Building Regulations
Mandatory provisions and general recommendations

Section 6 Hygiene, health and the environment

Important information

The following translation is strictly for informative purpose. The legally binding text is found in the Code of Statutes of the Swedish Board of Housing, Building and Planning.

This translation of the reprint of Building Regulations BFS 1993:57 with amendments including BFS 2006:22 (BBR) of the Swedish Board of Housing, Building and Planning contains mandatory provisions and general recommendations pursuant to

- *the Planning and Building Act (1987:10), PBL,*
- *the Planning and Building Ordinance (1994:383), PBF,*
- *the Act on Technical Requirements for Construction Works, etc (1994:847), BVL, and*
- *the Ordinance on Technical Requirements for Construction Works, etc (1994:1215), BVF.*

In the translation the expression client/owner of the building is used. This means anyone who on his own account carry out or commissions any one else to carry out construction, demolition or site improvement work, as stated in PBL 9:1.

6[54] Hygiene, health and the environment

This section contains mandatory provisions and general recommendations on Chapter 3, Article 2 of the PBL and Articles 5, 8 and 13 of the BVF. *(BFS 2006:12)*

6:1 General

Buildings and their installations shall be designed so that the quality of air and water, as well as light, humidity, temperature and sanitary conditions are satisfactory during the building's working life, thereby avoiding conditions detrimental to human health. *(BFS 2006:12)*

> *General recommendation*
> The concept 'health' refers to health as defined in PBL and includes e.g. the definition given in the Environmental Code insofar as this relates to health in terms of medical and hygienic aspects. *(BFS 2006:12)*

6:11 Materials

Materials and construction products used in a building shall not in themselves, or through their treatment, negatively affect the indoor environment or the local environment of the building, when the performance requirements of these regulations are fulfilled. *(BFS 2006:12)*

> *General recommendation*
> The Swedish Chemical Inspectorate issues regulations relating to chemicals in goods and products. Guidance with regard to the selection of building materials is given in the report *Kriterier för sunda material och byggnader (Criteria for healthy buildings and materials)* from the National Board of Housing, Building and Planning, and in the handbook H3, *Föroreningar och emissionsförhållanden (Pollutants and emission conditions)* from the Swedish Indoor Climate Institute. *(BFS 2006:12)*

6:12 Gamma radiation

The level of gamma radiation must not exceed 0.3 μSv/h in rooms which are frequently used by human beings. *(BFS 2006:12)*

[54] Latest wording BFS 1995:17

6:2 Air

6:21[55] General

Buildings and their installations shall be designed so that necessary conditions for good air quality in rooms, which are in frequent use by human beings, are created. The requirements for indoor air quality shall be determined on the basis of the room's intended use. The air must not contain pollutants in a concentration resulting in negative health effects or unpleasant smell. *(BFS 2006:12)*

General recommendation
The Swedish Work Environment Authority and the Swedish National Board of Health and Welfare also issue regulations on air quality and ventilation.
When designing, it is important to take into account how air contaminants fluctuate over time and in different parts of the building. Possible local and temporary contamination should be combated by means of selective exhaustion, e.g. variable-speed kitchen and bathroom ventilation devices. Materials, which do not emit large quantities of pollutants or emissions, should be selected at first hand to avoid an increased need for air change. *(BFS 2006:12)*

6:211 Area of application

These regulations are applicable to all rooms or separable parts of rooms, which are in frequent use by human beings. *(BFS 2006:12)*

6:212 Definitions

Occupied zone: The occupied zone in the room is enclosed by two horizontal planes, one 0.1m above floor level and the other 2.0m above floor level, and a vertical plane either 0.6m from the outer wall or other external limit, or 1.0m by windows and doors.

Vent: Opening device, the sole purpose of which is to allow air to pass through the building envelope for temporary ventilation purposes.

(BFS 2006:12)

6:22 Characteristics of air supplied to rooms

Buildings shall be designed and their installations shall be designed and fitted in such a way that the content of pollutant supply air does not exceed the relevant limit values for outdoor air. *(BFS 2006:12)*

General recommendation
Limit values for certain pollutants in outdoor air are given in the Ordinance (2001:527) on Environmental Quality Standards for Outdoor Air.
The quality of air supplied to a building should be ensured by appropriately placed air intakes, supplyair purifying, etc. The outside air intake should be fitted

[55] Latest wording BFS 1998:38

in such a way as to minimise the effect of exhaust gases and other sources of pollution. Recommendations regarding the placing of outside air intakes are given in guideline document R1 - Classified indoor climate systems - from the Swedish Indoor Climate Institute. *(BFS 2006:12)*

6:221 – 6:223 has been withdrawn by (BFS 2006:12)

6:23 Radon in indoor air

The annual mean value of ionising radiation from radon gas must not exceed 200 Bq/m^3. *(BFS 2006:12)*

General recommendation
The Swedish Radiation Protection Authority provides a description of the method for measuring radon in buildings.
If the incidence of ground radon is high, conduits in buildings should be sealed to prevent the leakage of radon into the indoor air. *(BFS 2006:12)*

6:231 – 6:234 has been withdrawn by (BFS 2006:12)

6:2341 – 6:2342 has been withdrawn by (BFS 2006:12)

6:235 has been withdrawn by (BFS 2006:12)

6:24 Microorganisms

Buildings and their installations shall be designed in such a way that microorganisms cannot affect indoor air to the extent where they are detrimental to human health or cause an unpleasant smell.
Installations for cooling and humidifying ventilation air shall be designed and installed in such a way that harmful quantities of microorganisms cannot be emitted into ventilation air or the surroundings.
Measures taken to prevent the growth of microorganisms must not in themselves give rise to negative health effects. *(BFS 2006)*

General recommendation
The maximum permitted moisture levels in parts of buildings are given in Clause 6:52.
Installations for cooling or humidifying air by means of direct contact between water and air should take into account the risk of spreading legionella bacteria. See also Clauses 6:62 and 6:63.
Water for humidifying or cooling should not emit harmful, irritating or odorous material into indoor air. *(BFS 2006)*

6:25 Ventilation

Ventilation systems shall be designed in such a way that the required flow of outlet air can be supplied to the building. They shall also be able to carry off hazardous substances, humidity, unpleasant smells and effluents from persons and emissions from building materials, as well as pollutants from building works. *(BFS 2006:12)*

General recommendation
When designing ventilation flows in buildings, the enviromnmental impact aspects of persons, activities, added humidity, emissions from material, ground and water should be considered.
The Swedish Building Centre's handbook *Fukthandboken (The moisture handbook)* chapter 51 deals with the environmental impact of humidity.
Regulations on efficient use of electricity are given in Clause 9:6.
Regulations on protection against the spreading of fire via air handling installations are given in Clause 5:65. *(BFS 2006:12)*

6:251 Ventilation flow

Ventilation systems shall be designed for a minimum outside air flow corresponding to 0.35 l/s per m^2 of floor area. When used, rooms shall be able to have a continuous change of air.
In residential buildings where the ventilation can be controlled separately for each dwelling, the ventilation system may be designed with presence and demand regulation systems. However, the flow of outside air must not be lower than 0.10 l/s per m^2 of floor area when the dwelling is unoccupied and 0.35 l/s per m^2 of floor area when the building is occupied. *(BFS 2006:12)*

General recommendation
The requirements for ventilation flow should be verified by calculation and measurement.
When designing outlet air flow, account should be taken of the fact that the flow could be reduced due to dirt in ventilation channels, changes in differential pressure over filters, etc.
The handbook *Självdragsventialtion (Natural ventilation)* from the National Board of Housing, Building and Planning may be used as a guide. *(BFS 2006:12)*

For other buildings than residential buildings, the ventilation system may be designed so that a reduction of supply airflow, in multiple stages, continuous or by intermittent operation, is possible when the building is unoccupied. *(BFS 2006)*

General recommendation
After a period of reduced air flow, normal air flow should be provided at least for a period of such length as is required to achieve a complete change of the volume of air in the room before it is reoccupied. *(BFS 2006:12)*

The reduction of the ventilation airflow must not give cause to negative health effects. Nor must the reduction bring about damage to the building or its installations due to humidity etc. *(BFS 2006:12)*

6:252 Air distribution

6:2521 Supply inlet air

Supply inlet air shall primarily be supplied in rooms or separable parts of rooms for daily communal use and for sleeping and rest. *(BFS 2006:12)*

General recommendation
Regulations on thermal comfort in relation to draughts are given in Clause 6:42. *(BFS 2006:12)*

6:2522 Air transfer in rooms

The ventilation system shall be designed so that the entire occupied zone is ventilated by the appropriate air flow. *(BFS 2006:12)*

General recommendation
The requirement in the mandatory provision is fulfilled if
- the local ventilation index is not less than 90% using the Nordtest method NT VVS 114 or
- the air exchange efficiency is not less than 40% using the Nordtest method NT VVS 047. *(BFS 2006: 12)*

6:2523 Internal air transfer

The spread of malodorous or insanitary gases or particles from one room to another shall be limited. Intentional air transfer must only be arranged from rooms with a more stringent requirement regarding air quality to rooms with identical or less stringent requirements. *(BFS 2006:12)*

General recommendation
The requirement regarding air quality is generally lower in for example kitchens and sanitary accommodations compared with rooms for daily communal use and rooms for sleeping and rest. *(BFS 2006:12)*

6:2524 Exhaust inlet air

Exhaust inlet air shall in the first instance be taken from rooms with a less stringent requirement regarding air quality. When calculating exhaust air flow volumes in sanitary accommodations and kitchens, the environmental impact of humidity and the presence of cooking smells shall be considered. Ventilation in kitchens shall be designed so that good catching capacity in the cooking area is achieved. *(BFS 2006:12)*

General recommendations
When designing kitchen fans and range hoods in accordance with SS-EN 13141 - 3 the catching of exhaust air should be at least 90% at forced air flow.
Regulations on exhaust air are given in Clause 6:72. *(BFS 2006:12)*

6:2525 Recirculate air

The quality of recirculate air in rooms shall be such that negative health effects are avoided and unpleasant smells are not spread. Exhaust air from kitchens, sanitary accommodations or similar spaces must not be returned. Recirculate air in dwellings is only permitted if the installation is designed so that air from one dwelling is returned to the same dwelling. *(BFS 2006:12)*

General recommendation
It should be possible to shut off the recirculate air flow if required. *(BFS 2006:12)*

6:253 Airing

Rooms or separable parts of rooms in dwellings intended for daily communal use, cooking, sleeping and rest, and sanitary accommodations, shall have the option of forced ventilation or airing. Airing shall be made possible by use of an openable window or ventilation shutter. It shall be possible to open windows and ventilation shutters to the external air or to a separate glazed balcony or patio, which has an openable window or ventilation shutter.
In dwellings intended for one student only, a separable part of a room for cooking shall at least have indirect access to an openable window or ventilation shutter. *(BFS 2006:12)*

6:254 Installations

Ventilation installations shall be situated and designed in such a way that they are accessible for maintenance and cleaning purposes. Main and connect ducts shall have stationary measure outlets for flow measuring. *(BFS 2006:12)*

General recommendation
For the appropriate design of ducts and inspection shutters for cleaning , see SS-ENV 12097 and SS 2645 respectively.
Regulations on the design of spaces for installations and equipment are given in Clause 3:32.
Regulations on execution, operating and maintenance instructions, etc, are given in Clauses 2:31 and 2:5.
Regulations on noise from building installations are given in Clause 7:2. *(BFS 2006:12)*

6:255 Airtightness

Pressure conditions between supply inlet air and exhaust inlet air installations shall be adapted to the airtightness of the installation so that the transfer of exhaust air to the supply air does not occur. *(BFS 2006:12)*

General recommendations
To prevent pollutants from returning through heat exchangers where air can travel from the exhaust air side to the supply air side, the pressure level should be higher on the supply air side than on the exhaust air side.
The building envelope should have adequate airtightness in relation to the selected ventilation system to ensure good functionality and for adjusting flow in individual rooms. The airtightness of the building envelope should also be

ensured with regard to the risk of damage due to moisture. Regulations on air tightness in relation to a building's envelope are given in Subclause 6:531. Measurements of leakage in sheet metal ducts may be done in accordance with SS-EN 12237. *(BFS 2006:12)*

6:3 Light

6:31[56] General

Buildings shall be designed so that satisfactory light conditions can be achieved without the risk of injury or human health hazards. Light conditions are satisfactory if sufficient intensity of light and correct lightness (luminance) are achieved and if no disturbing glare or reflections occur. *(BFS 2006:12)*

> *General recommendation*
> Further regulations for windows and lighting are given in Clauses 3:21, 5:35, 6:27, 8:21, 8:23, 8:24 and 9:52. The Swedish Work Environment Authority issues regulations on light conditions in workplaces. *(BFS 2006:12)*

6:311 Definitions

Direct daylight:	Light through windows directly from outside.
Direct sunlight:	Non-reflected sunlight in rooms.
Indirect daylight:	Light from outside which enters the room, other than through the window.

(BFS 2006:12)

6:32 Light conditions

6:321 Lighting
It shall be possible to arrange lighting adapted to the intended use in all building areas. The requirement applies to the building as a whole. *(BFS 2006:12)*

> *General recommendation*
> SS 12464-1 may be used in respect of lighting designing for indoor workplaces. *(BFS 2006:12)*

6:322 Daylight

Rooms or separable parts of rooms in buildings in frequent use by human beings shall be designed and oriented so that adequate access to direct daylight is possible, if this does not compromise the room's intended use. In dwellings intended for one student only, a separable part of a room for cooking shall at least have access to indirect daylight. *(BFS 2006:12)*

> *General recommendation*
> A general figure which may be applied is that the area of the window glazing should admit light corresponding to that achieved where window glazing amounts to at least 10% of the floor area, when the window has 2 or 3 clear glass panes. Glazing should be increased if other glass with lower light permeability is used or if parts of buildings or other buildings screen off daylight by more than 20°. A simplified method for assessing window glazing is given in SS 91 42 01. In certain spaces possibilities to be observed may be inappropriate. *(BFS 2006:12)*

[56] Latest wording BFS 2000:22

6:323 Sunlight

At least one room or separable part of a room in dwellings, which is in frequent use by occupants, shall have access to direct sunlight. *(BFS 2006:12)*

6:33 View

General recommendation
Windows in rooms or a separable part of a room in frequent use by occupants should be situated so that the view provides the opportunity to follow day and night as well as seasonal variations. In dwellings, skylights should not be the only source of daylight in rooms, which are in frequent use by occupants. *(BFS 2006:12)*

6:4 Thermal climate

6:41[57] General

Buildings shall be designed so that a satisfactory thermal climate can be achieved. *(BFS 2006:12)*

General recommendation
A satisfactory thermal climate entails
- achieving thermal comfort in the occupied zone,
- maintaining an appropriate climate in other spaces in the building with regard to their intended use.

Thermal climate also has an effect on the durability of the building. The Swedish Work Environment Authority and the Swedish National Board of Health and Welfare also issue regulations on thermal comfort. *(BFS 2006:12)*

6:411 Area of application

Requirements for thermal climate are applicable to the whole building. The requirement for thermal comfort is applicable to rooms or separable parts of rooms which are in frequent use by occupants. *(BFS 2006:12)*

6:412 Definitions/designations

Occupied zone:	The occupied zone is enclosed by two horizontal planes, one 0.1 m above floor level and the other 2.0 m above floor level, and a vertical plane 0.6 m from the outer wall or other external limit, or 1.0 m by windows and doors.
Design value for outdoor winter temperature DVUT:	Calculated in accordance with SS-EN ISO 15927-5 as the mean value of "mean *n*-day air temperature" and "hourly mean air temperature".
Radiation asymmetry:	Difference in thermal radiation to surrounding surfaces.

(BFS 2006:12)

6:42 Thermal comfort

Buildings and their installations shall be designed in such a way that thermal comfort adapted to a space's intended use can be achieved under normal operating conditions. *(BFS 2006:12)*

General recommendation
With regard to DVUT, buildings should be designed so that
- the minimum directional operative temperature in the occupied zone is estimated at 18 °C in habitable rooms and workrooms and 20°C in sanitary

[57] Latest wording BFS 1998:38

accommodations, care premises, and in rooms for pre-school children and for the elderly in service buildings and similar establishments.
- the difference in directional operative temperature at different points in the occupied zone is calculated at a maximum of 5K and
- the surface temperature of the floor beneath the occupied zone is calculated at a minimum of 16 °C (in sanitary accommodations at a minimum of 18°C and in premises utilised by children at a minimum of 20°C) and a maximum of 26 °C

Moreover, the calculated air velocity in the occupied zone of a room should not exceed 0.15 m/s during the heating season and air velocity in the occupied zone from the ventilation systems should not exceed 0.25 m/s at other times of the year. *(BFS 2006:12)*

6:43 Heating and cooling requirements

Heating installations shall be designed so that they can achieve the heat effect requirement needed to maintain thermal comfort in accordance with Clause 6:42. Potential cooling devices shall be designed in such a way that troublesome radiation asymmetry, wind and thermal draughts are avoided. *(BFS 2006:12)*

General recommendation
Regulations for refrigerating agents are issued by the Swedish Environmental Protection Agency. *(BFS 2006:12)*

6:5 Moisture

6:51 General

Buildings shall be designed so that moisture does not cause damage, bad smells or hygienic problems and microbial growth, which can affect human health. *(BFS 2006:12)*

> *General recommendation*
> The requirements in Clause 6:5 should be verified at the design stage with the aid of moisture safety design. Measures taken at other stages of the building process also affect the moisture safety.
> Buildings, building products and building materials should be protected against moisture and dirt during construction. Documented inspections, measurements or analyses should be carried out to ensure that materials are not damaged by moisture during construction. Information on how moisture safety can be controlled during construction is given in the publication by Byggutbildarna *Bygg- och kontrollteknik (Building and control engineering for small houses)*.
> The execution of building components and building parts, which are of importance for future moisture control should be documented. *(BFS 2006:12)*

6:511 Definitions

Moisture level:	The level of moisture conditions in a material. The moisture level of moisture for materials can be described as moisture content mass by volume, moisture content mass by mass, relative humidity, etc.
Critical moisture level:	The moisture level when a material's intended characteristics and function are no longer fulfilled.
Moisture safety design:	Systematic measures at the design stage aimed at ensuring that a building is not damaged directly or indirectly by moisture. Conditions, which apply to the construction and management phase to ensure moisture safety in buildings are also specified in this stage.

(BFS 2006:12)

6:512 has been withdrawn by (BFS 2006:12)

6:52 Maximum permitted moisture level

Critical moisture levels shall be used to determine the maximum permitted moisture level, taking into account unreliability in the calculation model, input parameters (e.g. material characteristics) or measuring methods.
Well-researched and documented critical moisture levels shall be used for materials and material surfaces where mildew and bacteria can grow. A material's critical moisture level shall be determined taking account of possible contamination of the material. If the critical moisture level for a material is not well-researched and documented, a relative humidity (RH) of 75% shall be used as the critical moisture level. *(BFS 2006:12)*

General recommendation
When determining critical moisture levels for a material, account may need to be taken of
- when the growth of mildew and bacteria begins,
- when unacceptable chemical and electrochemical reactions occur,
- when unacceptable movements due to moisture occur,
- when transport processes of moisture, ions and other watersoluble substances are affected to an unacceptable extent,
- changes in mechanical characteristics,
- changes in thermal characteristics,
- any attack of rot fungus and
- any attack by wooddestroying insects.

The critical moisture levels for different materials are not fully known. Information about critical moisture levels can normally be obtained from the manufacturer or importer. *(BFS 2006:12)*

6:53 Moisture safety

Buildings shall be designed so that neither building structures nor spaces in buildings can be damaged by moisture.
The moisture level in a part of a building shall always be less than the maximum permitted moisture level unless this is unreasonable, considering the intended use of the part of the building. The moisture level shall be calculated with regard to the most unfavourable conditions. *(BFS 2006:12)*

General recommendation
When designing moisture safety, account should be taken of the combinations of materials used in the part of the building. This is to ensure that the moisture level in materials and in boundaries between materials shall not be able to exceed the critical moisture level in an unpredictable way for such a long time that damage can occur.
It may sometimes take a long time for a part of a building or structural member to become moist. This should be considered when comparing the calculated or estimated moisture level with the maximum permitted moisture level.
For external walls with a protection layer against rain and an underlying ventilated air gap, the maximum permitted moisture level for growth of mildew and bacteria does not apply to the protection layer itself.
When assessing the moisture level, both in the execution phase and in the finished building, account should be taken of the occurring source of moisture (environmental impact of moisture). The extent, duration and frequency of the environmental impact of moisture should be determined with regard to local conditions. The following sources of moisture can occur
1) Precipitation
2) Humidity, outdoor and indoor
3) Water in the ground (liquid and vapour phase) and on the ground
4) Moisture from the construction process
5) Water from installations, etc.
6) Moisture in connection with cleaning

Further information on the environmental impact of moisture is given in the Svensk Byggtjänst's publication *Fukthandbok – praktik och teori (Moisture handbook - practice and theory)*, Section 51. *(BFS 2006:12)*

6:531 Airtightness

General recommendation
To prevent damage due to convection of moisture, the parts of the building which separate spaces with different climatic conditions should have as high airtightness as possible. In most buildings, the risk of convection of moisture is greatest in the building's upper parts, i.e. where internal overpressure may be prevalent.
Particular care should be taken to ensure airtightness where the environmental impact of moisture is great such as in public baths or where temperature differences are particularly large.
Airtightness can affect the moisture level, thermal comfort, ventilation and a building's heat loss.
A method for determining air leakage is given in SS-EN 13829. When determining air leakage, it should also be investigated whether the air leakage is concentrated to a particular part of the building. If this is the case, there is a risk of moisture damage. *(BFS 2006:12)*

6:532 Ground and parts of buildings

6:5321 Surface drainage

To avoid damage to a building from moisture, the adjacent ground surface shall be given an incline to drain away surface water or should be provided with devices to collect and divert surface water, unless the building is designed to withstand water pressure. *(BFS 2006:12)*

General recommendation
The slope of the adjacent ground surface should have an incline of 1:20 to a distance of three metres from the building. If it is impossible to create such a slope, a cut-off trench should be provided.
Regulations on accessibility to the building are given in Section 3. *(BFS 2006:12)*

6:5322 Drainage

General recommendation
Buildings not designed to withstand water pressure should have a drainage layer adjacent and underneath the building as well as around draining pipes, which is permeable enough to collect and drain off the appropriate quantities of water to draining pipes or corresponding systems.
Guidance on how drainage can be designed and constructed is given in the Svensk Byggtjänst's publication *Fukthandbok – praktik och teori* (*Moisture handbook – practice and theory), Section 39:4*.
For drainage water installations, see also Subclause 6:643. *(BFS 2006:12)*

6:5323 Foundation and floor structure

It shall be possible to inspect crawl spaces in their entirety. *(BFS 2006:12)*

General recommendation
A foundation should be designed with a capillarity barrier.
Particular attention should be taken to ensure that the maximum permitted moisture level is not exceeded in outdoor air-ventilated crawl space foundations .
Subclause 3:32 deals with spaces for installations and equipment.
The final check to ensure that the concrete has dried sufficiently, e.g. before flooring, should be carried out by moisture measurement. Guidance on how to carry out moisture measurements in concrete is given in the Sveriges Byggindustrier's handbook *Manual – Fuktmätning i betong* (*Manual - moisture measurement in concrete)*.
Regulations for the use of pressure impregnated timber are issued by the Swedish Chemicals Agency. *(BFS 2006:12)*

6:5324 Walls, windows and doors

General recommendation
Facade claddings consisting of wooden panels, boards and similar materials, as well as outer leaf of cavity walls, should be arranged so that moisture from outside cannot reach parts of buildings sensitive to moisture. This also applies to windows, doors, attachments, ventilation devices, joints and other parts, which go through or are connected to walls.
Walls of materials with moisture from the construction process, on which fixed moisture-sensitive fittings, etc. are installed, should be given the opportunity to become dry or the moisture-sensitive parts of the fittings should be protected.
The distance between the ground surface and the lower edge of moisture-sensitive facades should be at least 20 cm so that sprinkle of rain does not cause the facade to become damp or dirty.
Regulations on accessibility to the building are given in Section 3. *(BFS 2006:12)*

6:5325 Roofs and attic spaces

General recommendation
When selecting materials and designing components for roofs,
the slope of the roof should be taken into account.
If the roof covering is made from material which can be damaged by ice, this should be considered when the roof is designed. *(BFS 2006:12)*

It shall be possible to inspect attic spaces in their entirety unless this is clearly unnecessary. *(BFS 2006:12)*

General recommendation
If the entire attic space is clearly visible, the requirement is considered fulfilled.
Subclause 3:32 deals with spaces for installations and equipment.
Attic spaces over thermally insulated attic floor structures should be arranged so that moisture does not cause growth of mildew and bacteria.
With cold roofs and well-insulated floor structures there is an increased risk of microbial growth, e.g. on the inside of the roof. Particular care should be taken to ensure airtightness if the insulation of the attic floor structure is increased.

If the attic floor structure is made of materials with moisture from the construction process , e.g. concrete or aerated concrete, which can cause damage to materials, the penetration of moisture into the attic space should be minimised. *(BFS 2006:12)*

6:533 Spaces with requirements for watertight or water-repellent layers

6:5331 Watertight layers

Floors and walls which will be subject to flushing water, splashing water or leaking water shall have a watertight layer to prevent moisture from coming into contact with parts of buildings or spaces which are susceptible to moisture. Watertight layers shall be resistant to alkalinity from concrete and mortar, water, temperature variations and movements in the foundations, and have sufficiently high water vapour resistance. Watertight layers shall also be able to cope with vibrations from normal equipment in the space. Joints, connections, attachments and conduits in watertight layers shall be watertight. *(BFS 2006:12)*

General recommendation

If a moisture-sensitive material is placed between two tight materials, for example, between a vapour barrier and a watertight layer, it should be verified, e.g. with moisture safety design, that the highest permitted moisture level for the material has not been exceeded.

The water vapour resistance of the watertight layer should be higher than $1 \cdot 10^6$ s/m ($1.35 \cdot 10^{11}$ $m^2 \cdot s \cdot Pa/kg$) unless it is shown at the moisture safety design that a different vapour penetration resistance may be used. The water vapour resistance should be determined under conditions which are similar to the relevant case, e.g. between 75% and 100% RH.

A method for the assessment of watertightness of joints in finished floorings of plastic carpets is given in SS 92 36 21. The standard also applies to painted wall surfaces.

At present, for watertight layers made from liquid applied coverings under or behind ceramic materials, there is no suitable measurement method with which to check the tightness of the finished sealing layer compound . It is recommended to carry out a visual inspection of the liquid applied coverings and their connections before tiling. The check-up of whether the correct quantity of liquid applied coverings compound has been uesed per unit area should be documented.

Conduits and attachments in watertight layers should be avoided in places, which could be covered with water or subject to splashing water. Joints should be situated in places, which are least subject to be covered with water. For pipe conduits in the floor's watertight layer, sealing should be done against the pipe conduit and the watertight layer.

Bathrooms and shower rooms are spaces where watertight layers for walls and floors normally are required. Laundry rooms, spaces for water boilers and toilets are spaces where a watertight layer on the floor normally is required. The watertight layer should be folded up against the wall.

Regulations on replaceability are given in Clause 2:2 and regulations on design and construction in Subclause 2:31. *(BFS 2006:12)*

6:5332 Water-repellent surface layers

Floors, walls and roofs subject to splashes of water, wet cleaning, condensation water or high humidity shall have a water-repellent surface layer. *(BFS 2006:12)*

General recommendation
If a moisture-sensitive material is placed between two tight materials, for example between a vapour barrier and a tight, water-repellent surface layer, it should be verified that the maximum permitted moisture level for the material has not been exceeded.
Joints should be situated in places which are least subject to water. For pipe conduits in the floor's water-repellent surface layer, sealing should be done against the pipe conduit and the substrate .
Laundry rooms and spaces for water boilers are spaces where water-repellent layers on the walls normally are required. Floors should also be provided with water-repellent layers in spaces where moisture causes a greater environmental impact than normal, e.g. back door entrances. *(BFS 2006:12)*

6:5333 Substrate for watertight layers

Substrate for watertight layers shall be appropriate to their use. *(BFS 2006:12)*

General recommendation
Floor in wet rooms with ceramic materials and liquid applied coverings on a timber floor structure with boards or board structures are at significantly greater risk than if the foundation comprises a floor structure with higher rigidity, e.g. concrete.
Where liquid applied covering is applied on floor structure, account should be taken of the reciprocal movements of the floor structure and the walls, so that the liquid applied covering is not affected negatively. This can be done, for example, by adjusting the anchoring between the wall and the floor structure to the characteristics of the liquid applied covering.
An example of how timber floor structures can be designed to achieve adequate rigidity is given in *RA 98 Hus (RA 98 House)*, Section HSD. 122. *(BFS 2006:12)*

6:5334 Hidden surfaces

If there is a risk of leaking water or condensation on hidden surfaces, the outlet from these surfaces shall be arranged so the water becomes visible quickly. *(BFS 2006:12)*

General recommendation
A tight surface layer, e.g. a floor covering with tight joints, should be placed under dishwashers, sink units, refrigerators, freezers, icemachines or similar. The surface layer should be sealed at floor conduits and folded up at least 50 mm against the adjacent wall or similar. *(BFS 2006:12)*

6:5335 Diverting water to the floor gully

In spaces with floor gullies, the floor and the watertight layer shall have an inclination to the gully in those parts of the space which are regularly covered with water or

overflow water. A negative incline must not occur in any part of the space. *(BFS 2006:12)*

> *General recommendation*
> In connection to the floor gully, the incline of the floor in the shower section or corresponding area should be at least 1:150 to ensure drainage and at most 1:50 to reduce the risk of accidents. Other floor surfaces should slope towards the floor gully. Account should be taken of possible deformation of the floor structure. *(BFS 2006:12)*

In those parts of the floor, which are regularly subject to water or subject to splashing water, only conduits for gully units may be installed.
Floor gullies shall be anchored in the floor structure in such a way that reciprocal movement does not occur between the gully, the foundation, the liquid applied coverings and the floor covering. *(BFS 2006:12)*

> *General recommendation*
> The anchoring of the floor gully and position in terms of height and ground plane should be inspected before the watertight layer is applied. *(BFS 2006:12)*

6:5336 Cleanability

In wet rooms the surface layer, joints, connections and conduits shall be arranged so that they can be easily kept clean and not provide a favourable environment for microbial growth. *(BFS 2006:12)*

6:534 has been withdrawn by (BFS 2006:12)

6:6 Water and drainage

6:61 General

Buildings and their installations shall be designed in such a way that water quality and hygienic conditions satisfy general health requirements. *(BFS 2006:12)*

6:611[58] Area of application

The rules in this Clause apply to installations for water and drainage in buildings as well as in building sites. *(BFS 2006:12)*

6:612[59] Definitions

Cold tap water:	Cold water of drinking water quality.
Hot tap water:	Heated cold tap water.
Tap water:	Generic term for cold and hot tap water.
Other water:	Water which does not meet the requirements for tap water but which can be used for heating, refrigerating, flushing toilets, washing machines, etc. where the requirements for water quality depends on the purpose and where the water does not necessarily have to be tap water.

(BFS 2006:12)

6:613 – 6:615 have been withdrawn by (BFS 2006:12)

6:62 Tap water installations

Tap water installations shall be designed in such a way that the tap water, after the water outlet, is hygienic, safe and available in sufficient quantities. Cold tap water shall meet the quality requirements for drinking water after the water outlet. Hot tap water shall be hot enough to allow personal hygiene and household chores.
Tap water installations shall be made of materials which inhibit the release of unhealthy concentrations of harmful substances in the tap water. Installations shall not impart odour or taste to the tap water. *(BFS 2006:12)*

> *General recommendation*
> Regulations on drinking water are issued by the Swedish National Food Administration and the Swedish National Board of Health and Welfare. *(BFS 2006:12)*

6:621[60] Hot water temperatures for personal hygiene and household chores

Hot tap water installations shall be designed in such a way that a minimum water temperature of 50 °C can be reached after the water outlet. To reduce the risk of scalding, the maximum hot tap water temperature must not exceed 60°C after the

[58] Latest wording BFS 1998:38
[59] Latest wording BFS 1998:38
[60] Latest wording BFS 1998:38

water outlet.

However, the hot tap water temperature must not be higher than 38°C if there is a particular risk of accidents occurring. Devices for regulating hot tap water shall be designed to minimise the risk of personal injury from mistaking hot tap water for cold tap water. *(BFS 2006:)*

> *General recommendation*
> Fixed showers, which cannot be regulated from outside the shower space and showers for persons who cannot themselves be expected to be able to regulate the temperature themselves are examples of specific accident risks. *(BFS 2006:12)*

6:6211 – 6:6213 have been withdrawn by (BFS 2006:12)

6:622 Microbial growth

Tap water installation shall be designed in such a way as to minimise the possibility of microorganism growth in tap water. Cold tap water installations shall be designed in such a way that the cold tap water cannot be heated accidentally. Circulation pipes for hot tap water shall be designed in such a way that the temperature of the circulating hot tap water does not drop below 50°C in any part of the installation. *(BFS 2006:12)*

> *General recommendation*
> To reduce the risk of the growth of the legionella bacteria, among others, in cold tap water, cold tap water installations should not be located in places where the temperature is higher than room temperature. There is a risk, for example in warm shafts or in heated floors, in which installations for hot tap water, hot tap water circulation and radiators are situated . If it is not possible to avoid placing cold tap water installations in such locations, all installations should be designed and insulated so that increases in cold tap water temperatures are kept to a minimum.
> All pipelines for hot tap water circulation should have the facility for measuring water temperature.
> To prevent harmful quantities of legionella bacteria in installations where hot tap water is stationary, among others in in heaters or accumulators for heating e.g. by means of electricity, solar power, wood, heat pumps and district heating, the hot tap water temperature should not drop below 60 °C.
> Towel dryers, floor heating and other heaters should not be connected to hot tap water circulation pipes.
> Cut off ends, i.e. pipelines, which are not connected directly to the water outlets, in hot tap water installations should be short enough to ensure that the water temperature in these cut off ends does not drop below 50 °C.
> Common pipelines for multiple shower places with a maximum temperature of 38 °C should not be longer than 5 metres. *(BFS 2006:12)*

6:623 Tap water flow

Water outlets shall be designed in such a way that water flows remain adequate without causing noise or corrosion due to high water velocity. The design shall also minimise the risk of a dangerous surge pressure . Hot tap water at the correct

temperature shall be provided without having to wait an inconvenient amount of time. *(BFS 2006:12)*

General recommendation
For dwellings, the requirement of the mandatory provisions for water flow at the water outlet for both hot and cold water is met if the draw-off flow is 0.3 l/s for bath tubs and 0.2 l/s for other water outlets, and the adequate draw-off flow-rate for water outlets with cold water only is 0.1 l/s for toilets and 0.2 l/s for other water outlets.
For the tap water system as a whole, the requirement of the mandatory provisions is met if at least 70% of each water draw-off flow-rate can be achieved when a likely percentage of connected water outlets are opened simultaneously.
A water heater, which only serves a single dwelling house should be designed so that in a maximum period of 6 hours, it can heat cold tap water at 10°C so that two water draw-offs can each maintain a 140 l flow of mixed hot and cold tap water at 40 °C in one hour.
The design of water pipes and the placement of water heaters should ensure that hot tap water can be obtained within approximately 10 seconds with a flow of 0.2 l/s. However this does not apply if the hot tap water is heated for a single-dwelling house.
Regulations on noise from building installations are given in Clause 7:2. *(BFS 2006:12)*

6:624 Back flow prevention

Tap water installations shall be designed in such a way as to prevent back flow of contaminated water or other liquids. Installations shall be designed so that gas penetration or leaking of liquids cannot occur. *(BFS 2006:12)*

General recommendation
Installations should be designed in accordance with SS-EN 1717. With regard to the selection of protection modules for filling heating systems, account should be taken of the size of the heating system and possible additives to the hot water. *(BFS 2006:12)*

6:625 Design

Tap water installations shall be designed and made from materials which have adequate durability against the external and internal mechanical, chemical and microbial processes to which they are likely to be exposed.
The risk of damage to nearby parts of buildings or other inconvenience caused by freezing, condensation or as a result of escaping water shall be limited. Tap water installations which are hidden and cannot be inspected, e.g. in shafts, walls, floor structures or behind fixtures, shall be made without joints. Joints in tap water pipes shall be situated so that any leaking water can quickly be discovered and so that the water does not cause any damage. *(BFS 2006:12)*

General recommendation
Tap water pipes should be designed so that any leaking water from the pipes can quickly be discovered and so that the water does not cause any damage. The shaft for tap water pipes should be easily accessible and designed with a leak indicator,

e.g. a pipe with sufficient capacity which discharges into rooms with floor gullies or watertight floors. Regulations on the replaceability of installations are given in Clause 2:2 and regulations on designing and construction in Subclause 2:31. *(BFS 2006:12)*

Stop valves and facilities for draining the tap water system shall be installed to the required extent. *(BFS 2006:12)*

General recommendations
Dishwasher and washing machine connections, etc., should be fitted with stop valves which are visible and easily accessible. Stop valves should be installed so that the tap water to individual apartments can be shut off on an individual basis. *(BFS 2006)*

Tap water installations shall be designed for a static water pressure of not less than 1 MPa and with regard to the effect of surge pressure. *(BFS 2006:12)*

General recommendation
Plastic pipes for hot tap water installations should be designed to withstand the static pressure of 1 MPa at a temperature of 70 °C. *(BFS 2006:12)*

Flexible hose sets must not be used to connect tapping valves, mixers or similar appliances.
Pipelines in tap water installations shall be laid so that the necessary provision is made for expansion.
Fixed equipment connected to a water installation and placed in a space without a floor gulley, shall be provided with protection to prevent unintentional discharge of water. *(BFS 2006:12)*

General recommendation
Washing machines and water heaters should be placed in spaces with floor gulleys. *(BFS 2006:12)*

6:626 Documentation and commissioning

General recommendation
A documented risk assessment of the growth of legionella bacteria should be completed for tap water installations in residential homes for the elderly, hotels, sports halls, swimming baths, hospitals and blocks of flats. This should also be undertaken for water installations which spread aerosoles, e.g. whirlpool baths, open cooling towers and grocery store humidifiers.
Water installations should be flushed before operation. If the water has been stationary during the construction phase where the ambient temperature has been in excess of 20 °C, the installations may also need disinfecting.
Regulations on operation and maintenance are given in Subclause 2: 51. *(BFS 2006:12)*

6:63 Other water installations

Other water installations must not be connected to tap water installations. *(BFS 2006:12)*

General recommendation
Other water installations should meet all requirements set out in Subclause 6:62 unless the area of application permits otherwise. *(BFS 2006:12)*

6:631 Marking

All parts included in installations for other water shall be marked along their entire length so that they cannot be confused with tap water installations. *(BFS 2006:12)*

6:632 Microbial growth

Other water installations shall be designed so that the possibility of the growth of microorganisms is minimised. *(BFS 2006:12)*

General recommendation
Process water is an example of installations where the growth of legionella bacteria can occur. *(BFS 2006:12)*

6:64 Waste water installations

6:641 Waste water installations

Waste water installations shall be designed in such a way that waste water can be drained off without damaging the installations or drainage system, and so that their function is not affected.
Waste water installations shall be designed in such a way that they can continuously drain at least 150% of the draw-off flow-rates of the water outlets. The rate of waste water must not however be so small that it cannot remove the impurities for which the installation is intended. Odour must not be spread in the drainage system. *(BFS 2006:12)*

General recommendation
Waste water installations with drainage system based on gravity flow can be designed in accordance with SS-EN 12056 parts 1 and 2.
In designing waste water pipes for gravity drainage system, it should be noted that
- the dimension of the pipes should not decrease in the direction of flow,
- pipes from toilets should have a dimension (pipe designation) of not less than 100 mm,
- underground pipes should have a dimension (pipe designation) of not less than 75 mm.

Foul water drains using a vacuum system can
be designed in accordance with SS-EN 1293. *(BFS 2006:12)*

Each water outlet and safety valve shall be provided with a discharge unit, unless the waste water can be removed by other means without any inconvenience.
Safety devices, such as sprinklers, emergency showers and fire hydrants do not require such discharge units.
In apartments, at least one space used for personal hygiene shall be provided with a floor gulley.
In gravity drainage systems the discharge unit shall be connected in such a way that waste water from a discharge unit with a water seal cannot enter the water seal of another discharge unit.
Discharge units where waste water can cause inconvenience due to odour must not be connected to the floor gulley.
Discharge units for waste water which could contain inflammable or explosive liquids must not be provided with water seals. Outlets from toilets must not be connected to a petrol, oil or grease separator.
In foul water installations where the water can contain more than insignificant quantities of hazardous substances, the waste water shall be treated or separators installed. The design of separators shall ensure that the separated material cannot be released unintentionally or in an uncontrolled manner. *(BFS 2006:12)*

> *General recommendation*
> A separator should be provided if the waste water could contain more than insignificant quantities of
> - sludge or solid particles which involve a significant risk of creating deposits,
> - grease of other substances which separate out when the waste water cools down,
> - petrol or other inflammable or explosive liquids or
> - oil or other substances insoluble in water.
>
> Grease separators can be designed in accordance with SS-EN 1825-2. Oil and petrol separators can be designed in accordance with SS-EN 8588-2. *(BFS 2006:12)*

Gravity drainage systems shall be designed and vented so that any pressure changes do not break the water seal. Vent pipes shall be arranged so that they do not cause inconvenience due to odour or condensation on building elements. Gravity drainage systems must not be vented via the ventilation system of the building. *(BFS 2006:12)*

> *General recommendation*
> Separators containing inflammable or explosive gases, oil or grease, or may develop overpressure should be vented by separate vent pipes. *(BFS 2006:12)*

6:642 Surface water installations

Surface water installations shall be able to drain away rainwater and melt water so that the risk of flooding, accidents or damage to buildings and the ground is limited. *(BFS 2006:12)*

> *General recommendation*
> Rainwater installations can be designed in accordance with SS-EN 12056-1 and 12056-3. *(BFS 2006:12)*

Surface water installation shall have arrangements for the separation or treatment of substances which could damage or disrupt the function of the installation, drainage system or the surface water recipient . *(BFS 2006:12)*

> *General recommendation*
> Separators should be provided if the surface water could contain more than insignificant quantities of petroleum products, sludge or solid particles. See also Subclause 6:641. *(BFS 2006:12)*

6:643 Drainage water installations

Drainage water shall be drained off either by gravity flow directly into the ground, if this can be done without impairing the function of the drainage, or using surface water pipes.
Pipes for drainage water shall be provided with an inspection chamber with a sludge trap placed before their connection to the surface water drain. *(BFS 2006:12)*

> *General recommendation*
> For drainage, see also Subclause 6:5322. *(BFS 2006:12)*

6:644 Design

Waste water installations shall be designed and made from materials which have adequate durability against external and internal mechanical, chemical and microbial processes to which they are likely to be exposed. The risk of damage to nearby parts of buildings or other inconvenience caused by freezing, condensation or as a result of escaping water shall be limited. Pipelines in waste water installations shall be laid so that the necessary provision is made for expansion.
Waste water installations shall be designed so that sludge deposits do not reduce the capacity and cleaning devices are accessible. It shall be possible to clean the installation with cleaning equipment in general use. *(BFS 2006:12)*

> *General recommendation*
> Floor gullies should be situated so that they are easily accessible for cleaning when they are alongside bath tubs , shower cabinets, washing machines and similar installations and appliances.
> Regulations on the replaceability of installations are given in Clause 2:2 and regulations on designing and construction in Subclause 2:31. *(BFS 2006:12)*

6:7 Discharges to the environment

6:71 General

Buildings shall be designed in such a way that pollutants, which may occur as a result of the activities in the building can be removed without negative effects with respect to the health and hygiene of persons in the building or in the surroundings of the building. The discharge must not have an adverse effect on the ground, water or air in the surroundings of the building. *(BFS 2006:12)*

> *General recommendation*
> Pollutants refer to contaminated air, wastewater and combustible gases, among others. *(BFS 2006:12)*

6:72 Contaminated air

Exhaust air installations in buildings shall be designed so that unpleasant smells or pollutants are not reintroduced to air intakes, openable windows, doors, balconies or similar areas in the building, or to nearby buildings. *(BFS 2006:12)*

> *General recommendation*
> Exhaust air openings and air intakes should be designed in accordance with the Swedish Indoor Climate Institute's guidelines *R1 Klassindelade inneklimatsystem (R1 Classified indoor climate systems)*, Figure 3.121 and Table 3.122.
> Venting of foul water installations based on gravity flow should be designed in accordance with SS-EN 12056-2.
> Exhaust air from griddle plates or deep-fat fryers in restaurants, catering kitchens and similar establishments should be cleaned before discharge or dispersed at high altitude.
> Particular attention should be taken with regard to the formulation of exhaust air from petrol or grease separators and individual drains. *(BFS 2006:12)*

6:73[61] Waste water

Waste water installations shall be designed in such a way that waste water is either carried away via the municipal sewerage system or purified via private sewerage systems .
The connection to the municipal sewerage system shall be made above the backwater level of the municipal sewerage system. *(BFS 2006:12)*

> *General recommendation*
> Regulations on private sewerage systems are issued by the Swedish Environmental Protection Agency. *(BFS 2006:12)*

6:731 has been withdrawn by (BFS 2006:12)

[61] Latest wording BFS 1998:38

6:74 Combustion gases

Inconvenience caused by the content of flue gases and exhaust gases, which are discharged from buildings, shall be limited. *(BFS 2006:12)*

6:741 Solid fuel heating

The maximum emission of organically bound carbon (OGC) from buildings with solid fuel appliances with power up to 300 kW must not exceed the values given in Table 6:741. *(BFS 2006:12)*

Table 6:741 Maximum permitted values for the emission of organically bound carbon (OGC).

Nominal power, kW	**mg OGC per m^3_n dry gas with 10 % O_2.**
Manual fuel supply	
<50	150
>50 ≤ 300	100
Automatic fuel supply	
<50	100
>50 ≤ 300	80

(BFS 2006:12)

General recommendation
The testing of solid fuel appliances should be carried out in accordance with SS-EN 303-5.
Solid fuel appliances with manual fuel supply should be designed with an accumulator or corresponding device to ensure effective energy management. *(BFS 2006:12)*

6:7411 Secondary solid fuel appliances

The emission of carbon monoxide (CO) from stoves, fire inserts and similar appliances in buildings mainly heated with a different heating appliance, must not exceed 0.3 volume percentage at 13 % O_2. The maximum emission of carbon monoxide (CO) from pellet burners must not exceed 0.04 volume percentage at 13 % O_2. *(BFS 2006:12)*

General recommendations
The testing of secondary solid fuel appliances should be carried out in accordance with SS-EN 12815, SS-EN 13229, SS-EN 128 09, SS-EN 13240 and prEN14785. Minimum efficiency should in these cases amount to 60% for stoves, 50% for fire inserts and 70% for pellet burners. *(BFS 2006:12)*

The requirement for emission of carbon monoxide (CO) does not apply to open stoves and tiled stoves, which are primarily intended for comfort heating, nor does it apply to wood burning stoves primarily used for cooking. *(BFS 2006:12)*

6:742 Oil heating
The emissions of total hydrocarbons (THC), carbon monoxide (CO) and nitrous oxides (NO_x) as well as the soot emissions from buildings with oil heating appliances with power up to 400 kW must not exceed the values given in Table 6:742. *(BFS 2006:12)*

Table 6:742 Maximum permitted values for emissions of total hydrocarbons (THC), carbon monoxide (CO) and nitrous oxides (NO_x), as well as soot emissions.

Total hydrocarbons (THC)	10 ppm
Carbon monoxide (CO)	110 mg/kWh
Nitrous oxides (NO_x)	250 mg/kWh
Soot index	1

(BFS 2006:)

General recommendation
The testing of oil heating appliances should be carried out in accordance with SS-EN 303-2 and SS-EN 304.
For certain boilers, the regulations given in the mandatory provisions and general recommendations on efficiency requirements for new boilers heated by liquid or gaseous fuels of the National Board of Housing, Building and Planning (BFS 1997:58) apply. *(BFS 2006:12)*

6:743 Chimney height

Flue gases and exhaust gases shall be discharged through chimneys, which are of sufficient height to ensure the operational efficiency of the chimney and prevent inconvenience around the building or in its surroundings. Chimneys shall also be situated so that flue gases and exhaust gases are not reintroduced to the air intakes, openable windows, doors, balconies and similar areas in the building or transferred to nearby buildings. *(BFS 2006:12)*

General recommendation
Chimneys for fireplaces with a rated output of up to 60 kW should terminate above the roof ridge and besides, not less than 1.0 metre above the roof covering, unless particular conditions exist. When selecting chimney height, account should be taken of prevailing wind direction, the danger of fire from solid fuel heating and the risk of spreading sparks.
Regulations for calculating chimney height for fireplaces with a rated output of more than 60 kW are issued by the Swedish Environmental Protection Agency.
Gas heating with fan-assisted flues should be designed with regard to the minimum dimensions given in the Swedish Gas Association's energy gas standards, EGN 01, Chapter 7.9.4.4. *(BFS 2006:12)*

6:8 Protection from vermin

6:81 General

Doors, windows and grills shall be designed so that vermin, e.g. rats, mice and birds are prevented from entering the building when these openings are closed off. Vermin shall not be able to enter via conduits for pipes, cables, culverts or similar means, or through ventilating openings in the façade.
Partitioning and similar structures in buildings shall be executed with sufficient impenetrability to make the spread of all types of vermin more difficult. *(BFS 2006:12)*

> *General recommendation*
> Ventilation openings and similar openings may be furnished with a durable metal mesh with a maximum mesh width of 5 mm and with an insect-proof screen. Ventilation openings at the eaves of the roof base may be furnished with insect-proof screens. *(BFS 2006:12)*