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ANNEX

ANNEX

to the

Commission Delegated Regulation (EU)

supplementing Regulation (EU) No 305/2011 of the European Parliament and of the Council by establishing classes of performance in relation to the resistance to fire of construction products

ANNEX

A. SYMBOLS

For the purposes of this Annex the following symbols apply:

R	Load-bearing capacity
E	Integrity
I	Insulation
W	Radiation
M	Mechanical action
C	Self-closing
C0-5	Durability of self-closing: Use category (C) — Number of cycles 5 — ≥ 200 000 4 — ≥ 100000 3 — ≥ 50 000 2 — ≥ 10 000 1 — ≥ 500 0 — ≥ 1
S	Smoke leakage (in context of ventilation systems) / Smoke control (in context of doors)
P	Continuity of power and signal supply under the standard time temperature curve
PH	Continuity of power and signal supply under constant temperature
G / O	Soot fire resistance
K	Fire protection ability
T	Temperature class expressed in maximum gas temperature in °C (operating temperature)
D	Stability duration under constant temperature
DH	Stability duration under the standard time-temperature curve
F	Functionality of powered smoke and heat ventilators
B	Functionality of natural smoke and heat ventilators

B. Classes of performance in relation to the resistance to fire of construction products

General

The relevant definitions, tests and performance criteria are fully described or referenced in the European resistance to fire classification standards, harmonised European product standards, European testing standards, and relevant parts of Eurocodes.

If for asymmetrical elements the declared class of the element is only valid from one side, the class shall be accompanied by this information.

The following classes of performance are expressed in minutes unless otherwise specified.

1. Load-bearing elements without a fire-separating function

Table 1

Applies to	**Walls, floors, raised floors, roofs, beams, columns, balconies, walkways, stairs**										
R		15	20	30	45	60	90	120	180	240	360

2. Load-bearing elements with a fire-separating function

Table 2.1

Applies to	**Walls**										
RE		15	20	30	45	60	90	120	180	240	360
REI		15	20	30	45	60	90	120	180	240	360
REI-M		15	20	30	45	60	90	120	180	240	360
REW		15	20	30	45	60	90	120	180	240	360

Table 2.2

Applies to	**Floors, roofs, roof windows, rooflights and shutters**										
RE		15	20	30	45	60	90	120	180	240	360
REI		15	20	30	45	60	90	120	180	240	360
C	The C classification may be declared where a self-closing device is fitted and the element or product was not manually closed for the purpose of the test. Optionally, for durability of self-closing, the C classification may be complemented by the digits 0 to 5 according to the use category where cycle testing has been carried out.										

Table 2.3

Applies to	**Raised floors**										
RE		15	20	30	45	60	90	120	180	240	360
REI		15	20	30	45	60	90	120	180	240	360
Notes	The classification shall be made specific depending on the exposure. The absence of the designation letter "r" refers to standard temperature/time curve exposure (full fire resistance) whereas its presence refers to the constant temperature attack of 500 °C (reduced exposure). Raised floors satisfying the standard temperature/time curve exposure for a given time are considered to satisfy the reduced exposure conditions for at least the same period.										

3. Products and systems for protecting load-bearing elements

Table 3.1

Applies to	**Ceilings with no independent fire resistance**
Assessment of the contribution to the fire resistance of structural members: Expressed in terms of classification of the load-bearing element	

being protected.	
Notes	If satisfying the criteria with regard to the 'semi-natural' fire, the symbol 'sn' is added to the classification.

Table 3.2

Applies to	**Fire protective coatings (reactive), boards (slabs and mats), renderings (sprays), claddings and screens**
Assessment of the contribution to the fire resistance of structural members: Expressed in terms of classification of the load-bearing element being protected.	
Notes	For coatings, if satisfying the criteria with regard to the ‘slow heating’ curve, the symbol 'IncSlow' is added to the classification.

4. Non-loadbearing elements or products with a fire-separating function

Table 4.1

Applies to	**Partitions (including partitions incorporating uninsulated portions) and fixed windows**										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360
EI-M		15	20	30	45	60	90	120	180	240	360
EW		15	20	30	45	60	90	120	180	240	360

Table 4.2

Applies to	**Unloaded roofs**										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360
EW		15	20	30	45	60	90	120	180	240	360

Table 4.3

Applies to	**Cavity barriers**										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360
Notes	The classification is completed by a separate indication, if satisfying the sudden exposure test for cavity barriers.										

Table 4.4

Applies to	**Ceilings with independent fire resistance**										
EI		15	20	30	45	60	90	120	180	240	360
Notes	The classification is completed by indicating how the element has been tested, and refers to a fire from above '(a→b)' or from below '(b→a)' or both '(a ↔b)'.										

Table 4.5

Applies to	**Facades (curtain walls) and external walls (including glazed elements)**										
E		15	20	30	45	60	90	120	180	240	360

EI		15	20	30	45	60	90	120	180	240	360
EW		15	20	30	45	60	90	120	180	240	360
Notes	The classification is completed by '(i→o)'; '(o→i)'; or '(i↔o)' to indicate whether the element has been tested and fulfils the requirements from the inside only; from the outside only; or from both sides respectively. The addition of the suffix 'ef' indicates that the test was performed on the basis of the external fire curve.										

Table 4.6

Applies to	**Non-mechanical fire barriers for ventilation ductwork**										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360
Notes	In addition to meeting the requirements related to integrity (E), the non-mechanical fire barrier shall also: a) be tested from both sides, and b) achieve 360 $m^3/(m^2h)$ maximum leakage rate with reference to nominal duct cross-sectional area during the fire test. There is no S classification for this product, as it has no ambient temperature smoke performance. "ve" and/or "ho" show the product is intended to be used for vertical and/or horizontal use.										

Table 4.7

Applies to	**Penetration seals**										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360
Notes	The classification is expressed in terms of classification of the supporting construction with fire-separating function being penetrated. The classification of pipe penetration seals is completed by the addition of "U/U", "C/U", "U/C", or "C/C" depending on the tested pipe end configuration inside the furnace and outside the furnace respectively (U - uncapped; C – capped).										

Table 4.8

Applies to	**Combined penetration seals**										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360
Notes	The classification is expressed in terms of classification of the supporting construction with fire-separating function being penetrated. The classification shall be completed with the additional relevant classifications of combined elements as given in this annex.										

Table 4.9

Applies to	**Linear joint seals**										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360
Notes	The classification is completed by the addition of the symbols — "H", or "V", or "T" indicating that the classification is valid for the corresponding orientation (Horizontal supporting construction; Vertical supporting construction - vertical joint; Vertical supporting construction - horizontal joint respectively),										

	— "M", or "F", or "B" indicating the type of splices (Manufactured; Field; or Both manufactured and field respectively), — "X"; or "Mxxx" indicating the movement capability (No movement; or Movement induced (in %) respectively), including the subscript "lat" or "shear" indicating the induced movement, and — "W w1 to w2" indicating the joint width range (in mm) for which the classification criterion is satisfied (w1 being the lower width and w2 the higher width limit).

Table 4.10

Applies to	**Fire resisting doorsets, openable windows (in walls and roofs), openable rooflights and shutters (including those that incorporate glazing, closing devices and other building hardware)**										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360
EW		15	20	30	45	60	90	120	180	240	360
S_{200}	For elements and products having passed smoke control criteria depending on test conditions fulfilled.										
S_{a3} or S_{a4}	For elements and products having passed smoke control criteria depending on test conditions fulfilled.										
C	The C classification may be declared where a self-closing device is fitted and the element or product was not manually closed for the purpose of the test. Optionally, for durability of self-closing, the C classification may be complemented by the digits 0 to 5 according to the use category where cycle testing has been carried out.										
Notes	The EI classification is completed by the addition of the suffix '1' or '2' to indicate which definition of insulation is used. In the case the classification does not cover heating on both the closing and the opening face, this shall be made explicit in the classification. This table does not include or address products for smoke ventilation. Additional smoke control classification of large industrial doorsets is possible to a leakage limit of 50 m^3/h.										

Table 4.11

Applies to	**Closures for conveyers and track bound transportation systems**										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360
EW		15	20	30	45	60	90	120	180	240	360
C	The C classification may be declared where a self-closing device is fitted and the element or product was not manually closed for the purpose of the test. Optionally, for durability of self-closing, the C classification may be complemented by the digits 0 to 5 according to the use category where cycle testing has been carried out.										
Notes	The EI classification is completed by the addition of the suffix '1' or '2' to indicate which definition of insulation is used. An EI classification shall be generated for those cases where the test specimen is a pipe or duct configuration with no assessment of the closure for the conveyor system. Sustained operational capability of any clearing device and/or any separating device for a conveyor system is identified by using a "T".										

Table 4.12

Applies to	**Air transfer grilles**										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360

EW		15	20	30	45	60	90	120	180	240	360
Notes	If satisfying the criteria with regard to integrity during the open state, the symbol ‘resist flame’ is added to the classification. If satisfying the criteria with regard to the 'smoldering' curve, the symbol 'IncSlow' is added to the classification.										

Table 4.13

Applies to	**Service ducts and shafts**										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360
Notes	The classification defines how the element has been tested and refers to a fire from the inside '(i→o)' or from the outside '(o→i)' or both '(i ↔o)'. In addition, the symbols 've' and/or 'ho' show the product is intended to be used for vertical and/or horizontal use.										

Table 4.14

Applies to	**Chimneys**										
	G + distance in mm (e.g. G 50) or O + distance in mm (e.g. O 50)										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360

T (operating temperature) in ºC	80	100	120	140	160	200	250	300	400	450	600
Notes	Distance not required for built-in products. The classification defines how the element has been tested and refers to a fire from the outside '(o→i)' or both '(i ↔o)'. 've' and/or 'ho' show the product is intended to be used for vertical and/or horizontal use.										

Table 4.15

Applies to	**Wall and ceiling coverings**										
K_1	10	15	20	30	45	60	90	120	180	240	360
K_2	10	15	20	30	45	60	90	120	180	240	360
Notes	The suffixes '1' and '2' indicate which substrates, fire behaviour criteria and extension rules are used in this classification.										

5. Products for use in ventilation systems (excluding smoke and heat exhaust ventilation)

Table 5.1

Applies to	**Fire resisting ventilation ducts**										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360
S	10 $m^3/(m^2h)$ maximum leakage rate with reference to the duct surface area during the fire test										

Notes	In addition to meeting the requirements related to integrity (E) the duct must also achieve 15 $m^3/(m^2h)$ maximum leakage rate with reference to duct surface area during the fire test. The classification defines how the element has been tested and refers to a fire from the inside '(i→o)' or from the outside '(o→i)' or both '(i ↔o)'. 've' and/or 'ho' show the product is intended to be used for vertical and/or horizontal use. The classification shall indicate the pressure difference used in the test.

Table 5.2

Applies to	**Fire dampers**										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360
S	200 $m^3/(m^2h)$ maximum leakage rate with reference to nominal duct cross sectional area: a) smallest size at ambient temperature; b) largest size at ambient temperature and during the fire test.										
Notes	In addition to meeting the requirements related to integrity (E) the fire damper shall also: a) be tested from both sides, and b) achieve 360 $m^3/(m^2h)$ maximum leakage rate with reference to nominal duct cross sectional area during the fire test. 've' and/or 'ho' show the product is intended to be used for vertical (e.g., wall mounted) and/or horizontal (e.g., floor mounted) use. "H" indicates a fire damper capable of satisfying integrity (E), or integrity and insulation (EI) for the classification period having a horizontal blade axis or geometry. "V" indicates a fire damper capable of satisfying integrity (E), or integrity and insulation (EI) for the classification period having a vertical blade axis or geometry.										

6. Products to be used within electrical, power control and communication building service installations

Table 6.1

Applies to	**Fire protective systems for cable systems and associated components**										
P		15	20	30	45	60	90	120	180	240	360
Notes	The classification shall indicate: The type of cables which can be installed within the fire protective systems, i.e. any standard cable or only specific cables; and the cables configurations which can be protected and the operating voltage, i.e; — either to all types of power cables (rated voltage 300/500 V) for an operating voltage up to 230/400 V (three-phase AC); — either to all types of power cables (rated voltage 450/750 V up to 0,6/1 kV) for an operating voltage up to 400/690 V (Three-phase AC); — either to all types of signal-/control cables (rated voltage up to 170 V) for an operating voltage up to 110 V; — or any combination of the above possibilities.										

Table 6.2

Applies to	**Unprotected electric, power control and communication cables with intrinsic fire resistance**										
P_{ca}		15	20	30	45	60	90	120	180	240	360
Notes	For power cables and control cables the classification shall indicate for which rated voltage the performance criteria are satisfied.										

Table 6.3

Applies to	**Unprotected small electric, power control and communication cables with intrinsic fire resistance (<20 mm diameter and with conductor sizes ≤ 2.5 mm^2)**										
PH_{ca}		15	20	30	45	60	90	120	180	240	360
Notes	For power cables and control cables the classification shall indicate for which rated voltage the performance criteria are satisfied.										

7. Products to be used in smoke and heat control systems

Table 7.1

Applies to	**Single compartment smoke control ducts**										
E_{600}		15	20	30	45	60	90	120	180	240	360
S	5 m^3/(m^{2}h) maximum leakage rate with reference to duct surface area at ambient temperature and 5 m^3/(m^{2}h) maximum leakage rate related to the duct surface area during the fire test.										
Notes	In addition to meeting the requirements related to integrity (E) the duct must also achieve 10 m^3/(m^{2}h) maximum leakage rate with reference to duct surface area during the fire test. The classification is completed by the suffix 'single' for products intended to be used for single compartment use only. 've' and/or 'ho' show the product is intended to be used for vertical and/or horizontal use, within the compartment. '500', '1 000', '1 500' show the product is intended to be used up to these values of under-pressure, measured in Pa at ambient temperature.										

Table 7.2

Applies to	**Multi-compartment fire resistant smoke control ducts**										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360
S	5 m^3/(m^{2}h) maximum leakage rate with reference to duct surface area at ambient temperature and 5 m^3/(m^{2}h) maximum leakage rate related to the duct surface area during the fire test.										
Notes	In addition to meeting the requirements related to integrity (E) the duct must also achieve 10 m^3/(m^{2}h) maximum leakage rate with reference to duct surface area during the fire test. The classification is completed by the suffix 'multi' for products intended to be used for multi-compartment use. 've' and/or 'ho' show the product is intended to be used for vertical and/or horizontal use. '500', '1 000', '1 500' show the product is intended to be used up to these values of under-pressure, measured in Pa at ambient temperature.										

Table 7.3

Applies to	**Single compartment smoke control dampers**										
E_{600}		15	20	30	45	60	90	120	180	240	360
S	200 m^3/(m^{2}h) maximum leakage rate with reference to nominal duct cross sectional area: a) smallest size at ambient temperature; b) largest size at ambient temperature and during the fire test.										
Notes	In addition to meeting the requirements related to integrity (E) the single compartment smoke control damper shall also: a) be tested from both sides, b) pass a maintenance of opening test, and										

	c) achieve 360 $m^3/(m^2h)$ maximum leakage rate with reference to nominal duct cross sectional area during the fire test 1) smallest size at ambient temperature, and 2) largest size at ambient temperature and during the fire test. The classification is completed by the suffix 'single' for products intended for single compartment use. 'ved', 'vew', 'vedw' and/or 'hod', 'how', 'hodw' show the product is intended to be used for vertical and/or horizontal use, together with mounting in a duct or in a wall/floor or both respectively. "H" indicates a single compartment smoke control damper capable of satisfying integrity (E) for the classification period having a horizontal blade axis or geometry, "V" indicates a single compartment smoke control damper capable of satisfying integrity (E) for the classification period having a vertical blade axis or geometry. '500', '1000' and '1500' show that the product is intended to be used up to this value of under-pressure in Pa at ambient temperature. 'AA' denotes for use with applications providing automatic activation, 'MA' denotes for use with applications requiring manual intervention or providing automatic activation. 'C_{300}', C_{10000}', 'C_{MOD}' or 'C_{300}(N)', C_{10000}(N)', 'C_{MOD}(N)' show the product is intended to be used in smoke control only systems, fully controlled smoke control systems and smoke control systems combined with environmental systems or modulating smoke control dampers intended to be used in any system having a controlled or variable position, tested under load, or without load (N), respectively. 'HOT 400/30' (High Operational Temperature) indicates that the single compartment smoke control damper has been subjected to an additional test to demonstrate that it has the ability to be opened and closed during a period of 30 minutes of temperatures up to 400 °C.

Table 7.4

Applies to	**Multi-compartment fire resistant smoke control dampers**										
E		15	20	30	45	60	90	120	180	240	360
EI		15	20	30	45	60	90	120	180	240	360
S	200 $m^3/(m^2h)$ maximum leakage rate with reference to nominal duct cross sectional area: a) smallest size at ambient temperature; b) largest size at ambient temperature and during the fire test.										
Notes	In addition to meeting the requirements related to integrity (E) or integrity and insulation (EI) the multi-compartment fire resistant smoke control damper shall also: a) be tested from both sides, b) pass a maintenance of opening test, and c) achieve 360 $m^3/(m^2h)$ maximum leakage with reference to nominal duct cross sectional area during the fire test 1) smallest size at ambient temperature, and 2) largest size at ambient temperature and during the fire test. The classification is completed by the suffix 'multi' for products intended for multi-compartment use. 'ved', 'vew', 'vedw' and/or 'hod', 'how', 'hodw' show the product is intended to be used for vertical and/or horizontal use, together with mounting in a duct or in a wall/floor or both respectively. "H" indicates a multi-compartment fire resistant smoke control damper capable of satisfying integrity (E), or integrity and insulation (EI) for the classification period having a horizontal blade axis or geometry, "V" indicates a multi-compartment fire resistant smoke control damper capable of satisfying integrity (E), or integrity and insulation (EI) for the classification period having a vertical blade axis or geometry. '500', '1000' and '1500' show that the product is intended to be used up to this value of under-pressure in Pa at ambient temperature. 'AA' denotes for use with applications providing automatic activation, 'MA' denotes for use with applications requiring manual intervention or providing automatic activation. 'C_{300}', C_{10000}', 'C_{MOD}' or 'C_{300}(N)', C_{10000}(N)', 'C_{MOD}(N)' show the product is intended to be used in smoke control only systems, fully controlled smoke control systems and smoke control systems combined with environmental systems or modulating smoke control dampers intended to be used in any system having a controlled or variable position, tested under load, or without load (N), respectively. 'HOT 400/30' (High Operational Temperature) indicates that the multi-compartment fire resistant smoke control damper has been subjected to an additional test to demonstrate that it has the ability to be opened and										

	closed during a period of 30 minutes of temperatures up to 400 °C.

Table 7.5

Applies to	**Smoke barriers**										
D_{600}		15	20	30	45	60	90	120	180	240	360
DH		15	20	30	45	60	90	120	180	240	360

Table 7.6

Applies to	**Powered smoke and heat control ventilators (fans), including connectors**										
F_{200}		15	20	30	45	60	90	120	180	240	360
F_{300}		15	20	30	45	60	90	120	180	240	360
F_{400}		15	20	30	45	60	90	120	180	240	360
F_{600}		15	20	30	45	60	90	120	180	240	360
F_{842}		15	20	30	45	60	90	120	180	240	360

Table 7.7

Applies to	**Natural smoke and heat exhaust ventilators**										
B_{300}		15	20	30	45	60	90	120	180	240	360
B_{600}		15	20	30	45	60	90	120	180	240	360
B_{θ}		15	20	30	45	60	90	120	180	240	360
Notes	Where θ indicates the exposure condition (temperature), higher than 300 ºC. These products are designed to open in case of fire and do not have an integrity (E) classification.										