

# Sweden

The 2011 edition of the Swedish Building Regulations introduced requirements to fit sprinklers in hospitals and care homes. An English translation of the full document is on this web site.

## Hospitals

See 5:547. "Buildings in activity class 5C should be equipped with an automatic sprinkler plant". Activity class 5C is defined in 5:215 as premises for healthcare and medical care, with an example being given as a hospital.

## Care Homes

See 5:546, "Spaces in activity class 5B shall be equipped with automatic extinguishing systems." Activity class 5B is defined in 5:215 as "special housing for persons:

- with a physical or mental illness,
- with a functional impairment,
- with impaired development,
- with dementia, or
- whose ability to take him or herself to safety on their own is in any way impaired."

## High-Rise Buildings

The following texts are usually interpreted to mean that sprinklers are required in buildings higher than 16 storeys:

"5:22 Building classes

Building shall be divided into classes, Br, based on the need of protection.

-Buildings with a very great need of protection shall be designed in accordance with class Br0."

*"General recommendation*

In classification, factors that are related to evacuation and the consequence of collapse of the building shall be considered.

Buildings of more than 16 floors, larger buildings in activity class 5C, spaces in activity class 5D, and buildings with certain types of assembly rooms shall be designed in accordance with building class Br0."

"5:112 Analytical dimensioning

... Fire protection in buildings of building class Br0 shall be verified using analytical dimensioning."

## Design Freedoms

Escape routes may be increased by a third with sprinklers. 5.331, "In a space that is protected by an automatic extinguishing system, walking distances can be increased by one third."

Escape routes in establishments with more than 150 people where alcohol is served may be doubled. 5:212 defines activity class 2B as "an assembly room for more than 150 persons", while 2C is "an assembly room intended for more than 150 persons and where alcohol is served". 5:331 states, "In an assembly room in activity class 2C that is protected by an automatic water sprinkling plant, walking distance can be calculated as for assembly rooms in activity class 2B." Table 5:331 shows that this means an increase from 15m to 30m.

Public buildings with sprinkler systems need not have refuge areas. See 5:336.

Theatres with sprinklers need not have the stage designed as its own fire cell if sprinklers are fitted. See 5:542.

5:551 permits a reduction in the fire resistance of outer walls if sprinklers are fitted.

Table 5:561 shows that the fire compartment area of large buildings with a fire load above 800 MJ/m<sup>2</sup> is limited to 2,500m<sup>2</sup> without sprinklers and unlimited with sprinklers. Similarly if the fire load is less than 800 MJ/m<sup>2</sup> the maximum area is 5,000m<sup>2</sup> without sprinklers and unlimited with sprinklers.

Sweden has issued guidance for how to incorporate sprinklers into fire engineered solutions. The full guidance is also on this web site. It makes clear that if the heat release rate is below 5MW on activation of the sprinkler system, the designer may assume constant heat output for the first minute then reduce it by two-thirds during the next minute.

Otherwise the attached letter from Bo Hjorth in 2004, remains an accurate overview of the situation regarding legislative requirements for sprinklers in Sweden.

## **Swedish Building Regulations ( BBR 2002 ) – Fire Safety Requirements**

The Swedish Building Regulations, BBR 2002, are strictly performance based. In chapter 5, Fire safety requirements , this is given the following form:

1. The performance based requirements ( " shall " ) are followed by advice ( " should " ) often taken from older, more descriptive buildings regulations. Other means of complying with a specific requirement are of course allowed.
2. For all new or reconstructed buildings the builder or the owner must document his intentions for fulfilling the requirements of fire safety for occupants ( evacuation ) and neighbours ( fire spread ). This document is called the Fire protection document ( " brandskyddsdocumentation " ) and shall be written by the fire protection engineer ( or similar – no actual qualification is described for this person but if he or she is not "well known" for the authorities in the municipality a third party review of the documentation may be demanded. This is very rare. The same goes for any " unusual " solutions – this is more common to be demanded. )
3. In the Fire protection document the fire consultant must describe how a number of aspects of the fire risk and the fire safety will be met: evacuation; fire safety of construction; fire load; fire separation; ventilation; fire safety installations; maintenance etc
4. For a few specified hazards there are descriptive requirements for an evacuation alarm system ( hotels and places of assembly being the two hazards mentioned, the latter including occupancies like supermarkets and larger restaurants, i.e. places with more than 150 people ) and for some hazards ( hotels; hospitals; caring homes; kindergardens etc ) early detection is required ( and this is suggested to be a fire alarm system – except for hotels where it says that an automatic sprinkler system with QR- sprinklers may also serve as an early detection system. To initiate the evacuation alarm system! )

There is no other mention of fire sprinklers in BBR 2002.

In reality though, many fire engineers use fire sprinklers as an excuse to allow longer evacuation routes, lower classification of fire separation etc. But this is the decision of the individual fire engineer ( or whoever feels chosen to write the Fire protection document ), not something universally required by the Building regulation. A lot of fire sprinklers are installed in Stockholm and Gothenburg where the qualified fire engineers are many and commonly involved in a majority of the projects. Fewer fire sprinklers are installed in Östersund, Kramfors and Växjö where the lack of fire engineers makes for poor competition in the field of alternative solutions.