EUROPEAN FIRE SAFETY COMMUNITY

FIRE SAFE EUROPE 10 years ANNIVERSARY 2011 - 2021

Comparative study of national fire safety requirements

Identifying key trends across the EU for high-rise residential buildings and hospitals

Fire Information Exchange Platform
Online Meeting
15 April 2021

A European Fire Safety Community's project

- The Community was launched in 2019 by Fire Safe Europe:
  - To learn from one another
  - To bridge the communication gap between all of us
  - To join forces to take fire safety to the next level

An information hub

A unique and participative network

A policy framing hive

Fire Safe Europe

Fire Safe Europe is the first European Association advocating for fire safety in buildings with an active Community of 600+ fire experts. Our mission is to **improve fire safety in buildings for people and society**.

600+

Fire experts

Researchers

Firefighters

European associations

International companies

Members of the European Parliament

And more

Covering sectors such as:

Cable

Concrete

Insulation

Fire fighting

Fire research

Flame retardants

Roof & wall systems

Our Members are:

+ over 600 Individual European Fire Safety Community Members

2020-2021 Comparative study of national fire safety requirements

FSEU study

Analyses national regulations related to fire safety in schools, hospitals and high-rise residential buildings (2014)

- **Data from 10 EU Member States**
- **Study shared with EU and national policy-makers who asked for an update**

Start of the review by the European Fire Safety Community's Facades Advisory Panel (2020)

- **3 phases, focusing on 3 building types (high-rise, hospitals, schools)**
- **Final report to be published in December 2021**
- **Potential expansion to other building types post-2021**

ANALYSIS

EUROPEAN FIRE SAFETY COMMUNITY

FIRE SAFE EUROPE 10 years ANNIVERSARY 2011 - 2021

Comparative study of national fire safety requirements

Part One: High-rise residential buildings

INTRODUCTION

- **Objective:**
  - **present the data and provide insights into different countries requirements on high-rise residential buildings, key trends and differences.**
- **The European Fire Safety Community provided valuable data from 19 countries:**

Belgium (BE)	Bulgaria (BG)	Croatia (HR)	Czech Republic (CZ)	Denmark (DK)
Finland (FI)	Germany (DE)	Greece (EL)	Hungary (HU)	Italy (IT)
Lithuania (LT)	Republic of North Macedonia (MK)	Poland (PL)	Romania (RO)	Slovenia (SI)
Spain (ES)	Sweden (SE)	Switzerland (CH)	United Kingdom (UK)	

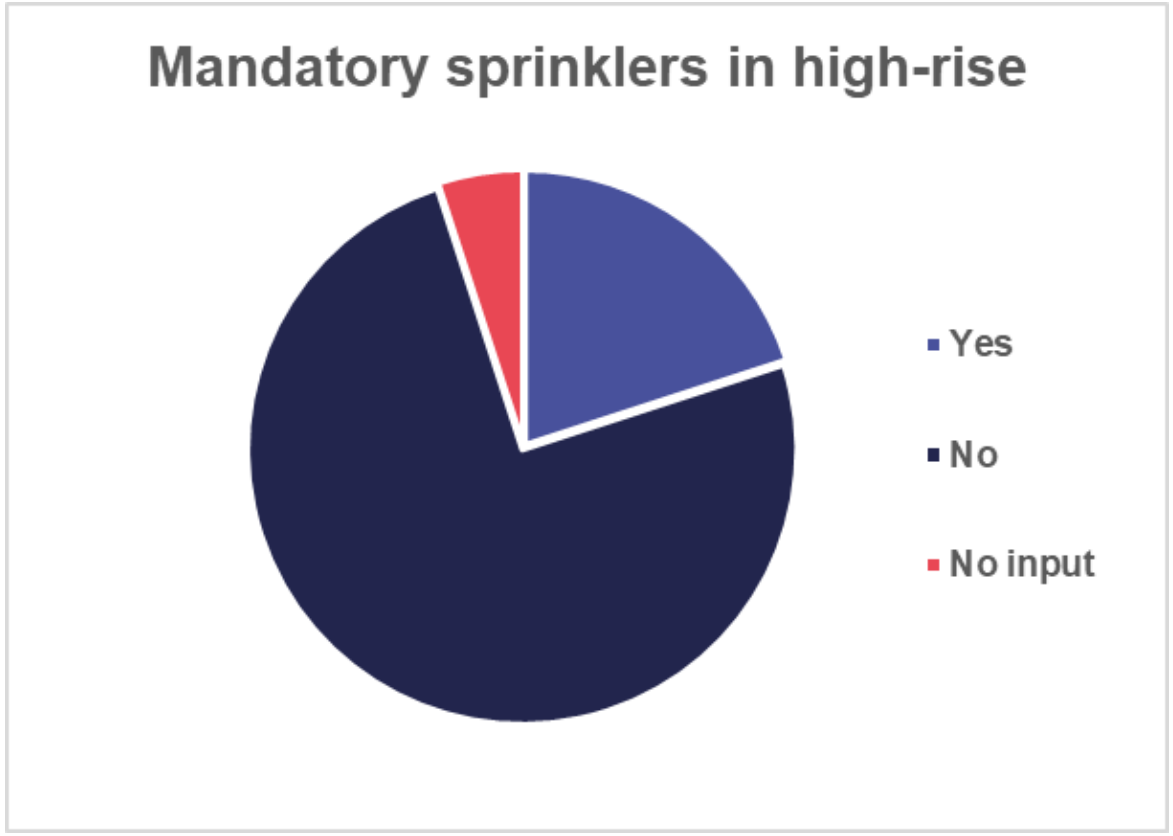
DEFINITION

HIGH-RISE RESIDENTIAL BUILDING

- →**Number of floors:** 15 = 45 m in total height
- →**Ground area of building:** 2200 m2
- →**Number of people:** 17 apartments on each floor, 1-5 persons of all ages in each
- →**Location of building:** In a city, with 3 km to nearest fire station


Analysis

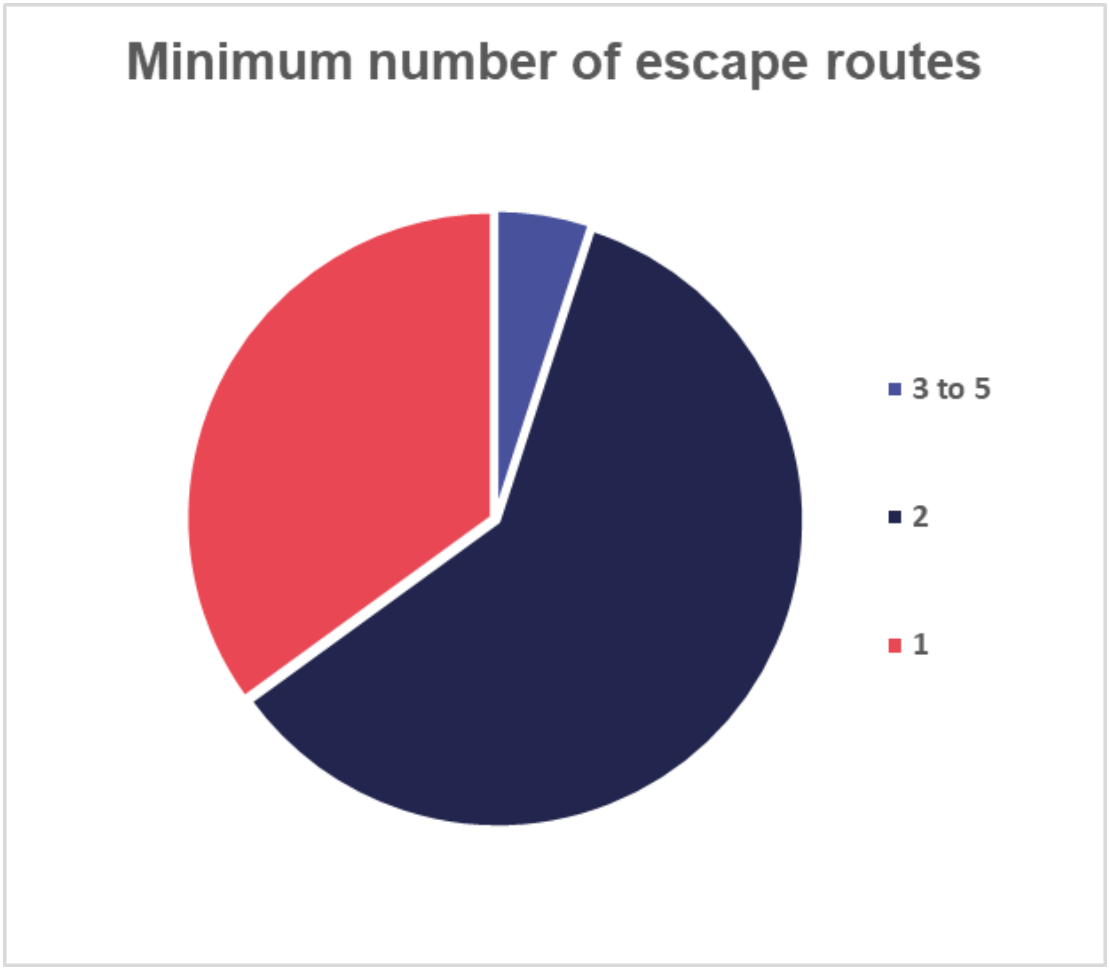
Sprinkler requirements for high-rise residential buildings



Sprinklers may be required for:

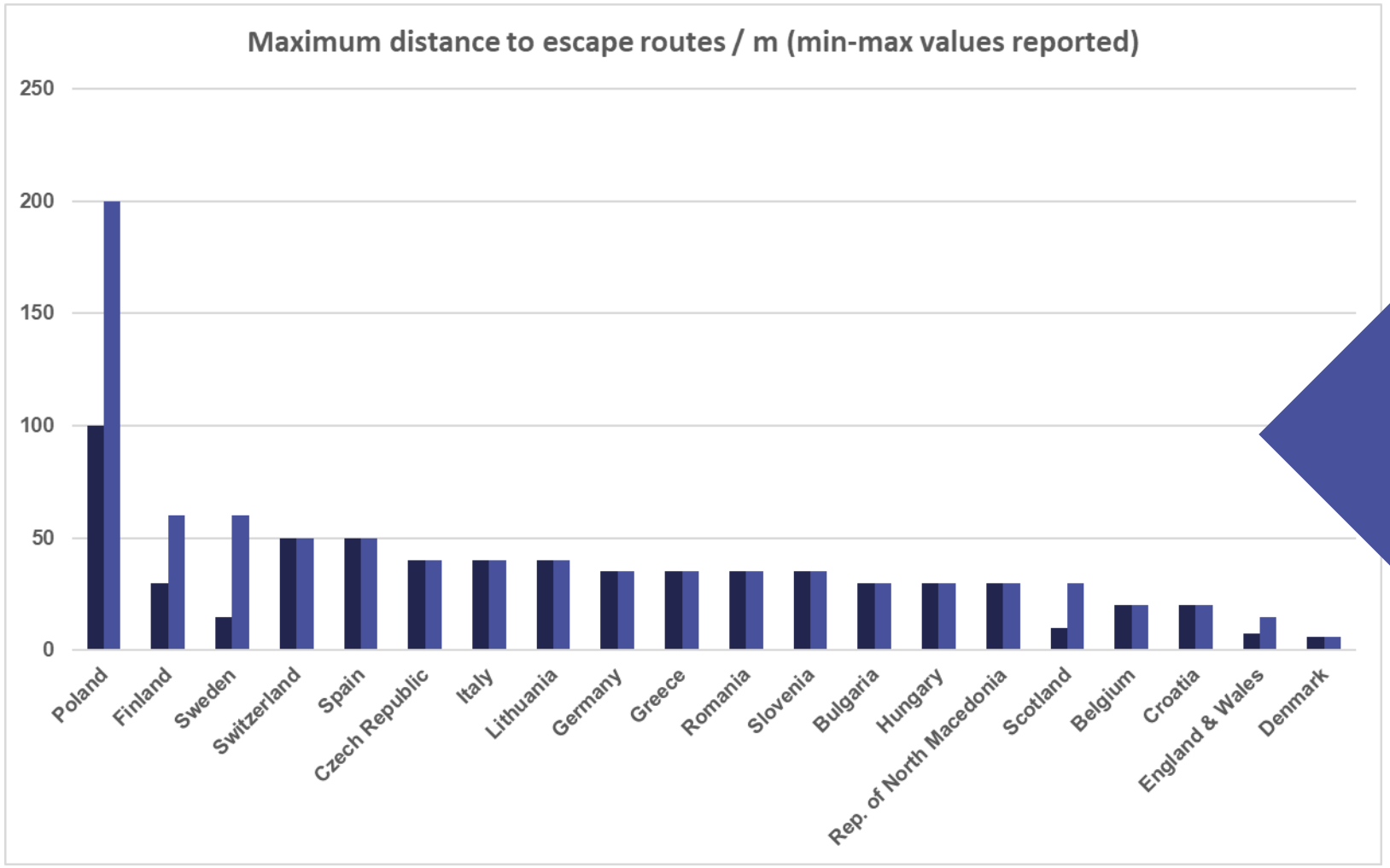
- **higher buildings (56m for Finland, 75m for Lithuania, 80m for Spain)**
- **if a compartment exceeds 200m² (Spain, Slovenia and Switzerland)**

Minimum number of escape routes



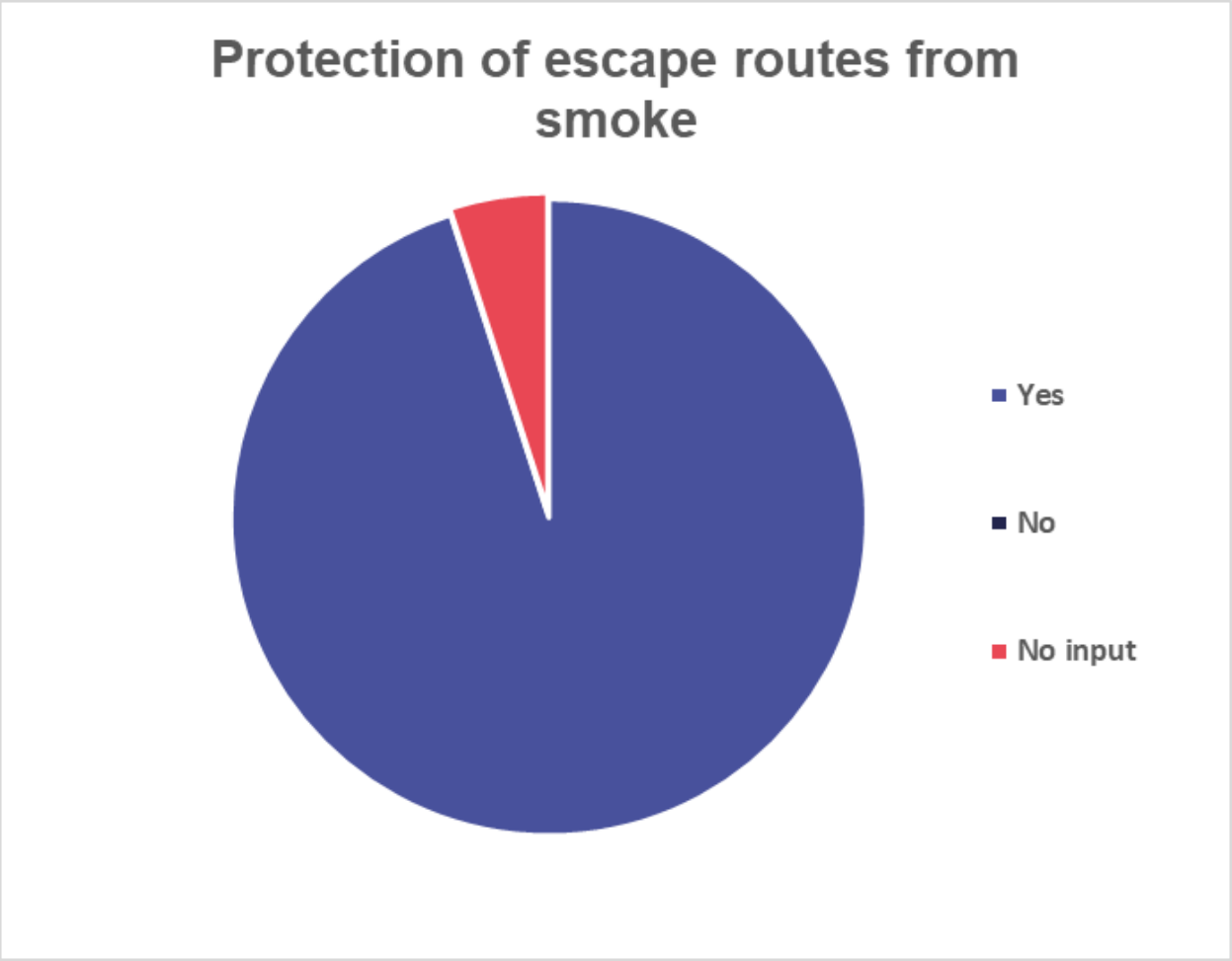
No of escape routes	Countries
3-5	IT
2	BE, BG, CZ, DE, EL, LT, MK, PL, RO, SE, Scotland, CH
1	HR, DK, England, Wales, FI, SI, ES

Distance to escape routes



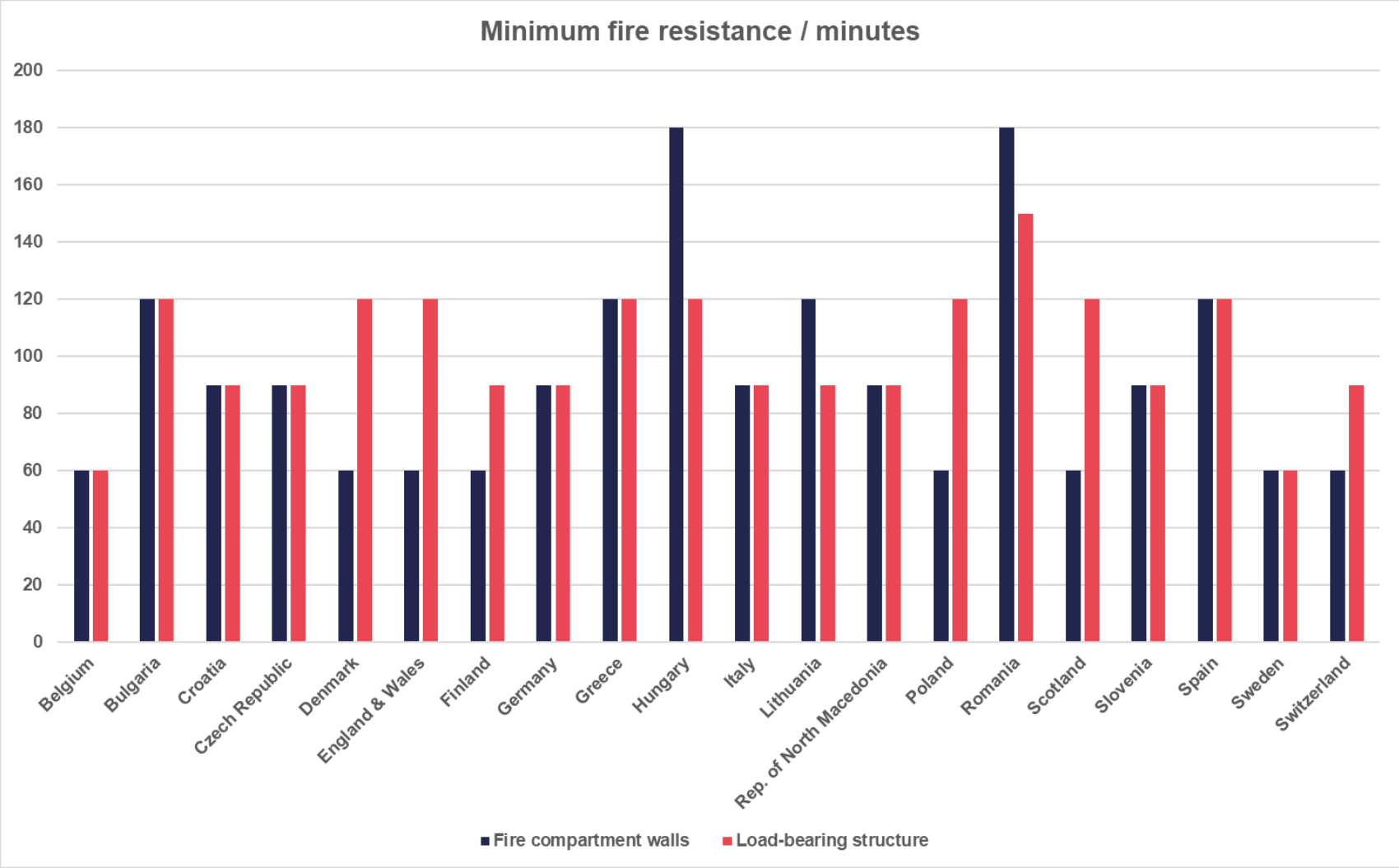
Longer distances are allowed when multiple independent escape routes are available.

Protection of escape routes against smoke spread



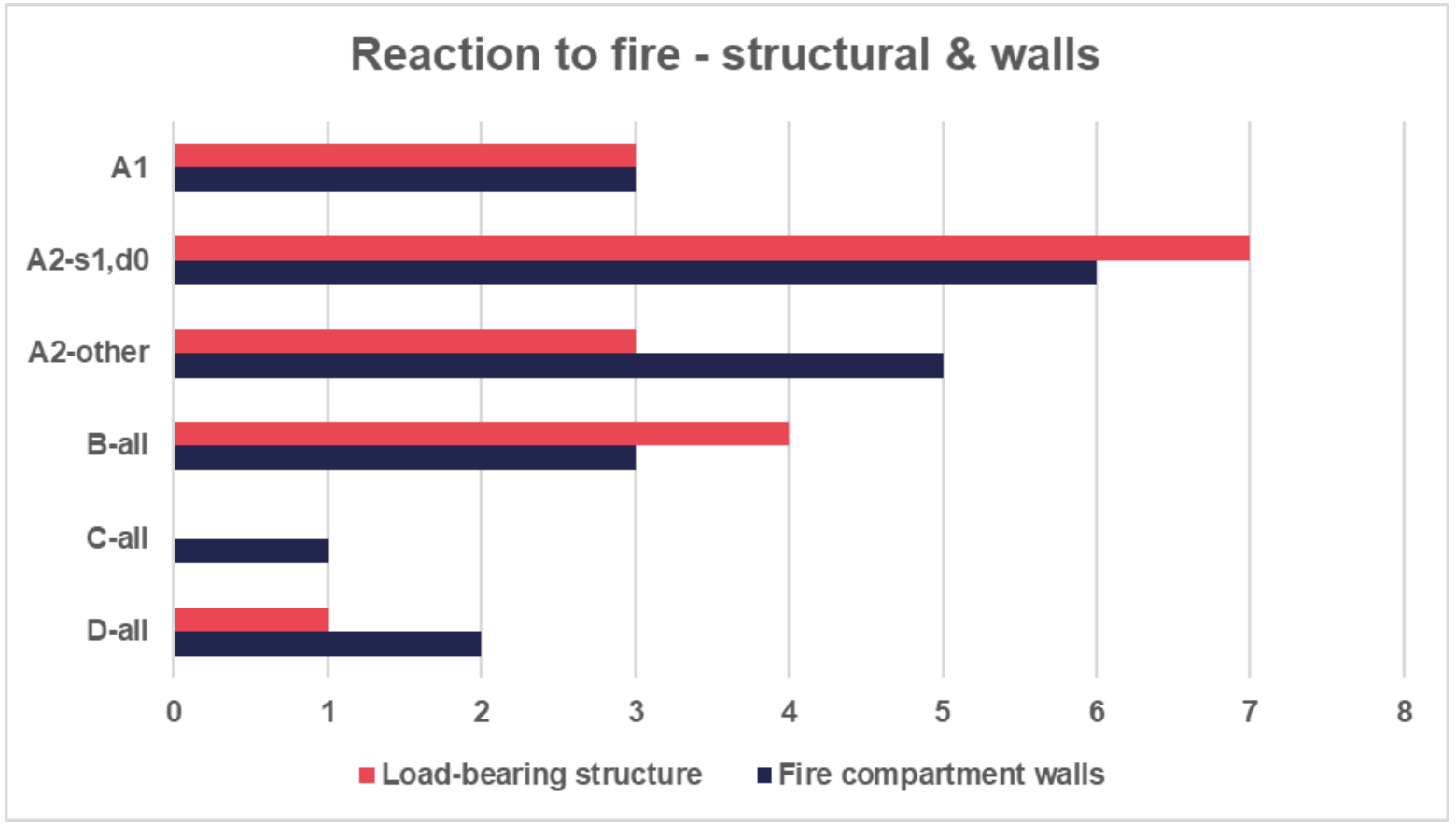
Nearly all countries require protection against smoke spread in the escape routes. 12 respondents indicated pressurisation as a requirement. 8 respondents indicated ventilation.

Fire resistance ratings



The most common requirement for loadbearing structure is R120. The most common requirement for fire compartment walls is EI60.

Reaction to fire – structural and fire compartment walls



A2-s1,d0 is the most common requirement.

Sweden indicated alternative rating depending on risk factors.

Roof coverings & insulation

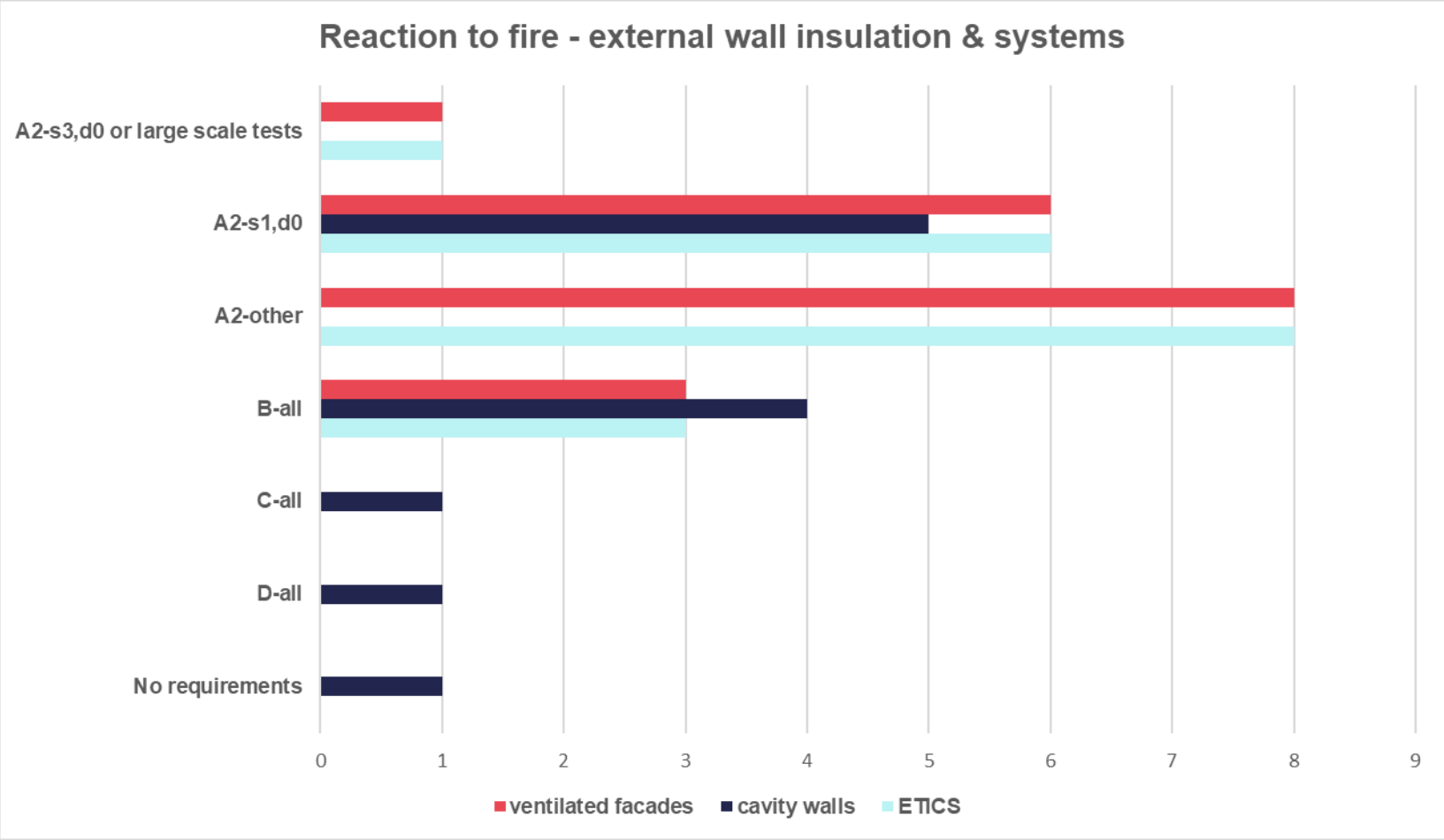
Country	Roof coverings	Roof insulation
Belgium	B_{ROOF}(t1)	B_{ROOF}(t1)
Bulgaria	A2	A2
Croatia	A2	A2
Czech Republic	B_{ROOF}(t1)/B_{ROOF}(t3)	Whole assembly of roof decking
Denmark	B_{ROOF}(t2)	A2-s1,d0
England & Wales	Varies	Varies
Finland	D-s2,d2	No requirements
Germany	A1	A2
Greece	No requirements	No requirements
Hungary	A1 / A2	A2
Italy	No requirements	No requirements
Lithuania	B_{ROOF}(t1)	B_{ROOF}(t1)
Rep. of North Macedonia	No information provided	No information provided
Poland	B-s3, d0	No requirements
Romania	A2-s1,d0	A2-s1,d0
Scotland	B_{ROOF}(t4) – F_{ROOF}(t4)	No requirements
Slovenia	A2	A2-s1,d0
Spain	B_{ROOF}(t1)	No requirements
Sweden	A2 or B_{ROOF}(t2)	No requirements
Switzerland	B_{ROOF}(t2)	A2-s1,d0 or B_{ROOF}(t2)

No real harmonisation

Different approaches to roof coverings:

- → External roof exposure – 4 test methods
- → Reaction to fire classes
- → Reaction to fire - flooring

Reaction to fire – external wall insulation & systems

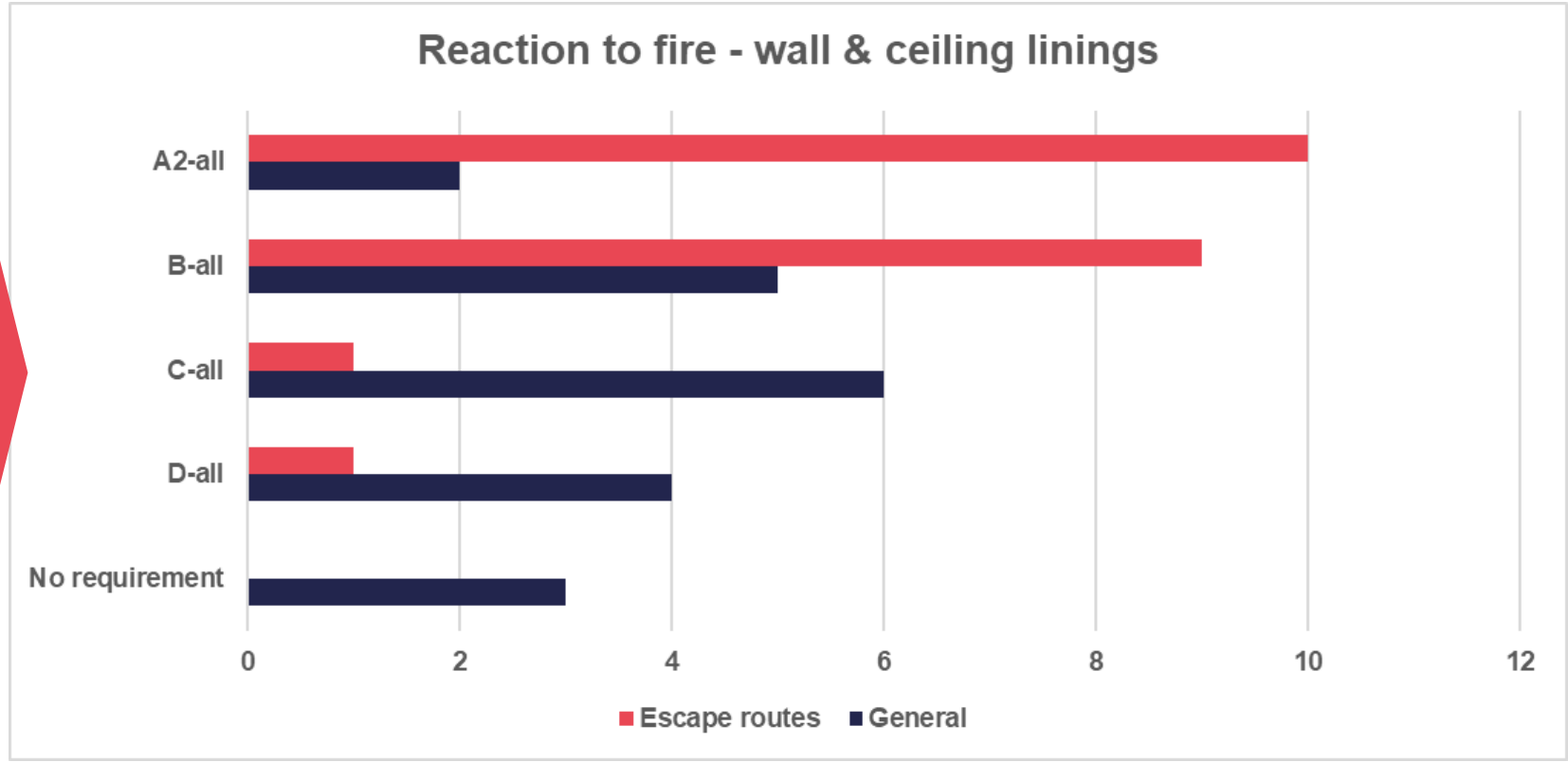


This is an overview of replies without comments and details.

Poland reported having lower requirements for the part of the façade below 25 m.

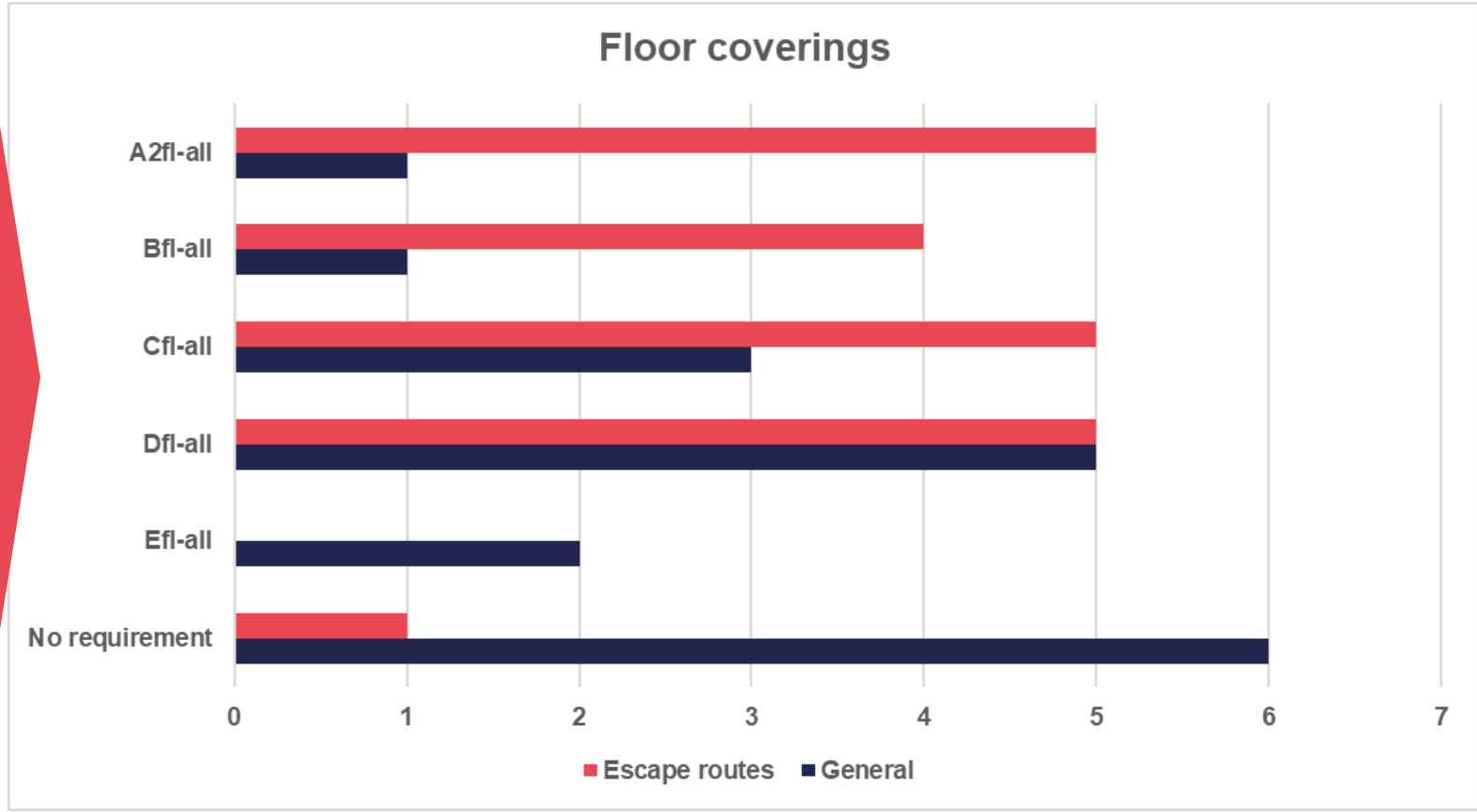
Reaction to fire – wall & ceiling linings

Not suprisingly, linings are more strictly regulated in escape routes.



Reaction to fire – floor coverings

Floor coverings in escape routes in high rise residential buildings are regulated more strictly than those in apartments.



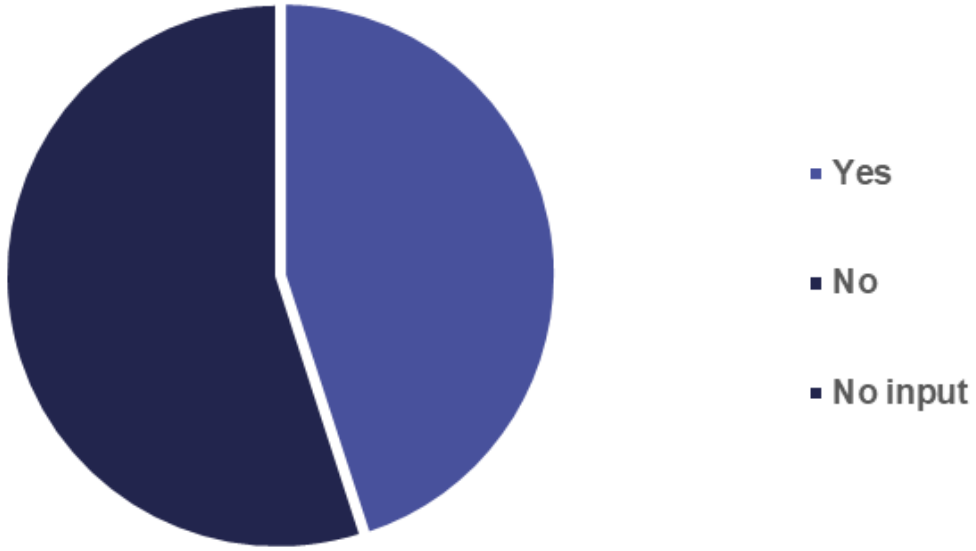
Pipe insulation & cables

Country	Pipe insulation	Cables
Belgium	C_L-s3,d2	C_{ca} / E_{ca}
Bulgaria	A2L	No requirements
Croatia	No requirements	No requirements
Czech Republic	Varies	Varies
Denmark	D-d2 / E-d2	D_{ca} / E_{ca}
England & Wales	Varies	Varies
Finland	No requirements	No requirements
Germany	According to MLAR Rule notified to TRIS Procedure	According to MLAR Rule notified to TRIS Procedure
Greece	D_L-s2,d2	D_{ca}-s2,d2,a2
Hungary	A2L-s1,d0	No requirements
Italy	B_L-s3,d0	No requirements
Lithuania	$A2_L$	E_{ca}
Rep. of North Macedonia	No information provided	No information provided
Poland	E	No requirements
Romania	No requirements	No requirements
Scotland	No requirements	No requirements
Slovenia	Acc. to compartmentation	E_{ca}
Spain	*Divergent responses:* i) No requirements; ii)B_L-s3,d0	No requirements
Sweden	Depends on risk factors	Depends on risk factors
Switzerland	A2-s1,d0 to A2-s1,d2	No requirements

Due to diversity of replies, the results are shown in full.

Only 30% of the responding countries have requirements for cables – stricter for escape routes.

Restrictions on furniture



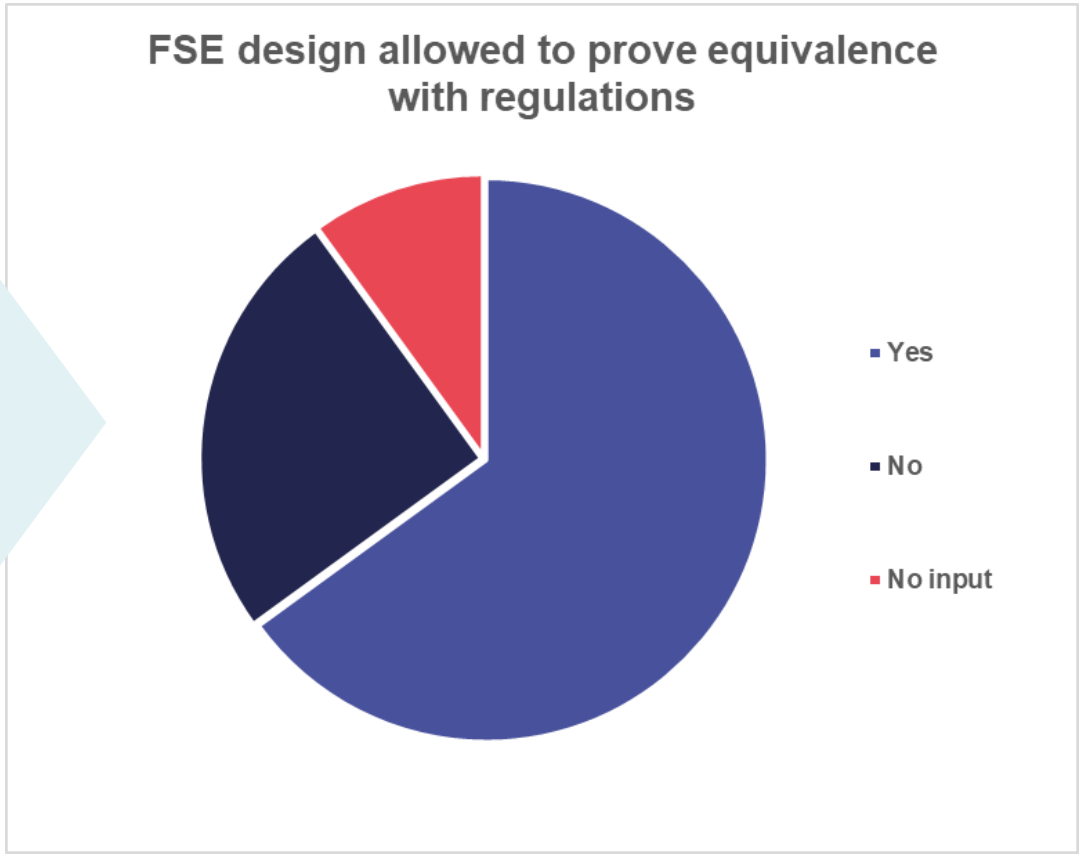
Some countries reported on the requirements on fire safety properties of furniture.

Others gave information about the presence of furniture in escape routes and related safety issues – blockage, fire load, etc.

Possibility to design using fire safety engineering tools

Approx. two-thirds of European countries allow using FSE design.

Almost all of these indicated some sort of control over the process by authorities, the need to prove equivalence with prescriptive requirements, or using a conservative approach.



ANALYSIS

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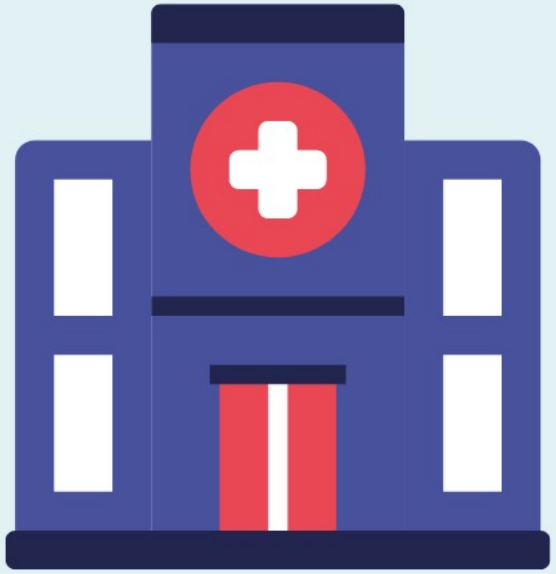
Part Two: Hospitals



INTRODUCTION

- **Objective:**
  - **present the data and provide insights into different countries requirements for hospitals, key trends and differences.**
- **The European Fire Safety Community provided valuable data from 20 countries:**

Albania (AL)	Belgium (BE)	Croatia (HR)	Cyprus (CY)	Czech Republic (CZ)
Denmark (DK)	Finland (FI)	France (FR)	Germany (North Rhine Westphalia) (DE)	Hungary (HU)
Ireland (IE)	Italy (IT)	Norway (NO)	Poland (PL)	Portugal (PT)
Romania (RO)	Slovenia (SI)	Spain (ES)	Sweden (SE)	United Kingdom (UK)

DEFINITION

HOSPITALS

→**Number of floors:** 8 + a basement - 35 m in total height

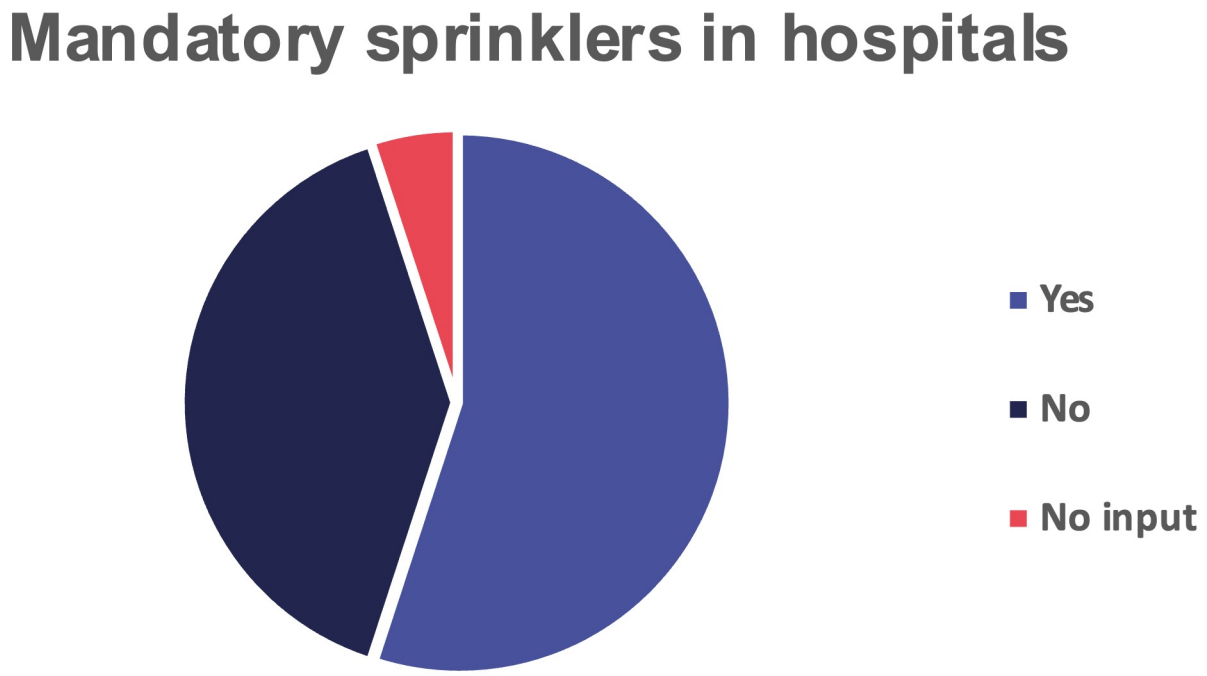
→**Ground area of building:** 10.000 m2

→**Number of people:** 1000 beds

→**Location of building:** In a city, with 3 km to nearest fire station


Analysis

Sprinkler requirements for hospitals



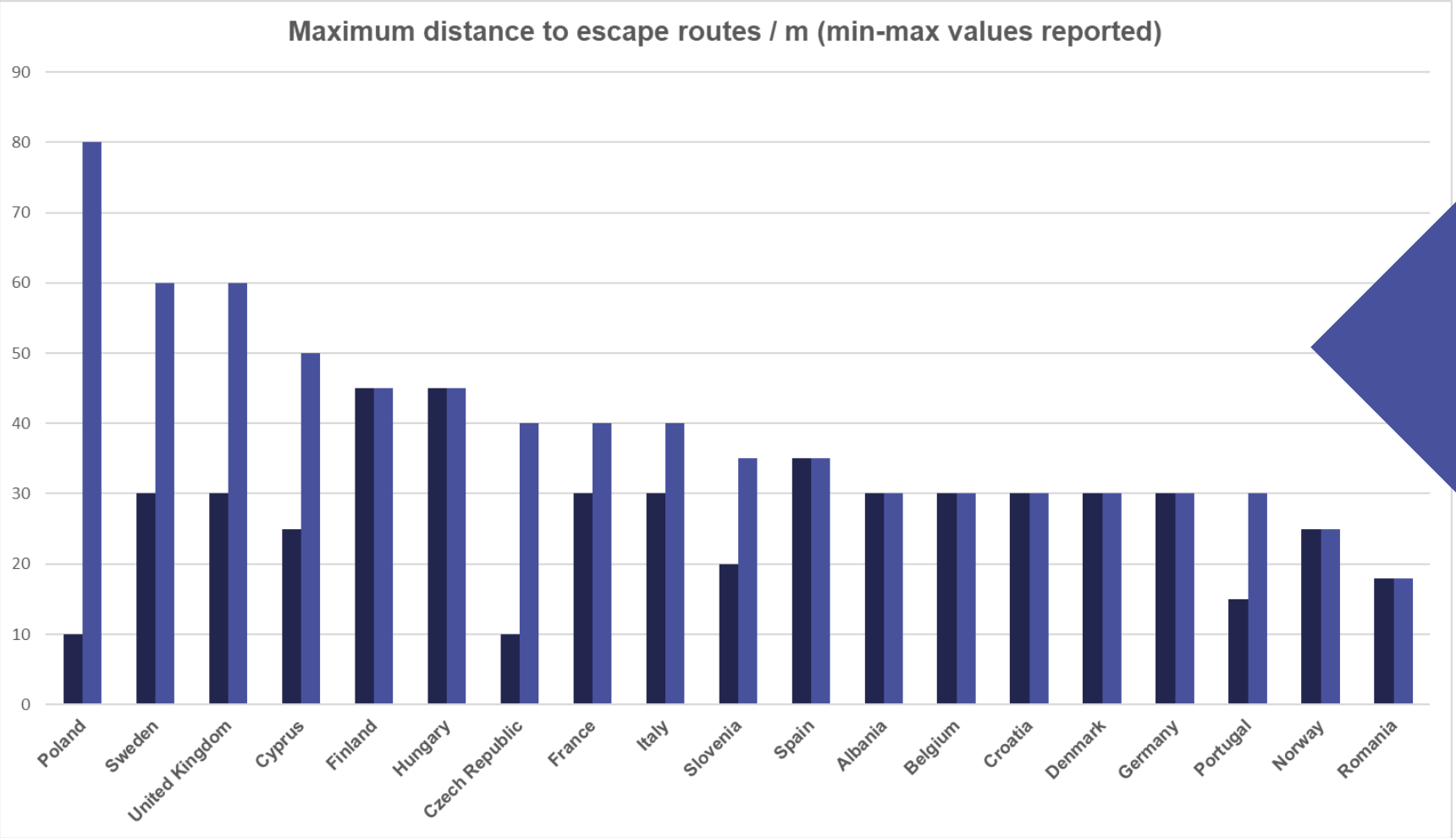
Some countries specified that the need for sprinklers may depend on other variables, like:

- ➜ **building height**
- ➜ **ability of patients to move**
- ➜ **fire load**
- ➜ **size of the fire compartment**

Minimum number of escape routes

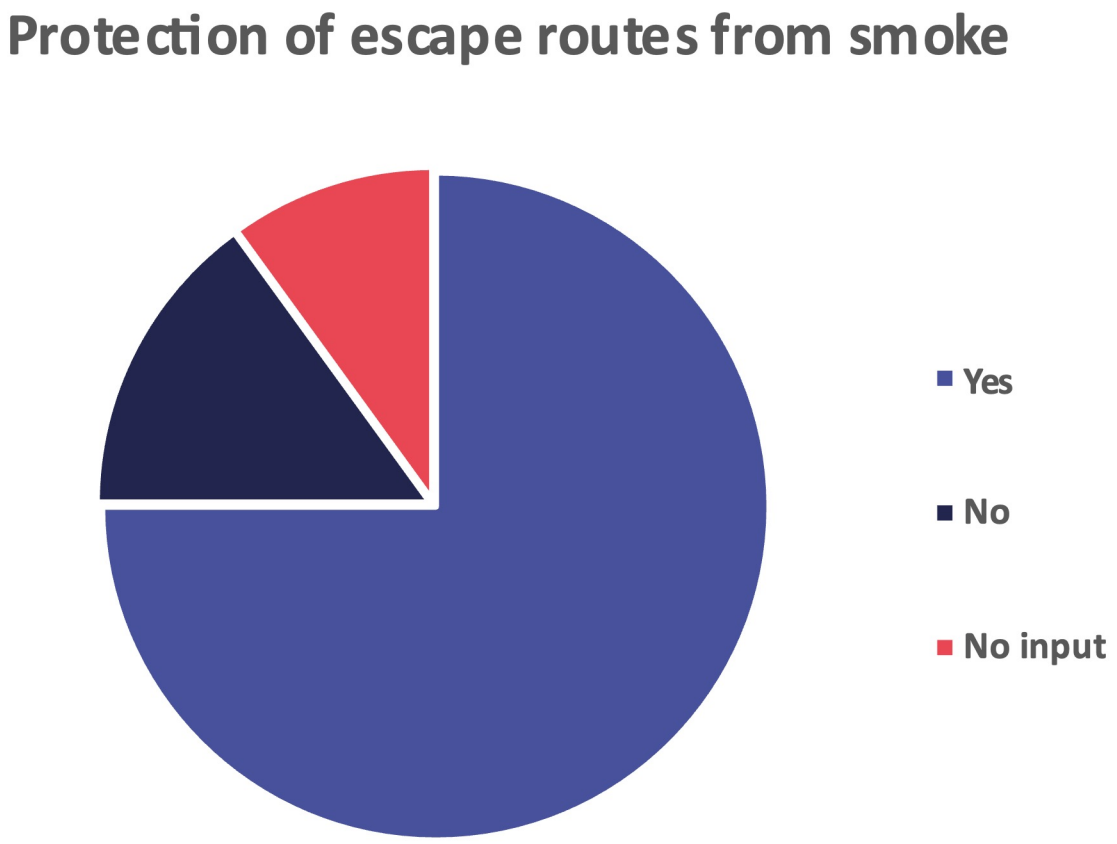
No of escape routes	Countries
2	AL, BE, HR, CY, DK, DE, HU, NO, PT, RO, SE, UK
2 routes + 2 elevators	CZ
2 / fire compartment	FI, IT
2 / storey	ES
1 / storey	FR
1 to 3	SI (depending on number of people)
1 to 2	IE, PL (depending on distance)

Distance to escape routes



Longer distances are allowed if there is 1+ escape routes, escape to safe areas (exterior, smoke- protected spaces), escape via pressurised / sprinklered path, presence of disabled people.

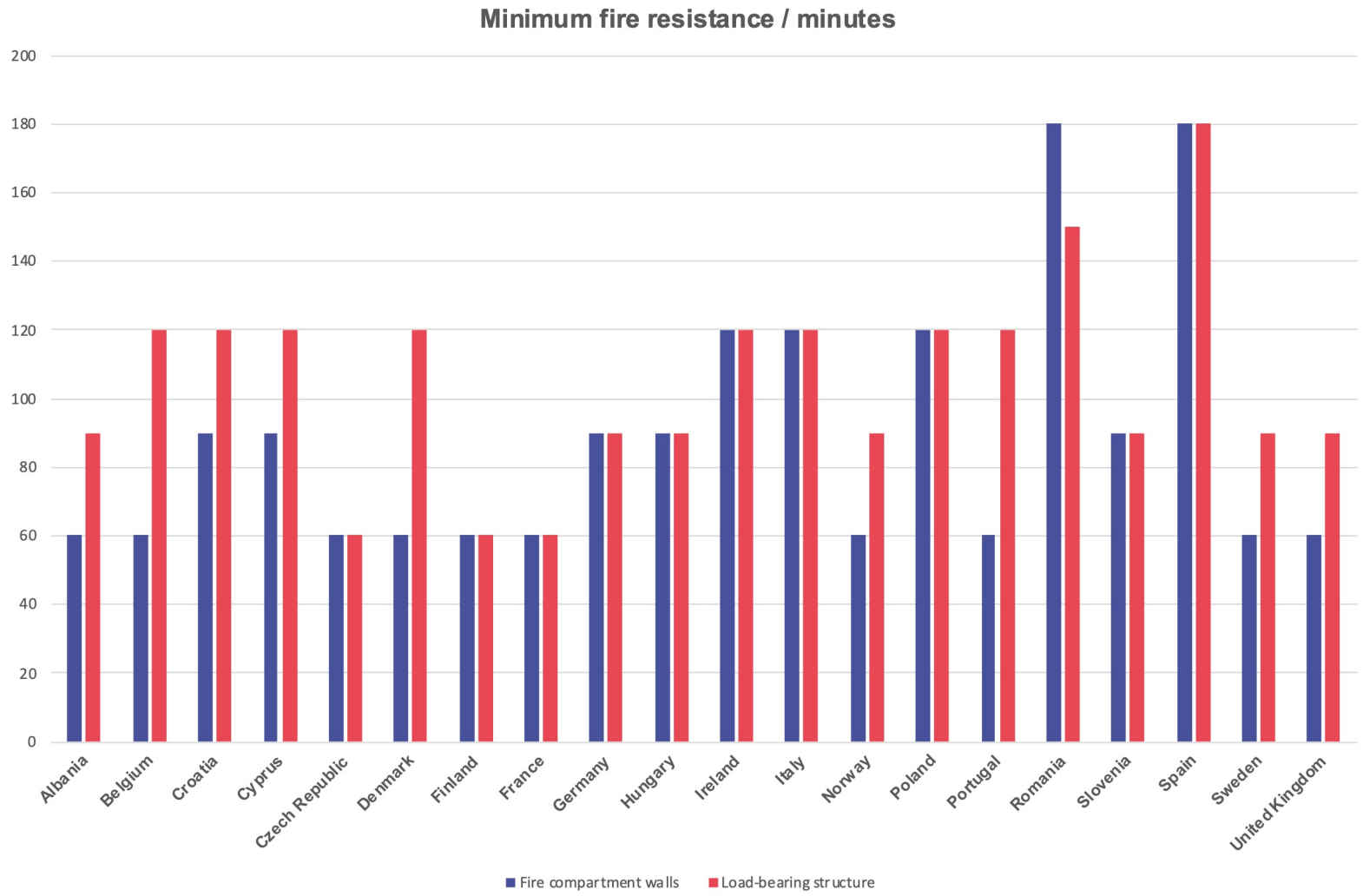
Protection of escape routes against smoke spread



All countries except Belgium, Sweden, and UK, require smoke protection.

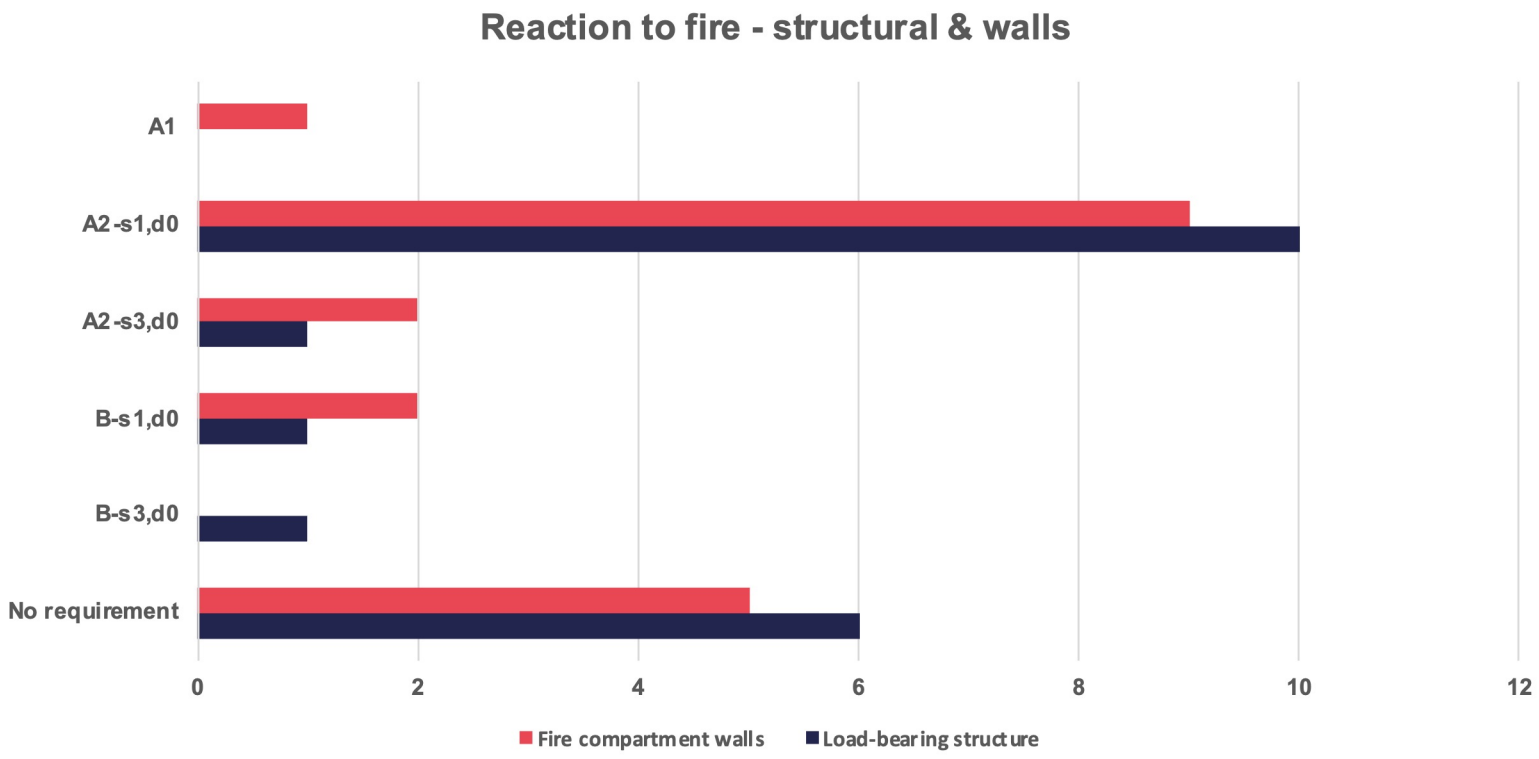
Usually in the form of natural or powered smoke exhaust, and/or pressurisation.

Fire resistance ratings



Fire compartment walls typically range from EI 60 to EI 90. Higher ratings are required in Italy, Poland, and Spain – EI 180 because hospitals this size are considered high-risk buildings.

Reaction to fire – structural and fire compartment walls



A2-s1,d0 is the most common requirement.

Approx. 1/4 of the countries have no requirement; however, these are often specific about fire protection of the load-bearing structure, sprinklers, or use of strcutural timber.

Roof coverings & insulation

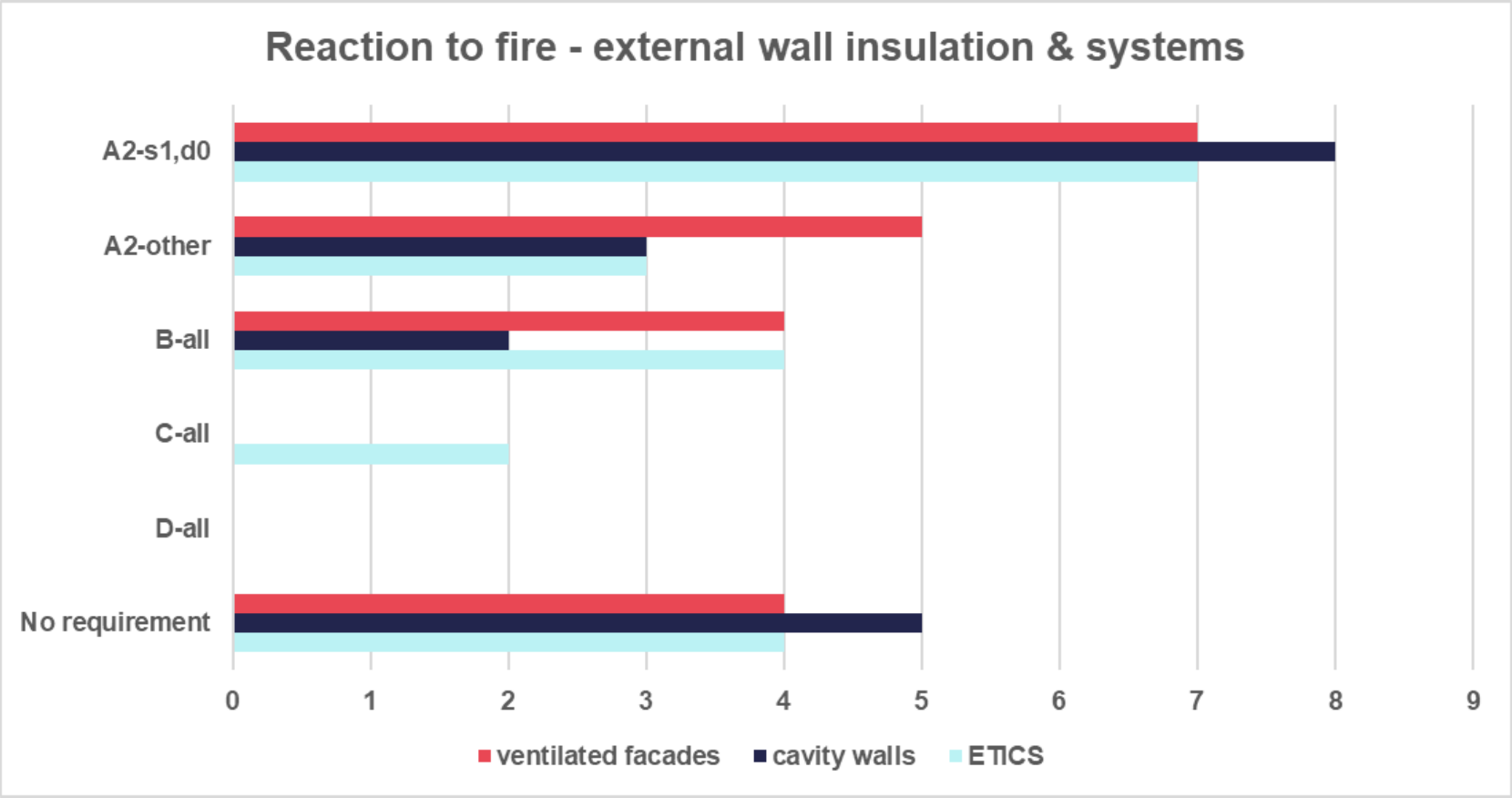
Country	Roof coverings	Roof insulation
Albania	N/A	N/A
Belgium	$B_{ROOF}(t1)$	No requirement
Croatia	A2	A2
Cyprus	$B_{ROOF}(t4)$ - $F_{ROOF}(t4)$	N/A
Czech Republic	$B_{ROOF}(t3)$	E
Denmark	$B_{ROOF}(t2)$	A2-s1,d0
Finland	$B_{ROOF}(t2)$	B-s1,d0
France	A2	A2-s2,d0
Germany	$B_{ROOF}(t1)$	A2-s1,d0
Hungary	A2	A2
Ireland	$C_{ROOF}(t4)$	A2-s1,d0
Italy	Not indicated	Not indicated
Norway	$B_{ROOF}(t2)$	A2-s1,d0
Poland	$B_{ROOF}(t1)$ / B-s3,d0	No requirement
Portugal	B-s1	No requirement
Romania	A2-s1,d0	A2-s1,d0
Slovenia	$B_{ROOF}(t1)$ / A2	A2 - E
Spain	B-s1,d0 / C_{FL}-s1	No requirement
Sweden	$B_{ROOF}(t2)$ / A1	No requirement
UK	$B_{ROOF}(t4)$ - $F_{ROOF}(t4)$	$B_{ROOF}(t4)$ - $F_{ROOF}(t4)$

No real harmonisation

Different approaches to roof coverings:

- → External roof exposure – 4 test methods
- → Reaction to fire classes
- → Reaction to fire - flooring

Reaction to fire – external wall insulation & systems

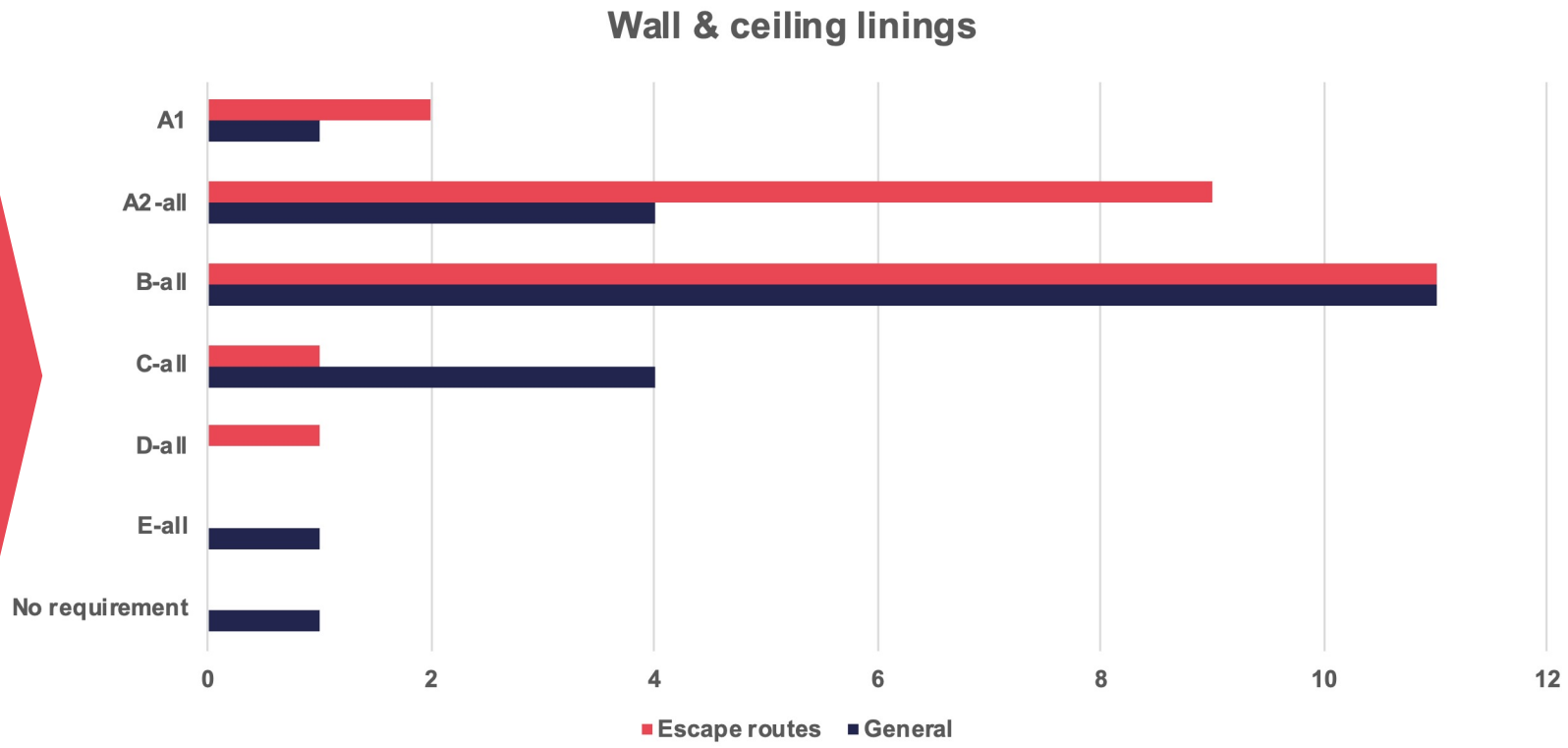


This is an overview of replies without comments and details.

Surprisingly, about 1/4 of the countries have no requirement for this type of building.

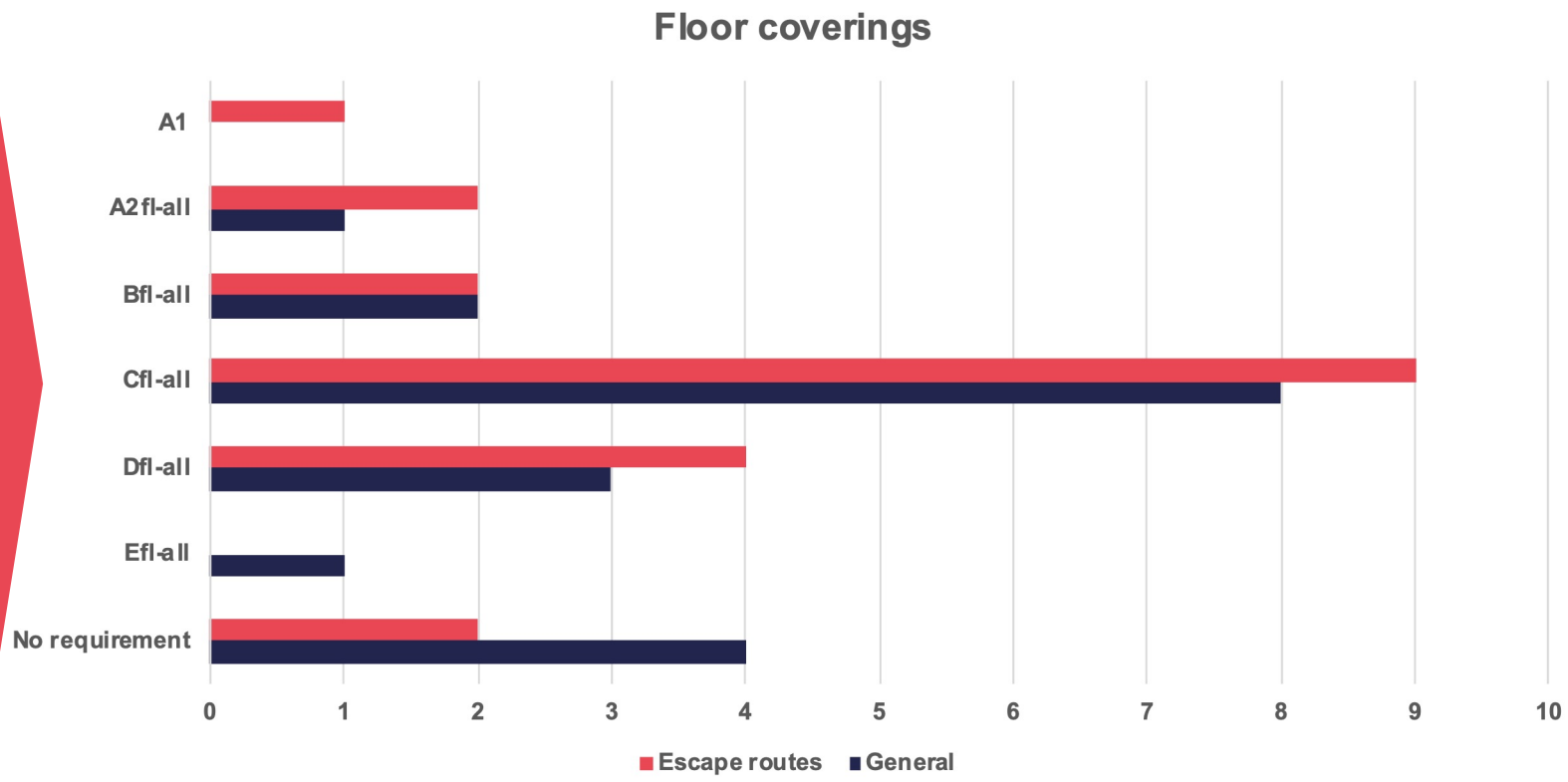
Reaction to fire – wall & ceiling linings

Not suprisingly, linings are more strictly regulated in escape routes.



Reaction to fire – floor coverings

Floor coverings in escape routes in hospitals are generally not required to have higher requirements, with a few exceptions.



Pipe insulation & cables

Country	Pipe insulation	Cables
Albania	N/A	N/A
Belgium	No requirements	Varies
Croatia	A2	No restrictions
Cyprus	N/A	IEC 60332 Part 3
Czech Republic	B-s1	D_{ca} / $B2_{ca}$-s1,d1
Denmark	D-d2 / E-d2	E_{ca} / D_{ca}
Finland	A2-s1,d0	Fire resistant wiring of the exit lighting
France	A2,s1-d0	NF C15-211
Germany	$A2_L$-s1,d0	A_{ca}
Hungary	A2-s1,d0	$B2_{ca}$-s1,d1
Ireland	No requirement	$B2_{ca}$-s1,d1
Italy	National classes	National classes
Norway	B-s1,d0	No input provided
Poland	B_L-s3,d0	No requirements
Portugal	B_L-s2,d0	Varies
Romania	N/A	N/A
Slovenia	Not defined	$B2_{ca}$-s1,d2,a1
Spain	B-s1,d0	No input provided
Sweden	As room lining	D_{ca}-s2,d2 / C_{ca}-s1,d1
UK	No restrictions	No restrictions

Due to diversity of replies, the results are shown in full.

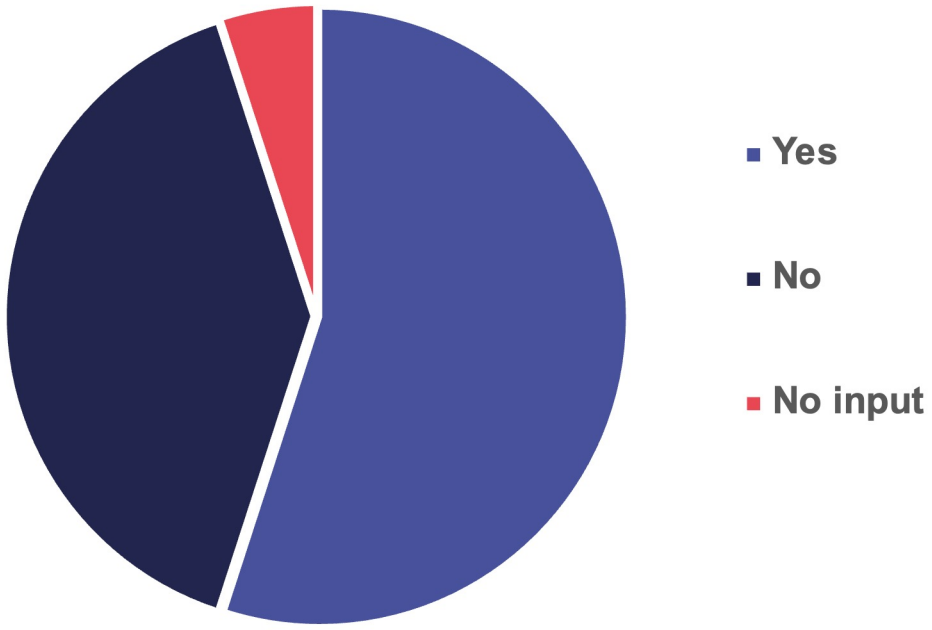
Various approaches to cables:

→Euroclasses for cables

→National classes

→IEC electrical standards

Restrictions on furniture



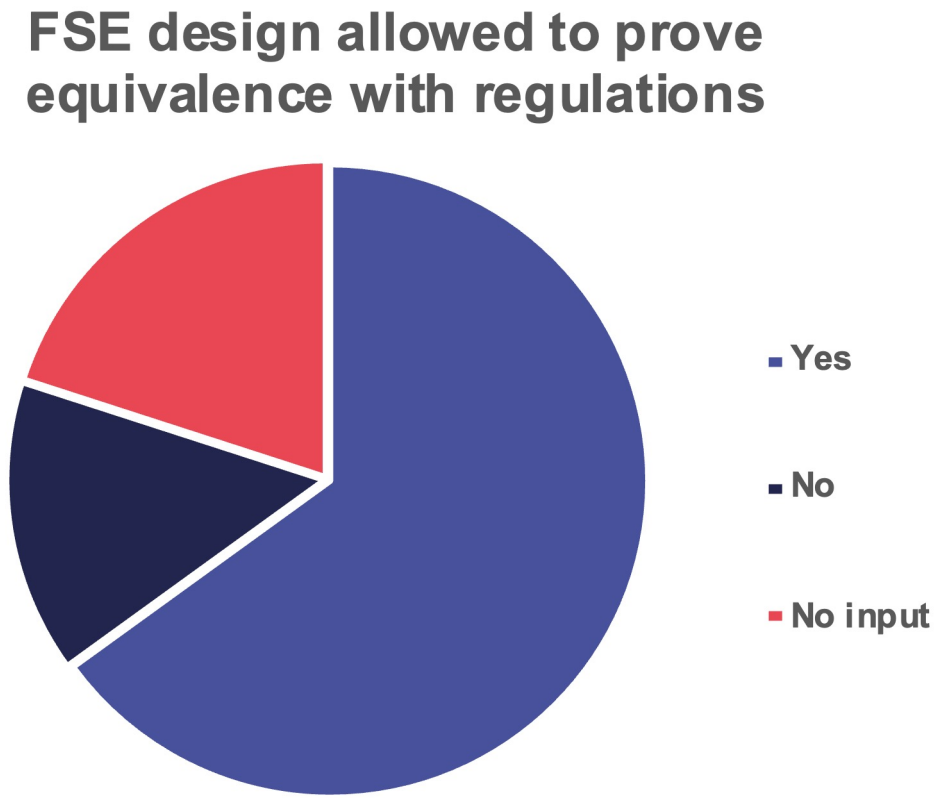
Some countries reported on the requirements on fire safety properties of furniture.

Others gave information about the presence of furniture in hospital rooms and escape routes and related safety issues – blockage, fire load, etc.

Possibility to design using Fire safety engineering tools

Approx. two-thirds of European countries allow using FSE design.

Almost all of these indicated some sort of control over the process by authorities, the need to prove equivalence with prescriptive requirements, or using a conservative approach.



To be continued...

→ **These were the 1st and 2nd parts of the project aimed at comparing regulations in Europe for specific buildings:**

- **High-rise residential building**
- **Hospital**
- **School**

→ **We warmly thank the European Fire Safety Community for their continuous support!**

To **participate to PART 3** of the project on **schools**' fire safety requirements:

JOIN US AT eufiresafety.community

Thank you!