

EUROPEAN ASSESSMENT DOCUMENT

EAD 350003-00-1109

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**KIT FOR FIRE RESISTANT
SERVICE DUCTS CONSISTING OF
PRE-FABRICATED CONNECTING
PIECES (MADE OF
MECHANICALLY PRE-COATED
STEEL SHEET) AND ACCORDING
ACCESSORIES**

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This European Assessment Document (EAD) has been developed taking into account up-to-date technical and scientific knowledge at the time of issue and is published in accordance with the relevant provisions of Regulation (EU) No 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

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1 SCOPE OF THE EAD

1.1 Description of the construction product

This EAD applies to kits for fire resistant service ducts consisting of the following components:

- a) pre-fabricated connecting pieces - in one piece or in two pieces with a bottom part and a top part - in different dimensions, forms and designs, consisting of
 - a folded or bent steel sheet (non-corrosive stainless steel or galvanised steel)
 - a mechanical coating consisting of intumescent material¹ including pre-treatment (e.g. primer)¹ on the inside of the sheet; an optional surface coating
 - optional barrier strips made of steel sections
- b) pre-fabricated special pieces - e.g. end caps, cable outlets - in different dimensions and designs, consisting of
 - a folded or bent steel sheet (non-corrosive stainless steel or galvanised steel)
 - insulation made of mineral wool or intumescent material (where applicable)
- c) accessories for assembling the service duct, e.g. fastenings, connecting profiles, sealing products, angles.

The components of each kit are manufactured and individually pre-assembled in view of the requirements of each project. The kit is assembled on site to form the fire resistant service duct.

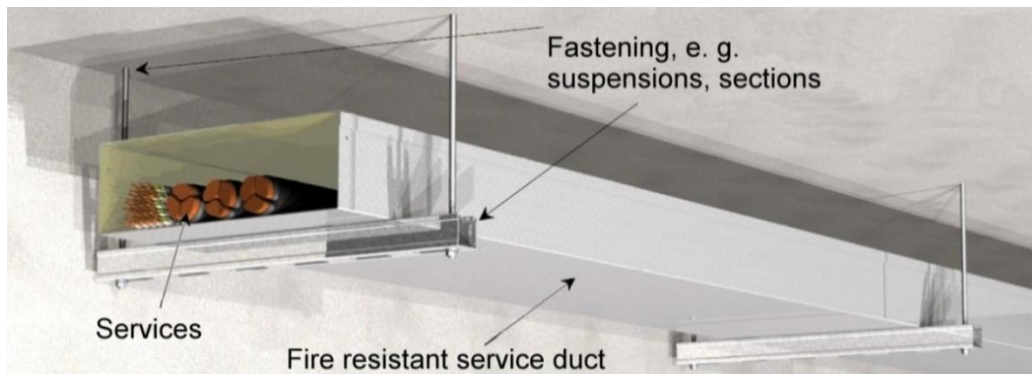


Figure 1 Example of a fire resistant service duct

Four basic types of fire resistant service ducts can be distinguished:

- four-sided fire resistant duct
- three-sided fire resistant duct (in case of fire, the adjacent building component forms the fourth side of the fire resistant construction)
- two-sided fire resistant duct (in case of fire, the adjacent building components form two sides of the fire resistant construction)
- tubular fire resistant duct.

The product is not covered by a harmonised European standard (hEN).

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

It is assumed that the product will be installed according to the manufacturer's instructions or (in absence of such instructions) according to the usual practice of the building professionals.

¹ The intumescent material is covered by an ETA.

Relevant manufacturer's stipulations having influence on the performance of the product covered by this European Assessment Document shall be considered for the determination of the performance and detailed in the ETA.

1.2 Information on the intended use of the fire resistant service duct

1.2.1 Intended use

The fire resistant service duct is intended to be used for preventing the spread of fire from one building component with a fire separating function to another. The duct can be exposed to fire from outside or inside.

The building components the duct is fastened to or passing through shall have the same fire resistance class as the duct. These building components shall be classified in accordance with EN 13501-2 for the fire resistance period required.

The duct is mounted in such a way that the duct itself and the adjacent building components with a fire separating function shall remain functional throughout the fire resistance period required. Appropriate measures for compensating the elongation of the duct and the deflection of the building components caused by the fire shall be taken.

The fire resistant service duct is not intended to be used for

- preventing the spread of fire as a result of thermal conduction along the piping installed in service ducts, or thermal conduction through the media these pipes carry
- preventing the spread of fire within the service duct as a result of spontaneous ignition along the cables installed in service ducts,
- maintaining the functional endurance of electrical cables,
- air distribution systems.

The fire resistant service duct is exclusively intended for indoor application. The intended use scenario is Z₂ as specified in EOTA TR 024.

1.2.2 Working life/Durability

The assessment methods included or referred to in this EAD have been written based on the manufacturer's request to take into account a working life of the fire resistant service duct for the intended use of 10 years when installed in the works provided that the fire resistant service duct is subject to appropriate installation (see 1.1). These provisions are based upon the current state of the art and the available knowledge and experience.

When assessing the product the intended use as foreseen by the manufacturer shall be taken into account. The real working life may be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for works².

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA when drafting this EAD nor by the Technical Assessment Body issuing an ETA based on this EAD, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

² The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject, as well as on the particular conditions of the design, execution, use and maintenance of that works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than referred to above.

1.3 Specific terms used in this EAD (if necessary in addition to the definitions in CPR, Art 2)

Service duct

Horizontal duct enclosing combustible or non-combustible services, such as pipes or cables.

Duct components

The pre-fabricated connecting pieces and special pieces listed in section 1.1 are referred to hereinafter as duct components.

Service support construction

Mechanical support provided in the form of clips, ties, hangers, ladder racks or trays, or any device designed to carry the load of the services (installations).

Suspension devices of the service duct

Mechanical support provided in the form of suspended or fastened mounting rails, suspension brackets etc. designed to carry the load of the service duct.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 1 shows how the performance of the fire resistant service duct is assessed in relation to the essential characteristics.

Table 1 Essential characteristics of the product and methods and criteria for assessing the performance of the product in relation to those essential characteristics

No	Essential characteristic	Assessment method	Type of expression of product performance <i>(level, class, description)</i>
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire	2.2.1	Class (in accordance with EN 13501-1)
2	Resistance to fire	2.2.2	Class (in accordance with EN 13501-2)
3	Resistance to the effects of higher temperatures	2.2.3	Description
4	Effects of direct contact with plastics/metals	2.2.4	Description
Basic Works Requirement 3: Hygiene, health and the environment			
5	Content and/or release of dangerous substances	2.2.5	Description

2.2 Methods and criteria for assessing the performance of the product in relation to essential characteristics of the product

2.2.1 Reaction to fire of the kit components

If required the reaction-to-fire performance shall be classified and declared for all raw materials or components used for manufacturing the fire resistant duct (e. g. steel sheets and intumescent materials or profiles, fastenings, insulation materials (mineral wool) or sealing products). Depending on the type of the component one of the following methods of assessment shall be used:

- a) The component shall be tested using the test method(s) relevant for the corresponding reaction to fire class in order to be classified according to EN 13501-1.
- b) The component is considered to satisfy the requirements for performance class A1 of the characteristic reaction to fire in accordance with the EC Decision 96/603/EC without the need for testing on the basis of its fulfilling the conditions set out in that Decision and its intended use being covered by that Decision.

Therefore the performance of the components is A1.

- c) The component is considered to satisfy the requirements for performance of the respective class of the characteristic reaction to fire in accordance with one of the EC decisions without the need for further testing (CWFT decisions) on the basis of its fulfilling the conditions set out in that decisions and its intended use being covered by that decisions.

Therefore the performance depending on its type and the conditions under which the component is used may be taken from the respective decision applicable for the component.

2.2.2 Resistance to fire of the service duct

The service duct shall be tested in accordance with EN 1366-5.

The assembling of the kit components forming the fire resistant service duct and the installation of the assembled service duct in the opening of the building component shall be described in detail including a description of all installation conditions (e. g. thickness and fire resistance of the adjacent building components, type and spacing of the suspension or fastening of the service duct, type and dimensions of the services, type and execution of the sealing of the connections and other components).

This description shall correspond with the test configuration relating

- the size and weight of the pre-fabricated connecting pieces and special pieces
- the weight of the services arranged directly on the duct floor
- the fastening of the duct (type and spacing of the suspensions and fasteners).

The service duct and the suspensions shall meet the requirements of EN 1366-5, clause 13.3 and 13.4.

The service duct shall be classified in accordance with EN 13501-2.

In addition, existing national data from tests carried out in accordance with DIN 4102-11 may be used for extended applications provided that

- the service duct has already been tested in accordance with DIN 4102-11
- the basic test(s) are carried out in accordance with EN 1366-5 (see EN 1366-5, Figures 5, 6 or 7)
- the comparison of the test results from the basic tests and the test results from earlier tests carried out in accordance with DIN 4102-11 shows that an extension or extrapolation of the test results is viable.

If these conditions are met, the following extended applications are permitted:

a) Service ducts

- 1) Service ducts consisting of two- or three-sided duct components shall be considered to meet the requirements for service ducts consisting of four-sided duct components provided that the comparability between the two- or three-sided duct components and the four-sided duct components has been verified and
 - the basic tests with four-sided duct components have to be carried out in accordance with EN 1366-5
 - the services are supported by a service support construction which is fastened to the adjacent building component(s)
 - the adjacent building component(s) is/are made of concrete or masonry
 - the duct components are installed as close as possible to the adjacent building components. If necessary, the joints shall be sealed with suitable materials.
- 2) The test results for service ducts with services not supported by a service support construction (i.e. with the services arranged on the floor of the duct) may be extended to service ducts with services supported by a service support construction, but not vice versa.
- 3) Service ducts need to be tested only with fire exposure from inside provided that there are conclusive basic test results showing that these tests can be expected to produce more critical results than tests with fire exposure from outside the duct.
- 4) Test results from duct components made of galvanised steel sheet may be extended to duct components made of stainless steel sheet provided that the comparability of the materials has been verified.
- 5) Test results of inlets or outlets of services tested and classified in accordance with DIN 4102-11 may be extended to ducts tested in accordance with EN 1366-5 provided that the test results have been positive and the inlets or outlets have had no negative impact on the fire resistance of the duct.

If applicable, these extended applications have to be evaluated within the framework of the European Technical Assessment.

The EXAP rules in this EAD are based on current knowledge on the basis of national data at the time of issue. Once CEN has published an extended application standard for service ducts, the requirements of the EN shall be used.

b) Wall constructions

Flexible wall constructions

- 1) Test results obtained with the standard flexible wall constructions in accordance with EN 1363-1 cover all flexible wall constructions (with or without insulation) of the same fire resistance class provided
 - the construction is classified in accordance with EN 13501-2
 - the construction has an overall thickness equal to or greater than that tested
 - the number of board layers and the overall board layer thickness are equal or greater than those tested
 - flexible wall constructions with timber studs are constructed with at least the same number of layers as tested, no part of the duct component is closer than 100 mm to a stud, the cavity between the duct component and the stud is closed with a minimum of 100 mm of insulation of class A1 or A2 in accordance with EN 13501-1.
- 2) The standard flexible wall construction does not cover sandwich panel constructions and flexible walls where the lining does not cover the studs on both sides. Service ducts in such constructions shall be tested on a case-by-case basis.

Rigid wall constructions

- 3) Test results obtained with flexible supporting walls may be applied to concrete or masonry elements of an overall thickness equal to or greater than that of the element used in the tests and a minimum density of 350 kg/m³.

2.2.3 Resistance to the effects of high temperatures of the intumescent material

The applied intumescent material may be temporary, occasionally or permanently in contact with working cables or with pipes, transporting hot substances. So the intumescent material shall not change essentially characteristics as "expansion ratio" and/or "expansion pressure" when exposed to temperatures of 80 °C.

EOTA TR 024, clause 4.3.2.1, describes a procedure for testing the intumescent material at permanently higher temperatures. The test specimens shall be prepared and conditioned in accordance with EOTA TR 024, clause 4.2.2.

The assessment result is a statement "No influence on the intumescent material" based on testing the essential characteristics "expansion ratio" and/or "expansion pressure" (e.g. change in expansion ratio after exposure to a certain temperature for 40 days) after the exposure. For details on the assessment procedure see EOTA TR 024, clause 4.2.1.

2.2.4 Resistance of the intumescent material in contact with metals/plastics

The applied intumescent material may be used in permanently direct contact with plastics or metals (e.g. pipes, substrate). Chemical exchange processes may occur between the substrate (plastic, metal) and the intumescent material and may influence the material's properties.

EOTA TR 024, clause 4.3.6, describes a procedure to test intumescent materials in direct contact with plastics (clause 4.3.6.2) or metals (clause 4.3.6.1).

The test specimens shall be prepared and conditioned in accordance with EOTA TR 024, clause 4.2.2.

The assessment result is a statement "No influence on the intumescent material" based on testing the essential characteristics "expansion ratio" and/or "expansion pressure" (e.g. change in expansion ratio after 40 days in direct contact with plastics/metal) after the exposure. For details on the assessment procedure, see EOTA TR 024, clause 4.2.1.

2.2.5 Content, emission and/or release of dangerous substances of the kit components

The performance of the product related to the emissions and/or release and, where appropriate, the content of dangerous substances will be assessed on the basis of the information provided by the manufacturer using the following methods and criteria: EOTA TR 034, in particular

- EOTA TR 034, substance list No. 1 (notified regulation 2009/167/D): The presence of substances which must be labelled with "Acute Toxicity" category 1, 2 or 3 and "STOT" category SE 1 or RE 1 as well as "Carcinogenicity" category 1A or 1B and "Germ cell mutagenicity" category 1A or 1B, in accordance with Regulation (EC) No 1272/2008, has to be checked and is a criterion for exclusion.
- EOTA TR 034, substance list No. 5 (notified regulation 2009/167/D, 2007/9016/N and Regulation (EC) No 1907/2006): The presence of polybrominated diphenylether (PBDE), hexabromcyclododecane (HBCDD) or organophosphorus compounds shall be declared by the applicant or the Technical Assessment Body has to verify that the product does not contain halogenated aromatic compounds or organophosphorus compounds due to the chemical composition of the product. The content of halogenated aromatic compounds or organophosphorus compounds shall be stated in the ETA.

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 System(s) of assessment and verification of constancy of performance to be applied

For the products covered by this EAD the applicable European legal act is: Decision 1999/454/EC.

The system is: 1

3.2 3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of kits for fire resistant service ducts in the procedure of assessment and verification of constancy of performance are laid down in Table 2.

Table 2 Control plan for the manufacturer of the kit; cornerstones

No	Subject/type of control (product, raw/constituent material, component - indicating characteristic concerned)	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Factory production control (FPC)*					
1	Checking of the incoming materials and components <ul style="list-style-type: none"> - precise designation and relevant characteristics of the material or component - references to European and/or international standards or relevant specifications - inspection of the delivery note 		Compliance with the requirements for materials or components		Every delivery
2	Checking the compliance of actual dimensions with specified dimensions (drawings) and visual inspection of the duct components		Compliance with dimensions and tolerances required	1	At the beginning of each production series. For large series: - once a day
3	Checking the compliance of each kit with the requirements of the project in question		Compliance with the project requirements	1	Every kit

* The factory production control shall take account of the detailed control plan to be included in the ETA. The detailed control plan shall be deposited with the Technical Assessment Body.

3.3 Tasks of the notified body

The cornerstones of the actions to be undertaken by the notified body in the procedure of assessment and verification of constancy of performance are laid down in Table 3.

Table 3 Control plan for the notified body; cornerstones

No	Subject/type of control (product, raw/constituent material, component - indicating characteristic concerned)	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Initial inspection of the manufacturing plant and of factory production control					
1	Inspection of the factory and factory production control as described in the control plan included in the ETA	Checking of devices, equipment and documentation within the framework of the FPC			When launching a new production or product line
Continuous surveillance, assessment and evaluation of factory production control					
2	Checking of the incoming materials and components <ul style="list-style-type: none"> - exact designation and relevant characteristics of the material or component - references to European and/or international standards or relevant specifications - inspection of the delivery note 		Compliance with materials or components required		Once or twice per year*
3	Checking the compliance of actual dimensions with specified dimensions (drawings) and visual inspection of the duct components		Compliance with dimensions and tolerances required	1	Once or twice per year*
4	Checking the compliance of each kit with the requirements of the project in question		Compliance with the project requirements	1	Once or twice per year*

* Continuous surveillance, assessment and evaluation of factory production control shall be carried out twice per year. After at least one year of continuous surveillance without any irregularities to report, the notified body may reduce the frequency of surveillance to once per year provided that the production is not prone to errors.

4 REFERENCE DOCUMENTS

AS FAR AS NO EDITION DATE IS GIVEN IN THE LIST OF STANDARDS THEREAFTER, THE STANDARD IN ITS CURRENT VERSION AT THE TIME OF ISSUING THE EUROPEAN TECHNICAL ASSESSMENT IS OF RELEVANCE.

EN 13501-1	Fire classification of construction products and building elements, part 1: Classification using data from reaction to fire tests
EN 13501-2	Fire classification of construction products and building elements, part 2: Classification using data from fire resistance tests, excluding ventilation services
EN 1363-1	Fire resistance tests – Part 1: General requirements
EN 1366-5	Fire resistance tests for service installations – Part 5: Service ducts and shafts
EN 15804	Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
EN ISO 1182	Reaction to fire tests for products – Non-combustibility test
EN ISO 1716	Reaction to fire tests for products – Determination of the gross heat of combustion (calorific value)
DIN 4102-2	Fire behaviour of Building Materials and Building Components; Building Components; Definitions, Requirements and Tests
DIN 4102-4	Fire behaviour of building materials and building components - part 4: synopsis and application of classified building materials, components and special components
DIN 4102-4/A1	Fire behaviour of building materials and building components - Part 4: Synopsis and application of classified building materials, components and special components; Amendment A1
DIN 4102-11	Fire behaviour of building materials and building components; pipe encasements, pipe bushings, service shafts and ducts, and barriers across inspection openings; terminology, requirements and testing
EOTA TR 024	Characterisation, Aspects of Durability and Factory Production Control for Reactive Materials, Components and Products
EOTA TR 034	General BWR3 Checklist for EADs/ETAs - Dangerous substances in construction products