

Ventilation system and fire protection

Tallinn
15th February 2023

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International Business Developer
Fire protection

Contents

- Fire Protection Systems
  - What are they?
  - Why are they important?
- Regulation scheme
  - CE marking
  - FPC Factory Production Control
  - CPR Constancy of performance report
  - DoP Declaration of Performance
- Classification
- Cases of study



Fire Protection Systems – Approaches



Fire Resistant Duct (FRD)

- Ventilation systems that start or keep operating during fire. Connected or not to fan (active or passive duct)

Kitchen extract duct

- Fire resistant duct used to extract kitchen smoke/heat

Natural Smoke Ventilation

- Manual/automatic opening of windows/roof etc.

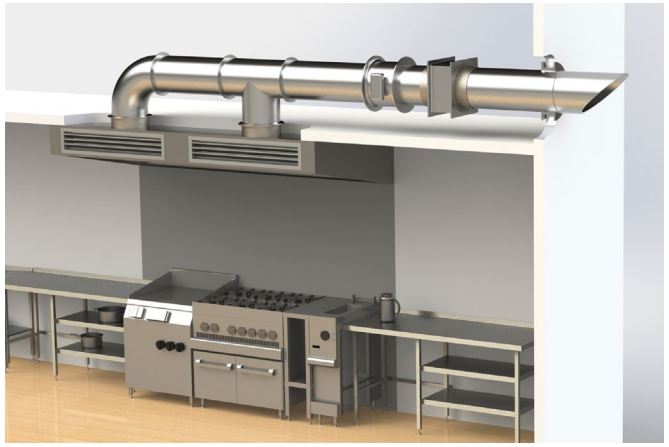
Mechanical Smoke Ventilation

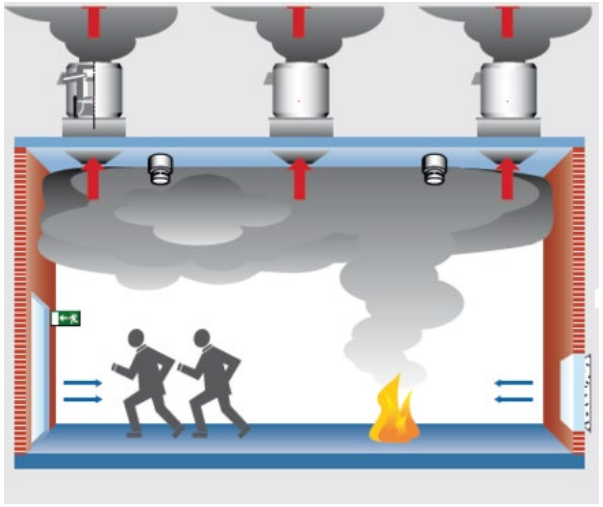
- Pressure Differential (e.g. staircase pressurization
- Smoke clearance (single and multi compartment)

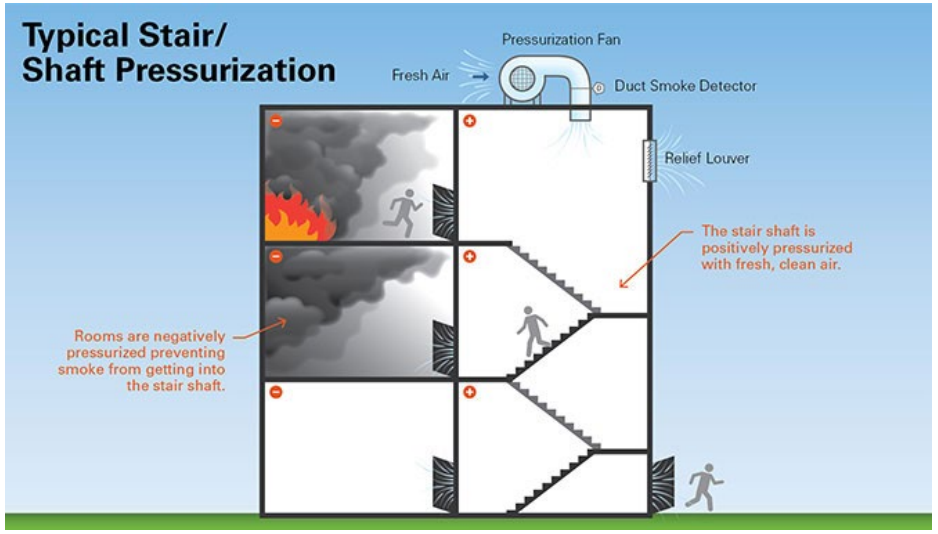
Fire Protection Systems - Examples





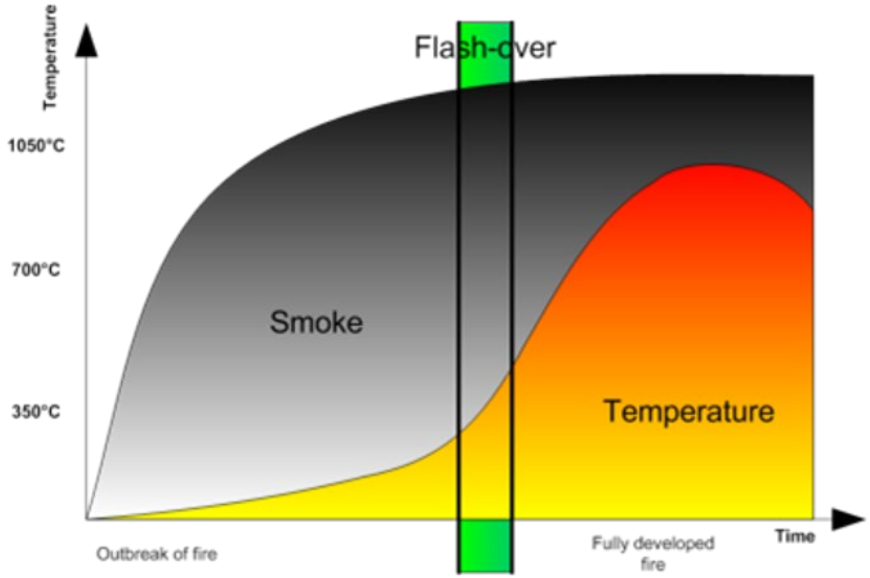




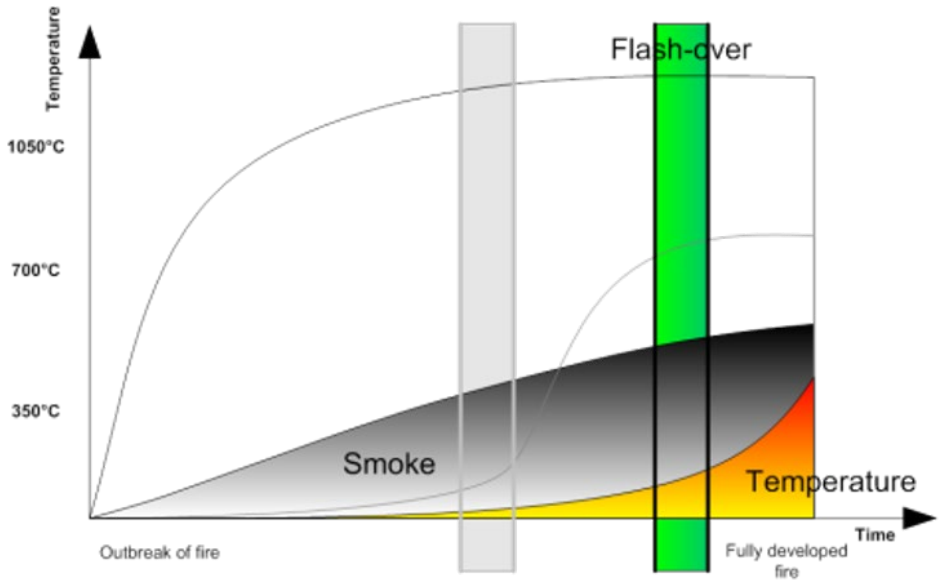




Flash-over



Progression of fire without smoke evacuation



Progression of fire with smoke evacuation

Smoke and temperature are connected. The smoke evacuation delays the flash-over and reduces toxicity, thermal energy and improves visibility.

Flash-over

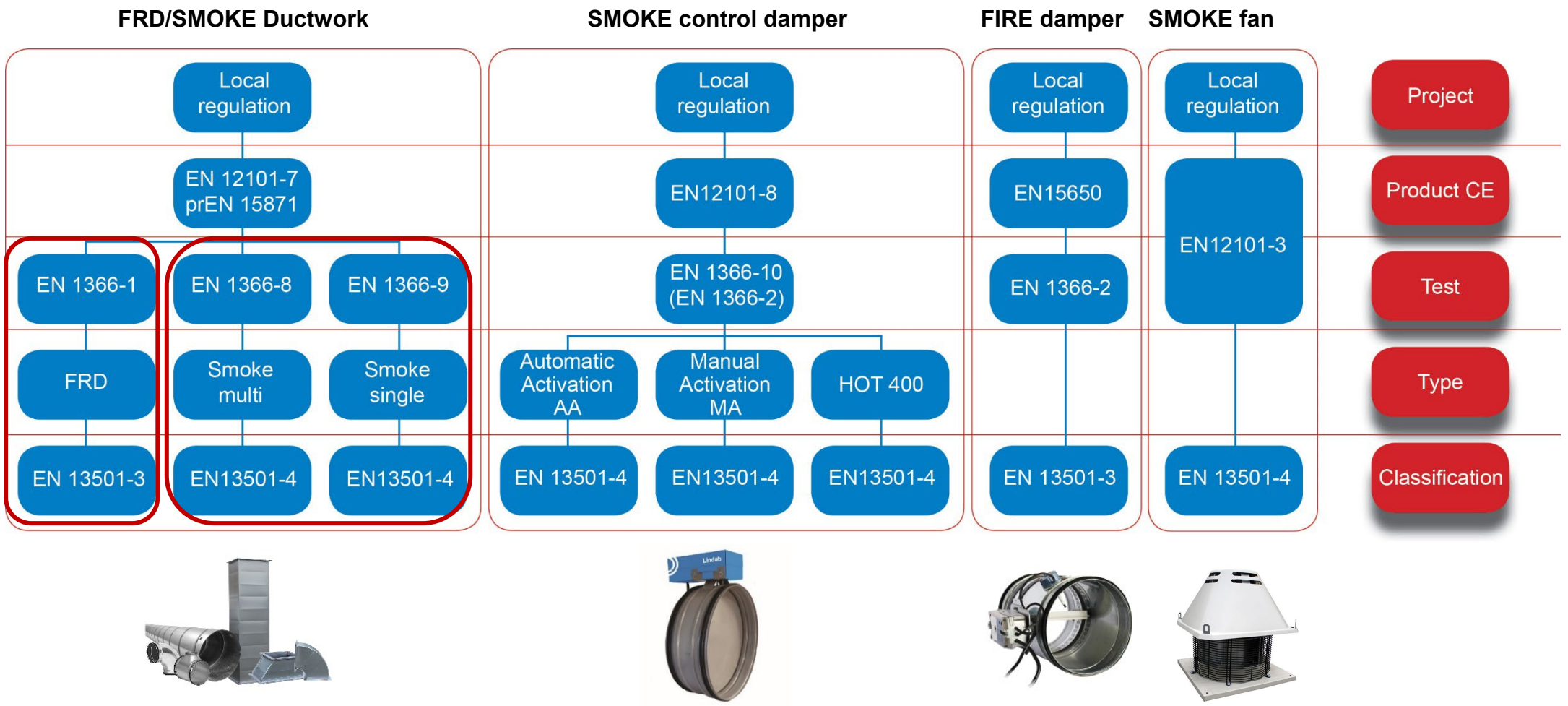


Why?

- Protect lives and keep people safe
- Minimize damage to property and the structure of the building
- Protect investment
- Delay and/or prevent flash-over
- Keep safe paths clear of smoke
- Facilitate and streamline evacuation and firefighting



Regulation scheme



Regulation scheme – EU n.305/2011

Regulation (EU) n.305/2011 of the European Parliament and of the Council of 9th March 2011 – Marketing of the construction products

A "regulation" is a **binding legislative act**. It must be applied in its entirety across the EU.

Article 4

Declaration of performance

1. When a construction product is covered by a harmonised standard or conforms to a European Technical Assessment which has been issued for it, the manufacturer shall draw up a declaration of performance when such a product is placed on the market.

Article 6

Content of the declaration of performance

1. The declaration of performance shall express the performance of construction products in relation to the essential characteristics of those products in accordance with the relevant harmonised technical specifications.

2. The declaration of performance shall contain, in particular, the following information:

(b) the system or systems of assessment and verification of constancy of performance of the construction product, as set out in Annex V;

Article 8

General principles and use of CE marking

1. The general principles set out in Article 30 of Regulation (EC) No 765/2008 shall apply to the CE marking.

2. The CE marking shall be affixed to those construction products for which the manufacturer has drawn up a declaration of performance in accordance with Articles 4 and 6.

Regulation scheme – Smoke duct and FRD

Fire resisting ducts

Product standard	Classification standard	Test standard	Extended field of application standard
pr EN 15871 Fire resisting ducts. CE	EN 13501-3 Fire classification of construction products and building elements - part 3: classification using data from fire resistance tests on components of normal building service installations.	EN 1366-1 Fire resistance tests for service installations: Ducts.	EN 15882-1 Extended applications of test results for installations: Ducts.

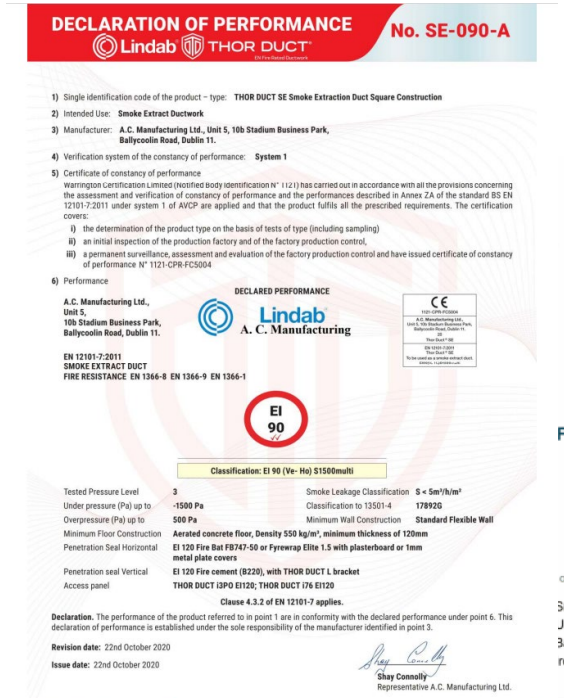
Smoke control ducts

Product standard	Classification standard	Test standard	Extended field of application standard
EN 12101-7 Smoke and heat control duct systems. CE	EN 13501-4 Fire classification of construction products and building elements - part 4: classification using data from fire resistance tests on components of smoke control systems.	EN 1366-8 Fire resistance tests for service installations: Smoke extraction ducts (multi compartment). EN 1366-9 Fire resistance test for service installations: Single compartment smoke extraction ducts.	pr EN 15882-8 Extended applications of test results for Smoke extraction ducts.



Regulation Scheme – DoP, CPR, FPC, CE

	Regulation EU 305/2011	
	Smoke Sys	Fire Rated Sys
Harmonized Std	✓ EN12101-7	✗ prEN15871
DoP	✓	✗
CPR	✓	✗
CE mark	✓	✗
Test Report	✓ EN1366-8/9	✓ EN1366-1
Classification Report	✓ EN13501-4	✓ EN13501-3
Extended field app.	✗ prEN15882-8	✓ EN15882-1



DECLARATION OF PERFORMANCE
Lindab THOR DUCT
No. SE-090-A

1) Single identification code of the product – type: THOR DUCT SE Smoke Extraction Duct Square Construction
2) Intended Use: Smoke Extract Ductwork
3) Manufacturer: A.C. Manufacturing Ltd., Unit 5, 10b Stadium Business Park, Ballycoolin Road, Dublin 11.
4) Verification system of the constancy of performance: System 1
5) Certificate of constancy of performance
Warrington Certification Limited (Notified Body identification N° 1121) has carried out in accordance with all the provisions concerning the assessment and verification of constancy of performance and the performances described in Annex ZA of the standard BS EN 12101-7:2011 under system 1 of AVCP are applied and that the product fulfils all the prescribed requirements. The certification covers:
i) the determination of the product type on the basis of tests of type (including sampling)
ii) an initial inspection of the production factory and of the factory production control,
iii) a permanent surveillance, assessment and evaluation of the factory production control and have issued certificate of constancy of performance N° 1121-CPR-FC5004
6) Performance

DECLARED PERFORMANCE

A.C. Manufacturing Ltd., Unit 5, 10b Stadium Business Park, Ballycoolin Road, Dublin 11.

Lindab A. C. Manufacturing

EN 12101-7:2011
SMOKE EXTRACT DUCT
FIRE RESISTANCE EN 1366-8 EN 1366-9 EN 1366-1

EI 90

Classification: EI 90 (Ve- Ho) S1500multi

Tested Pressure Level	3	Smoke Leakage Classification	S < 5m³/h/m²
Under pressure (Pa) up to	-1500 Pa	Classification to 13501-4	17892G
Overpressure (Pa) up to	500 Pa	Minimum Wall Construction	Standard Flexible Wall
Minimum Floor Construction	Aerated concrete floor, Density 550 kg/m³, minimum thickness of 120mm		
Penetration Seal Horizontal	EI 120 Fire Bat FB747-50 or Fyrewrap Elite 1.5 with plasterboard or 1mm metal plate covers		
Penetration seal Vertical	EI 120 Fire cement (B220), with THOR DUCT L bracket		
Access panel	THOR DUCT i3PO EI120; THOR DUCT i76 EI120		

Clause 4.3.2 of EN 12101-7 applies.

Declaration. The performance of the product referred to in point 1 are in conformity with the declared performance under point 6. This declaration of performance is established under the sole responsibility of the manufacturer identified in point 3.

Revision date: 22nd October 2020

Issue date: 22nd October 2020

Shay Connolly
Representative A.C. Manufacturing Ltd.

warringtonfire
Proud to be part of element

FIRE RESISTANCE CLASSIFICATION REPORT No. 19648C

OF THE CLASSIFICATION REPORT

Smofir Trading Limited
Unit 5, 10B Stadium Business Park
Ballycoolin Road, Dublin 11
Ireland

UCTION

This classification report defines the classification assigned to a multi-compartment smoke control duct – type: Thor Duct®, in accordance with the procedures given in EN 13501-4:2016: Fire classification of products and building elements – Part 4: Classification using data from fire resistance tests on components of smoke control systems.

This classification report consists of 14 pages and 2 annexes and may only be used or reproduced in its entirety.

egolf FOUNDING MEMBER

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BTW/VAT/TVA: BE0870.418.414 - Ondernemingsnummer: RPR GENT, afdeling Gent 0870.418.414

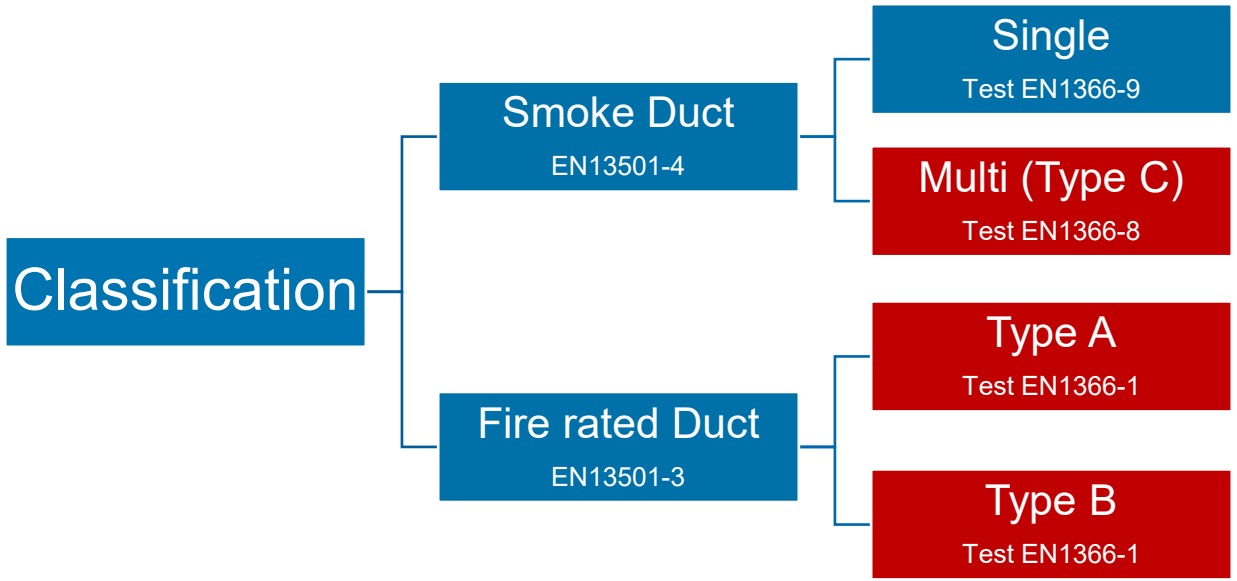
BELAC

CE
1121-CPR-FC5004

A.C. Manufacturing Ltd.,
Unit 5, 10b Stadium Business Park,
Ballycoolin Road, Dublin 11.
18
Thor Duct ® SE

EN 12101-7:2011
Thor Duct ® SE
To be used as a smoke extract duct.
EI60(V_e-H_o)S1500multi

Classification

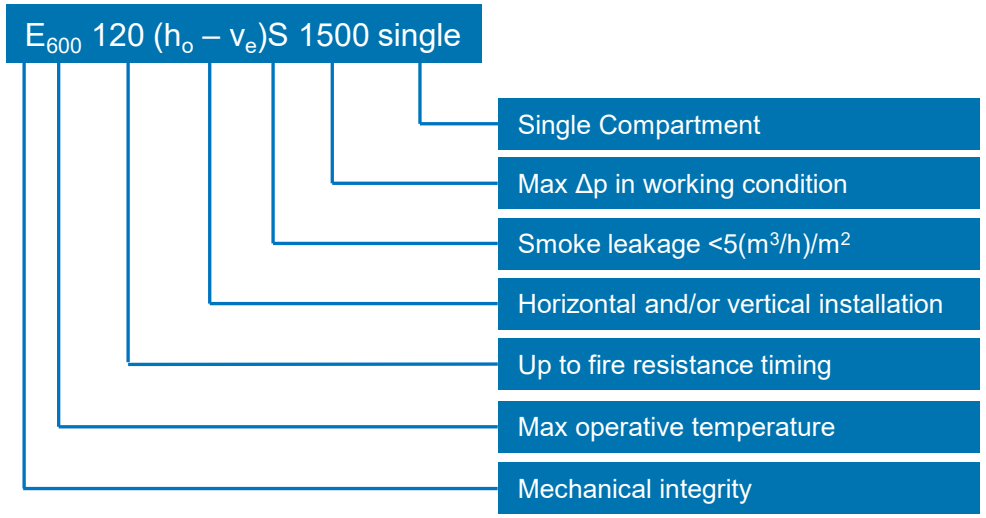


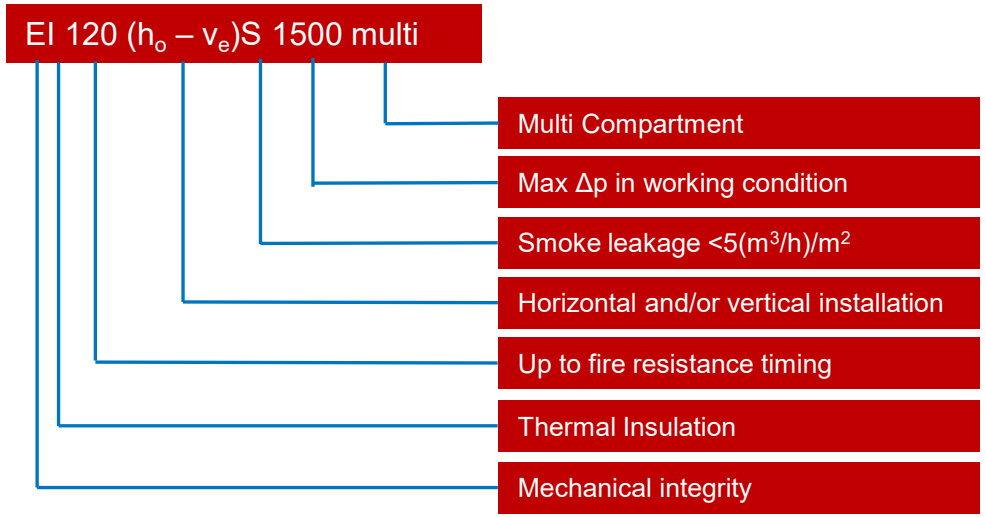
E_{600} 120 (h_o – v_e)S 1500 single CE

EI 120 (h_o – v_e)S 1500 multi CE

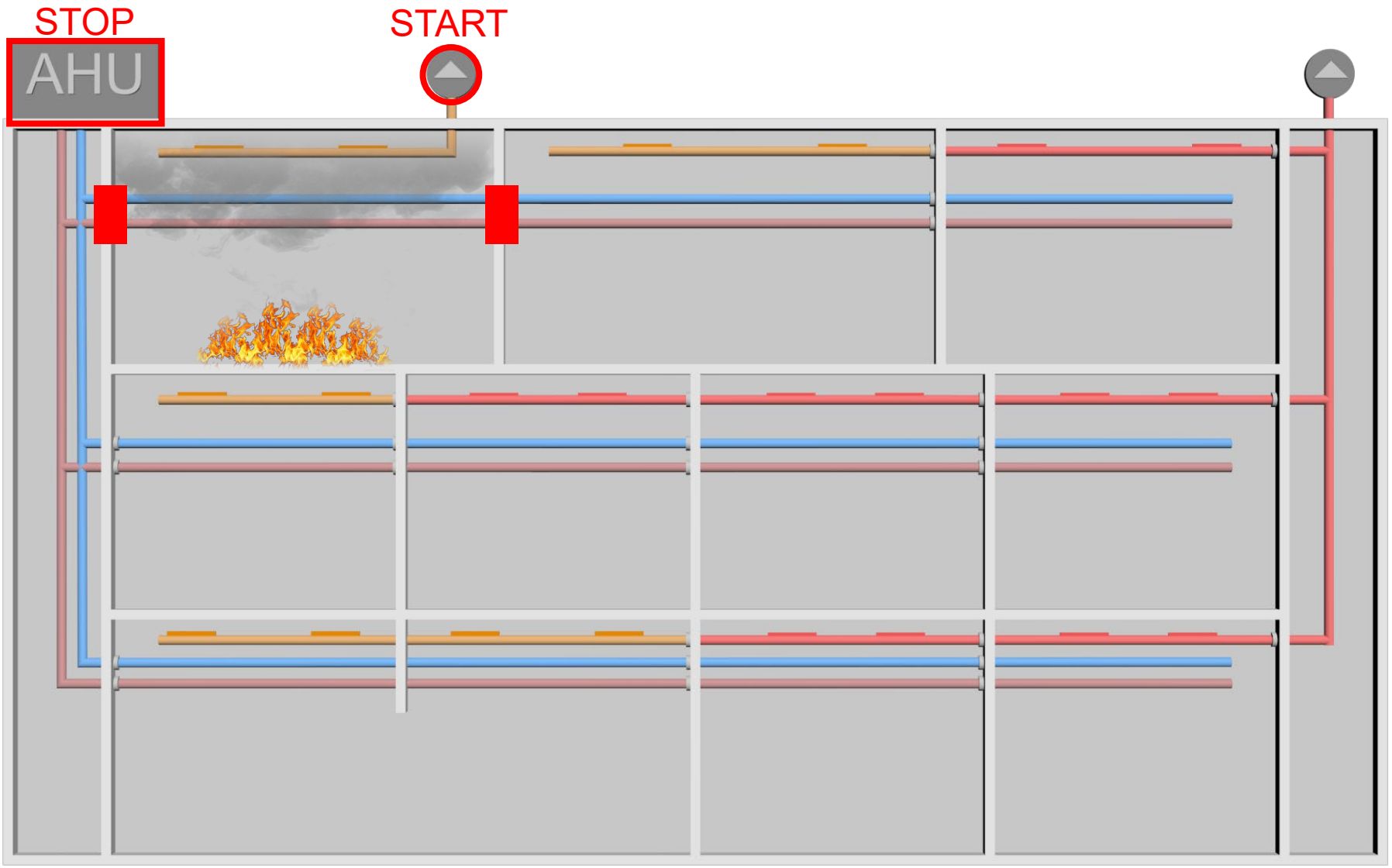
EI 120 (h_o – v_e)(o->i) S

EI 120 (h_o – v_e)(o<-i) S





Smoke clearance – Single & Multi compartment



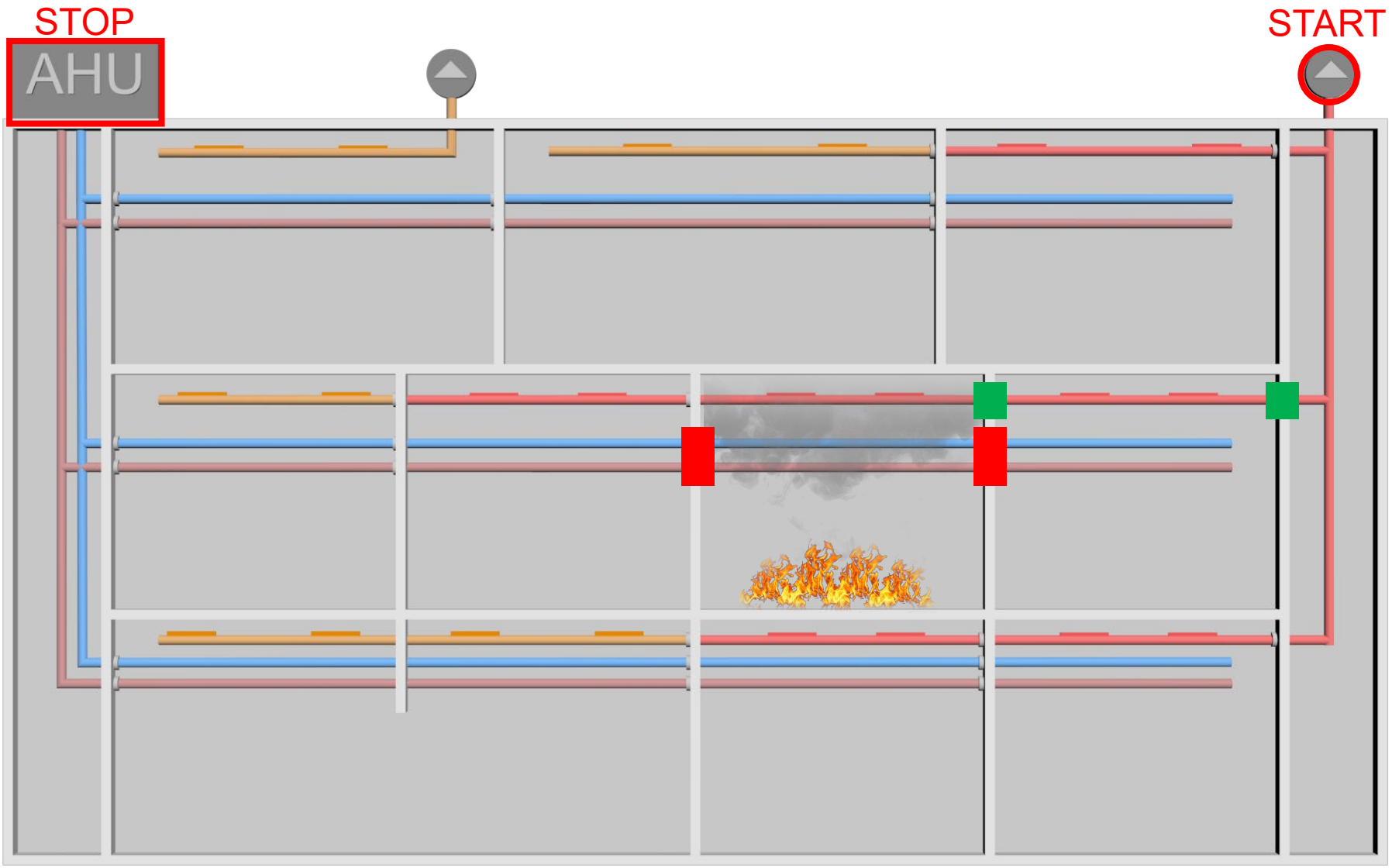
Smoke single

Smoke Multi

Supply

Exhaust

Smoke clearance – Single & Multi compartment



Smoke single

Smoke Multi

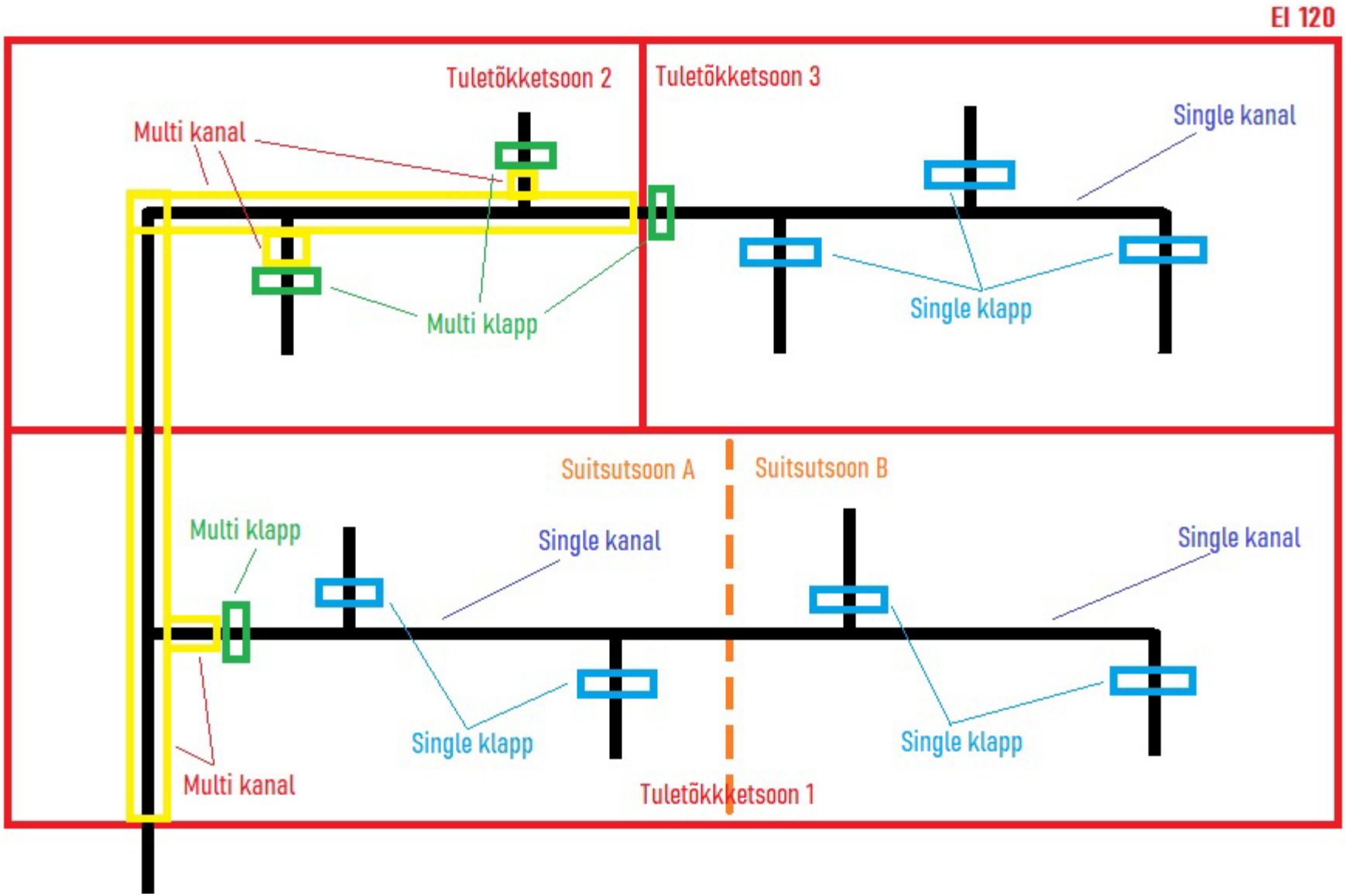
Supply

Exhaust

Fire damper closed

Smoke damper opened

Compartmentation example



Lindab Single Compartment Smoke - Circular

- E_{600} (ho)S 1500 Single classification (EN13510-4)
- CE marked
- Up to 1000mm diameter
- Accessories tested (EN1366-9)
  - Grilles
  - Access panel
  - Silencer
  - Compensator



Lindab Single Compartment Smoke - Rectangular

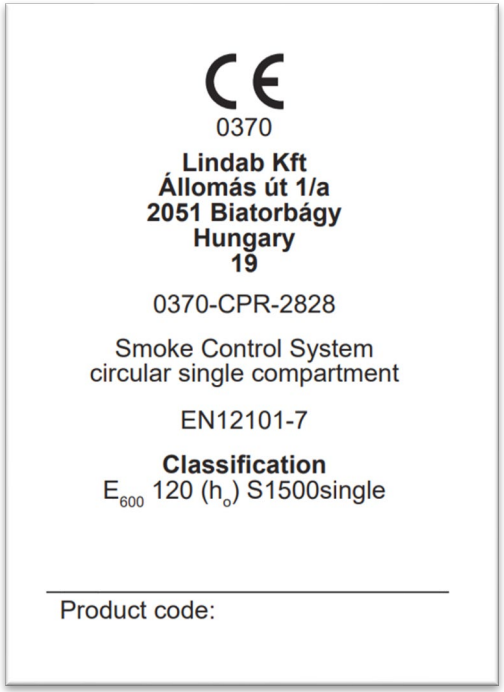
- E_{600} (ho, ve)S 1500 Single classification (EN13510-4) up to 1250x1000mm
- E_{600} (ho)S 1500 Single classification (EN13510-4) XL size from 1250x1000mm to 1900x1700mm
- Full scale test run on 1900x1700mm size (EN1366-9)
- Accessories tested (EN1366-9)
  - Grilles
  - Access panel
  - Silencer
  - Compensator
  - Regulating damper
  - Threaded insert for inspection/drain

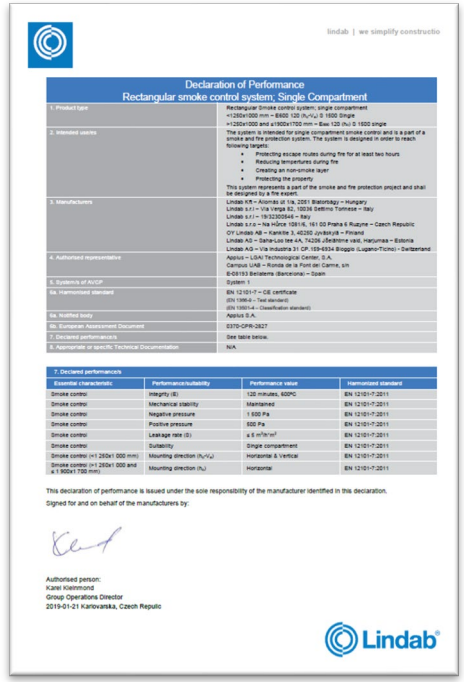


Documentation – Smoke Evacuation System Single

- **Mounting instruction** in local language is a binding document that the installer will use and refer to.
- **CE label** on each duct/fitting item
- Declaration of performance **DoP** by the manufacturer



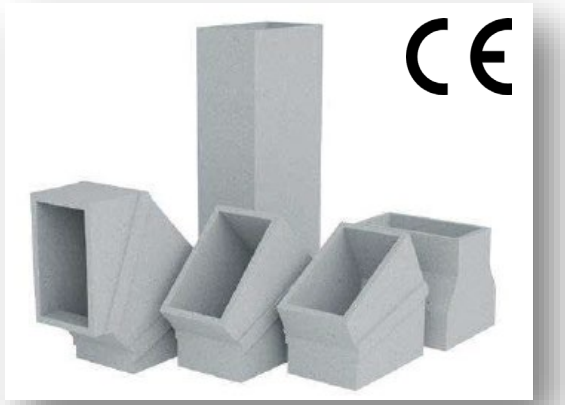




Fire Protection Systems – Multicompartment EN12101-7



Calcium silicate board or other



Calcium silicate duct or other



Wrapped duct

Member of EOTA www.eota.eu

Assembled system at site - case

- **CE mark CANNOT be placed on the finished system**, because the FPC (Factory Production Control) could not be carried out on the finished good in one factory (duct + Insulation).
- **DoP CANNOT be issued** by the producer, because it is not a finished system unless a “third party scheme” by an external notified body is appointed.
- The documents to endorse the solution are:
  - **Classification report** issued by a Notified Body
  - **ETA** (European Technical Assessment), process to replace the CE marking



ITeC The Catalonia Institute of Construction Technology

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ES-08018 Barcelona
Tel. +34 93 309 34 04
qualprod@itec.cat
itec.cat

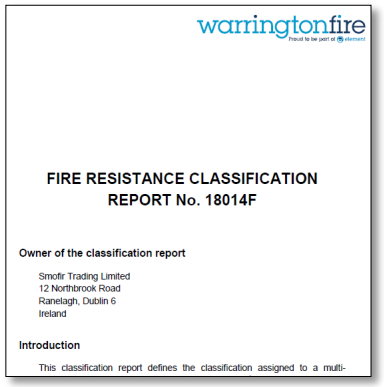
Member of EOTA
www.eota.eu

European Technical Assessment **ETA 18/0691 of 12.12.2022**

General part

Technical Assessment Body issuing the ETA: ITeC
ITeC has been designated according to Article 29 of Regulation (EU) No 305/2011 and is member of EOTA (European Organisation for Technical Assessment).

Trade name of the construction product	Ultimate Protect Slab 4.0 Ultimate Protect Slab 4.0 Alu 1



warringtonfire

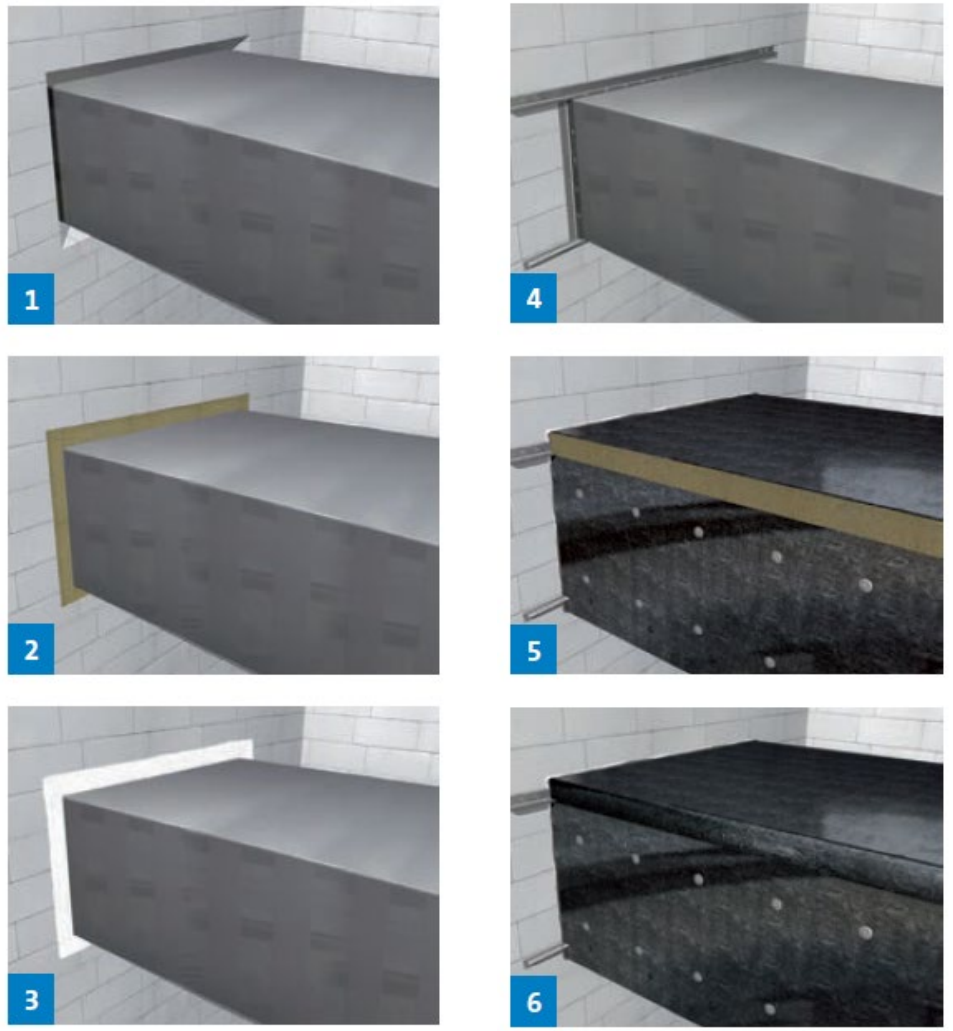
FIRE RESISTANCE CLASSIFICATION REPORT No. 18014F

Owner of the classification report

Smofir Trading Limited
12 Northbrook Road
Ranelagh, Dublin 6
Ireland

Introduction

This classification report defines the classification assigned to a multi-

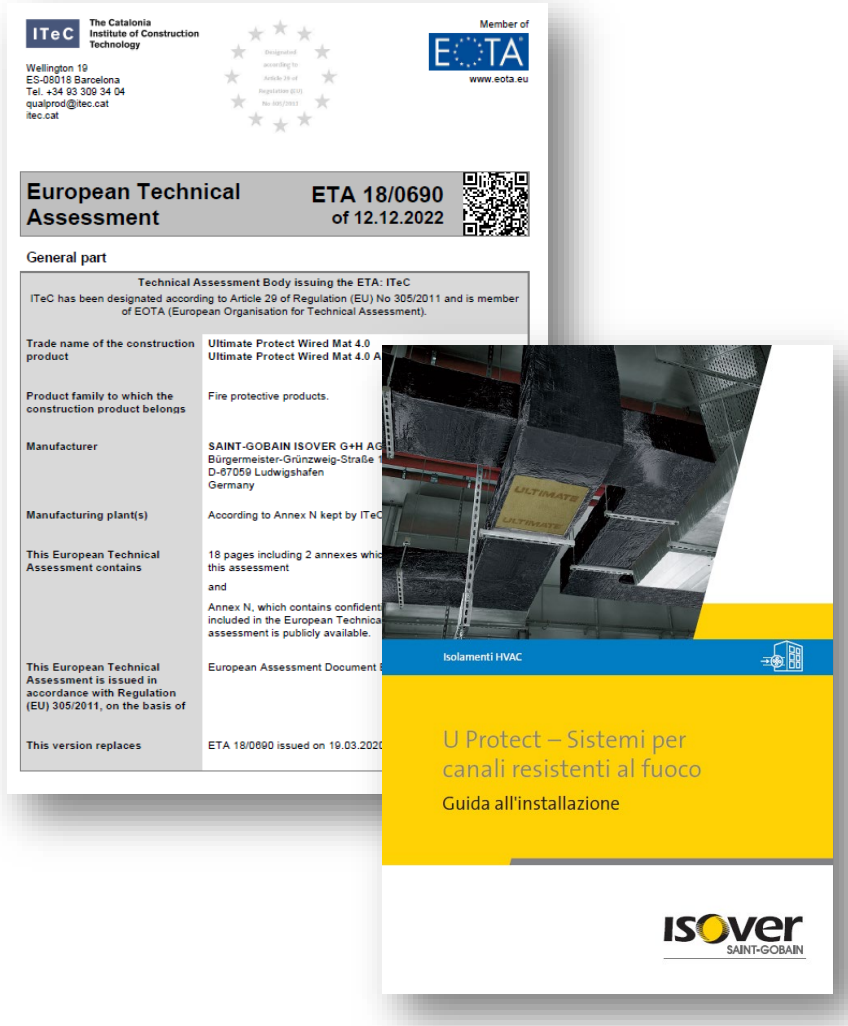


Documentation – Smoke Evacuation System – Multicompartment – Assembled at site

- **Mounting instruction** in local language is a binding document that the installer will use and refer to.
- **Classification report** issued by a Notified Body

or

- European Technical Assessment **ETA** issued by a Notified Body



<u>All the documents must be released by the fire certificate owner.</u>

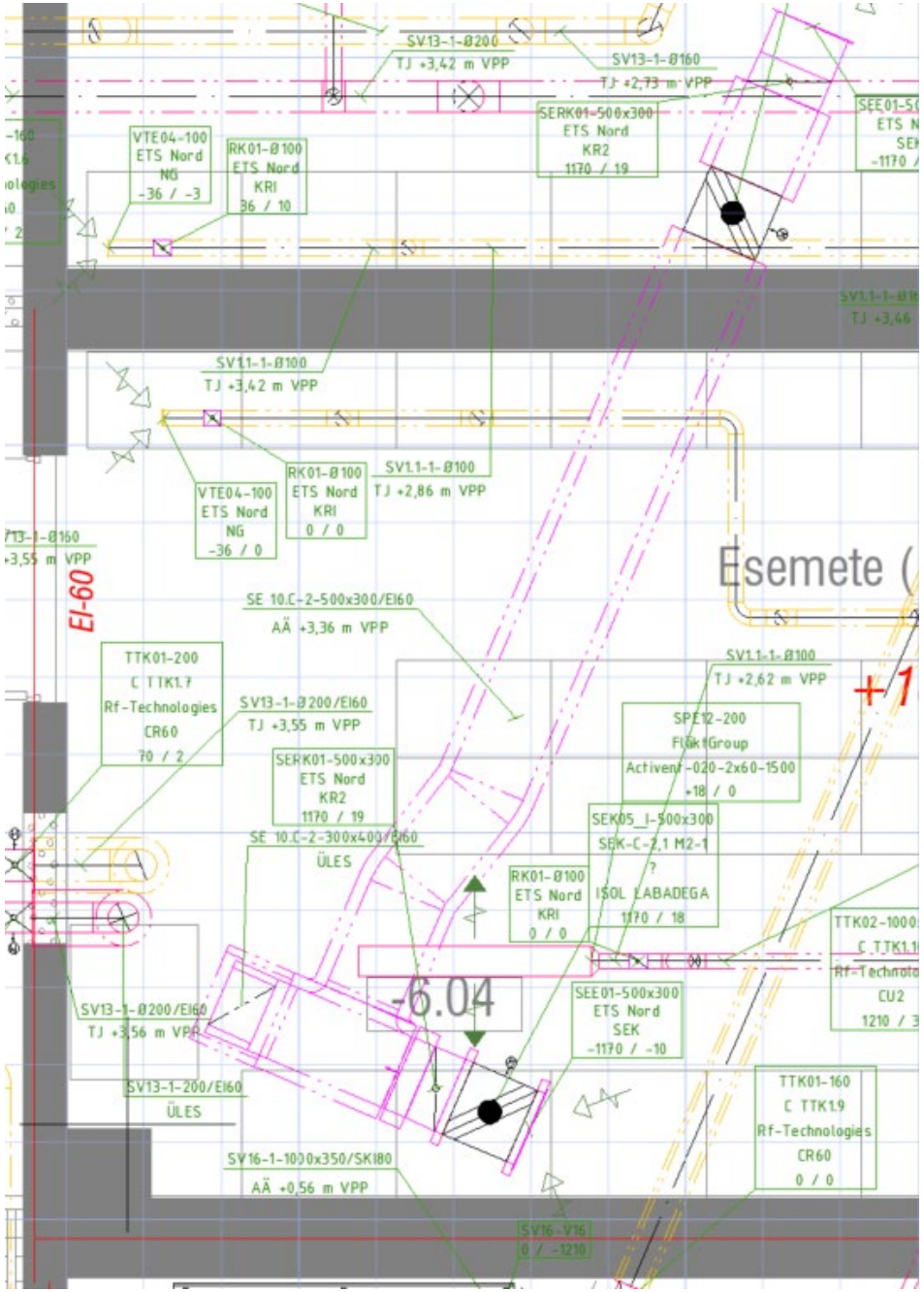
Cases of study

- Is it allowed to insulate a <u>single compartment system</u>?

NO

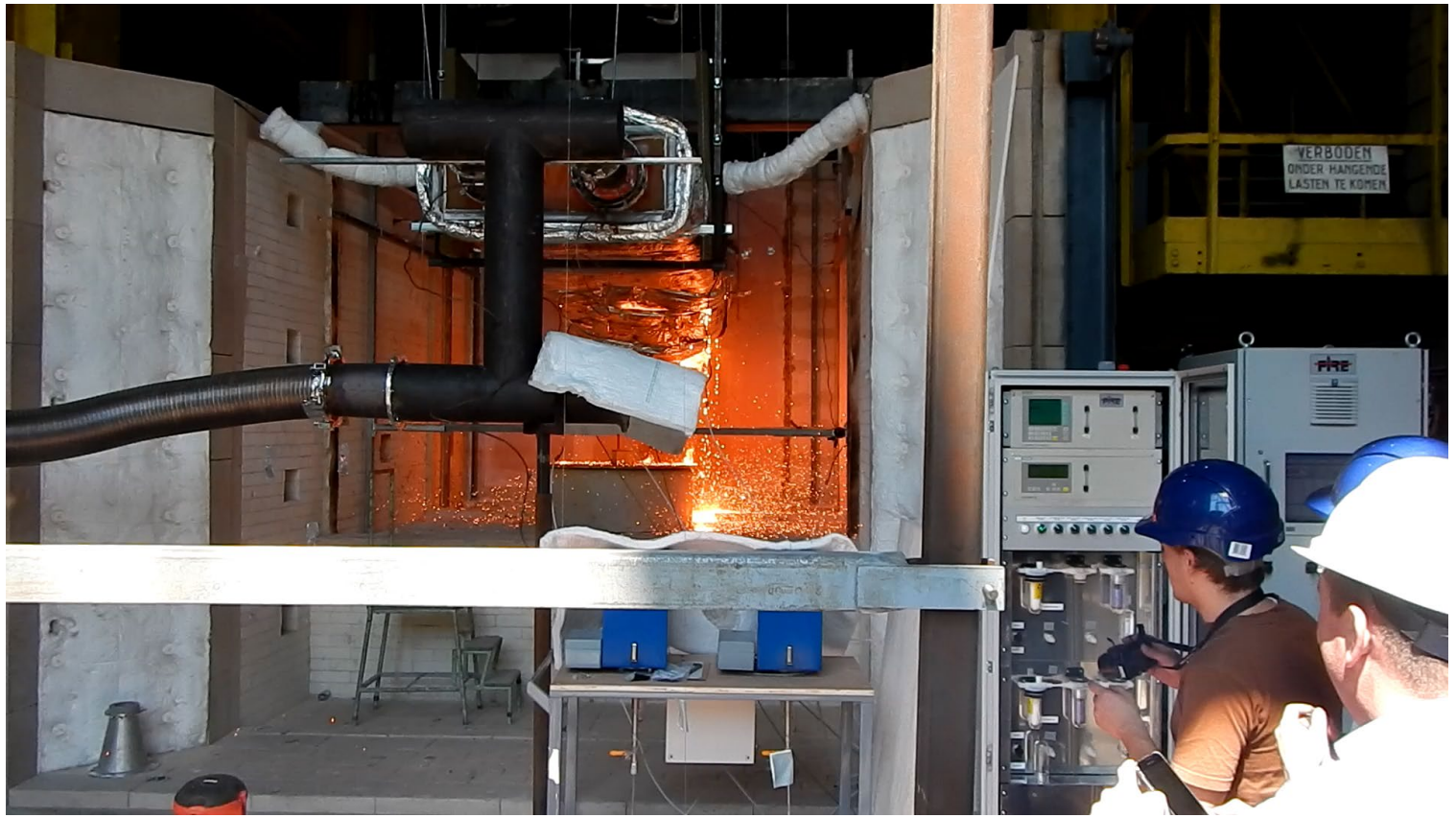
It can be dangerous!

Needs Risk assessment by Fire Engineer



What if I insulate a NOT certified duct?

- The system (duct+insulation) must be tested together as a whole system.
- Insulate with tested insulation a non-tested duct could compromise the integrity of the system.
- Insulate with tested insulation a tested duct, but tested with other insulation, could compromise the integrity of the system.
- The duct construction MUST follow the technical details by the certificate owner.



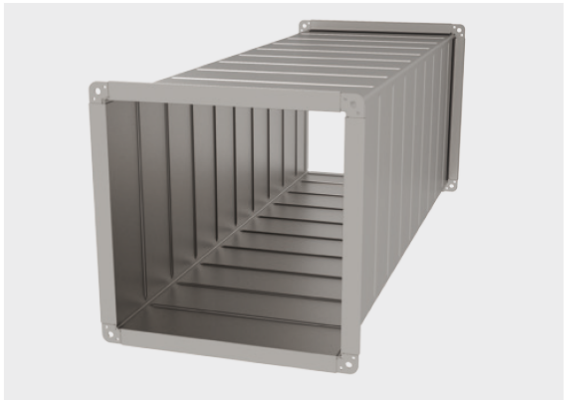
Duct construction details – the key for integrity

2.8. Smoke Extraction (according to EN 1366-8)

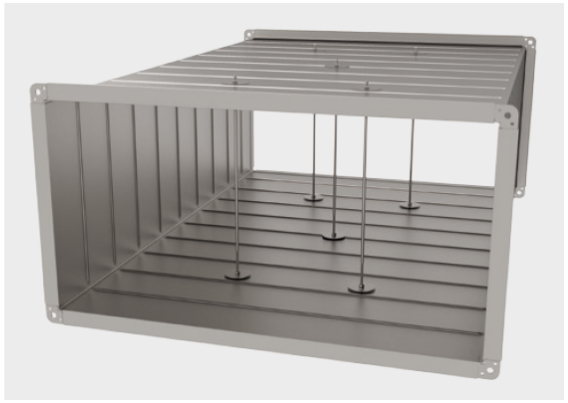
Stiffeners must be used and fitted perpendicular to any side of the duct where dimension exceeds 500 mm. One stiffener per every 0.3 [m^2] surface of the duct side is needed.
The stiffeners must be:

- Either a steel thread rod diameter 8 mm, inside a 3/8“ diameter steel pipe or steel pipe diameter 17.1 mm, thickness 2.3 mm.
- Or a stiffener made of steel with an equal stiffness as described above.

The steel rod must be fixed to the ducts using 4 pieces of M70 mm washers with thickness 1 mm and M8 nuts.



Examples:
Duct with width 500 mm, height 500 mm and section length 1500 mm: no stiffener needed.



Duct with width 1000 mm, height 500 mm and section length 1500 mm: 5 stiffeners needed, evenly distributed over the surface.
The number of stiffeners to apply is: (1 x 1.5) [m^2] / 0.3 [m^2/stiffener] = 5 stiffeners.

Up to EI90, the minimum steel thickness is 0.7 mm.
For EI120, the minimum steel thickness is 1 mm and C-profiles with minimum steel thickness of 1 mm must be used over the steel flanges, together with the clamps.





Cases of study

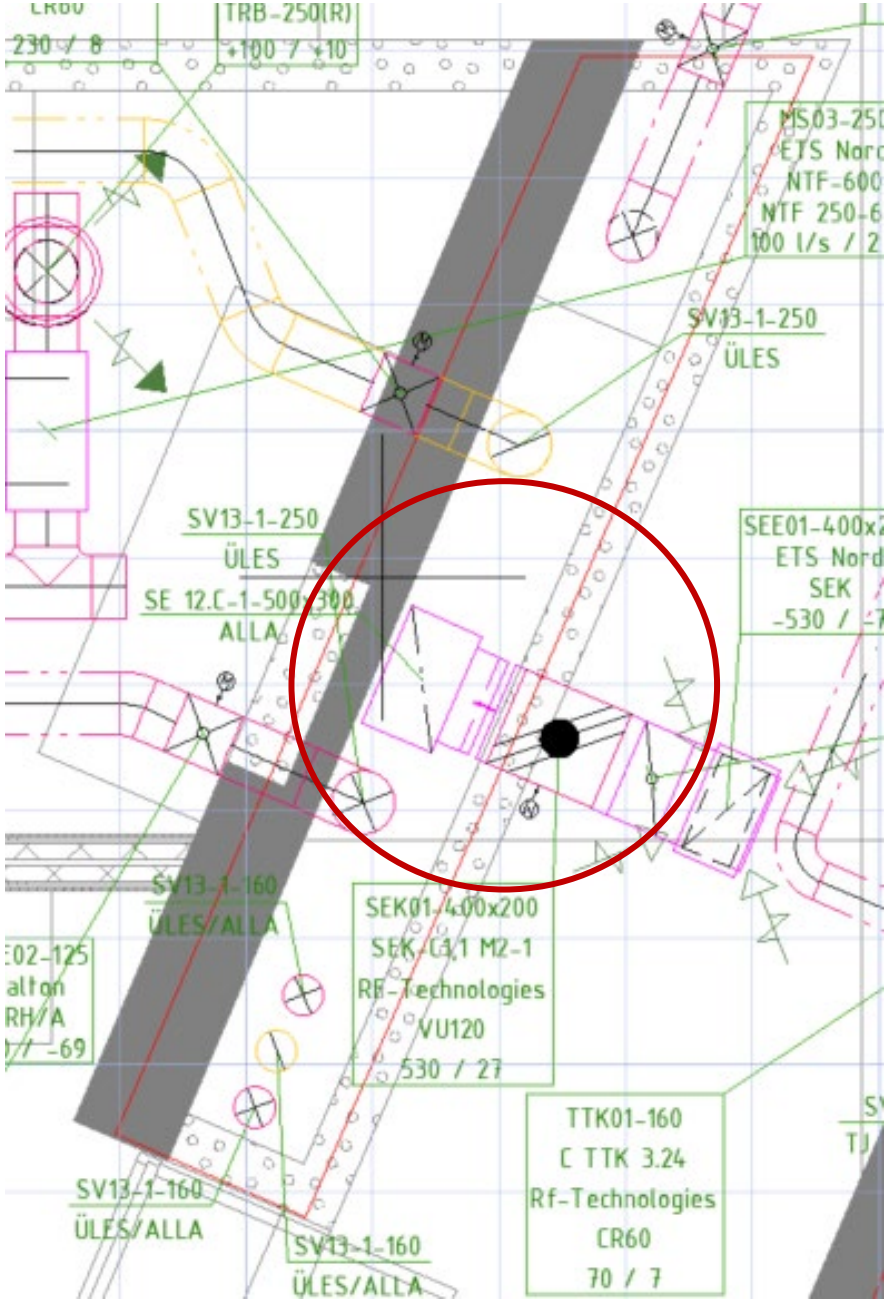
- Is it necessary to insulate a multi compartment system that run in a fire rated shaft?

It depends

Are there other utilities in the shaft?

Risk to ignite other utilities running close the multi compartment system.

Needs a risk analysis.



Cases of study

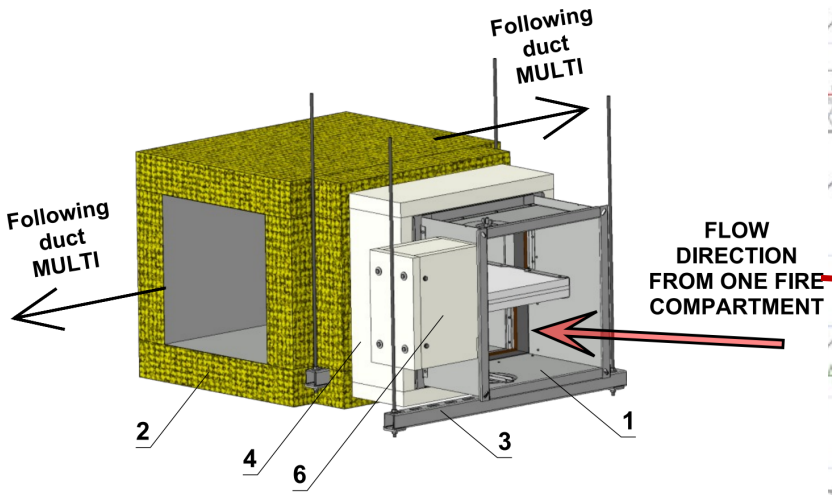
- Do I need compensators in the smoke evacuation system?
- Is the system tested with or without compensator?

It depends



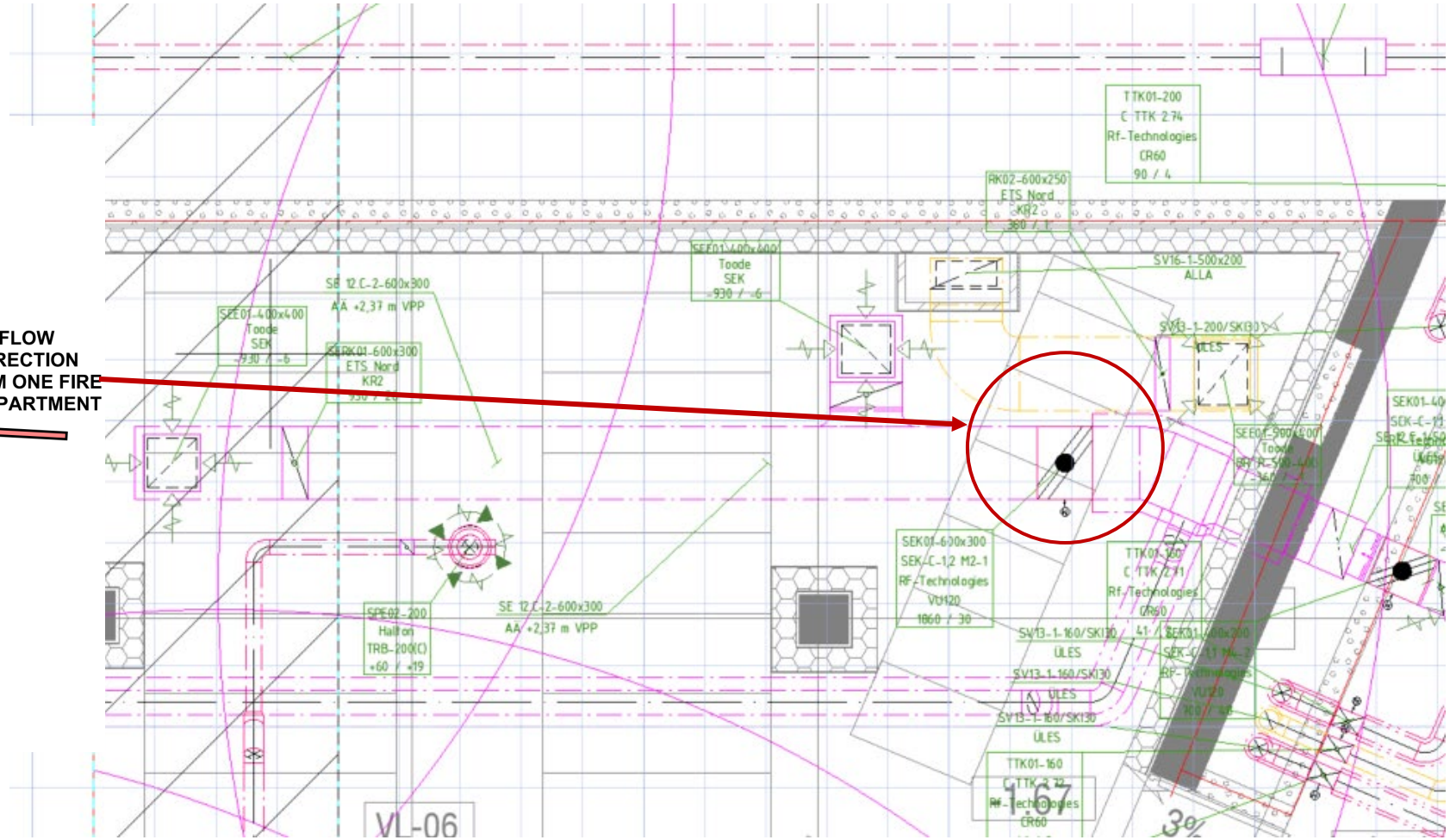
Case of study

- Transition from/to single compartment system to multi with damper <u>out of the wall</u>



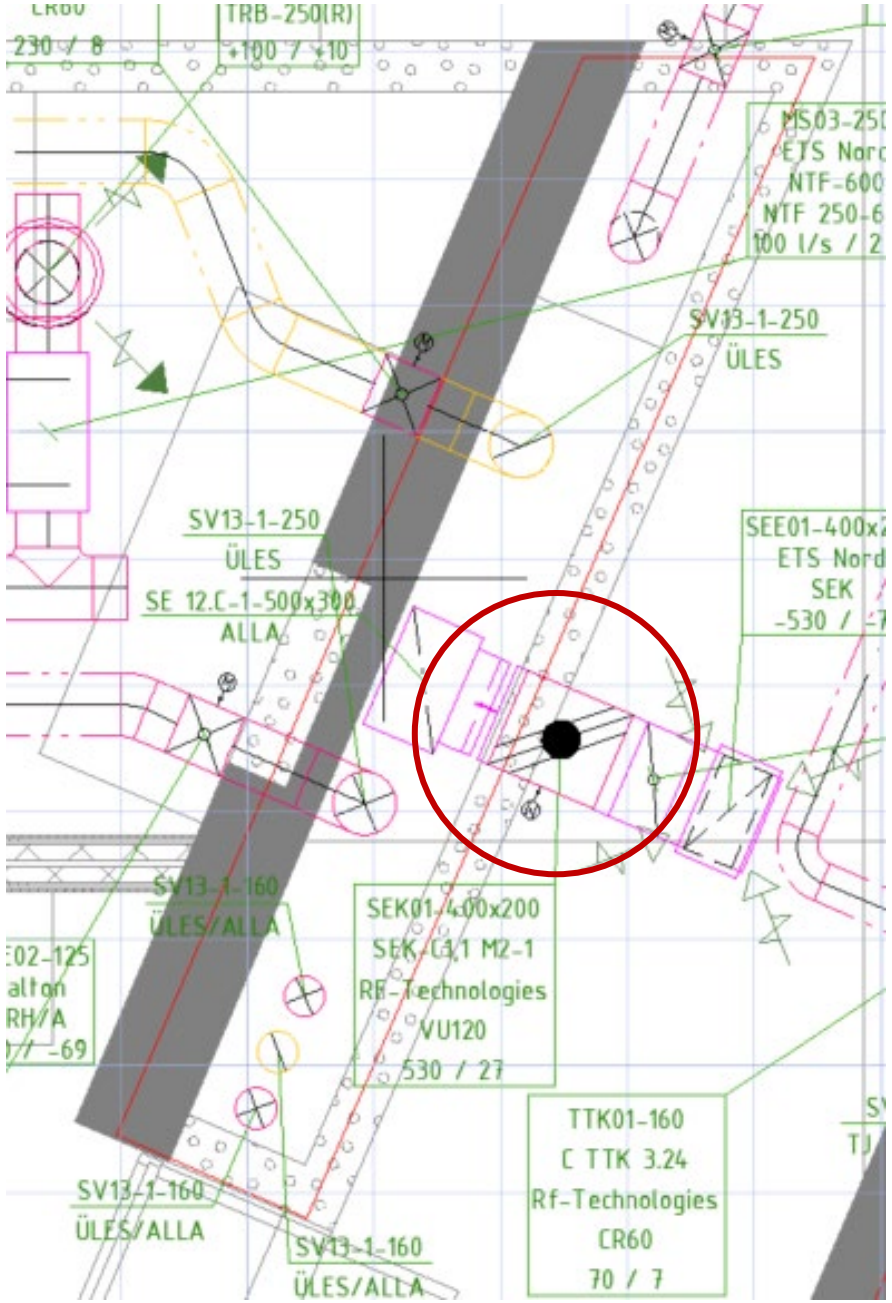
Position:

1 MSD
2 Duct
3 Fixing profile with threaded rod
4 PROMATECT MS - th. min 40 mm, min. density 750 kg/m³
5 Protection cladding-boards are in line with blade – it is a part of the damper in designs A1 and IB1
6 Protection box of actuator - part of the IB and IB1 damper design
Note: There is no protection box in designs A and A1.



Cases of study

- Transition from/to single compartment system to multi with damper <u>in the wall</u>

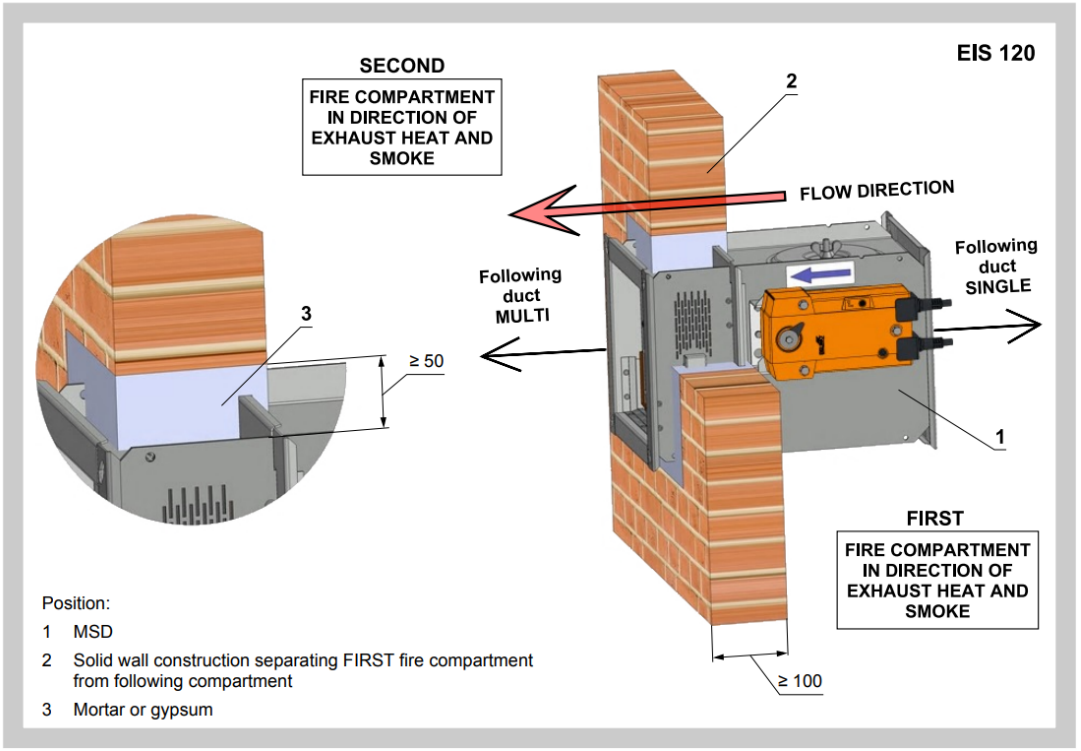


Cases of study

- Transition from/to single compartment system to multi with damper <u>in the wall</u>

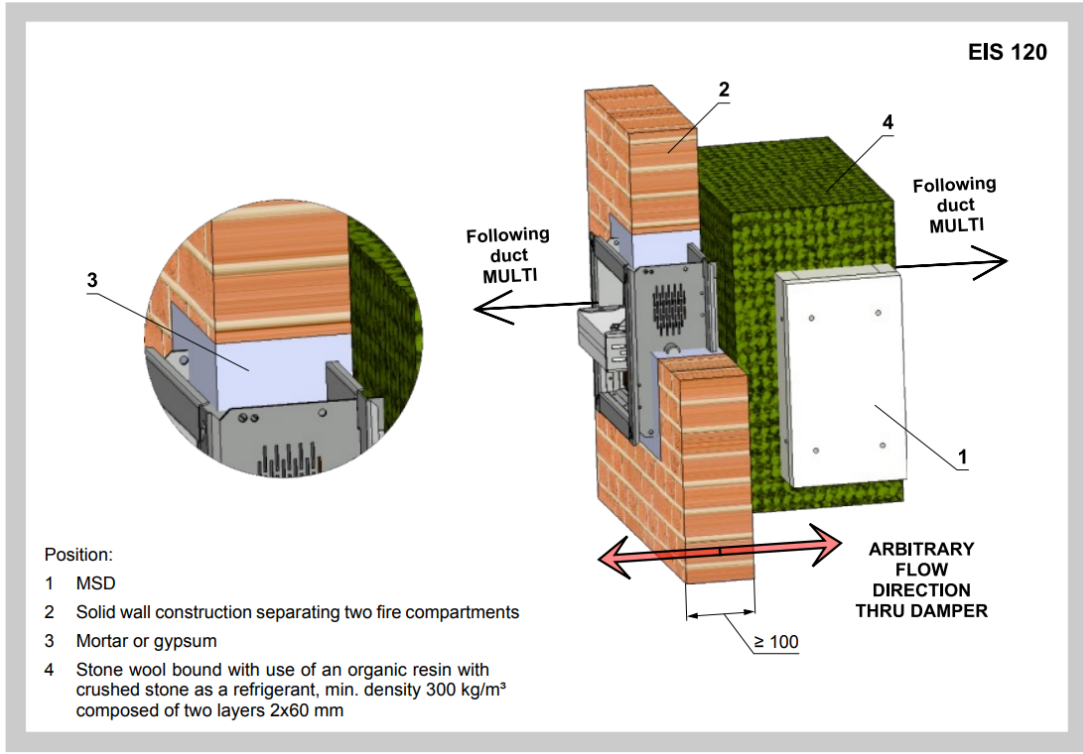
5.2. Installation in solid wall construction SINGLE / MULTI

Fig. 36 Dividing construction between SINGLE / MULTI duct - mortar or gypsum



5.3. Installation in solid wall construction MULTI / MULTI

Fig. 39 Dividing construction between MULTI / MULTI duct - insulation with stone wool - mortar or gypsum





Thank you!

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