Summary for Finland

The Ministry of the Environment Decree on the fire safety of buildings dates from 2018. It is available in English on this web site.

The decree defines the various building uses to which it frequently refers:

§ 5

Use of the building

A building or its fire compartment shall be classified on the basis of its primary use.
For the purposes of this Decree:

1) *dwellings* refers to premises used as residences, such as residential apartments and leisure apartments;
2) *accommodation premises* refers to premises such as hotels, holiday homes and residential homes that are normally in use 24 hours a day and where no one is under care or in confinement;
3) *institutions* refers to premises such as hospitals, homes for the elderly, prisons and day-care centres that are in use 24 hours a day, and where people are under care or in confinement;
4) *assembly and business premises* refers to premises such as restaurants, shops, schools, day-care centres and other early childhood education premises, sports halls, exhibition halls, theatres, churches, libraries and day-care institutions that are generally in daytime or evening use and occupied by a considerable number of members of the public or customers;
5) *office premises* refers to premises such as offices and bureaux that are generally in daytime use and where the majority of the personnel are familiar with the premises;
6) *production and storage premises* refers to premises associated with industrial activity and storage, such as ordinary industrial premises, premises for agricultural production and large warehouses with a generally regular personnel familiar with the local conditions;
7) *garages* refers to premises intended for the keeping of cars and similar motor vehicles.

The activities in production and storage premises are divided into two fire hazard classes:

1) 1) activities involving a minor or moderate fire hazard;
2) 2) activities involving a significant or major fire hazard, or where there may be an explosion hazard.

An area where there is fire or explosion hazard must not be located in a building where there are dwellings, accommodation premises, institutions or assembly and business premises. However, necessary areas where there is a fire or explosion hazard and that are required by the intended use of the building may be located with the above-mentioned premises if effective arrangements are in place to ensure that these do not jeopardise personal safety.

Article §4 sets out that there are four fire classes of building:

"§ 4

Fire classes of buildings

The building fire classes are P0, P1, P2 and P3.
Fire classes P1, P2 and P3 are to be used when the building is designed on the basis of the classes and numerical criteria set out in this Decree. Fire class P0 is to be used when the building is designed primarily or entirely using the procedure based on a design fire scenario.
Different parts of a building may belong to different fire classes provided that the spread of fire from one part to another is prevented by a firewall."

The decree later specifies the compartment fire resistance and other criteria that must be met for a building to be classed as P1, P2 or P3. Depending on which class a building achieves, it may

have larger or smaller compartment sizes and numbers of occupants. A P1 class building is assumed to sustain fire without collapse. There are no limits on size or occupant number. P1 class buildings are categorised by their assumed fire load density, as follows:

" 1) less than 600 MJ/m^2;
2) at least 600 MJ/m^2, but not more than 1 200 MJ/m^2;
3) over 1,200 MJ/m^2.

The fire load category shall be determined on the basis of the use of the fire compartment, or the fire load and the fire load category determined on the basis of this shall be determined by calculation."

The decree includes guidance on how to determine the fire load category on the basis of the use of the building:

§ 7

Determination of fire load category on the basis of use

Areas of a building or of a part thereof that are reserved for various uses may be placed in fire load categories according to use on the basis of the determined fire load density.
Areas belonging to fire load category *less than 600 MJ/m^2* are dwellings, accommodation premises, institutions, office premises, garages and some assembly and business premises, such as restaurants, schools, sports halls, theatres, churches, day-care centres, day-care institutions and shops with a fire compartment size not exceeding 300 square metres.
Areas belonging to fire load category *at least 600 MJ/m^2 but not more than 1 200 MJ/m^2* are some assembly and business premises such as shops (fire compartment size over 300 square metres), exhibition halls and libraries, fire compartments of residential buildings that contain storage areas for personal property, and premises for the repair and servicing of motor vehicles.
Areas belonging to fire load category *over 1 200 MJ/m^2* are storage areas that form separate fire compartments.
The fire load of production and storage premises is determined on a case-by-case basis."

The decree has a further sub-categorization for production and storage buildings:
"The activities in production and storage premises are divided into two fire hazard classes:
1) activities involving a minor or moderate fire hazard;
2) activities involving a significant or major fire hazard, or where there may be an explosion hazard."

Most warehouses are categorized as fire hazard class 1.

P2 classification can be met with less fire resistance of the load-bearing structural elements. An overall adequate level of safety is achieved with other measures, such as sprinklers. Class P2 includes timber-framed buildings.

No fire resistance is specified for the load-bearing structures for fire class P3. Adequate safety, depending on the usage, is achieved by limiting building size and the number of occupants.

Table 1a clarifies that buildings of fire class P3 may only be one or two storeys in height.

Table 1 a. Restrictions regarding use and size of P3 fire class building.

Building	**Number of storeys no more than**	**Height [1] no more than**	**Gross floor area no more than**
one-storey, general	1	9 m	2 400 m^2 (4 800 m^2 *)
two-storey, general	2	9 m	1 600 m^2 (2 400 m^2 *)
Institution	1	9 m	2 400 m^2
Production or storage building	1 [2]	14 m	no restriction
Drying house for agricultural products that forms a separate building	1	18 m	no restriction
Garage	1	9 m	no restriction
Residential building where successive storeys belong to different apartments	not permitted	not permitted	not permitted

[1] The height of a building is calculated from the ground level to the point of intersection of the roof and the face of the elevation (MRA 58 §). If necessary, the mean height of the building's corner points shall be calculated.
[2] No more than 200 m^2 of fire-separated and no more than 50 m^2 of non-fire-separated areas that essentially relate to the business of the building may be located on the second storey.
* The building is provided with an automatic fire-extinguishing system that is suitable for this purpose.

Table 1b clarifies that buildings of fire class P2 may be up to eight storeys in height.

Table 1 b. Restrictions regarding the use and size of a P2 fire class building.

Building	**Number of storeys no more than**	**Height[1] no more than**	**Gross floor area no more than**
General	2	9 m	no restriction
one-storey production or storage building	1[2]	no restriction	no restriction
Fire hazard class 2 production or storage building	1[2]	no restriction	no restriction
Residential building, institution (excluding closed prisons), accommodation building and office building of more than two storeys [3]	8 *	28 m *	12 000 m^2 *
Assembly and business building of more than two storeys[3]	4 *	14 m *	12 000 m^2 *
A residential building of more than two storeys, where all the storeys of each housing unit belong to one and the same apartment [3]	4	14 m	12 000 m^2

[1] The height of a building is calculated from the ground level to the point of intersection of the roof and the face of the elevation (MRA 58 §). If necessary, the mean height of the building's corner points shall be calculated.
[2] No more than 200 m^2 of fire-separated and no more than 50 m^2 of non-fire-separated areas that essentially relate to the business of the building may be located on the second storey.
[3] Storage premises with a fire load exceeding 1 200 MJ/m^2 are not permitted within the building.
* The building is provided with an automatic fire-extinguishing system that is suitable for its purpose.

Table 3. Class requirements of load-bearing and reinforcing structures in P1 and P2 fire class buildings.

Building	**Building's fire class and fire load categories MJ/m²**			
	P1			**P2**
	More than 1 200	**600-1 200**	**Less than 600**	**-**
one- or two-storey building, general	R 120 (R60 *)	R 90 (R60 *)	R 60	R 30
- institutions, accommodation premises	R 120, A2 (R60 *, A2)	R 90, A2 (R60 *, A2)	R 60, A2	R 30
- uppermost basement storey	R 120, A2 (R90 *, A2)	R 90, A2 (R60 *, A2)	R 60, A2	R 60, A2
- uppermost floor in a building where there is no attic and the structure is an essential part of the structural body [1)]	R 60	R 60	R 60	R 30
- single-storey production and storage building	R 60 (R30 *) (R15, A2 *)	R 60 (R30 *) (R15, A2 *)	R 60 (R30 *) (R15, A2 *)	R 30 (R15 *) (R15, A2)
- uppermost floor in a building where there is no attic and the structure is not an essential part of the structural body [1)]	R 15	R 15	R 15	R 15
Building of over two storeys with a height not exceeding 28 m, general	R 180, A2 (R90 *, A2)	R 120, A2 (R60 *, A2)	R 60, A2	R 60 * # [3) 4)]
- uppermost basement storey	R 180, A2 (R90 *, A2)	R 120, A2 (R60 *, A2)	R 60, A2	R 60 * A2
- residential building, dwelling, uppermost storey	R 60 +	R 60 +	R 60 +	R 60 * # [3)]
- residential building, dwelling, two uppermost storeys [2)]	R60 * #	R60 * #	R60 * #	R 60 * # [3)]
- a residential building of more than two storeys, with a height not exceeding 14 m and where all the storeys of each housing unit belong to one and the same apartment	R 45, A2 (R30, A2 *)	R 45, A2 (R30, A2 *)	R 45, A2 (R30, A2 *)	R 45 # (R30 * #)
Building of over two storeys with a height greater than 28 m but not exceeding 56 m, general	R 240, A2 (R180 *, A2)	R 180, A2 (R120 *, A2)	R 120, A2 (R90 *, A2)	not possible
Building of over two storeys with a height exceeding 56 m	R180 *, A2	R120*, A2	R 120 *, A2	not possible
Basement storeys below uppermost basement storey	R 240, A2 (R180 *, A2)	R 180, A2 (R120 *, A2)	R 120, A2 (R 120 *, A2)	R 120, A2 (R90 *, A2)

Notes on the Table:

The fire resistance time requirement for balconies is half that of the load-bearing structures of the storey.
Load-bearing structures must be made of building materials of at least class D-s2, d2, unless otherwise stated in the table.
The class requirement for the flight of stairs and staircase landing of a fire-separated exit in a building of over two storeys is R 30. The class requirement for the flight of stairs and staircase landing of the exit of a basement storey below the uppermost basement storey is R 60. If class requirement A2-s1, d0 is prescribed for load-bearing structures, this also applies to flights of stairs and staircase landings. Flights of stairs and staircase landings of the exit of a building of over two storeys and P1 fire class must be made of at least A2-s1, d0-class building materials.
No fire resistance requirements are prescribed for roof structures of an attic or void that are not essential load-bearing structures of the building's structural body or structures that brace the structural body in a fire.

[1)] '[E]ssential parts of the structural body' are the main trusses, the secondary trusses that brace the structural body and the stiffener plates for the uppermost floor, and other such individual structures that act to preserve the stability of the uppermost floor, plus the connections between them.

[2)] When the three uppermost storeys are provided with an automatic fire-extinguishing system that is suitable for its purpose.

[3)] NB the requirements laid down in § 24(3)

[4)] If the fire load category according to use is 600─1 200 MJ/m², the class requirement will be R 90 * # [3)]

Symbols in the table:

*	The building is provided with an automatic fire-extinguishing system that is suitable for its purpose.
#	Heat insulators and other fillings must be at least A2-s1, d0-class.
+	The essential insulating part of heat insulators and other fillings must be at least D-s2, d2-class.
A2	Load-bearing structures must be at least A2-s1, d0-class.
not possible.	Not possible.

Table 5 sets out the compartment size limits in square metres for the different building classes

Use	**Building's fire class and number of storeys**			
	P1	**P2 over two storeys [1)]**	**P2 one or two storeys**	**P3**
STOREYS				
Residential buildings	by apartment	by apartment	by apartment	by apartment
Accommodation premises and institutions				
- overnight accommodation areas	800^2 (1 200 *[2)])	800^2	800^2 (1 200^2 *)	400^2 (600^2 *)
- other premises	1 600 (3 200 *)	1 200	1 600 (2 400 *)	400 (1 200 *)
Assembly and business premises and office premises				
- one-storey	2 400 (24 000 *)	not possible	2 400 (9 600 *)	400 (1 200 *)
- two storeys	2 400 (12 000 *)	not possible	2 400 (4 800 *)	400 (600 *)
- more than two storeys, office premises	2 400 (9 600 *)	2 400	not possible	not possible
- more than two storeys, shop premises	2 400 (4 800 *)	300	not possible	not possible
- more than two storeys, other premises	2 400 (4 800 *)	1 200	not possible	not possible
Production and storage premises, fire hazard class 1				
- one-storey, general	6 000 [5)] (60 000 *)	not possible.	4 000 [5)] (36 000 *)	2 000 (12 000 *)
- building without heat insulation	12 000 (60 000 *)	not possible	12 000 (36 000 *)	12 000
- greenhouse	24 000 [5)]	not possible	24 000 [5)]	24 000 [5)]
- two-storey	4 000 [5)] (24 000 *)	not possible.	2 000 [5)] (12 000 *)	not permitted
- more than two-storey	3 000 (9 000 *)	not permitted	not permitted	not permitted
Production and storage premises, fire hazard class 2				
- one-storey	2 000 [5)] (12 000 *)	not possible	1 000 [5)] (6 000 *)	2 000*
- more than one-storey	1 000 (6 000 *)	not permitted	not permitted	not permitted
Garages				
- as part of an above-surface building	3 000 [3) 5)] (24 000 *)	not possible	3 000 (24 000 *)	400 (3 000*)
- separate garage above ground surface	3 000 [3) 4) 5)] (24 000 *)	not possible	3 000 [3)] (24 000 *)	1 000 (6 000*)
- underground	1 500 [5)] (10 000 *)	not possible	1 500 [5)] (10 000 *)	not permitted
ATTICS	1 600	1 600	1 600	according to compartments below
BASEMENT STOREYS	800	800	800	400

Attics and uppermost floor voids shall be divided into 400 m^2 parts; however, in fire class P3 residential buildings, they shall be divided at least by apartment.

Base floor voids shall be divided into 400 m^2 parts if the area's surfaces (apart from minor parts) do not meet the D-s2, d2-class requirements.

[1)] The building is provided with an automatic fire-extinguishing system that is suitable for its purpose, apart from a residential building of two to four storeys, where all storeys of each housing unit belong to one and the same apartment and whose height does not exceed 14 m.

[2)] The fire compartment shall be divided into parts by accommodation room.

[3)] The surface area of an open garage compartment may be 50 per cent greater.

[4)] In an open garage of no more than five storeys, the maximum area may be used as the surface area of the storeys, even though the driveways between the various storeys are combined. This, however, requires that the class of the intermediate floors be at least REI 60.

[5)] The surface area of a fire compartment may be increased by a maximum of 50 per cent if the area is provided with a fire detector that is linked to the emergency centre and effective extinguishing work can be commenced at a sufficiently early stage.

* When the building or area is provided with an automatic fire-extinguishing system that is suitable for its purpose.

Table 6. Class requirements for fire-separating building elements

	Building's fire class and number of storeys, and fire load category MJ/m²					
	P1			**P2 over two storeys**	**P2 one or two storeys**	**P3**
	More than 1 200	**600-1 200**	**Less than 600**	**-**	**-**	**-**
Storeys, general	EI 120 [1)] (EI 60 *) [1)]	EI 90 [1)] (EI 60 *) [1)]	EI 60 [1)]	EI 60 [2)]	EI 30	EI 30
- building over 56 metres high	EI 90, A2 *	EI 60, A2 *	EI 60, A2 *	not possible	not possible	not possible
- uppermost floor, if fire-separating requirement	EI 60	EI 60	EI 60	EI 60 [2)]	EI 30	EI 30
- production and storage premises, fire hazard class 1, area-based compartmentalisation	EI-M 90, A1 (EI-M 60, A1 *)	EI-M 90, A1 (EI-M 60, A1 *)	EI-M 90, A1 (EI-M 60, A1 *)	not possible	EI-M 90, A1 (EI-M 60, A1 *)	EI-M 90, A1 (EI-M 60, A1 *)
- production and storage premises, fire class 2, area-based compartmentalisation	EI-M 120, A1 (EI-M 60, A1 *)	EI-M 120, A1 (EI-M 60, A1 *)	EI-M 120, A1 (EI-M 60, A1 *)	not possible	EI-M 120, A1 (EI-M 60, A1 *)	EI-M 60, A1 *
- garages, area-based compartmentalisation	EI 60, A2	EI 60, A2	EI 60, A2	not possible	EI 60	EI 30
Attics	EI 30	EI 30	EI 30	EI 30	EI 30	EI 30
Basement storeys	EI 120, A2 (EI 90, A2 *)	EI 90, A2 (EI 60, A2 *)	EI 60, A2	EI 60, A2	EI 60, A2	EI 30, A2 [3)]

[1)] Fire-separating building elements of a building of over two storeys and P1 fire class must be made of at least A2-s1, d0-class building materials.

[2)] NB the requirements laid down in § 24(3).

[3)] In a basement belonging to a single dwelling, the class requirement is EI 30.

A1 Building materials A1 class

A2 Building materials at least A2-s1, d0-class

* When the building or area is provided with an automatic fire-extinguishing system that is suitable for its purpose.

Assembly and business premises

From Table 5, assembly buildings (which includes shops, sports halls, exhibition halls, theatres and schools) with compartments larger than 2,400 m^2 must be fitted with sprinklers.

Accommodation premises, dwellings and offices

From Table 3, a building higher than 28m must achieve fire class P1. From § 7 accommodation premises (such as hotels), dwellings and offices have a fire load less than 600 MW/m^2. If the hotel, dwelling or office is over 28m but less than 56m in height the minimum structural fire resistance is R 120, which can be reduced to R 90 with sprinklers or water mist. If the hotel, dwelling or office is higher than 56m it must be sprinklered.

Garages

From Table 5, underground garages with a compartment area larger than 1,500 m^2 must be sprinklered. The unsprinklered area limit for closed above ground garages is 3,000 m^2 and for open garages it is 4,500m^2. For above ground garages these unsprinklered limits may be increased by 50% if the garage has a fire detection system linked to the fire brigade.

Production and storage premises

From Table 5, a single storey factory or warehouse without structural fire resistance (Fire class P3) is limited to a fire compartment of 2,000 m^2 unless sprinklers are fitted. If the building has R30 structural fire resistance, which is often the case in Finland, it achieves Fire class P2 and the compartment area limit is 4,000 m^2, above which it must be sprinklered. From Table 6, the fire resistance of compartments may be reduced by 30 minutes.

Wooden structures

From Table 1a, buildings cannot be P3 if they are of more than two storeys but from Table 1b residential, institution, accommodation and office buildings can be P2 if they are up to eight storeys or 28m in height. From Table 3, a P2 building may be more than two storeys and up to 28m in height if it is fitted with an automatic fire extinguishing system that is suitable for its purpose. This is interpreted to mean sprinklers or water mist. Wooden structures protected with gypsum panels can achieve class R 60 for the load bearing structure as required in Table 3 for class P2. Thus residential buildings, hospitals, hotels, care homes and offices with a wooden structure can be over two storeys and up to eight storeys in height if fitted with sprinklers or water mist.