was used as a basis for the calculation.

Overview of product variants:

Firestop Speed Sleeve - S
(CFS-SL S, CFS-SL GA S, CP 653 2"):

- Diameter: 63 mm
- Length of metal sleeve: 266 mm
- Total length: 327 mm

Firestop Speed Sleeve - M
(CFS-SL M, CFS-SL GA M, CFS-SL GA M ILS, CP 653 4"):

- Diameter: 113 mm
- Length of metal sleeve: 266 mm
- Total length: 359 mm

Firestop Speed Sleeve - L
(CFS-SL L, CFS-SL GA L):

- Diameter: 113 mm
- Length of metal sleeve: 366 mm
- Total length: 461 mm

2.5 Base materials / Ancillary materials

Material distribution

Designation	Value	Unit
Fibreglass, hose	62.4	g
EPDM, gaskets	72.0	g
Steel, flange	308.4	g
ABS, plastic housing	355.6	g
Steel, metal housing	610.6	g
PUR-E, foam strips	2.7	g
Inlays	196.3	g
Cardboard, packaging	232.0	g
Total	1.84	g

The product / At least one partial product contains substances from the candidate list (14.11.2018) exceeding 0.1 percentage by mass: **No**.
No halogenated fire retardants are used. The following substances contained support the intumescent flame retardant system: ammonium polyphosphate, melamine.

2.6 Manufacturing

The plastic components of the housing are manufactured by injection-moulding of ABS granulate. The fibreglass hose and the inlays are then fixed inside the plastic housing. The adhesive foam strips are glued to the plastic housing. The pre-assembled plastic housing and its internal components are then pushed fully inside the cylindrical metal housing. The final sleeve is packed into a cardboard box along with 2 metal flanges and 2 rubber gaskets.
The inlays and the fibreglass hose are produced in Germany and transported to Malaysia by ship. Onward transport is by truck. All other components are exclusively transported by truck. Country-specific power mixes are considered for the production processes.

The following process diagram depicts the production process on which this is based.

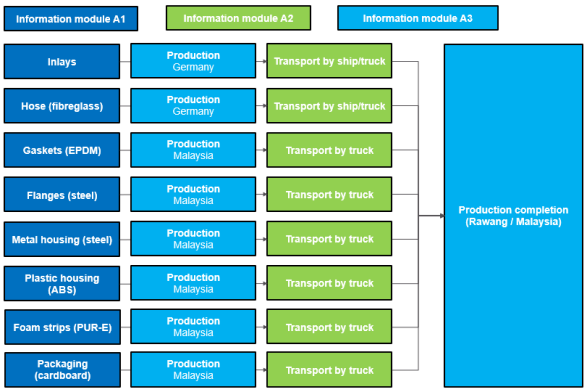

Fig.: Production flow chart

2.7 Environment and health during manufacturing

The plant in which the firestop sleeve is produced falls under the Hilti Code of Conduct for suppliers (/CoC/). This is a public and binding document (part of the contract with the supplier) which outlines the following environmental requirements:

- The supplier / manufacturing plant must strive to avoid/minimise harmful environmental emissions (waste, air, soil, water).
- The supplier / manufacturing plant must contribute to recycling and reusing materials and products.

- The supplier / manufacturing plant must continuously improve energy efficiency (in production processes and in handling materials / during transport).
- The supplier / manufacturing plant must meet the requirements in the Chemical Checklist.

Suppliers may not handle chemicals in a way that has negative impacts on the environment.
The injection-moulding process is the most energy-consuming step during production at this manufacturing plant. As most steps are carried out manually, energy consumption is low during the manufacturing process.
Environmental and health impacts in the plant are evaluated during recurring audits and site inspections.

2.8 Product processing / Installation

The product is delivered with instructions for use outlining the basic steps for installation:

1) Drilling/Preparing the opening
2) Inserting and positioning the firestop sleeve
3) Applying the EPDM gaskets on both sides and using the metal flanges to fix them to the substrate (wall/ceiling)
4) Open/Close function for inserting cables

As the firestop elements are integrated in the sleeve, no additional “wet-applied” products (e.g. sealant) are required for installation.
Firestop sleeves must always be installed in accordance with Hilti specifications and approvals (taking consideration of the substrate, annular gap sizes, cable types etc.).

2.9 Packaging

The firestop sleeves are packed individually into cardboard boxes.
These cardboard boxes are not a component of the product and can be recycled.
The packaging size varies depending on the size of the product in an effort to avoid materials and waste.
The firestop sleeves are supplied in export boxes and on reusable pallets.

2.10 Condition of use

The firestop sleeves can remain in the firestop opening if there is a change of use and cables can be added as required. Cables can also be removed retrospectively at any time.

2.11 Environment and health during use

No environmental or health risks for users of buildings are expected during use.

2.12 Reference service life

As this EPD only takes information modules A1-A3 into account, there is no need to specify the reference service life.

2.13 Extraordinary effects

Fire
Building material class E acc. to /EN 13501-1/

Fire protection

Designation	Value
Building material class	E
Burning droplets	not applicable in Class E
Smoke gas development	not applicable in Class E

Water
The firestop sleeves should not be exposed to water.

Mechanical destruction
In the event of mechanical destruction of the firestop sleeves, the firestop openings must be resealed or repaired.

2.14 Reuse phase

The firestop sleeves can be reused for filling other firestop openings at any time. The firestop sleeves can remain in the firestop opening if there is a change of use and cables can be added as required. Cables can also be removed retrospectively at any time.

2.15 Disposal

The firestop sleeves are not made from hazardous materials and can be disposed of as household waste – waste code: 20 03 01 01.

2.16 Further information

Further information is available on the Hilti website: www.hilti.group.

3. LCA: Calculation rules

3.1 Declared unit

The declared unit is one unit of the HILTI Firestop Speed Sleeve CP 653 / CFS-SL GA, weighing 1,608 kg. At a weight of 0.232 kg, the packaging is also included in the calculation. According to the PCR, the declared unit must be indicated in m³. As this EPD concerns a product which is used for cable penetration, the manufacturer claims that such indications do not made technical sense. The following table depicts the data on the declared unit.

Data on the declared unit

Designation	Value	Unit
Declared unit	1	unit
Weight	1.84	kg
Conversion factor to 1 kg	0.543	-

3.2 System boundary

Type of EPD: cradle to plant gate. The following information modules are defined in this study as system boundaries:

A1-A3 Product stage:

- Raw material extraction
- Transport to manufacturer
- Manufacturing

A total of three information modules are reviewed in order to obtain an accurate record of the indicators and environmental impact of the declared unit. Information modules A1 to A3 outline the provision of raw materials, transport to the production facility and the actual product production process.

3.3 Estimates and assumptions

Country-specific power mixes and additional background information are calculated for the production processes.
A Chinese data set was used for the provision of lubricants for the background data for the steel components production process (punching, bending) in Malaysia.
Assumptions were made for certain data sets within the framework of this calculation.

3.4 Cut-off criteria

All of the information modules under review were included in detail in the calculation so as to comply with the requirements of /EN 15804/. Material consumption for the Euro-pallets used for transport is less than 5% by mass on account of the fact that they are reused and therefore fall short of the cut-off criterion in the overall calculation.

3.5 Background data

The basis for the background data from the /GaBi 8.7/ data bases (SP 36), to which this study also refers, is documented in the following link: /Thinkstep/

3.6 Data quality

Specific data for 2017 from the HILTI manufacturing plant in Malaysia was used for generating this life cycle assessment. The background data used from the /GaBi 8.7/ data base refers to 2018 and is therefore very recent. The data on the provision of materials for the product is taken from a deinstallation and dismantling analysis commissioned by Hilti AG. As the masses of the individual materials have been established with an accuracy of 0.1g, it can be assumed that the results of the LCA are of adequate quality.

3.7 Period under review

This LCA is based on data from 2017 which corresponds with the annual average.

3.8 Allocation

Co-products are allocated in information modules A1-A3 as the production waste for steel components is directed in a closed-loop process to the material provision processes as secondary material. The production waste incurred by injection-moulded parts is thermally recovered. The electric and thermal energy credits resulting therefrom are completely charged in Module A3.

3.9 Comparability

As a general rule, a comparison or an evaluation of EPD data is only possible if all of the data sets to be compared were created according to /EN 15804/ and the building context and/or the product-specific characteristics of performance are taken into account. The background data base used must be indicated. The basis for the background data from the /GaBi 8.7/ data bases (SP 36), to which this study also refers, is documented in the following link: /Thinkstep/.

4. LCA: Scenarios and additional technical information

As this study takes account of information modules A1-A3, there are no details on LCA scenarios and additional technical information.

5. LCA: Results

SYSTEM BOUNDARIES (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

Product stage			Construction process stage		Use stage							End-of-life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from manufacturer to site	Assembly	Use / Application	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction / Demolition	Transport	Waste processing	Disposal	Reuse, recovery or recycling potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	MND	MND	MND	MND	MND

LCA RESULTS – ENVIRONMENTAL IMPACT: Speed Sleeve CP 653 / CFS-SL GA / 1unit

Parameter	Unit	A1-A3
Global warming potential	[kg CO_2 equiv.]	5.22
Depletion potential of the stratospheric ozone layer	[kg CFC11 equiv.]	3.20E-9
Acidification potential of soil and water	[kg SO_2 equiv.]	1.37E-2
Eutrophication potential	[kg $(PO_4)^3$ equiv.]	2.92E-3
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene equiv.]	1.61E-3
Abiotic depletion potential - non-fossil resources	[kg Sb equiv.]	9.17E-6
Abiotic depletion potential fossil resources	[MJ]	84.09

LCA RESULTS – USE OF RESOURCES: Speed Sleeve CP 653 / CFS-SL GA / 1unit

Parameter	Unit	A1-A3
Renewable primary energy as energy carrier	[MJ]	4.46
Renewable primary energy as material utilisation	[MJ]	3.90
Total use of renewable primary energy sources	[MJ]	8.36
Non-renewable primary energy as energy carrier	[MJ]	69.23
Non-renewable primary energy as material utilisation	[MJ]	17.21
Total use of non-renewable primary energy sources	[MJ]	86.44
Use of secondary materials	[kg]	0.29
Renewable secondary fuels	[MJ]	0.00E+0
Non-renewable secondary fuels	[MJ]	0.00E+0
Net use of fresh water	[m^3]	9.40E+0

LCA RESULTS – OUTPUT FLOWS AND WASTE CATEGORIES: Speed Sleeve CP 653 / CFS-SL GA / 1unit

Parameter	Unit	A1-A3
Hazardous waste for landfilling	[kg]	1.12E-5
Non-hazardous waste for disposal	[kg]	1.53E-1
Radioactive waste for disposal	[kg]	8.03E-4
Components for reuse	[kg]	0.00
Materials for recycling	[kg]	0.00
Materials for energy recovery	[kg]	0.00
Exported electrical energy	[MJ]	0.00
Exported thermal energy	[MJ]	0.00

All indicators are collected in accordance with /EN 15804/. The estimated impact of environmental impacts is in accordance with /CML 2001 Apr. 2015/.

*SM involves the use of secondary materials in the manufacture of steel and paper.

6. LCA: Interpretation

The dominance analysis indicates that the main causes of environmental impacts and indicators can be found in information module A1. This depicts the global warming potential as accounting for approx. 82% for the provision of materials, in terms of all information modules.

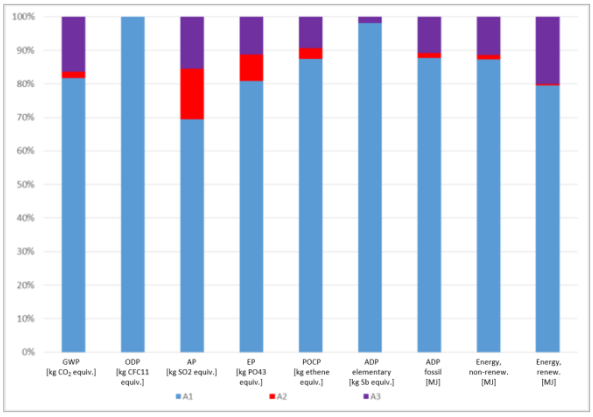

Fig.: Dominance analysis A1-A3

Detailed analysis of material provision for the Speed Sleeve CP 653 / CFS-SL GA indicates that two raw materials make a decisive contribution towards the respective environmental impacts and indicators. Material provision of the steel coil (metal housing and flanges) accounts for approx. 54% while ABS (plastic housing) accounts for approx. 30% of global warming emissions. This ratio is practically analogous for the other environmental impacts and indicators.

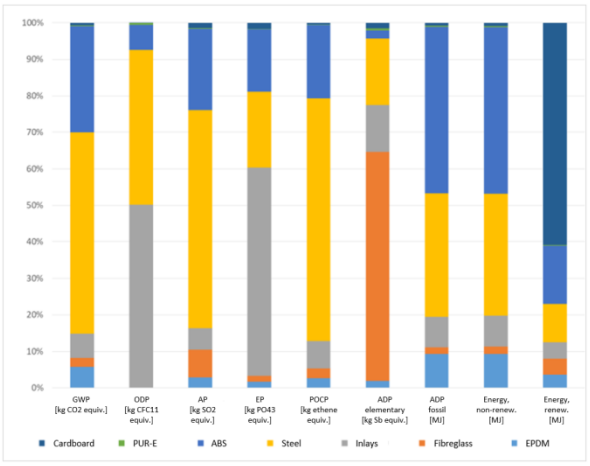

Fig.: Dominance analysis A1

As the mass of the metal housing, flange and plastic housing was established using a deinstallation and dismantling study with an accuracy of 0.1g, it can be assumed that the results of the LCA are of adequate quality.

The relevant data sets used to calculate the provision of materials for the Speed Sleeve CP 653/ CFS-SL GA are very current (GLO: steel, cold-turned coil; source: Worldsteel; year: 2014; DE: ABS granulate; source: TS; year: 2017).

As these data sets have a strong influence on the results – as indicated by the dominance analysis – the same also applies for the overall calculation.

7. Requisite evidence

Due to the identical composition and identical manufacturing process for the CFS-SL GA and CP 653 firestop sleeves from the plant in Malaysia, all of the data and evidence provided in the EPD applies for both product lines.

7.1 VOC

Summary of results: compliant with CDPH

Exposure scenario	Individual VOCs of concern*	
	Criterion	Compliant?
School classroom	≤½ Chronic REL	Yes
Private office	≤½ Chronic REL	Yes

*Maximum allowable concentrations of individual target VOCs are specified in Table 4-1 (ibid.)

Exposure scenario	Formaldehyde**	
	Criterion	Compliant?
School classroom	≤9.0 µg/m^3	Yes
Private office	≤9.0 µg/m^3	Yes

*Maximum allowable formaldehyde concentration is ≤9 µg/m^3, effective 1 Jan. 2012; previous limit was ≤16.5 µg/m^3 (ibid.)

Exposure scenario	TVOC***
	Range
School classroom	≤0.5 mg/m^3
Private office	≤0.5 mg/m^3

*** Informative only; predicted RVOC range in three categories, i.e. ≤0.5 mg/m^3, >0.5 – 4.9 mg/m^3 and ≥5.0 mg/m^3

(Exposure scenarios & product quantities for classroom & office are defined in Tables 4-2 – 4-5 (CDPH Std. Mtd. V1.2-2017)).

In accordance with /Report by Berkeley analytical: 1031-002-01A-Jun2118/

7.2 Durability and serviceability

Durability and serviceability acc. to /EOTA TR 024/ and /ETAG 026-2/
Durability type Z2 acc. to /MPA Stuttgart, Test report number 902 0501 000 – Stä/ dated 30.11.2010 and /MPA Stuttgart, Test report number 901 7813 000 – Stä/ dated 22.10.2009

7.3 Air permeability

Air permeability acc. to /EN 1026:2000/:

		Airflow per device [m^3/h]				
	Cable fill [%] ->	0%	20%	40%	60%	100%
	No. of cables* ->	0	28	57	86	142
Pressure [Pa]	10 Pa	0.24	0.60	2.10	3.31	2.01
	25 Pa	0.48	1.22	4.40	6.97	4.44
	50 Pa	0.83	2.09	7.16	11.43	7.68
	75 Pa	1.10	2.82	9.47	15.13	10.44
	100 Pa	1.38	3.53	11.57	18.49	12.98
	150 Pa	1.83	4.77	15.21	24.22	17.33
	200 Pa	2.21	5.88	18.49	29.27	21.26
	250 Pa	2.59	6.89	21.48	33.82	24.81
	300 Pa	2.95	7.83	24.17	37.87	28.21
	450 Pa	3.94	10.43	31.42	49.18	37.02
	600 Pa	4.79	12.69	37.63	58.86	44.82

Test conditions: 21 °C - 52 - 57% RH
*Cable: CAT6 – OD = 6 mm

Measurements and values acc. to reports:
/ift Rosenheim GmbH, Report 16-003640-PR02/ dated February 2017
/ift Rosenheim GmbH, Report 16-003640-PR03/ dated February 2017
/ift Rosenheim GmbH, Report 16-003640-PR04/ dated February 2017
/ift Rosenheim GmbH, Report 16-003640-PR08/ dated February 2017
/ift Rosenheim GmbH, Report 16-003640-PR09/ dated February 2017

8. References

/IBU 2016/
IBU (2016): General EPD programme instructions of Institut Bauen und Umwelt e.V. (IBU), version 1.1, Institut Bauen und Umwelt e.V., Berlin

/ISO 14025/
DIN EN /ISO 14025:2011-10/, Environmental labels and declarations – Type III environmental declarations – Principles and processes

/EN 15804/
/EN 15804:2012-04+A1 2013/, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products

Product Category Rules for Building Products, Part B:
Pre-formed fire protection systems for cable and pipe penetration, 2015-03

Thinkstep
http://www.gabi-software.com/deutsch/index/ (12.12.2018)

Worldsteel Association
https://www.worldsteel.org/ (12.12.2018)

GaBi 8.7 software for life cycle assessment
http://www.gabi-software.com/deutsch/index/ (12.12.2018)

CML 2001, Apr. 2015
https://www.universiteitleiden.nl/ (12.12.2018)

/ETA No. 17-0081/
European Technical Assessment for Firestop Sleeve CFS-SL GA issued by UL International (UK) Ltd. (21.06.2017)

/EN 13501-1/
/EN 13501-1:2007+A1/, Fire classification of construction products and building elements

/ETAG (European Technical Approval Guidelines) 026-2/
/ETAG 026-2:2008-10/, Guideline for European Technical Approval of Fire Stopping and Fire Sealing Products, Clause 1.2: Durability

/ASTM G 21/
/ASTM G 21:2015-00/, *Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi*

/ISO 846/
/ISO 846:1997-06/, Plastics – Evaluation of the action of microorganisms

/EN 1026:2000/
/EN 1026:2000-09/, Windows and doors – Air permeability – Test methods

/CoC/
Hilti Code of Conduct for suppliers
https://www.hilti.group/content/dam/documents/Media-Release/supplier_documents/en/CoCfS_EN.pdf (14.11.2018)

/Waste code: 20 03 01/
Waste code 20 03 01: Mixed municipal solid waste acc. to the European Waste Catalogue (EWC)

CDPH testing standards
Standard method for VOC emissions – Method for evaluating and assessing volatile organic compounds from indoor sources using climate chambers, one of the most widely distributed standards for evaluating building and indoor products for their compliance with chemical emission limits

Report by Berkeley analytical: 1031-002-01A-Jun2118
Examining and evaluating volatile organic compounds from CP 653 4" acc. to /CDPH testing standards/ (06.2018)

/EOTA (European Organisation for Technical Assessment) TR 024/
Characterisation, Aspects of Durability and Factory Production Control for Reactive Materials, Components and Products

MPA Stuttgart, test report number 902 0501 000 – Stä
Approval test for application for a European Technical Approval for CFS-SL (30.11.2010) acc. to /ETAG 026-2/ and /TR 024/

MPA Stuttgart, test report number 901 7813 000 – Stä
Approval test for application for a European Technical Approval for inlays (22.10.2009) acc. to /TR 024/

SGS Institut Fresenius GmbH customer service report 4509175917
Determining mould growth in inlays acc. to /ASTM G 21/ and /ISO 846/ (06.2011)

ift Rosenheim GmbH, report 16-003640-PR02
Determining the air permeability of the firestop sleeve with 0% contents (0 cables) acc. to /EN 1026:2000/

ift Rosenheim GmbH, report 16-003640-PR03
Determining the air permeability of the firestop sleeve with 100% contents (142 cables) acc. to /EN 1026:2000/

ift Rosenheim GmbH, report 16-003640-PR04
Determining the air permeability of the firestop sleeve with 40% contents (57 cables) acc. to /EN 1026:2000/

ift Rosenheim GmbH, report 16-003640-PR08
Determining the air permeability of the firestop sleeve with 20% contents (28 cables) acc. to /EN 1026:2000/

ift Rosenheim GmbH, report 16-003640-PR09
Determining the air permeability of the firestop sleeve with 60% contents (86 cables) acc. to /EN 1026:2000/

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