

# Building Regulations

Drawn up in pursuance of sections 3, 5, 16(8)-(9), 16A, 16B(1), 18(5), 21(1)-(2), 22(5), 28(1)&(3), 30(2) and 31D(1) of the Danish Building Act; see Consolidating Act no. 452 of 24 june 1998, as amended by Act no. 228 of 31 march 2001 and Act no. 514 of 17 june 2008.

Building Regulations  
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The Building Regulations 2010 contains the rules for construction of buildings in Denmark, both private and commercial. Regulation is primarily based on functional re-quirements.

The primary changes compared to BR08 are in chapter 7, concerning energy consumption

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## Introduction

The Building Regulations 2010 (BR10) are divided into two columns. The column on the left (this column) contains the legal requirements, i.e. the legally binding regulations, and the column on the right contains guideline sketches and comments on the legal requirements. The Building Regulations also comprise six appendices. Drawings in the guidance column are only to be taken as examples.

In addition to the guidance set out in the column on the right the Danish Enterprise and Construction Authority has drawn up guidance relating to particular areas which are governed by the Building Regulations. This guidance is posted on the Danish Enterprise and Construction Authority's website [www.bygningsreglementet.dk](http://www.bygningsreglementet.dk). In addition to the guidance issued by the Danish Enterprise and Construction Authority, SBI (the Danish Building Research Institute) has drawn up SBI Guidelines 230, Guidelines on Building Regulations 2010. These guidelines can be used as an aid to interpreting the requirements of the Building Regulations. The SBI Guidelines refer inter alia to standards, instructions and other background material which provides more detailed information. The SBI Guidelines are posted on the Danish Enterprise and Construction Authority's website [www.bygningsreglementet.dk](http://www.bygningsreglementet.dk)

an online version is available at [www.sbi.dk](http://www.sbi.dk) and a paper version from SBI.

See [www.byggevaereinfo.dk](http://www.byggevaereinfo.dk) for information on current standards, construction products, CE marking etc.

Pursuant to Articles 28 and 30 of the Treaty establishing the European Community, the Agreement establishing the European Economic Area and Council Decision no. 95/1/EC of the EC-Turkey Association Council, all construction products legally produced and marketed in other EU member states or in Turkey

or legally produced in EFTA countries which have signed the agreement establishing the European Economic Area

and which comply with technical standards or specifications which are on a par with such Danish standards as have been included in the Building Regulations, will be deemed to comply with the provisions of these regulations and may be marketed in Denmark.

The draft technical provisions of BR10 were notified under European Parliament and Council Directive 98/34/EC (the Information Procedure Directive), as most recently amended by Directive 98/48/EC.

These Building Regulations and associated supplements have been revised in good faith with every endeavour to ensure the accuracy of the contents. However, users apply these regulations at their own risk and the Danish Enterprise and Construction Authority accepts no liability for erroneous decisions made on the basis of errors in or omissions from this document.

## 1. Administrative provisions

### 1.1 General

1.1(1) These Building Regulations apply to all buildings unless otherwise provided by 1.2.

*(1.1(1)) The main scope of the Building Regulations is multi-storey domestic buildings and all forms of industrial, commercial and institutional buildings, including the building categories listed in section 11 of the Building Act; single-family houses for permanent dwellings, either detached single-family houses or wholly or partially joined houses (semi-detached, terraced, linked or cluster houses etc.); holiday homes in designated "summer house" areas, allotment sheds, campsite cabins and garages, outbuildings and other so-called ancillary buildings.*

1.1(2)

The Building Regulations apply to the building works listed in section 2 of the Building Act.

*(1.1(2)) Section 2 of the Building Act deals with the erection of new buildings, extensions to buildings, conversion of and any other alterations to buildings and any significant change of use of buildings as provided for in the Building Act or the Building Regulations; and with the demolition of buildings. The Building Act also covers mines and similar structures or erections to which the public has access.*

### 1.2 Limitations of the scope of the Building Regulations

1.2(1) These Building Regulations do not apply to:

*(1.2(1)) These structures, erections etc. may be built and demolished without permission or notice. The Building Regulations contain no special provisions in respect of these structures, erections etc. The limitations are defined in sections 3 and 16 B(1) of the Building Act.*

- 1) Bridges, tunnels and other structures or erections for traffic purposes built or approved by the highways, railway or other authorities or companies with statutory responsibility for the construction works; and temporary structures and installations necessary for the completion of the construction works.

- 2) Power supply pylons, ordinary masts for electrical installations, including street lighting, road illumination and masts for the overhead cable systems of public electric railways.
- 3) Bus shelters etc.
- 4) Substations and roadside junction boxes for the transmission of electricity, metering and pressure regulating stations for the transmission of gas; pumping stations and booster stations for water, drainage and district heating systems; radio and signal huts and relay housings for public transport purposes with a maximum area of 30 m<sup>2</sup> and a maximum height of 3.0 m.
- 5) Siren units for warning systems installed or approved by the Danish Emergency Management Agency.
- 6) Boundary walls between adjoining properties, by roads or paths and not exceeding 1.8 m.

1.2(2) Allotment sheds that are otherwise permitted and whose size and location have been provided for in a local plan, town planning by-law or registered declaration approved by a public authority are only subject to the provisions on exhaust systems and water and drainage systems set out in Part 8.

*(1.2(1) para 4) Equipment houses for electronic communications networks or services are not covered by this provision.*

*(1.2(1) para 6) See the Fencing Act.*

*(1.2(2)) Allotment sheds may be built without a building permit or notice; see the provisions of 1.6. For the development, location and extent of allotments, see the Planning Act and the Allotments Act.*

*The siting of an allotment shed relative to its neighbours must make allowance for the risk of the spread of fire between the buildings. See 5.5.*

*Exhaust systems referred to here are as defined in 8.1(1). Provisions governing exhaust systems are set out in 8.1, 8.5.1, 8.5.2 and 8.5.3. Provisions governing water and drainage systems are set out in 8.4.*

*Legislation on gas apparatus and water and drainage pipe installations states that with the exception of certain defined, simple installation works, building works on gas, water and drainage systems may only be carried out by authorised tradesmen or companies.*

1.2(3) Agricultural buildings are exempt from the provisions of Parts 2, 3, 4, 5, 7 and 8 with the exception of the provisions on:

- Height and clearance set out in 2.3 and 2.4.
- Building rights set out in 2.7.8.
- Layout of places of work in 3.4.1(3).
- Execution and design of building structures in 4.1 and 4.2.
- Fire safety in 5.1, escape routes in 5.2, structural factors in 5.3 (apply only to livestock housing), fire safety systems in 5.4 (apply only to livestock housing), spread of fire and smoke in 5.5, and 5.6 facilitating the work of the emergency services.
- Water and drainage systems in 8.4 and exhaust systems in 8.5.

1.2(4) The provisions of Parts 2-8 may be relaxed in relation to listed buildings and buildings which form part of a scheduled ancient monument where such provisions are deemed to be in conflict with the protection and preservation value of the site.

*(1.2(4)) When assessing whether relaxation of specific provisions of Parts 2-8 may be justified on the grounds of protection and preservation, the municipal council takes into consideration whether there may be other means of accommodating the underlying rationale of the provision. This applies in particular to the provisions in respect of access, as set out in Part 3.*

*The building permit must clearly state whether any relaxations apply.*

*Applicants who seek relaxation of the provisions of Parts 3-8 as they relate to listed buildings and buildings which form part of a scheduled ancient monument and which are covered by the provisions of 1.3.1 and 1.5(5) must apply to the municipal council for exemption.*

*Where the application relates to buildings covered by 1.3.2, the applicant must apply to the municipal council for exemption from the provisions of Parts 3-4 and 6-8.*

1.2(5) Masts and antenna systems, comprising antennas and associated technical equipment including cables, fixings, amplifiers, filters, equipment houses/housings/cabinets, electrical earthing and microlinks for transmission lines which are used for railway communications are exempt from the provisions of Parts 1 and 2 of these Regulations.

*(1.2(5))The exemption applies only to structural elements which form part of signal and radio communication systems alongside public railway lines.*

*"Railway communications" here means safety-related exchanges between train drivers and personnel in the control centres, the transfer of safety-related data between the trains and trackside systems, and other communication which is essential for the operation of the railway, including shunting and passenger information.*

### **1.3 Application for a building permit**

1.3(1) Unless otherwise provided in 1.5 or 1.6, building work must not commence without the permission of the municipal council.

*(1.3(1)) When processing an application for a building permit the municipal council must ensure that the requisite documentation is in place showing that an insurance company has agreed to provide a building damage insurance; see section 25c(1) of the Building Act.*

*Under section 16(6) of the Building Act, the municipal council may use partial permits to allow construction to commence before all matters relating to the building project have been definitively clarified. This allows the municipal council to ensure, for example, that any necessary structural calculations and drawings for the next phase are available before the relevant partial permit is issued.*

*A building permit is required for the erection of balconies; the provisions of 1.3.1, 1.3.2 and 1.3.3 therefore apply.*

1.3(2) Application for a building permit must be made in writing to the municipal council. The application and supplementary documentation may be submitted in digital form provided the municipal council has the facility for receiving and reading such electronic documents and drawings. The municipal council may stipulate detailed technical requirements in respect of the use of digital communications on the municipality's website, including acceptable forms of digital signatures.

1.3(3) The application must be signed and dated by the owner. If the owner submits the application in digital form, it must be accompanied by a digital signature whose security is, at the very least, on a par with that of the OCES signature. In the absence of the owner's signature, whether manual or digital, other means of validating the applicant's right to carry out the work must be produced.

1.3(4) If the provisions of 1.3.1, 1.3.2 or 1.5(5) apply to a building, this must be made clear in the application.

*(1.3(2)) The municipal council decides whether the documents may be submitted in digital form.*

*As the municipality concerned must have the technical facility for receiving the digital application, the municipal council may, for example, impose detailed requirements as to the format of digital applications and may stipulate that only particular forms of digital signatures may be used at the security level specified in the provisions.*

*(1.3(3)) Both OCES signatures and other digital signatures with a security level equivalent to or higher than the OCES signature may be used.*

*Anyone wishing to use an OCES signature must apply to a certification centre accredited by the National IT and Telecom Agency to issue OCES certificates.*

*To issue an OCES certificate, the certification centre checks the identity of the applicant, which includes checking that the address given corresponds to that listed in the Central Office of Civil Registration (the CPR office) under the stated civil registration number. Application in person is not required.*

*Further information can be found on the website for the OCES digital signature: [www.signatursekretariatet.dk](http://www.signatursekretariatet.dk) and at [www.digitalsignatur.dk](http://www.digitalsignatur.dk)*

*(1.3(4)) The definitive evaluation of whether the building is covered by 1.3.1, 1.3.2 or 1.5(5) is made by the municipal council. If the council decides that the building is not so covered, it must inform the applicant accordingly within two weeks.*

### 1.3.1 Particular provisions relating to certain small buildings and detached single-family houses etc.

1.3.1(1) In the case of the following buildings, applications need only be made to the municipal council if the provisions of Part 2 apply.

*(1.3.1(1)) These structures are defined as buildings of limited complexity and as such are exempt from the technical provisions generally applied by the municipal council; see section 16(3) and (4) of the Building Act. Applicants are therefore not required to submit applications in circumstances covered by Parts 3-8.*

*If, when considering the provisions of Part 2, the municipal council authorises the erection of a building whose location will necessitate the imposition of specific fire safety requirements, the municipal council may impose such requirements even in the absence of application documentation in respect of the provisions of Part 5. In such cases the municipal council may demand any documentation which is required to permit the application to be processed. This might, for example, be documentation demonstrating that external walls etc. have been provided with fire protection.*

*In the event of modifications to the design which mean or may mean that the structure is no longer covered by 1.3.1(1) the applicant must notify the municipal council accordingly. The municipal council will then judge whether the building is still covered by 1.3.1(1). If the municipal council decides that the building is no longer covered by 1.3.1(1), it will then apply the provisions of 1.3.3.*

- 1) Single-storey garages at ground level, including any conversions or extensions, when the total area of the building exceeds 50 m<sup>2</sup>.
- 2) Carports, outbuildings, greenhouses and similar small buildings, including any conversions or extensions thereto, when the total area of the building exceeds 50 m<sup>2</sup>.

*(1.3.1(1) para 1) This provision applies to basement garages in single-family houses.*

- 3) Detached single-family houses and any conversions or extensions. The provision also applies even if part of the dwelling is used for the type of commercial activity which is often based in the home.

*(1.3.1(1) paras 3-5) In the case of these buildings, conversion work can be carried out without a building permit or notice provided that there is no extension of the floor area or significant change of use; see 1.6(1).*

*Commercial activity which is often based in the home, includes hairdressing; offices of such professionals as estate agents, lawyers, accountants and architects; and childminding etc.*

- 4) Linked single-family houses incorporating no more than two dwellings, including any extensions. The provision also applies even if part of the dwelling is used for the type of commercial activity which is often based in the home.

*(1.3.1(1) para 4) This provision only applies to linked single-family houses with a vertical party wall.*

- 5) Sommerhuse samt tilbygninger hertil.

1.3.1(2) The application must set out a clear description of the work to be carried out and must be accompanied by the relevant drawings, stating the scale used. The application must include all the information required by the municipal council when considering the provisions of Part 2. If the application is submitted on paper, both the application and its appendices must be submitted in triplicate.

*1.3.1(2)) Depending on the nature of the building work, information and drawings such as the following may be relevant:*

*Drawings showing the total extent of the works, sufficiently detailed to allow an assessment to be made of the total impact of the building on the surroundings; details of the building on the surroundings; details of the size of the plot, the floor area of the building, its heights and separation distances, the location of buildings on adjacent or neighbouring plots, current and future levels of the plot and those of adjacent or neighbouring plots; calculation of the plot ratio.*

*The drawings must only provide such information as is required by the municipal council for its deliberations in respect of the provisions of Part 2.*

*If compliance with the provisions of Parts 3-8 has implications for aspects which are covered in Part 2, the applicant must provide the municipal council with the relevant*

*information (together with the application for a building permit). This may be, for example, the location of external ventilation systems which affect the external appearance of the building.*

*The municipal council may demand any information and drawings which may be necessary for a building permit to be considered in accordance with Part 2.*

*If other legislation so necessitates, the municipal council may require supplementary information relating to the application. This may be information such as details of the materials chosen, colours etc., to be taken into consideration in relation to local planning provisions.*

*Applicants who submit paper drawings prepared using AutoCAD or similar software are encouraged to submit a digital copy of the relevant files at the same time, in part because this will simplify the measurement of the buildings as designed and thereby improve the quality of data that is entered in the Building and Housing Register (BBR). See the executive order on owners' duty to provide information to the Building and Housing Register (BBR).*

1.3.1(3) The application must normally include:

- 1) Any information necessary for the identification of the property, building or unit.
- 2) ) Information on the proposed use of the building and, in the case of conversions and changes of use, information on the current use.
- 3) Information required for having the project included on the Building and Housing Register (BBR).

*(1.3.1(3) para 1) Information will typically be the title number, address, property number, floor, side/door number.*

*(1.3.1(3) para 2) In addition to permission under the Building Act, the permission of the municipal council is required under section 40 of the Planning Act for reclassifying the use of holiday homes in designated "summer house" areas into permanent dwellings.*

*(1.3.1(3) para 3) See the executive order on owners' duty to provide information to the Building and Housing Register (BBR), requiring the owner, when submitting the application for a building permit, to provide all information which is relevant to the operation and updating of the BBR.*

- 4) Information relating to any instances which bring the project into breach of any provisions of the Building Act, the Building Regulations, easements or covenants and other building guidelines, must be submitted accompanied by a substantiated application for any necessary exemptions or permissions.

*(1.3.1(3) para 4) If exemption is sought from the provisions of Parts 3-8, the application must be accompanied by such information as the municipal council requires for processing the application.*

1.3.1(4) If deemed necessary in individual cases, the municipal council may demand certification by a surveyor, in the City of Copenhagen by the City Surveyor, and in Frederiksberg Municipality by the Municipal Surveyor, of the reported size of the plot or the setting-out of the building.

*(1.3.1(4)) As at 1 October 2010, the Danish National Survey and Cadastre will be the competent land registration authority for the Copenhagen and Frederiksberg municipalities in accordance with legislation amending the legislation on parcelling out and other registration in the Land Register; see Act no. 12 of 11 January 2010.*

### **1.3.2 Specific provisions relating to linked single-family houses, agricultural buildings and certain industrial and warehouse buildings**

1.3.2(1) In the case of the following buildings, applications need only be made to the municipal council if the provisions of Parts 2 and 5 apply.

*(1.3.2(1)) These structures/erections are considered to be buildings of limited complexity and as such may be exempt from the technical provisions generally applied by the municipal council, with the exception of the provisions of Part 5; see section 16(3)-(5) of the Building Act.*

*In the event of modifications to the design which mean or may mean that the structure is no longer covered by 1.3.2(1) the applicant must notify the municipal council accordingly. The municipal council will then judge whether the building is still covered by 1.3.2(1). If the municipal council decides that the building is no longer covered by 1.3.2(1), it will then apply the provisions of 1.3.3.*

- 1) Linked single-family houses incorporating more than two dwellings. The provision also applies even if part of the dwelling is used for the type of commercial activity which is often based in the home.

*(1.3.2(1) para 1) In the case of these buildings, conversion work can be carried out without a building permit or notice provided that there is no extension of the floor area; see 1.6.*

*Commercial activity which is often based in the home, includes hairdressing; offices of such professionals as estate agents, lawyers, accountants and architects; and childminding etc.*

*This provision does not apply to two-family houses or multi-storey domestic buildings with horizontal party walls.*

- 2) Single-storey agricultural buildings which may be assigned to consequence class CC1 or CC2 in DS/EN 1990 DK NA.

However, this provision does not apply to agricultural buildings, where failure would seriously endanger the lives of livestock, that is to say structures corresponding to buildings which would be assigned to consequence class CC3 if they were designed for human occupation.

*1.3.2(1) para 2) This provision does not apply to agricultural buildings which occupy two storeys or more or which have been assigned to consequence class CC3 in DS/EN 1990 DK NA.*

*Nor does it apply to agricultural buildings, where failure would seriously endanger the lives of livestock, that is to say agricultural buildings which would be assigned to consequence class CC3 if they were destined for human occupation. This would typically be livestock housing of more than 2,000 m<sup>2</sup>, where evacuation of all the animals in the building in the event of a problem would be difficult. Thus, applications relating to buildings assigned to consequence class CC3 are always subject to the technical provisions of these regulations.*

- 3) Single-storey industrial and warehouse buildings which may be assigned to consequence class CC1 or CC2 in DS/EN 1990 DK NA.

*(1.3.2(1) para 3) See 16(3) para 4 of the Building Act.*

*This provision does not apply to industrial and warehouse buildings which occupy two storeys or more or which have been assigned to consequence class CC3 in DS/EN 1990 DK NA and which have central heating boilers etc. with an effective rated output of more than 400 KW.*

*When considering whether a building is covered by 1.3.2(1) para 3, the municipal council must base its deliberations on the building as a whole. This means that a building whose primary function is as an industrial or warehouse facility will be subject to this provision even if it incorporates office premises. The municipal council must treat the building as a single unit.*

1.3.2(2) The application must set out a clear description of the work to be carried out and must be accompanied by the relevant drawings, stating the scale used. The application must include all the information required by the municipal council when considering the provisions of Parts 2 and 5. If the application is submitted on paper, both the application and its appendices must be submitted in triplicate.

*(1.3.2(2)) Depending on the nature of the building work, information and drawings such as the following may be relevant:*

*Drawings showing the total extent of the works, sufficiently detailed to allow an assessment to be made of the total impact of the building on the surroundings; details of the size of the plot, the floor area of the building, its heights and separation distances, the location of buildings on adjacent or neighbouring plots, current and future levels of the plot and those of adjacent or neighbouring plots; calculation of the plot ratio.*

*Information on materials and structures which will have implications affecting compliance with the provisions of Part 5.*

*If compliance with the provisions of Parts 3-4 and Parts 6-8 has implications for aspects which are covered in Part 2, applicants must provide the municipal council with the relevant information together with the application for a building permit.*

*The municipal council may demand any information and drawings which may be necessary for a building permit to be considered in accordance with Part 2 and Part 5.*

*Applicants who submit paper drawings prepared using AutoCAD or similar software are encouraged to submit a digital copy of the relevant files at the same time, in part because this will simplify the measurement of the buildings as designed and thereby improve the quality of data that is entered in the Building and Housing Register (BBR).*

1.3.2(3) The application must normally include:

- 1) Any information necessary for the identification of the property, building or unit.
- 2) Information on the proposed use of the building and, in the case of conversions and changes of use, information on the current use.

*(1.3.2(3) para 1) Information will typically be the title number, address, property number, floor, side/door number.*

- 3) Information required for having the project included on the Building and Housing Register (BBR).

*(1.3.2(3) para 3) See the executive order on owners' duty to provide information to the Building and Housing Register (BBR), requiring the owner, when giving notice of such building works, to provide all information which is relevant to the operation and updating of the BBR.*

- 4) Information relating to any instances which bring the project into breach of any provisions of the Building Act, the Building Regulations, easements or covenants or other building guidelines, accompanied by a substantiated application for any necessary exemptions or permissions.

*(1.3.2(3) para 4) If exemption is sought for the provisions of Parts 3-4 and Parts 6-8, the application must be accompanied by such information as the municipal council requires for processing the application.*

1.3.2(4) If deemed necessary in individual cases, the municipal council may require:

- 1) Fire safety documentation showing the layout of the building and justifying the choice of fire safety measures.
- 2) Documentation showing how checks and maintenance of the fire safety systems and building elements will be carried out.
- 3) A fire safety declaration by a competent officer in respect of the fire safety documentation; see 1.3.2(4) paras 1 and 2. The costs must be met by the applicant.
- 4) Certification by a surveyor, in the City of Copenhagen by the City Surveyor, and in Frederiksberg Municipality by the Municipal Surveyor, of the reported size of the plot or the setting-out of the building.

*(1.3.2(4) para 4) As at 1 October 2010, the Danish National Survey and Cadastre will be the competent land registration authority for the Copenhagen and Frederiksberg municipalities in accordance with legislation amending the legislation on parcelling out and other registration in the Land Register; see Act no. 12 of 11 January 2010.*

### 1.3.3 Other buildings

1.3.3(1) The application for a building permit must include a clear description of the work to be carried out and all information relevant to the processing of the application, including registration of the project with the Building and Housing Register (BBR). The application must be accompanied by the relevant drawings, stating the scale used. If the application is submitted on paper, both the application and its appendices must be submitted in triplicate.

*(1.3.3(1) and (2)) The municipal council may demand any information and drawings which may be necessary for a building permit to be considered.*

*Depending on the nature of the building work, information and drawings such as the following may be relevant:*

- *Drawings showing the total extent of the works, sufficiently detailed to allow an assessment to be made of the total impact of the building on the surroundings; details of the size of the plot, the floor area of the building, its heights and separation distances, the location of buildings on adjacent or neighbouring plots, current and future levels of the plot and those of adjacent or neighbouring plots; calculation of the plot ratio.*
- *Information for the purpose of assessing energy consumption.*
- *Structural calculations.*
- *Information on materials and structures.*
- *Detailing of ventilation.*
- *Layout and fitting out, including disabled access.*
- *Information on water and drainage etc.*

*Applicants who submit paper drawings prepared using AutoCAD or similar software are encouraged to submit a digital copy of the relevant files at the same time, in part because this will simplify the measurement of the buildings as designed and thereby improve the quality of data that is entered in the Building and Housing Register (BBR). See the executive order on owners' duty to provide information to the Building and Housing Register (BBR).*

1.3.3(2) The application must normally include:

- 1) Any information necessary for the identification of the property, building or unit.  
*(1.3.3(2) para 1) Information will typically be the title number, address, property number, floor, side/door number.*
- 2) Information on any provisions of the Building Act, the Building Regulations, easements or covenants and other building guidelines with which the project might be in conflict. The application must contain a substantiated application for any necessary exemptions or permissions.
- 3) Information on the proposed use of the building and, in the case of conversions and changes of use, information on the current use.
- 4) Information as to the extent to which the works have been designed under the less restrictive provisions on conversion work; see Part 3. The application must include a report on the existing building structures and other structural issues relevant to the processing of the application.  
*(1.3.3(2) para 4) See 3.1(2).*
- 5) Information clarifying how measures essential for responsible construction and necessitated by climatic conditions have been implemented; see 4.1(5).  
*(1.3.3(2) para 5) As a general rule, the requisite information for building work in the period from 1 November to 31 March may be based on the winter bill of quantities in the Winter Regulations.*
- 6) Information relating to buildings covered by 7.2, Energy performance frameworks in new buildings, the calculated energy needs of the building, documentation demonstrating compliance with the energy performance framework; and information on low energy class, where appropriate.  
*(1.3.3(2) para 6) See the Act on the Promotion of Energy Savings in Buildings.*

- 7) An application for permission to allow public access to a mine or similar structure must include a report on the expert survey of the strength and stability of the subsoil and must identify the relevant responsible individual(s).
- 8) Information required for having the project included on the Building and Housing Register (BBR).

*(1.3.3(2) para 8) See the executive order on owners' duty to provide information to the Building and Housing Register (BBR), requiring the owner, when giving notice of such building works, to provide all information which is relevant to the operation and updating of the BBR.*

1.3.3(3) If deemed necessary in individual cases, the municipal council may require:

- 1) Fire safety documentation showing the layout of the building and justifying the choice of fire safety measures.
- 2) Documentation showing how checks and maintenance of the fire safety measures and building elements will be carried out.
- 3) A fire safety declaration by a competent officer in respect of the fire safety documentation; see 1.3.3(3) paras 1 and 2. The costs must be met by the applicant.

*(1.3.3(3) paras 1-2) Depending on the nature of the building work, the documentation should include: The overall strategy for fire safety measures, drawings and specifications showing the structural fire resistance properties of each building element, the fire safety systems, escape routes and rescue facilities etc.; fire safety calculations, documentation showing the fire resistance properties of the individual building elements and installations; and a description of how the regular checks and maintenance of all fire safety systems and building elements will be conducted.*

- 4) Documentation that the building structures do not violate any provision of Part 4, Structures. The declaration must be in accordance with Appendix 4 (Documentation for load-bearing structures).

*(1.3.3(3) para 4) The applicant appoints a construction designer for the load-bearing structures with responsibility for collating and coordinating the structural documentation, so that it constitutes a coherent whole.*

*Structural documentation for secondary building structures is not covered by the requirement for a declaration to be made by a structural engineer certified under the rules set out in Appendix 3.*

*In the case of buildings in a low documentation classification (see SBi Guidelines 223), there is normally no basis for requiring documentation demonstrating that the building structures satisfy the provisions of Part 4.*

- 5) Certification by a surveyor, in the City of Copenhagen by the City Surveyor, and in Frederiksberg Municipality by the Municipal Surveyor, of the reported size of the plot or the setting-out of the building.

*(1.3.3(3) para 5) As at 1 October 2010, the Danish National Survey and Cadastre will be the competent land registration authority for the Copenhagen and Frederiksberg municipalities in accordance with legislation amending the legislation on parcelling out and other registration in the Land Register; see Act no. 12 of 11 January 2010.*

1.3.3(4) In the case of buildings where failure of the load-bearing structures would seriously endanger human life or have substantial economic, social or environmental consequences, 1.3.3(3) para 4 requires that the structural documentation be accompanied by a declaration drafted and signed in person by a structural engineer who is certified under the rules set out in Appendix 3 (Certification of structural engineers).

*(1.3.3(4)) The building structures covered by this provision correspond to those structures which, under the National Annex to Eurocode 0, table B1 (EN 1990 DK NA National Annex to Eurocode 0: Basis of structural design) section B4, are assigned to high consequence class CC3.*

*However, the requirement for a certified structural engineer's declaration does not extend to secondary building structures where failure would only affect that particular structural element and where the consequences of failure would be limited.*

The declaration must include the structural documentation in its entirety. It is for the owner to choose the structural engineer.

1.3.3(5) In the case of buildings covered by 1.3.3(4) where the consequences of any failure would be particularly serious, the certified structural engineer must have no financial association, whether direct or indirect, with the organisation(s) which have been involved in designing the structure. The owner appoints the certified structural engineer and the appointment then requires the endorsement of the municipal council.

1.3.3(6) In the case of buildings not covered by 1.3.3(4) and (5), the municipal council may, in special cases, require that the structural documentation in accordance with 1.3.3(3) para 4, with associated appendices, be accompanied by a declaration drafted and personally signed by a structural engineer who is certified under the rules set out in Appendix 3 (Certification of structural engineers).

1.3.3(7) If the documentation and declarations in accordance with 1.3.3(3)-(6) are submitted in digital form, they must be digitally signed by the person concerned, with a security level equivalent to or higher than that of the OCES signature.

*1.3.3(5)) The building structures covered by this provision correspond to those structures which, under the National Annex to Eurocode 0 (EN 1990 DK NA National Annex to Eurocode 0: Basis of structural design) section B4, are assigned to high consequence class CC3 and covered by 1.3.3(4) and (5).*

*The certified structural engineer carries out an independent inspection of the project and provides documentary evidence of the checks in accordance with SBi Guidelines 223.*

*(1.3.3(6)) An example of the special cases where the municipal council can require that a structural declaration be appended to the structural documentation pursuant to 1.3.3(3) para 4, would be building structures which, in accordance with SBi Guidelines 223, are assigned high documentation classification.*

*(1.3.3(7)) The person concerned is the person who is responsible for the documentation etc., for example the surveyor or certified structural engineer.*

### 1.3.4 Specific provisions relating to combined processing of applications to erect masts and antennas

1.3.4(1) The municipal council may process concurrently an application for permission to erect a mast and an application for a building permit for possible future antennas on that mast.

*(1.3.4(1)) Joint consideration of an application to erect a mast and possible future antennas on the mast may be carried out at the same time as an application for a building permit for a mast is processed. The municipal council itself judges whether to process the applications together.*

*This provision can also be applied to applications for building permits for several proposed antennas on existing masts.*

*If the joint processing of an application for a building permit entails an obligation to conduct a hearing with the parties concerned in accordance with the requirements of the Public Administration Act, the hearing must deal both with the mast and with the possible future antennas to which the application relates.*

*The municipal council's permit may stipulate that it must be notified every time an antenna is added to the mast. Antennas which are subsequently erected on the mast must comply with the building permit.*

1.3.4(2) Joint consideration of an application to erect a mast and possible future antennas on the mast requires the application for a building permit to set out specifications of the possible future antenna structures which may later be erected on the mast. The specifications must state the number of antennas and their location on the mast.

*(1.3.4(2)) The municipal council must process separately any applications to erect antennas on the mast which were not included in the original application for a building permit, or to change the location specified on the original application.*

1.3.4(3) The building permit to erect the mast will lapse if work on erecting the mast has not started within a year of the date of the permit. However the permit to erect the authorised antennas on the mast will not lapse even if erection of the antennas is not planned until more than a year after erection of the mast.

*(1.3.4(3)) This is pursuant to section 16(7), first full stop, of the Building Act.*

*The provisions of 1.3.4(3), last full stop, only apply to such antennas as were covered by the joint consideration process.*

1.3.4(4) Notification must be given of completion of the building works and permission to take into use may be given as soon as the mast has been erected, without waiting for the authorised proposed antennas to be mounted on the mast. Permissions for use are issued subject to the requirements of 1.8(2).

### 1.4 Building permit

1.4(1) Building permits must be in writing. A building permit may include a requirement to notify the municipal council of commencement of each new stage of the building work.

*(1.4(1)) Under section 16(7) of the Building Act, a building permit lapses if the building work is not commenced within one year of the date of the permit. The municipal council may require notification of the various stages of building works to ensure that it has the opportunity to carry out such inspections as it sees fit.*

*In the case of buildings covered by 1.3.1, the municipal council is only required to grant the building permit in respect of the provisions of Part 2. In the case of buildings covered by 1.3.2, the municipal council is only required to grant the building permit in respect of the provisions of Parts 2 and 5.*

1.4(2) The building permit may impose requirements for:

*(1.4(2)) Noise measurements must be carried out in accordance with SBi Guidelines 217 "Udførelse af bygningsakustiske målinger" [Performance of building acoustics measurements] and SBi Guidelines 218 "Lydforhold i undervisnings- og daginstitutionsbbygninger" [Sound conditions in educational and childcare buildings].*

- 1) measurements taken in the completed building to demonstrate compliance with the sound insulation requirements set out in Part 6, Indoor climate.
- 2) measurements taken in the completed building to demonstrate compliance with the sound insulation requirements of Part 7, Energy consumption. The municipal council is required to demand airtightness measurement in no less than 5% of the construction projects.

*(1.4(2) para 2) The requirement in respect of airtightness measurement in 5 per cent of the construction projects only applies to those buildings which are covered by an energy performance framework and which are therefore heated to above 15 degrees. Such buildings are listed in 7.2.1(4)-(6).*

- 3) demanding a performance bond for the completion of enabling works pursuant to section 4 of the Building Act before the building is taken into use.
- 4) the measurement or other type of documentation provided by a structural damp specialist to verify compliance with the requirements of 4.1(6) in respect of the critical moisture content of structures and materials.
- 5) documentation and declarations for the load-bearing structures in accordance with 1.3.3(3) para 4 and 1.3.3(4)-(6) which are consistent with the finished building no later than when it is taken into use.
- 6) a system integration test of the fire safety systems before the building is taken into use.

*(1.4(2) para 6) The system integration test must ensure that the co-existing fire safety systems interact as required by the fire safety strategy.*

1.4(3) With the exception of paras 2 and 3 of 1.4(2), the provisions of 1.4(2) do not apply to buildings covered by 1.3.1 and 1.3.2.

*(1.4(3)) In the case of buildings covered by 1.3.1 and 1.3.2 the municipal council may also require that measurements be taken verifying compliance with the airtightness measurement requirement.*

*The measurement report must be submitted to the municipal council.*

## 1.5 Building notices

1.5(1) The following building works may be carried out subject to a building notice being submitted to the municipal council:

- 1) Garages, carports, outbuildings, greenhouses, roofed-over terraces and similar structures; and equipment houses for electronic communications networks or services of no more than 50 m<sup>2</sup>.

*(1.5(1) paras 1-3) See the executive order on owners' duty to provide information to the Building and Housing Register (BBR), requiring the owner, in the context of the construction of such buildings, to provide all information which is relevant to the operation and updating of the BBR.*

- 2) Extensions to garages, carports, out-buildings, greenhouses, roofed-over terraces and similar structures; and to equipment houses for electronic communications networks or services, provided the area after extension does not exceed 50 m<sup>2</sup>.

*Note that work on listed buildings which goes beyond ordinary external and internal maintenance requires permission under the Act on the Protection of Buildings.*

*Buildings worthy of preservation and covered by a protective town planning by-law, a local preservation plan or a registered preservation order, remain subject to the provisions thereof governing conversions, alterations etc.*

*The provisions of town planning by-laws and local plans on the location and layout of buildings still apply, even if the building work does not require a building permit.*

- 3) Individual conversions and other structural alterations that only affect a single residential unit of no more than 150 m<sup>2</sup> in multi-storey buildings comprising more than one dwelling or a single business unit of no more than 150 m<sup>2</sup>. Such individual conversions or alterations must not entail any extension of the floor area.

*(1.5(1) para 3) This provision applies to single residential units in multi-storey buildings and to business units. The conversion of single-family houses, holiday homes and other buildings previously covered by the Building Regulations for Small Dwellings may be carried out without a building notice or permit under the provisions of 1.6.*

*The building notice system only covers discrete conversions in a single dwelling or business unit. Conversion work on a whole building still requires a building permit. For example, an entire multi-storey building cannot be altered simply by submitting separate notices for each unit.*

*The building notice system applies, for example, to the discrete alteration of a bathroom or kitchen, installation of fireplaces, wood-burning stoves, boilers etc. in multi-storey buildings and commercial properties.*

*A building permit is required if alterations or similar works entail an extension of the floor area, i.e. an increase in the plot ratio.*

- 4) Wind turbines.
- 5) Satellite antennas with a diameter of more than 1.0 m
- 6) Outdoor facilities for the storage of livestock slurry, grain and animal feed, and hard surface areas.

*(1.5(1) para 6) This provision covers slurry tanks, slurry lagoons, dung yards, silage clamps, feed stores, washing areas, silos for grain, feed etc.*

1.5(2) If the municipal council has not responded within two weeks of receipt of the notice, the building work may commence.

*(1.5(2)) The time limit is counted from the day the building notice is received by the municipal council. If the notice is sent by post, the normal postal delivery period must be added to the time limit. In the same way, the municipal council must issue any response to the building notice within two weeks of receipt of the notice, and the normal postal delivery period must again be added. The work may thus not commence before the two weeks plus the normal delivery period have elapsed.*

1.5(3) The building notice must be in writing. It must be signed and dated by the owner and submitted to the municipal council under the provisions of 1.3(2) and (3).

1.5(4) The building notice must include the postal or BBR address and the title number.

1.5(5) In the case of the following buildings, building notices need only be sent to the municipal council if the provisions of Part 2 apply:

- Garages, carports, outbuildings, greenhouses and similar small buildings, including any conversions thereof/extensions thereto, when the area of the building does not exceed 50 m<sup>2</sup>.
- The building notice must be accompanied by drawings showing the location of the building on the site, its height, length and width, its distance from the boundary and other buildings on the site.

1.5(6) In the case of buildings not covered by 1.5(5), the building notice must include a clear description of the work to be carried out; and drawings - with the scale marked and a specification appended - showing the location of the building on the site, its height, length and width, its

distance to boundaries and other buildings on the site, and indicating the materials chosen for the external walls and roofing.

1.5(7) In addition to the information stipulated in 1.5(6), building notices relating to wind turbines must be accompanied by any permits required by other legislation.

1.5(8) In the case of individual conversions and alterations to dwellings in multi-storey domestic buildings and commercial buildings, see 1.5(1) para 3, the building notice must include, in addition to the information set out in 1.5(6), a drawing showing the structures that are to be altered and new service connections to existing stack pipes, details of current use; and clarification of whether the design of the works is in accordance with the less restrictive provisions on conversion work; supplemented by a report on the existing structures and other construction issues relevant to the processing of the application. This does not apply to buildings covered by 1.3.2(1) para 3.

*(1.5(8)) See 3.1(2)*

1.5(9) In the case of antennas, the building notice must contain, in addition to details on the address and title number of the property, information on the location of the antenna, its height and relevant clearance factors and structural factors affecting the fixing of the antenna to the building.

1.5(10) If the building work requires exemption from the provisions of the Building Regulations, such exemption must be applied for in the building notice, and the work must not commence before exemption is given; the two-week time limit is therefore not relevant.

*(1.5(10)) See 1.13. In the case of buildings covered by 1.5(5), applications seeking exemption from the provisions of Parts 3-8 must be accompanied by such information as the municipal council requires for processing the application.*

1.5(11) A building notice lapses if the work is not commenced within one year of the date of the permit.

1.5(12) Building works covered by Part 1 need not be notified to the municipal council.

## 1.6 Building works exempt from a building permit or notice

1.6(1) The following building works may be carried out without a building permit or notice:

- 1) Conversions and other alterations to buildings as listed in 1.3.1(1), 1.3.2(1) para 1 and 1.5(5). The conversion or alteration must not entail any extension of the floor area or significant changes of use.

*(1.5(12)) See the executive order on owners' duty to provide information to the Building and Housing Register (BBR), requiring the owner, in the context of the completion or actual occupancy of the building, to provide all information which is relevant to the operation and updating of the BBR.*

*(1.6(1)) The building works must comply with the relevant requirements of the Building Regulations for the execution of the works. If this is not possible, an application must be made to the municipal council for exemption, and the building work must not be commenced until the exemption has been given.*

*(1.6(1) para 1) The buildings listed in 1.3.1(1) paras 3-5, and 1.3.2(1) para 1 are the buildings covered by the previous Building Regulations for Small Dwellings (detached and linked single-family houses and holiday homes etc.). The erection of balconies is covered by 1.3.1.*

*External retro-fitted insulation to a maximum thickness of 25 cm is not regarded as an extension of the floor area under the terms of the Building Act. The extension must be notified to the Building and Housing Register (BBR).*

*Alterations to the number of rooms, to kitchens etc. must be reported to the Building and Housing Register (BBR).*

*A building permit is required if alterations and similar works entail an increased floor area, i.e. an increase in the plot ratio in accordance with 1.3.1 and 1.3.2. Examples include all extensions and full or partial incorporation into the living space of an unused roof space which was not previously included in the floor area.*

*Incorporation of outbuildings, garages etc. into the dwelling is a significant change of use and as such requires a building permit.*

- 2) Building works on small buildings of no more than 10 m<sup>2</sup>, covered by 2.7.7. *(1.6(1) paras 2 and 4-5) The erection of such structures must be notified to the Building and Housing Register (BBR).*
- 3) Building works on open-air swimming pools, garden fireplaces and terraces adjoining single-family houses and holiday homes.
- 4) Building works on campsite cabins and allotment sheds. *(1.6(1) para 4) See 1.2(2).*
- 5) Drying installations for grain, seeds and other crops.
- 6) LPG tanks of up to 1,000 kg (2,400 l tank capacity) in stationary LPG installations and LPG tank stations. *(1.6(1) para 6) LPG installations and LPG tank stations whose total storage exceeds 100 m<sup>3</sup> of liquefied petroleum gas require approval under the Environmental Protection Act.*  
  
*For the installation of LPG tanks, see also the executive order on bottled gas issued by the Ministry of Justice.*  
  
*See also the executive order on the use of pressure equipment issued by the Danish Working Environment Authority.*
- 7) Satellite antennas with a diameter of no more than 1.0 m and CE marked roof antennas. *(1.6(1) para 7) Large satellite antennas must be notified: see 1.5(1) para 5.*
- 8) Structures and systems which comprise user-operated functions, such as IT points, ATMs and self-service machines and similar public-facing service functions. *(1.6(1) para 8) User-operated functions incorporated in constructions and installations, which are covered by the provisions of Part 4, may be built without a building permit or notice.*

- 9) Conversions and other alterations to existing buildings, which will affect the energy consumption of those buildings and which are covered by section 2(1) para (e) of the Building Act.

*(1.6(1) para 9) Under this provision, no building permits, building notices or occupancy permits are required for minor conversions or alterations to an existing building which will reduce energy consumption in that building. The provision applies solely to building works which are covered by section 2(1) para (e) of the Building Act and are therefore defined as minor. The requirement of essentiality in respect of the extent of works, in the context of the other provisions of the Building Regulations remains applicable irrespective of the provisions of section 2(1) para (e) of the Building Act.*

- 1.6(2) Building works covered by Part 1 need not be notified to the municipal council.

*(1.6(2)) See the executive order on owners' duty to provide information to the Building and Housing Register (BBR), requiring the owner, in the context of the completion or actual occupancy of the building, to provide all information which is relevant to the operation and updating of the BBR.*

## 1.7 Demolition of buildings

- 1.7(1) Demolition of buildings may be carried out subject to a building notice being submitted to the municipal council.

*(1.7(1)) Demolition of buildings must be notified to the Building and Housing Register (BBR),*

*Demolition of listed buildings and those worthy of preservation requires permission under section 11 of the Act on the Protection of Buildings.*

*Concerning demolition of buildings, see the executive order issued by the Ministry of Labour on the Conditions at Construction Sites and Similar Places of Work pursuant to the Working Environment Act.*

*See also the executive order on asbestos issued by the Ministry of Labour.*

*Local plans may include clear provisions for the preservation of existing buildings, such that a building may only be demolished with the permission of the municipal council.*

1.7(2) In the case of demolition, the building notice must contain, in addition to details on the address and title number of the property and building identification, information on the approximate height and surface area of the building. The municipal council may impose guidelines for the demolition in each individual case.

*(1.7(2)) See the executive order on owners' duty to provide information to the Building and Housing Register (BBR), requiring the owner, when giving notice of such building works, to provide all information which is relevant to the operation and updating of the BBR.*

1.7(3) The following buildings may be demolished without permission or notice:

*(1.7(3)) This provision does not apply to integral garages, carports and similar small buildings.*

1) Garages, carports, outbuildings and similar small buildings in connection with single-family houses and holiday homes.

2) Buildings listed in 1.6(1) paras 2-8.

### **1.8 Occupancy permit and completion notice**

1.8(1) On completion of any building work, a completion notice must be submitted to the municipal council; but see 1.5(12) and 1.6(2).

*(1.8(1)) See the executive order on owners' duty to provide information to the Building and Housing Register (BBR), requiring the owner, in the context of the completion or actual occupancy of the building, to provide all information which is relevant to the operation and updating of the BBR.*

*On completion of the building the municipal council must verify that the requisite documentation is in place demonstrating that a building damage insurance policy is in place and the premium paid; see section 25c(2) of the Building Act.*

*The executive order on the certification of energy performance of buildings requires the owner to submit the energy performance certificate (EPC) to the local building authority no later than on completion of the building work.*

1.8(2) Building works that require a building permit must not be taken into use without the permission of the municipal council.

*(1.8(2)) The municipal council may refuse to grant an occupancy permit if the building works do not comply with the building permit, and the municipal council may in such cases serve notice on the owner to remedy the breach of condition; see section 17 of the Building Act.*

*The municipal council may, for example, demand that the fire strategy be updated or require other documentation demonstrating that the building conforms with requirements.*

1.8(3) Building works may, however, be taken into use without permission under 1.8(2) if the works comprise buildings covered by 1.3.1 and 1.3.2.

*(1.8(3)) An occupancy permit is not required for building works where the municipal council's permit does not refer to conditions in Parts 3-8 (buildings covered by 1.3.1) and Parts 3-4 and 6-8 (buildings covered by 1.3.2). In these cases the municipal council only requires that it be sent a completion notice; see 1.8(1).*

1.8(4) In the case of buildings covered by 1.3.1, documentation must be sent to and kept by the municipal council demonstrating compliance with the provisions of Parts 3-8; this must be accompanied by the declaration in Appendix 8.

*(1.8(4)-(5)) This requirement derives from section 16(2) of the Building Act.*

*Applicants send in the documentation accompanied by the declaration in Appendix 8. The municipal council's sole function in respect of this documentation is to archive it and it must therefore not process it in any way. The municipal council is only required to check that the applicant has signed the declaration in Appendix 8*

1.8(5) In the case of buildings covered by 1.3.2, documentation must be sent to and kept by the municipal council demonstrating compliance with the provisions of Parts 3-4 and 6-8; this must be accompanied by the declaration in Appendix 8.

*It is the responsibility of the applicant to ensure that the necessary documentation has been submitted. Appendix 8 sets out examples of the documentation which may be appropriate for the building project.*

1.8(6) The municipal council may give permission for buildings covered by 1.8(2) to be taken into full or partial use, even if the building work has not been fully completed. The municipal council may set a deadline for the completion of the building work and may require a performance bond. If the deadline is exceeded, the building may be completed on the instigation of the municipal council, invoking the performance bond provided.

1.8(7) Where permission for use involves giving the public access to a mine or similar structure, an expert's report on the strength and stability of the subsoil must be provided. The municipal council may require the mine or similar structure to be monitored.

### 1.9 Preliminary dialogue

1.9(1) Before a building permit or exemption is granted, and in the case of building notices, the municipal council may hold a preliminary dialogue with the owner and the owner's representatives.

*(1.9(1)) During the preliminary dialogue, the parameters of the building project will be clarified, and agreements may be made between the owner and the building authority concerning, for example, the time schedules and documentation.*

*The preliminary dialogue may serve to clarify whether a building is covered by the provisions of 1.3.1 and 1.3.2; this matter will then have been settled before the application is submitted.*

### 1.10 Relationship with other legislation

1.10(1) Before granting a building permit and when notice has been given, the municipal council must investigate whether the building work conflicts with other legislation, such as:

The Planning Act

The Livestock Farming Environmental Approval Act

The Protection of Nature Act

The Act on the Protection of Buildings

The Act on Forests

The Environmental Protection Act

The Act on Contaminated Soil

The Act on the Erection and Shared Use of Masts for Radio Communication Purposes etc.

The Working Environment Act

The Public Roads Act

The Act on Private Roads

The Act on Slum Clearance

The Act on Urban Redevelopment

*(1.10(1)) The obligations of the municipal council extend to all other legislation which has a bearing on the processing of applications for building permits. Irrespective of 1.10(1) this obligation rests with the municipal council in its capacity as public administration authority.*

*The National Building and Housing Agency guidance on examination of the legislation by the municipal council states the provisions of that legislation with which a municipal council must ensure compliance.*

*In the case of buildings covered by 1.3.1 and 1.5(5) it is the applicant who is responsible for ensuring that there are no matters relating to Parts 3-8 which are in breach of the provisions of other legislation.*

*In the case of buildings covered by 1.3.2 it is the applicant who is responsible for ensuring that there are no matters relating to Parts 3-4 and 6-8 which are in breach of the provisions of other legislation.*

The Heat Supply Act  
 The Act on Temporary Regulation of  
 Housing Conditions  
 The Emergency Services Act  
 The Act on Museums  
 The Act on Compensation for Flood  
 Damage  
 The Water Supply Act  
 The Act on Urban Renewal and Urban  
 Development  
 The Act on the Promotion of Energy Sav-  
 ings in Buildings  
 Legislation on gas apparatus and water  
 and drainage pipe installations.

1.10(2) If the building work conflicts with other legislation, the municipal council must, where notice has been given, respond to such notice within two weeks of receipt of the said notice.

1.10(3) If a building permit includes requirements of other legislation, this must be stated separately in the permit.

1.10(4) If a suitable habitat evaluation under 1.10(1) has not been conducted, the municipal council must, before issuing a building permit, judge whether the plan or project will have a detrimental impact on the natural habitat.

*If, pursuant to other legislation such as environmental legislation, working environment legislation, planning legislation etc. or privately negotiated easements or covenants, the municipal council is obliged to conduct checks in areas of a specialist or technical nature, it must continue to carry out this function. If, pursuant to other legislation, the municipal council is required to monitor compliance with certain aspects of these Building Regulations, the municipal council must continue to carry out this function as such monitoring is carried out under such other legislation.*

*(1.10(2)) In the case of buildings covered by 1.5(5), the municipal council is only required to respond if there are matters relating to Part 2 which are in breach of the provisions of other legislation.*

*If, pursuant to other legislation such as environmental legislation, working environment legislation, planning legislation etc. or privately negotiated easements or covenants, the municipal council is obliged to conduct checks in areas of a specialist or technical nature, it must continue to carry out this function. If, pursuant to other legislation, the municipal council is required to monitor compliance with certain aspects of these Building Regulations, the municipal council must continue to carry out this function as such monitoring is carried out under such other legislation.*

1.10(5) A building permit may be granted irrespective of 1.10(4) if it is in the public interest to do so, given the existence of exceptional, urgent national imperatives and the absence of alternatives.

*(1.10(5)) Such cases will be rare exceptions, where vital, urgent national consideration of the public interest can only be satisfied by waiving the broader consideration which is normally given to the administration of an international nature reserve. This exemption cannot therefore be granted for local or regional reasons. As an example of exceptional, urgent national consideration of the public interest can be cited the erection of offshore wind farms.*

*For details of the procedure under the Habitat Directive see the relevant guidance issued by the Danish Enterprise and Construction Authority.*

### **1.11(1) Temporary use of an adjoining plot**

The municipal council may give an owner temporary permission to use an adjoining plot in the following circumstances:

*(1.11(1)) See section 12 of the Building Act, including the two-week notice period.*

*In the case of work on roads, permission must be obtained from the highways authority.*

- 1) When it is necessary to safeguard neighbouring plots, buildings, pipelines and cables in connection with foundation works, excavations or earthworks on the owner's plot.
- 2) When it is necessary for an owner to carry out building, repair or maintenance works on the owner's own property.

*(1.11(1) para 2) Permission may be given to erect bracing, ladders, cranes, scaffolding, screening roofs etc. on adjoining plots or to provide access via an adjoining plot.*

1.11(2) The adjoining plot must be used in such a way as to cause the least possible inconvenience. When the work has been completed, the person to whom the permit was granted must return the adjoining plot to its former condition as soon as possible.

1.11(3) If a new building on a common boundary or the alteration or removal of an existing building on a boundary will

oblige the neighbour to alter or remove a structure on the boundary, the neighbour must be given the opportunity to carry out the necessary work before this is ruled out by the building work.

### 1.12 Fees

1.12(1) The municipal council may charge for permits, temporary permissions and notices pursuant to the Building Regulations. The municipal council may also charge for exemptions in respect of building works that do not require a building permit or notice.

*(1.12(1)) Fees are charged pursuant to section 28(1) of the Building Act.*

1.12(2) The municipal council may decide not to make any charge, or only to charge fees for certain types of works.

1.12(3) The method for calculating and charging fees is determined by the municipal council.

*(1.12(3)) Special principles apply to setting fees for particular purposes. The calculation may only include costs which are directly, indirectly or complementarily related to the area.*

1.12(4) If the municipal council decides to impose charges, separate fees must be charged for the following categories of building:

*(1.12(4)) In order to ensure that the municipal council only charges a fee which is commensurate with the expenses it has incurred in processing the application for any given category of building, a discrete fee is chargeable for each individual category. The municipal council may decide that it is appropriate to sub-divide the categories.*

*If a building does not readily fall into any category, the municipal council will decide which is the most appropriate category in each instance, given the primary purpose of the building.*

#### 1) Simple structures.

*(1.12(4) para 1) This category includes garages, carports, outbuildings and similar ancillary buildings; i.e. buildings covered by 1.3.1(1) paras 1-2 and 1.5(5).*

- 2) Single-family houses.. *(1.12(4) para 2) This category includes detached and linked single-family houses with vertical party walls; i.e. buildings covered by 1.3.1(1) paras 3-5 and 1.3.2(1) para 1.*
- 3) Industrial and warehouse buildings; and agricultural buildings of limited complexity. *(1.12(4) para 3) This category includes agricultural buildings, industrial buildings and warehouse buildings for which the municipal council is only required to issue permits for matters provided for in Parts 2 and 5, i.e. buildings covered in 1.3.2(1) paras 2 and 3.*
- 4) Other permanent structures etc. *(1.12(4) para 4) This category includes permanent structures which are not strictly speaking buildings but which are covered by section 2(2) of the Building Act. Examples include antennas, satellite antennas, masts, signage, mini wind turbines, platforms such as bandstands, playground equipment, facade signs, sign boards, free-standing (pylon) signs and structures covered by 1.5(1) para 7.*
- 5) Other commercial and multi-storey buildings. *(1.12(4) para 5) This category includes buildings which do not belong in any of the above categories, i.e buildings covered by 1.3.3. Examples include:*
- *domestic buildings with horizontal party walls;*
  - *shops, supermarkets;*
  - *office buildings;*
  - *buildings to which the public or people who do not work there have access, such as hotels, restaurants, cinemas, theatres, exhibition spaces, libraries, museums, churches, institutions, schools, health clinics, sports halls and facilities, swimming pools etc.;*
  - *and the industrial and warehouse buildings, agricultural buildings for which the municipal council grants a building permit in respect of all the provisions of these Building Regulations.*

1.12(5) The fee is payable when the permit or exemption is granted. If the fee is calculated on the basis of construction costs, it is payable as soon as the fee can be calculated accordingly.

1.12(6) In the case of notices issued in accordance with the Building Regulations, the fee is payable on submission of the building notice.

1.12(7) The municipal council may withhold the permit or exemption until the fee has been paid, unless the fee cannot be determined until after commencement of the building works; see 1.12(5).

### 1.13 Exemption etc.

#### 1.13(1)

Exemption from the provisions of the Building Regulations is covered by section 22 of the Building Act.

*(1.13(1)) The municipal council may grant exemption from the substantive provisions of the Building Act and the Building Regulations. Exemption from the procedural rules, such as the provisions governing when a project must be processed by the authorities; when neighbours must be informed in advance of the granting of an exemption; and rules governing appeals etc. The municipal council may only grant exemption where it considers that to do so is compatible with the intentions of the provision from which exemption is sought. Note the triviality limit specified in section 22(2) of the Building Act, under which the municipal council may omit to inform neighbours when the exemption is considered to be insignificant to the neighbours concerned.*

1.13(2) In the case of buildings covered by 1.3.1, 1.3.2 and 1.5(5), if exemption is sought from the provisions of the Building Regulations, an application to the effect must be submitted to the municipal council.

*(1.13(2)) The requirement in respect of applications for exemption applies to matters covered by the Building Regulations in their entirety, even if no application documents are required relating to matters covered by Parts 3-8 (1.3.1 and 1.5(5)), or Parts 3-4 and Parts 6-8 (1.3.2).*

*The municipal council may demand any information and drawings which may be necessary for the exemption to be granted.*

1.13(3) The municipal council may require that an application for exemption or permission to continue a breach be signed personally by the owner. This requirement will be considered to have been met if the owner submits the application in digital form accompanied by a digital signature with a security level equivalent to that of the OCES signature.

1.13(4) Derogations from the provisions of the Building Act and the Building Regulations may only be deemed to be granted if the exemption or permission is expressly stated in the building permit or otherwise notified in writing.

*(1.13(4)) Derogations from the provisions of the Building Act and the Building Regulations can thus only be considered to have been approved/permited if the exemption or the permission has been given in writing.*

### 1.14 Appeals

1.14(1) Appeals may be lodged against decisions made by the municipal council concerning provisions of the Building Regulations under sections 23 and 24 of the Building Act.

*(1.14(1)) Appeals against municipal council decisions may be made to the state administration under the Act on Regional State Administration. The decisions of the state administration cannot be appealed to any other administrative authority.*

There is only scope to appeal in matters which are dealt with by the municipal council; see 1.3.1, 1.3.2 and 1.5(5).

*It is only possible to appeal against a decision made by a municipal council if the decision covers points of law, i.e. there can be no appeal against the municipal council's technical decisions. The time limit for an appeal is four weeks from the day the decision is notified.*

*The decision of the appeals authority may be brought before the courts within 6 months of the date of notification of the decision; see section 25 of the Building Act.*

### 1.15 Sanctions

1.15(1) A fine will be payable by any person who

*(1.15(1)) Section 30(1)-(5) of the Building Act sets out the penalty clauses for breach of the terms of the Building Act.*

- 1) in breach of the provisions of Part 1, fails to give notice of building work, to

submit a notice of completion of the building work, to apply for exemption; or

- 2) fails to comply with the provisions of Parts 1-8.

## 2. Building control provisions

### 2.1 General

2.1(1) The total footprint of a building and its impact on the surroundings must comply with the building control provisions set out in 2.2-2.6. The provisions regulate the total footprint of the building and its impact on the surroundings in respect of:

- 1) the size of the plot.
- 2) the distance of the building from common boundaries, roads and paths and from other buildings on the same plot.
- 3) the height of the building and number of storeys, including the height of the building in relation to common boundaries, roads and paths and to other buildings on the same plot.
- 4) the floor area of the building and the plot ratio.
- 5) the layout of the unbuilt areas.

*(2.1(1) paras 1-5) The building controls set out in 2.1(1) paras 1-5 cover the same subject matter and have the same substantive scope of application as the building control provisions of the Building Act which applied up to 1 October 2001.*

*Note the local planning obligations under the Planning Act. In sum, a local plan is therefore required for new buildings and conversions which will have a significant impact on the environment.*

*Note the provisions in respect of building rights, set out in 2.7. The floor area of the building and its height and separation distances must be calculated under the rules set out in Appendix 1, B 1.1.3, B.1.1.4 and B.1.1.5.*

2.1(2) The provisions of 2.1-2.7 do not apply if a local plan, town planning by-law or regulatory plan under the previous building acts provides otherwise.

*(2.1(2)) The calculation rules set out in Appendix 1 apply independently and cannot be amended by a local plan, town planning by-law or regulatory plan.*

### 2.1.1 General criteria

2.1.1(1) In the case of modifications in respect of one or more of the building control specifications set out in 2.2-2.6, the deliberations of the municipal council must take the following points into account:

- 1) The overall footprint of the building must be appropriate for the function of the building.

*(2.1.1(1)) The conditions listed in 2.1.1(1) paras 1-6 are an expression of the legally binding limits on the municipal council's assessment of building control specifications and thus express the substantive factors which the municipal council can legally take into account in its overall assessment and use as a basis for its decision.*

- 2) The total footprint of the building must be consistent with the norm for the complex, the neighbourhood or the area or with that which is envisaged for the area.

*(2.1.1(1) para 1) Evaluation of whether the footprint of the building is appropriate for its function will take into account the provisions set out in 2.2-2.6. The individual provisions will not apply equally to all types of buildings. For example, recreation areas will be weighted more heavily in determinations of the plot ratio of a domestic building than of a commercial building, which might therefore be permitted a greater floor area. In the case of commercial buildings to which the public has access, the requirement for parking will, on the other hand, be weighted more heavily than in the case of a domestic building.*

*(2.1.1(1) para 2) "Area" here means an area designated by the municipal council, such as a "summer house" area, a housing estate or development of single-family houses, an industrial zone or a development whose character defines it as a designated area.*

*In the case of development of a vacant property, an assessment must be made of what is the norm for the neighbourhood, and/or, alternatively, for the area. If the norm for a neighbourhood or area cannot be determined in such circumstances; or in the case of buildings in a newly designated area, due consideration must be given to the proposed character of the area. Framework provisions on plot size, floor area, number of storeys, height and separation distances specified in a municipal plan may be used as guidance for what is usual or proposed for the area.*

- 3) Taking account of the use of the property, satisfactory lighting conditions must be provided for buildings on the property and adjacent buildings.

*(2.1.1(1) para 3) As under 2.1.1(1) para 1, an assessment of significant factors will be made, evaluating the lighting conditions in relation to the use to which the property is to be put and the impact of the building on adjacent buildings.*

- 4) In accordance with 2.6, sufficient open spaces must be provided in relation to the use of the property, including recreation areas for residents, users and employees.

- 5) In accordance with the requirements of 2.6 and taking account of the use of the property, satisfactory pedestrian and vehicular access must be provided for the users of the property, including access for the disabled and the emergency services; sufficient parking areas also must be provided.

- 6) In the case of a development on the edge of dense, built-up urban areas adjacent to an undesignated area or developments for detached houses, holiday homes or allotments, or a development of dense low-rise housing, determination of the total footprint of the building must take account of the character of adjacent areas and the footprint of any development.

*(2.1.1(1) para 6) This provision addresses a number of "conflicting cases" in which the assessment must take the character of specified adjacent areas into account in the same way as the other considerations set out in 2.1.1(1) paras 1-5 whereby importance is otherwise only given to the character of the building in the relevant complex, neighbourhood or area, and not to the stated geographically conflicting issues. The character of the adjacent areas is not necessarily always relevant in relation to all instances where building control is required; for example, in the case of a conversion project which only involves one or a small number of works for which building control is required.*

## 2.2 The size of the plot

- 2.2(1) In the case of parcelling out, registration or transfer of land, the size of the plot must be determined in accordance with the criteria specified in 2.1.1 and 2.2(2) of this provision.

*(2.2(1)) When establishing the size of the plot, all the factors specified in 2.1 may legally be taken into consideration, including in cases of subdivision, to allow for continued lawful use of the property.*

*The municipal council may by the same token refuse to approve the size of a plot if, once sub-divided, it would be inadequate for accommodating buildings which conform to the building control requirements for unbuilt areas, including access to the property and separation distances, particularly the ratio between the height of a building and its distance from adjacent buildings.*

*Note also 2.7.5, whereby the municipal council cannot refuse to grant approval for detached single-family houses on plots of at least 700 m<sup>2</sup> nor for holiday homes on plots of at least 1200 m<sup>2</sup> in designated "summer house" areas.*

2.2(2) On the basis of an overall assessment, to include the relationship between any existing buildings and the plot size, a plot size must be determined which is adequate for a building and the use of the property in accordance with the requirements of 2.3-2.6, and which allows for vehicular access under highways legislation and ensures that the unbuilt areas comply with the requirements of Part 2.

### 2.3 Separation distances

2.3(1) The distance of the building from roads, paths and boundaries must be determined in accordance with the criteria set out in 2.1.1 and the requirements of 2.3(2).

*(2.3(1)) The distances defined in accordance with 2.3(1) must provide for a satisfactory relationship between the height of the building and its distance from roads, paths and common boundaries in accordance with 2.4. See Appendix 1, B.1.1.5 for the rules for calculating separation distances.*

*Note also the fire separation distances in Part 5.*

2.3(2) The distances determined in accordance with 2.3(1) must be sufficient to ensure that:

- 1) roof water is retained within the building's own plot.
- 2) windows, balconies etc. do not provide an unreasonable degree of overlooking into other buildings on the same plot or adjoining plot(s).

2.3(3) If an area consists predominantly of dense housing, the municipal council may decide that new buildings must be erected so as to abut the road boundary or building line and extend to the boundary with the adjacent plots.

## 2.4 Height and number of storeys

2.4(1) The height of the building and number of storeys must be determined in accordance with the criteria set out in 2.1.1 subject to the allowances and limitations specified in 2.4(2).

*(2.4(1)) This provision covers both the horizontal and inclined height-limiting planes.*

2.4(2) The height and number of storeys of the building must be determined in accordance with 2.4(1), taking into account the relationship between the height of the building and the distance from other buildings and open spaces on the same plot and the buildings on adjacent plots and their open areas, and from roads and paths, in order to provide satisfactory light conditions and to prevent unreasonable overlooking.

*(2.4(2)) See Appendix 1, B.1.1.4 for the rules for calculating the height of the building. See Appendix 1, B.1.1.6 for the rules for calculating the number of storeys in the building.*

## 2.5 Floor area

2.5(1) The floor area of the building must be determined in accordance with the criteria specified in 2.1.1 and 2.5(2) of this provision.

2.5(2) When determining the floor area for residential purposes in existing buildings, including existing unused roof spaces, the municipal council must give due weight to the need to provide up-to-date dwellings of a reasonable size in relation to the total area that is intended to be used.

*(2.5(2)) The provision of new (additional) dwellings in an existing property may be subject to a requirement to provide parking spaces and open spaces in accordance with 2.6.*

## 2.6 Unbuilt areas

2.6(1) The areas specified in 2.6 may be shared by several properties. The registration of the properties concerned must be such as to secure the layout, landscaping and use of such communal open spaces.

*(2.6(1)) Unbuilt areas laid out in accordance with the provisions must not be used for purposes other than those for which they were provided. See section 7 of the Building Act.*

### 2.6.1 Recreation areas for the building

2.6.1(1) Any building must be provided with recreation areas of an appropriate size for the use, footprint and location of the building.

2.6.1(2) Such recreation areas must be at ground level, but may be provided in a covered or raised courtyard or may extend to roof areas or large-scale balconies.

2.6.1(3) For blocks of flats and dense low-rise housing, developments including terraced and linked houses etc., an appropriate part of the recreation area must be laid out as a playground area. The size of the playground area must be determined by the municipal council and must be specified in the building permit.

*(2.6.1(3)) The safety requirements for playground equipment are stated in Part 4, Structures.*

2.6.1(4) The building permit may set a deadline in respect of the layout of recreation areas and playground areas.

*(2.6.1(4)) This provision gives scope for residents' input in respect of the layout of recreation areas and playground areas.*

### 2.6.2 Parking areas

2.6.2(1) Sufficient parking areas must be provided (reserved) for the residents of or employees in the building, visitors, customers, suppliers etc. to park cars, motorcycles, mopeds, bicycles etc. on the property.

2.6.2(2) The municipal council must determine how large a proportion of the plot area is to be provided (reserved) for

parking areas, and when the area is to be laid out; this must be specified in the building permit.

2.6.2(3) The layout of parking areas must include an appropriate number of parking spaces which cater for disabled people. This requirement does not apply to detached single-family houses or holiday homes in designated “summer house” areas.

*(2.6.2(3)) Disabled parking spaces should have a useable area of 3.5 x 5 m, be located as close to the entrance as possible and have firm, even surfacing. At least one disabled parking space should have a useable area of 4.5 x 8 m to allow for a minibus with a tail lift. Drops/rises in any stepped access from the parking area to other areas must be of no more than 2.5 cm.*

*DS manual 105, “Outdoor areas for all - Planning and design - Guidelines for providing access for disabled persons” contains instructions for laying out the physical environment so as to allow the disabled greater independence, freedom of movement and safety. See also “Færdselsarealer for alle” [Traffic areas for all] issued by the Danish Road Directorate.*

### 2.6.3 Adgangs- og tilkørselsarealer

2.6.3(1) Pedestrian and vehicular access must be provided from roads to entrances to the buildings on a property and to the unbuilt areas of the property. The layout of such pedestrian and vehicular access must be in keeping with the nature of the building.

*(2.6.3(1)) Lighting of pedestrian and vehicular access areas must be directional and not glaring; see also the rules on private roads set out in the Act on Private Roads, according to which the municipal council may decide that lighting must be provided on publicly accessible roads.*

Lighting must be provided for pedestrian and vehicular access routes. Stairs and ramps must be most brightly illuminated.

2.6.3(2) Pedestrian and vehicular access must be laid out so as to enable the disabled to use the building. Access from roads, including from car parks to the unbuilt area of the property and to entrances to buildings must be no less than 1.3 m wide and have firm, even surfacing.

*(2.6.3(2)) The DS publication, “Outdoor areas for all - Planning and design - Guidelines for providing access for disabled persons” contains instructions for laying out the physical environment so as to give the disabled greater independence, freedom of movement and safety.*

*Ramps with a gradient of between 1:25 and 1:20 may be fitted with guarding instead of handrails or may be contoured so as to eliminate any danger of falling sideways.*

Differences in levels must be compensated for by contoured landscaping or by means of ramps, and ramps must be supplemented by steps with a rise of no more than 150 mm and a going of no less than 300 mm. Ramps must not have a gradient of more than 1:20 and there must be a horizontal area of no less than 1.3 m x 1.3 m at both ends of the ramp.

Ramps with a gradient of more than 1:25 must also have landings every 12 m. Graspable handrails must be provided at a height of approx. 0.8 m on both sides of ramps and steps.

2.6.3(3) Footways to the building must be separated from other types of traffic by a contrasting tactile feature. At the top of steps on access routes, there must be a change in the colour and texture of the surfacing 0.9 m before the staircase starts and across the full width of the staircase. The edges of the treads and nosings must be highlighted in a contrasting colour.

2.6.3(4) Doors or openings required by 2.6.3(1) must be designed so as to provide easy access for emergency vehicles.

2.6.3(5) Detached single-family houses used only for residential purposes and holiday homes in designated “summer house” areas are not subject to the provisions of 2.6.3(1)-(3).

*(2.6.3(3)) To prevent collision with free-standing staircases from the side or underside, the staircase should be fitted with guarding/safety railings, allowing headroom of 2.2 m. For the sake of the visually impaired, tread surfaces with open mesh grating, holes etc. should be avoided, or be so constructed as not to trap white canes or injure the claws of guide dogs.*

*(2.6.3(4)) Emergency vehicles require an entrance with a clear width of no less than 2.8 m and headway of no less than 3.4 m. In narrow streets it may be necessary to widen the route.*

*(2.6.3(5)) Detached single-family houses part of which is used for commercial purposes are subject to the provisions of 2.6.3(1)-(3).*

## 2.7 Building rights

2.7(1) The municipal council cannot refuse to approve a building's floor area, number of storeys, height and separation distances if the conditions specified in 2.7.1-2.7.2 are satisfied, with the limitations and extensions specified in 2.7.3-2.7.9.

*(2.7(1)) The provisions of Part 2 identify the building rights which apply to the properties indicated. The municipal council may not refuse to approve a building if it complies with the conditions specified for all matters covered by these provisions and does not exceed the stated plot ratio, number of storeys, height and separation distances.*

### 2.7.1 Plot ratio

2.7.1(1) When calculating the plot ratio, the floor area of the property must not exceed:

*(2.7.1(1)) The plot ratio is calculated in accordance with the rules specified in Appendix 1.*

- 1) 60 in the case of multi-storey buildings in an area designated for the purpose in the municipal plan.
- 2) 40 in the case of wholly or partially joined single-family houses, including semi-detached houses, terraced houses, linked houses and similar dense/low-rise housing.
- 3) 30 in the case of housing estates comprising detached single-family houses and/or two-family houses with a horizontal party wall.
- 4) 15 in the case of holiday homes in designated "summer house" areas.
- 5) 45 in the case of other buildings.

*(2.7.1(1) para 3) "Housing estate" here means an area which the municipal council designates as a residential area for detached single-family or two-family houses, or a residential development whose character defines it as a housing estate.*

*(2.7.1(1) para 5) "Other buildings" means commercial buildings and institutions.*

### 2.7.2 Number of storeys and heights in general

2.7.2(1) The municipal council may not refuse to approve the height of a building pursuant to 2.7 if the height of the building as applied for does not exceed two storeys and no part of the external walls or roof of the building is more than 8.5 m above ground level.

*(2.7.2(1)) The number of storeys is calculated in accordance with the provisions of Appendix 1, B.1.1.6.*

*This provision covers the horizontal height-limiting plane. No part of the external walls or roof of the building may exceed 8.5 m; but see Appendix 1, B.1.1.4(2).*

### 2.7.3 Detached single-family houses and two-family houses

2.7.3(1) In the case of detached single-family houses and two-family houses with a horizontal party wall, the municipal council may not refuse to approve the height of the building or the separation distances if the conditions of 2.7.3(1) paras 1 and 2 have been met.

- 1) Maximum height:  $1.4 \times$  the distance from the common boundary and path.
- 2) Minimum distance from road, path and boundary: 2.5 m.

*(2.7.3(1) para 1) This provision covers the inclined height-limiting plane. No part of the external walls or roof of the building may exceed  $1.4 \times$  the distance from the common boundary and path; but see Appendix I, B.1.1.4(2)).*

*(2.7.3(1) para 2) The distance requirement applies equally to elevated recreation areas outside the building, conservatories, external staircases, balconies, chimneys, roof terraces etc. and swimming pools.*

### 2.7.4 Holiday homes in designated “summer house” areas

2.7.4(1) In the case of holiday homes in designated “summer house” areas, the municipal council may not refuse to approve the number of storeys, height and separation distances of a building if the conditions of 2.7.4(1) paras 1-3 have been met.

- 1) Maximum number of storeys: 1.
- 2) Maximum height: roof: 5.0 m; and external wall along at least one longitudinal side: 3.0 m.
- 3) Minimum distance from road, path and boundary: 5.0 m.

*(2.7.4(1)) If the existing buildings in the area are predominantly non-compliant with the provisions of 2.7.4(1) paras 1-3 in respect of building height and use of roof spaces, new buildings may then be erected which are in keeping with the character of the area as determined by the overall assessment set out in 2.1.*

*(2.7.4(1) para 2) This provision covers the horizontal height-limiting plane.*

*The distance requirement applies equally to elevated recreation areas outside the building, conservatories, external staircases, balconies, chimneys, roof terraces etc. and swimming pools.*

### 2.7.5 The size of the plot

2.7.5(1) In the case of parcelling out, registration or transfer of land in connection with plots for detached single-family houses and holiday homes in designated

*(2.7.5(1)) In connection with plots for buildings other than detached single-family houses or holiday homes in designated "summer house" areas, land must be parcelled out, registered or transferred in accordance with the provisions of 2.2.*

"summer house" areas, the municipal council may not refuse to grant approval for properties with a plot size of:

- 1) at least 700 m<sup>2</sup> in the case of detached single-family houses.
- 2) at least 1200 m<sup>2</sup> in the case of holiday homes in designated "summer house" areas; see the Planning Act.

### 2.7.6 Garages, carports, outbuildings and similar small buildings

2.7.6(1) The following buildings must comply with the provisions of 2.7.2 and 2.7.3 but may be erected on a boundary or closer than 2.5 m to a road, path or boundary:

*(2.7.6(1)) This provision covers buildings which serve as outbuildings, including boiler rooms and storage tanks for heating oil and similar installations which are necessary for the operation of the building itself, and other outbuildings which normally take the form of detached buildings.*

*This provision does not cover buildings used for residential purposes, kitchens, WCs and bathrooms.*

- 1) Garages and carports.
- 2) Roofed-over terraces which are not raised above ground level.
- 3) Greenhouses, sheds and similar small buildings serving as outbuildings.
- 4) Storage tanks for heating oil and similar installations which are necessary for running the building itself.
- 5) Equipment houses for electronic communications networks or services.

2.7.6(2) If the building is erected closer than 2.5 m to a road, path or boundary, the conditions in 2.7.6(2) paras 1-4 must be satisfied:

- 1) Within a distance of 2.5 m from the boundary, no part of the external walls or roof of the building, including any fire parapet, may be higher than 2.5 m above ground level or the level plane set for the building.
- 2) The sides which face a boundary must not exceed a total length of 12.0 m. Only the longest side of the buildings facing the boundary is measured.

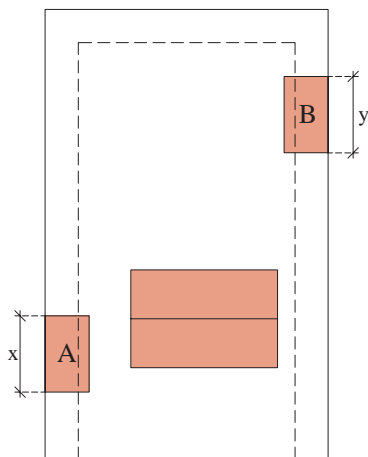
*(2.7.6(2)) If the building does not comply with all the conditions of 2.7.6(2) paras 1-4 of this provision, an overall assessment as addressed in 2.1 must be applied.*

*(2.7.6(2) para 1) Within 2.5 m of the boundary, the buildings must not exceed 2.5 m in height. Beyond 2.5 m and further into the plot, the height must not exceed 1.4 x the distance from a path or boundary.*

*(2.7.6(2) para 2) Overhangs of more than 0.5 m are added to the length of the building. The length of a carport must be measured 0.5 m inside the limit of the roof surface.*

*This provision covers all buildings erected within 2.5 m of a boundary, including buildings covered by 2.7.7.*

$$x + y = \text{max. } 12.0 \text{ m.}$$



- 3) No windows, doors or similar openings may be installed or formed facing the boundary.

- 4) Roof water must be retained within the building's own plot.

2.7.6(3) In respect of holiday homes in designated "summer house" areas, buildings covered by 2.7.6(1) must comply with the provisions of 2.7.4, and the buildings may be erected no less than 2.5 m from a boundary abutting a road, path or adjacent property if the conditions of 2.7.6(3) paras 1-4 have been met.

*(2.7.6(3)) Holiday homes must not be built closer than 5.0 m to a boundary abutting a road, path or adjacent property..*

- 1) Within a distance of 2.5 to 5.0 m from the boundary, no part of the external walls or roof of the building, including any fire parapet, may be higher than 2.5 m above ground level or the level plane set for the building.
- 2) The sides which face a boundary must not exceed a total length of 12.0 m. Only the longest side of the buildings facing the boundary is measured.
- 3) No windows, doors or other openings may be installed or formed facing the boundary.
- 4) Roof water must be retained within the building's own plot.

### **2.7.7 Small buildings of no more than 10 m<sup>2</sup>**

2.7.7(1) Small buildings of no more than 10 m<sup>2</sup> are only subject to the provisions of 2.7.7, but see 2.7.6(2) para 2.

*(2.7.7(1)) Up to two small buildings which comply with the provisions of 2.7.7 may be erected without a building notice or permit, see 1.6(1) para 2. In accordance with 1.5, notice must be given in the case of erection of more than two small buildings, which, pursuant to B.1.1.3(3) para 3, are also added to the floor area but, pursuant to B.1.1.3(4) may be deducted.*

*It should, however, be ascertained whether there are any privately negotiated easements or covenants, declarations or public building lines, local plans or town planning by-laws etc. that may affect the erection of such buildings.*

2.7.7(2) Each title number entails entitlement to up to two small buildings if the conditions of 2.7.7(2) paras 1-3 have been met:

- 1) The area of each building must not exceed 10 m<sup>2</sup>.
- 2) The distance from other buildings under the same title number must be no less than 2.5 m.
- 3) No part of the external walls or roof of the building may be higher than 2.5 m above ground level.

2.7.7(3) Small buildings in designated “summer house” areas must not be built closer than 2.5 m to a common boundary or path and must comply with the provisions of 2.7.7(2) paras 1-3.

### **2.7.8 Agricultural buildings**

2.7.8(1) Agriculture-related buildings serving agricultural and forestry holdings in rural zones, which do not require permission under the Planning Act, may be built to a height of up to 12.5 m.

*(2.7.8(1)) Heights are measured in accordance with the provisions of Appendix 1, B.1.1.4.*

2.7.8(2) Silos erected as part of a large building of the type listed in 2.7.8(1) and having a cross section of no more than 80 m<sup>2</sup> may be erected to a height of up to 20 m.

*(2.7.8(2)) This provision also applies to free-standing silos built as part of a feeding system connected to the livestock production building via a feeder system/feed conveyor.*

*Cross sections are measured as the horizontal plane at the widest point of the silo.*

2.7.8(3) Market gardens and nurseries are also subject to the rules specified in 2.7.8(1) for properties which it has not been possible to register as agricultural properties in the land register.

### **2.7.9 Plots in exceptional locations**

2.7.9(1) In the case of conversions and extensions on plots in exceptional locations built before 1 February 1977, the municipal council cannot refuse to approve a floor area pursuant to 2.5 if the plot ratio in the application does not exceed 50.

2.7.9(2) Buildings covered by 1.3.1(1) are not covered by 2.7.9(1).

2.7.9(3) Plots in exceptional locations, see 2.7.9(1), are:

- 1) corner plots;
- 2) roadside plots with a width of 15 m or more;
- 3) plots with a depth of no more than 25 m measured from the plot's road-facing boundary.

### 3. Design, layout and fitting out of buildings

#### 3.1 General

3.1(1) Buildings must be so designed, laid out and fitted out as to provide satisfactory operational conditions in terms of safety, health, accessibility and use by all, and in terms of cleaning and maintenance.

*(3.1(1)) For more detailed guidance on the design, layout and fitting out of buildings, see SBI Guidelines 222, "Tilgængelige boliger" [Accessible dwellings], DS/INF 470, Directions for technical prevention of violence and vandalism and DS 471, Technical prevention against burglary.*

*DS manual 105, "Outdoor areas for all - Planning and design - Guidelines for providing access for disabled persons" contains instructions for laying out the physical environment so as to allow the disabled greater independence, freedom of movement and safety. See also SBI's "Tjeklister til BR10 - Tjeklister for personer med handicap" [Checklists for BR10 - Checklists for the disabled].*

*The working environment legislation often includes other dimensional requirements for spaces, corridor widths and layout. This applies particularly to institutions/dwellings in which technical aids are used. The publication "Indretning af ældreboliger til fysisk plejekrævende" [Design and layout of sheltered accommodation/dwellings adapted for assisted living for people with physical care needs] (The Danish Working Environment Authority et al.) contains guidance on appropriate provision.*

3.1(2) In the case of conversions, the provisions of Part 3 may be relaxed if the municipal council is satisfied that the conversion work cannot otherwise be carried out without extensive alterations to the building. This provision does not apply to buildings covered by 1.3.1 and 1.3.2.

*(3.1(2)) If this provision applies, the conversion work must be carried out with the greatest possible provision for those with impaired mobility and orientation. Conversion work must otherwise provide a layout which is appropriate for its intended use.*

*In the case of buildings covered by 1.3.1 and 1.3.2, exemption can be sought from the provisions of Part 3 if it is not deemed possible for the conversion to satisfy the specified requirements.*

*Implementation of this provision also requires the municipal council to undertake a separate assessment of the conversion project, of the structures of the building and other constructional matters.*

*If the provisions of Part 3 can be satisfied without extensive alterations to the building, the conditions which require the implementation of this provision do not apply.*

*See Executive Order no. 1250 of 13 December 2004 on accessibility provisions in connection with alteration of existing buildings and the Danish Enterprise and Construction Authority's "Vejledning til kommunerne om byggesagsbehandling af tilgængelighedsbestemmelser" [Guidance for municipal authorities in respect of accessibility provisions in applications].*

3.1(3) Holiday homes in designated "summer house" areas are not covered by the provisions of Part 3.

*(3.1(3)) A designated "summer house" area is an area which is designated in the regional plan as a holiday home area.*

## 3.2 Access / Accessibility

### 3.2.1 General

3.2.1(1) Access to buildings must ensure accessibility for all. Each dwelling and other unit must be directly accessible from the outside or via a shared access route from the outside.

*(3.2.1(1)) With regard to ensuring accessibility for all, see parts 2 and 3 of SBi Guidelines 230, Guidelines on Building Regulations 2010, which give examples of how buildings can be made accessible to all potential users including the disabled.*

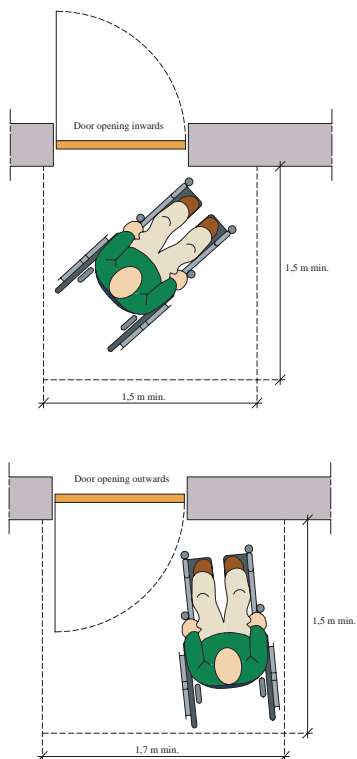
*For access routes which are also escape routes, see Part 5 on fire safety.*

3.2.1(2) External doors must provide level access to units and to any lifts on the ground floor (access storey) of the building. Any differences in levels must be evened out in the access area outside the building. Ramps may be used. Outside external doors, there must be a horizontal, firm and level area of 1.5 m x 1.5 m, measured from the hinged side of the door. If the door opens outwards, there must be an additional 0.2 m along the facade of the building. The area outside external doors must be flush with the internal floor. The area at external doors must have tactile markings or be of a different colour from

*(3.2.1(2)) In addition to external doors, this provision covers doors on escape routes on the ground floor as well as garden, balcony and terrace doors. "Level access" means that there must not be a step between the level (ground level) outside the building and the ground floor units or any lifts. Stair lifts, lifting platforms and loose scraper mats are not permitted under this provision. Doorsteps with a height of no more than 25 mm are permitted; see 3.2.1(4). Entry telephone and intercom systems should be located at a height between 90 and 120 cm above the floor/ground.*

the surrounding surface finish.

Entry telephones and intercom systems must have the facility to acknowledge both audibly and visually that the equipment has been activated, and that a connection has been made with the recipient. If the operating panel of an entry telephone or intercom system uses numbers, the number 5 must be marked with a tactile identification.



3.2.1(3) In buildings which are accessible to the public and which have a public-facing service function, essential information on wayfinding in and use of the building must be easy to see, read and understand.

*(3.2.1(3)) This requirement only applies to that part of the building to which the public has access and has a public-facing service function.*

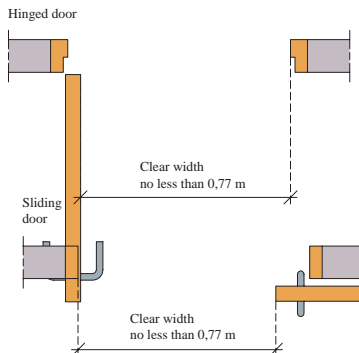
*This provision applies to information by the entrance to the building and information directing the public to essential services in the building such as sanitary conveniences, disabled toilets, lifts, stairs, passageways etc.*

*Such information may take the form of clearly visible, legible and intelligible signs. It may be supplemented with Braille signs, sound, pictograms etc. Where appropriate, the information may take the form of lights, pathfinder lines, other technological solutions etc.*

3.2.1(4) Doors must have a clear passage width of no less than 0.77 m. If the door opens towards the user, there must be no less than 0.5 m on the side of the door opposite its hinged side. Doorsteps may be no more than 25 mm high.

(3.2.1(4)) *The clear passage width is measured with the door 90 degrees open.*

*This provision covers doors on shared access routes, including at least one door to each unit on each of the storeys of the building.*



### 3.2.2 Shared access routes

3.2.2(1) Shared access routes must be sufficiently wide for their intended use, must allow unobstructed passage across their full width and must be identified by contrasting materials, colours or lighting. The clear width must be no less than 1.3 m.

(3.2.2(1)) *Shared access routes serve two or more dwellings, offices, meeting rooms or other units and include storm porches, lobbies, corridors, access balconies, covered access balconies, the space in front of lifts, ramps and landings both inside and outside the building, including the external area giving access to any basement.*

*The working environment legislation requires certain industrial or commercial buildings to be designed for use by particular vehicles such as trucks.*

*Most shared access routes are also escape routes and must therefore also comply with the provisions of Part 5 on fire safety for escape routes.*

3.2.2(2) Shared access routes must provide level access to all units on each storey in the building. Any steps and differences in level must be compensated for by ramps. Ramps must not have a gradient of more than 1:20 (50 mm per metre) and there must be a level area of no less than

(3.2.2(2)) *This provision covers level access to lifts, residential and business units and shared areas, including outdoor recreation areas on the different storeys.*

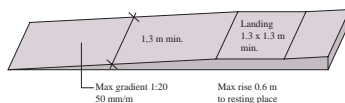
*Any steps and differences in level within units accessible by the public should be compensated for by ramps, chair lifts or similar.*

1.3 m x 1.3 m at both ends of the ramp. Ramps to accommodate differences in level of more than 0.6 m must in addition be provided with a level landing for each 0.6 m rise. Ramps must be provided with handrails. Ramps with a gradient of 1:25 (40 mm per metre) or less do not need to be fitted with handrails.

3.2.2(3) Stairs on shared access routes must be designed with sufficient width and headroom for their intended use.

3.2.2(4) Stairs on shared access routes must have a gradient (going and rise) that makes them safe and easy to use. The rise of stairs must not exceed 180 mm. On straight flights and quarter-turn and half-turn staircases, the going must not be less than 280 mm, subject to a minimum of 250 mm in domestic buildings. On spiral and winding staircases, the going must not be less than 200 mm.

*Balconies must be regarded as independent units. Terraces on the roof of the building are exempt from this requirement, provided they are not accessed by lifts.*



(3.2.2(3)) This requirement may be met by building stairs with a clear width of no less than 1.0 m and headroom of no less than 2.1 m.

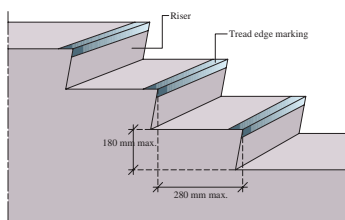
*If there are only a few users, for example in two-family houses, the requirement may be satisfied by a clear width of no less than 0.9 m. If there are multiple users, the width should be increased accordingly.*

*The height must be measured above the walking line.*

*The clear width must be measured horizontally between the handrails or, if there is only a handrail on one side, between the wall, central newel post etc. and the handrail.*

(3.2.2(4)) Stairs with a lesser gradient (lower rise and deeper going) than the specified requirements are easier and safer to use. The going must be measured on the walking line, i.e. at the centre of the clear width of the staircase, but no more than 0.5 m from the inner handrail.

*Staircases should be fitted with risers and the outermost edge of the tread surface and the nosing should be marked in a contrasting colour.*



3.2.2(5) Buildings with three storeys or more must be fitted with at least one lift that can serve each floor, including any habitable roof space and basement. Single-family houses are exempt from this provision.

3.2.2(6) Buildings equipped with lifts must have at least one lift the size and construction of a type 2 lift in accordance with DS/EN 81-70, Safety rules for the construction and installation of lifts – Particular applications for passenger and goods lifts – Part 70: Accessibility – including disabled access – to lifts for people.

### 3.2.3 Guarding

3.2.3(1) Taking account of the use of the building, corridors, staircases and ramps on shared access routes as well as balconies, French windows, balcony doors, access balconies, air locks, roof terraces, external staircases and other elevated recreation areas must be secured by guarding and fitted with handrails. Handrails must be easy to grip and hold onto.

*(3.2.2(5)) A building with a ground floor, first floor and second floor is deemed to be a three storey building. In this context, the basement is not included in the number of storeys. Where dwellings in domestic buildings have several interconnecting storeys, only the individual access storeys to each individual dwelling are in this context included in the number of its storeys.*

*(3.2.2(6)) This provision applies to each stairway in buildings with several stairways. See the executive order on the design of lifts etc. issued by the Danish Working Environment Authority. In the case of conversions, smaller lifts than those specified, including mini-lifts, may be used if, in the opinion of the municipal council, the conversion work cannot otherwise be carried out without extensive alterations in the building; see 3.1(2). Note also Part 8 on the installation of lifts.*

*(3.2.3(1)) This requirement may be complied with by fitting handrails on both sides of stairs. Narrow staircases may be fitted with a handrail on only one side if the clearance between the handrail and the wall, central newel post etc. is less than 1.1 m. Ramps with a gradient of between 1:20-1:25 may be fitted with guarding instead of handrails so as to eliminate any danger of falling sideways. Wide stairs and ramps should be divided by handrails with a spacing of no more than 2 m.*

*The height of the guarding or railing should be no less than 1.0 m. Guarding by stairs and ramps should be no less than 0.8 m in height, and on landings, no less than 0.9 m. The height of guarding on stairs with a gap of more than 0.3 m, on access balconies and air locks should be increased as appropriate, but should be no less than 1.2 m.*

*Handrails should be continuous throughout flights and landings and must end horizontally. The underside of the staircase should be screened with guarding, leaving headroom of 2.2 m.*

*The height of the guarding and handrails must be measured above nosings and ramps.*

3.2.3(2) The design of all types of guarding or railings must take account of the use of the building and make adequate safety provision for users. Guarding made of glass must comply with the provisions of Part 4 on structures.

*(3.2.3(2)) The distance between balusters of all types, including vertical and horizontal balusters, must be such as to avoid causing physical injury.*

*Particular attention must be paid to ensuring that children cannot climb onto or become stuck between the balusters.*

### 3.3 Dwellings

#### 3.3.1 Design, layout and fitting out of dwellings

3.3.1(1) The design and fitting out of a dwelling, and the size and layout of individual rooms, must be such that both the dwelling as a whole and the individual rooms are adequate for their intended use. The municipal council may require documentation demonstrating compliance with this requirement, for example an exposition of furniture layout options.

*(3.3.1(1)) When flats are being laid out and fitted out for residential purposes, the municipal council may, subject to a specific evaluation, impose stipulations for the provision of up-to-date dwellings of a reasonable size and appropriate layout relative to the total area which it is proposed should be used.*

*This provision applies first and foremost to substantial conversions and changes of use of existing buildings.*

3.3.1(2) In addition to habitable rooms, a dwelling must have a kitchen, bathroom and sanitary convenience.

3.3.1(3) The kitchen may either be a separate room or form part of a habitable room; or it may be a cooking recess in residential units of less than 50 m<sup>2</sup>.

*(3.3.1(3)) In addition to space for storage and chilling of food, a kitchen must contain storage space for tableware, a sink with a drain and space for hotplates and food preparation.*

3.3.1(4) There must be sufficient storage space inside and outside blocks of flats and linked single-family houses for clothing, kitchen utensils and other equipment, bicycles, pushchairs and prams, and space to wash and dry clothing.

*(3.3.1(4)) In blocks of flats, provision must be made for drying clothing outside the dwelling for the sake of the indoor climate in the dwelling.*

3.3.1(5) Habitable rooms and kitchens must have sufficiently high ceilings.

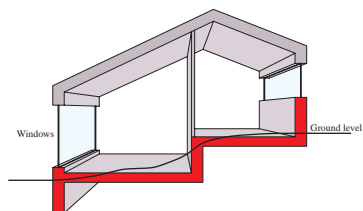
The ceiling height must be determined by reference to the size and depth of the rooms and the location of windows in the dwelling.

*(3.3.1(5)) The larger and deeper the room, the higher the ceiling should be. In the case of blocks of flats a clear ceiling height of at least 2.5 m will satisfy this requirement. If the rooms are of different heights, the ceiling height may be taken as the average height of the habitable rooms and kitchen of the dwelling. In the case of detached and linked single-family houses a clear ceiling height of at least 2.3 m will satisfy this requirement.*

*If the ceiling is not horizontal, the ceiling height must be measured as the average height, counting only headroom of 2.1 m and above. In the case of rooms with sloping walls, a ceiling height of at least 2.3 m over at least 3.5 m<sup>2</sup> of the floor area will satisfy this requirement.*

3.3.1(6) The floor of habitable rooms and kitchens must not be lower than the ground outside. In the case of exceptional site conditions, this provision may be waived if the floor lies above ground level along at least one wall with a window.

*(3.3.1(6)) The drawing shows an example of where this requirement has been waived, as the floor along the entirety of a wall with a window is above ground level.*



3.3.1(7) Kitchens must have sufficient space for kitchen tasks to be carried out in a practical, safe manner.

*(3.3.1(7)) This requirement may be complied with by a clearance in front of workstations and storage spaces of no less than 1.1 m. Greater clearance improves comfort and user-friendliness.*

*In rooms with a sloping ceiling, headroom of at least 2.1 m at the front edge of workstations and storage spaces will satisfy this requirement.*

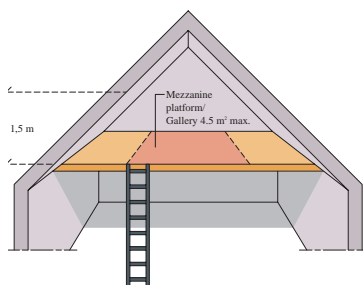
*For appropriate kitchen layouts for people with impaired mobility, see SBi Guidelines 222, "Tilgængelige boliger" [Accessible dwellings].*

3.3.1(8) Mezzanine platforms (galleries/sleeping platforms) are not deemed to be separate habitable rooms if their floor area does not exceed 4.5 m<sup>2</sup>.

(3.3.1(8)) This is subject to the mezzanine platform (sleeping platform/gallery) being open to the room into which it is built. The floor area to be included is measured on a horizontal plane 1.5 m above the finished floor to the intersection of the plane with the outer surface of the roof cladding.

There may be two or more such mezzanine platforms (sleeping platforms/galleries) with an area of no more than 4.5 m<sup>2</sup>, but if they are not to be deemed to be separate habitable rooms, they must not be internally connected, which means that there must be separate accesses to the mezzanine platforms (sleeping platforms/galleries).

If several mezzanine platforms (sleeping platforms/galleries) are interconnected, the area of these must be added together.



### 3.3.2 Bathrooms and rooms containing sanitary conveniences

3.3.2(1) A dwelling must have at least one sanitary convenience at entry level, with level access and appropriate layout and dimensions.

(3.3.2(1)) This requirement may be complied with by a minimum clearance of 1.1 m from sanitary fittings such as the washbasin and WC. Greater clearance improves comfort and user-friendliness.

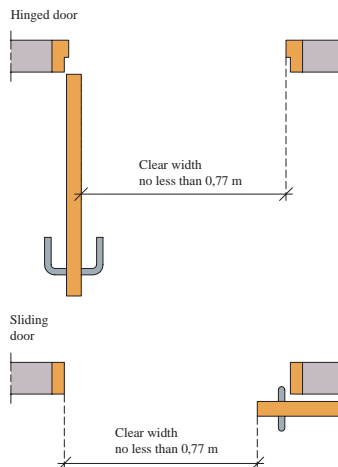
For appropriate layouts for people with impaired mobility, see SBi Guidelines 222, "Tilgængelige boliger" [Accessible dwellings].

3.3.2(2) There must be a washbasin in or adjacent to the room containing the sanitary convenience.

### 3.3.3 Width of doors

3.3.3(1) Doors on the access storey of a dwelling must have a clear width of no less than 0.77 m.

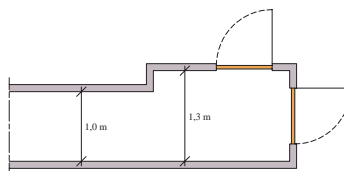
*(3.3.3(1)) This provision applies to external doors, doors to storm porches, entrance halls, corridors and similar access spaces and at least one door to each habitable room, kitchen, bathroom and sanitary convenience on the access storey of the dwelling.*



### 3.3.4 Width of corridors

3.3.4(1) Storm porches, entrance halls, corridors and similar access spaces must be laid out so as to allow unobstructed passage across their full width.

*(3.3.4(1)) This requirement may be complied with by a clear width of no less than 1.0 m in the access spaces. If there are doors or cupboard doors at the sides of a circulation space, the width of that space should be increased by at least 0.3 m. Greater clearance improves comfort and user-friendliness.*



## 3.4 Buildings other than domestic buildings

### 3.4.1 General

3.4.1(1) To the extent that other buildings may be comparable with domestic build-

ings, the provisions of 3.3 on the design, layout and fitting out of dwellings apply to these buildings.

3.4.1(2) In buildings containing places of work which are subject to the Working Environment Act, the design, layout and fitting out of workrooms/work areas must comply with the requirements of 3.4.2, and sanitary conveniences, bathrooms/showers and ancillary spaces must be provided in accordance with the provisions of 3.4.4 and 3.4.5.

The place of work must also comply with the requirements of the Ministry of Labour executive order on the conditions at permanent places of work in respect of circulation routes and areas, workrooms/work areas, temperature conditions etc., ventilation, lighting, maintenance and cleaning as well as welfare provisions, including dining areas, washbasins, cloakrooms, changing rooms, bathrooms/showers, rest areas and sleeping accommodation.

3.4.1(3) In agricultural buildings in which places of work covered by the Working Environment Act are set up, the workplace must be laid out in accordance with the Ministry of Labour executive order on the conditions at permanent places of work.

3.4.1(4) Buildings not covered by the provisions of 3.3 or 3.4.1(1)-(3) must be laid out in accordance with such health and safety requirements as the municipal council may impose in each individual case in respect of design, layout and fitting out of the buildings.

*(3.4.1(2)) The applicable executive order issued by the Danish Working Environment Authority on the conditions at permanent places of work identifies the types of industrial buildings for which applications are processed by the municipal council without involving the Danish Working Environment Authority. Please see also the range of guidelines and instructions issued by Danish Working Environment Authority in conjunction with this executive order.*

*Note that exemption pursuant to section 22 of the Building Act may only be granted by the municipal council within its sphere of competency under the Building Act.*

3.4.1(5) On storeys in buildings where sanitary conveniences are accessible to the public or are designated for people other than those employed in the building, at least one sanitary convenience must comply with the provisions of 3.4.1(5) paras 1-8. At least one sanitary convenience which complies with paras 1-8 must be provided on the ground floor or on other storeys which are accessible by a lift, stair lift etc.

- 1) Level access must be provided to sanitary conveniences.
- 2) The clear width of a door to a sanitary convenience must be no less than 0.77 m.
- 3) The washbasin and WC must be fitted at the corners of two adjoining walls such that the washbasin can be reached by a person on the WC.
- 4) There must be a clear distance of no less than 0.9 m at the side of the WC, i.e. the wall facing the washbasin. No fixed furniture must be mounted next to the WC on the wall facing the washbasin.
- 5) There must be a clear manoeuvring area with a diameter of 1.5 m in front of the WC, clear of the opening arc of the door.
- 6) The toilet seat must be at a height of 48 cm.
- 7) Lifting armrests must be fitted at a height of 0.8 m on both sides of the WC.

- 8) The washbasin must be fitted at a height of approx. 0.8 m, with the drain recessed below the washbasin.

3.4.1(6) In the case of conversions, rooms containing sanitary conveniences covered by 3.4.1(5) must be laid out so that they can be used by people in wheelchairs. At least one sanitary convenience which can be used by people in wheelchairs must be provided on the ground floor or on other storeys which are accessible by a lift, stair lift etc.

3.4.1(7) In publicly accessible areas and premises with fixed audience seating, an appropriate number of seats must be provided for wheelchair users.

*(3.4.1(7)) This provision covers concert halls, cinemas, theatres, churches, sports venues etc. which have fixed audience seating. Spaces for wheelchair users should be distributed amongst other audience seating such that the disabled and able-bodied can sit together.*

*An appropriate proportion of the total number of seats is 1%, but no fewer than two spaces.*

### 3.4.2 Workrooms

3.4.2(1) The size, ceiling height and volume of any workplace must be sufficient to allow work to proceed in a safe manner, as appropriate for the function of the workroom and the number of people normally working there.

*(3.4.2(1)) Compliance with this requirement may be achieved even in small workrooms by providing headroom of at least 2.5 m and a volume of no less than 12 m<sup>3</sup> per person working in the workroom.*

*If there are likely to be a significant number of people in a workroom who are not working there, the volume must be increased to suit the number of such people.*

*The municipal council may permit a reduction in volume if the room is provided with effective mechanical ventilation, but in such cases the volume should not be less than 8 m<sup>3</sup> per person.*

*Under the Working Environment Act, a "workroom" is any room in which work is carried out.*

3.4.2(2) The area and volume of normal classrooms in schools etc., as well as in occupiable rooms in childcare institutions, must be sufficient for the number of children and employees in the institution. Occupiable rooms in childcare institutions must have a clear floor area of no less than 3 m<sup>2</sup> per nursery-age child and 2 m<sup>2</sup> per pre-school child.

Normal classrooms in schools etc. must, subject to the provision of effective ventilation, have a volume of no less than 6 m<sup>3</sup> per person.

3.4.2(3) The floor in occupiable rooms in day nurseries and residential childcare institutions and in normal classrooms in schools etc. must not be lower than the ground outside. In the case of exceptional site conditions, this provision may be waived if the floor lies above ground level along at least one wall with a window.

### 3.4.3 Dining areas

3.4.3(1) Where a dining area is required due to the nature of the work, it must be conveniently located in relation to the work areas.

3.4.3(2) Dining areas must be provided with a sink and cooking facilities, and with windows which afford a view of the surroundings.

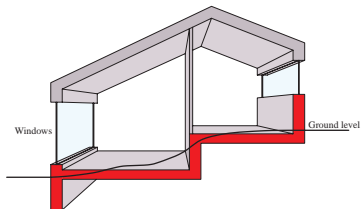
*(3.4.2(2)) The calculation of volume must only include those parts of the room where headroom is sufficient to accommodate workstations.*

*The calculation must also allow for any significant reduction in volume due to machinery, furniture and stored items etc.*

*Any part of the room that is more than 4.0 m above the floor must not be included in the calculation of the volume.*

*For ventilation in day childcare institutions and normal classrooms in schools etc., see 6.3.1.3(1)-(2).*

*(3.4.2(3)) The drawing shows an example of where this requirement has been waived, as the floor along the entirety of a wall with a window is above ground level.*



*(3.4.3(1)) Under the Working Environment Act, a dining area must normally be provided if more than three people are employed at the place of work at the same time.*

*Dining areas must not open directly onto a room containing a sanitary convenience or the anteroom of such a room.*

### 3.4.4 Rooms containing sanitary conveniences

3.4.4(1) Access from workrooms and occupiable rooms to a room containing a sanitary convenience must be through an anteroom.

*(3.4.4(1)) The anteroom may be shared by several sanitary convenience cubicles.*

3.4.4(2) The number of sanitary conveniences must be appropriate for the number of employees.

*(3.4.4(2)) This requirement may be complied with by providing at least one WC for every 15 employees. If urinals are provided for men, the number of WCs may be reduced to one for every 20 employees. In such cases, there should be at least one urinal for every 20 men.*

*Separate WCs should be provided for men and women unless each individual WC is installed in a separate room with an anteroom which does not contain urinals.*

3.4.4(3) Rooms containing sanitary conveniences, or associated anterooms, must be provided with washbasins.

3.4.4(4) In office and administrative buildings, at least one sanitary convenience on each storey on which sanitary conveniences are provided must comply with the requirements of 3.4.4(4) paras 1-7.

- 1) The clear width of a door to a sanitary convenience must be no less than 0.77 m.
- 2) The washbasin and WC must be fitted in the corner of two adjoining walls such that the washbasin can be reached by a person on the WC.
- 3) There must be a clear distance of no less than 0.9 m next to the WC, i.e. in front of the wall facing the washbasin. No fixed furniture must be mounted next to the WC on the wall facing the washbasin.

- 4) There must be a clear manoeuvring area with a diameter of 1.5 m in front of the WC, clear of the opening arc of the door.
- 5) The toilet seat must be at a height of 48 cm.
- 6) Lifting armrests must be fitted at a height of 0.8 m on both sides of the WC.
- 7) The washbasin must be fitted at a height of approx. 0.8 m, with the drain recessed below the washbasin.

At least one sanitary convenience laid out in accordance with paras 1-7 must be provided on the ground floor or on other storeys with access via a lift, stair lift etc.

3.4.4(5) In the case of conversions, rooms containing sanitary conveniences covered by 3.4.4(4) must be laid out so that they can be used by people in wheelchairs. At least one sanitary convenience which can be used by people in wheelchairs must be provided on the ground floor or on other storeys which are accessible by a lift, stair lift etc.

### **3.4.5 Bathrooms and changing facilities**

3.4.5(1) If showers/bathrooms are required by 3.4.1(2), the number of showers, which must be suitably laid out, must be appropriate for the number of employees. Changing rooms must be provided in conjunction with showers/bathrooms.

*(3.4.5(1)) This requirement can be satisfied by providing at least one shower for every ten employees. Changing rooms should be screened from showers/bathrooms.*

*Under the Working Environment Act, there must be separate men's and women's showers/bathrooms or provision for men and women to use the shower/bathroom individually.*

3.4.5(2) Sanitary conveniences must be provided in conjunction with showers/bathrooms.

3.4.5(3) In the case of work which is dirty or hazardous to health, business and industrial workplaces must provide an appropriate number of freely accessible washbasins.

*(3.4.5(3)) This requirement may be satisfied by providing at least one washbasin for every 5 employees. Washbasins in sanitary conveniences or lockable anterooms are not included in this number of washbasins.*

3.4.5(4) Showers/bathrooms and other rooms with washing facilities must be fitted with floor gullies

### 3.5 Hotels etc.

3.5(1) In the case of hotels, inns and similar accommodation, at least one fifth of the bedspaces with en suite facilities must have wheelchair access in accordance with 3.3.2(1).

3.5(2) Pursuant to 3.5(1), buildings with 10-20 bedspaces must provide at least two fully wheelchair-accessible bedspaces with en suite facilities. Pursuant to 3.5(1), buildings with 21-40 bedspaces must provide at least four fully wheelchair-accessible bedspaces with en suite facilities.

*(3.5(2)) A "bedspace" is defined as a bed standing on the floor. Folding, sofa and bunk beds do not count as bedspaces. Beds which are 140 cm wide count as double beds.*

*The design, layout and fitting out of accessible bedspaces with en suite facilities should include:*

- level access to the bedroom and to its en suite facilities.
- a clear manoeuvring area with a diameter of 1.5 m clear of the opening arc of the door; this applies both to the sleeping accommodation and to its en suite facilities.
- a clear width of at least 77 cm in doorways to the room and its sanitary convenience and bathroom.
- washbasin and WC fitted at the corner of two adjoining walls such that the washbasin can be reached by a person on the WC.

- *a clear distance of no less than 0.9 m next to the WC, i.e. in front of the wall facing the washbasin. No fixed furniture must be mounted next to the WC on the wall facing the washbasin.*
- *the toilet seat at a height of 48 cm.*
- *lifting armrests at a height of 0.8 m on both sides of the WC.*
- *making available a height-adjustable bathing chair or another solution that ensures that wheelchair users sitting at a height of 48 cm and provided with armrests can use the bathing facilities.*
- *a step of no more than 25 mm between the bathroom floor and shower cubicle. See also 4.6(5).*

3.5(3) In accordance with 3.5(1) buildings with more than 40 bedspaces must have at least one fully wheelchair-accessible bedspace with en suite facilities for each additional 20 bedspaces.

3.5(4) Buildings with at least 10 fully wheelchair-accessible bedspaces with en suite facilities will comply with the requirements of 3.5(1)-(3) irrespective of the total number of bedspaces.

3.5(5) As set out in 3.5(1), balconies connected with rooms must be so designed as to be accessible to and useable by the disabled.

## 4. Structures

### 4.1 General

4.1(1) Buildings must be constructed so as to provide satisfactory conditions in terms of function, safety, sustainability and health.

Buildings must be constructed in accordance with best practice, using materials which are appropriate for the purpose.

4.1(2) Load-bearing structures must be designed to withstand normally occurring static and dynamic loads.

4.1(3) Foundations must be taken down to frost-free depth and load-bearing ground or must otherwise be constructed so as to prevent damage resulting from earth surface movements.

Beds for sewer pipes and drainpipes, foundation structures etc. must be frost-proofed.

4.1(4) Roofs and skylights in roofs must be sufficiently protected against people on the roof treading through them.

4.1(5) Climate control measures essential to the proper construction of the building must be taken as necessary during planning, design, tendering for and erection of its load-bearing structures.

*(4.1(1)) Proper and workmanlike construction of building works includes not only load-bearing capacity, health and safety provisions and a given durability, but also measures against rats and other pests.*

*The provisions also cover the construction period. To comply with the provisions, measures to prevent collapse etc. during construction must be taken. Load-bearing structures which are founded directly on the subsoil must be protected against radon; see Part 6 on radon proofing. The whole construction must be airtight to reduce energy consumption; see Part 7 on energy consumption.*

*(4.1(2)) Other factors such as sound insulation and fire may also be subject to design consideration.*

*(4.1(3)) Solutions for external frost protection of foundations must be sufficiently robust and reliable to maintain frost protection throughout the lifetime of the building.*

*(4.1(5)) This provision includes ensuring that wet moisture-sensitive materials as well as materials and building elements which are affected by mould are not incorporated during the construction period. This may be achieved by, for example, constructing in fully enclosed conditions and by appropriate storage of building materials.*

*Adequate quality assurance procedures are also extremely important in this context. See the executive order on building and civil engineering works in the period 1 November to 31 March issued by the Danish Enterprise and Construction Authority.*

- *The functional requirement may, for example, be complied with by:*
- *focusing during the planning and design phases on avoiding materials and constructional solutions that are unduly moisture-sensitive.*
- *explicitly allocating time in the client's tendering plan and time schedule for all necessary drying out of building materials and structures.*
- *the client carrying out a cost-benefit analysis, in advance of inviting tenders if possible, of the benefits of fully enclosing the building during construction and prescribing total enclosure if it is financially viable, or where the tender documents specify particularly moisture-sensitive materials or constructional solutions.*
- *arrangements for shared facilities for storage of moisture-sensitive materials being provided for in the client's tendering process for trade contracts.*

4.1(6) Building structures and materials must not have a moisture content which is liable to increase the risk of mould growth once the building is occupied.

*(4.1(6)) This requirement minimises the risk of moving into overly damp buildings and the risk of growth of mould. This applies to both new builds and renovation projects. When determining the critical moisture content of the material, account must be taken of any surface dirt.*

*This requirement must be read in conjunction with 4.1(5).*

## 4.2 Design of structures

4.2(1) Structures must be designed on the basis of the following Eurocodes with associated Danish annexes:

- DS/EN 1990 Basis of structural design, with DS/EN 1990 DK NA
- DS/EN 1991-1-1, Densities, self-weight, imposed loads for buildings, with DS/EN 1991-1-1 DK NA
- DS/EN 1991-1-2, Actions on structures exposed to fire, with DS/EN 1991-1-2 DK NA
- DS/EN 1991-1-3, Snow loads, with DS/EN 1991-1-3 DK NA
- DS/EN 1991-1-4, Wind actions, with DS/EN 1991-1-4 DK NA
- DS/EN 1991-1-5, Thermal actions, with DS/EN 1991-1-5 DK NA
- DS/EN 1991-1-6, Actions during execution, with DS/EN 1991-1-6 DK NA
- DS/EN 1991-1-7, Accidental actions, with DS/EN 1991-1-7 DK NA
- DS/EN 1992-1-1, Design of concrete structures, General rules and rules for buildings, with DS/EN 1992-1-1 DK NA
- DS/EN 1992-1-2, Design of concrete structures, Structural fire design, with DS/EN 1992-1-2 DK NA
- DS/EN 1992-3, Liquid retaining and containment structures, with DS/EN 1992-3 DK NA
- DS/EN 1993-1-1, Design of steel structures, General rules and rules for buildings, with DS/EN 1993-1-1 DK NA
- DS/EN 1993-1-2, Design of steel structures, Structural fire design, with DS/EN 1993-1-2 DK NA
- DS/EN 1993-1-3, Design of steel structures, Cold formed members and

*(4.2(1)-(4)) A row of linked single-family houses (semi-detached houses and terraced houses) may be designed as one building, regardless of types of ownership and registration of title. See the provision set out in 1.3.2.*

*In the case of wind turbines, the requirements of Part 4 may be deemed to have been satisfied if the wind turbine is built in accordance with the approval granted under the executive order on the technical approval scheme for the design, manufacture and installation of wind turbines issued by the Danish Energy Authority.*

*DS/EN 1992-3, Liquid retaining and containment structures, with DS/EN 1992-3 DK NA sets out supplementary rules for the design of liquid retaining and containment structures, and of other concrete structures which require liquid repellent protection.*

*For tents and similar temporary structures, see DS/EN 13782, Temporary structures – Tents – Safety. Implementation of this standard must take the Eurocodes and National Annexes set out in 4.2(1) into account.*

sheeting, with DS/EN 1993-1-3 DK NA

- DS/EN 1993-1-4, Design of steel structures, Supplementary rules for stainless steel, with DS/EN 1993-1-4 DK NA
- DS/EN 1993-1-5, Design of steel structures, Plated structural elements, with DS/EN 1993-1-5 DK NA
- DS/EN 1993-1-6, Design of steel structures, Strength and stability of shell structures, with DS/EN 1993-1-6 DK NA
- DS/EN 1993-1-7, Design of steel structures, Plated structures subject to out of plane loading, with DS/EN 1993-1-7 DK NA
- DS/EN 1993-1-8, Design of steel structures, Design of joints, with DS/EN 1993-1-8 DK NA
- DS/EN 1993-1-9, Design of steel structures, Fatigue, with DS/EN 1993-1-9 DK NA
- DS/EN 1993-1-10, Design of steel structures, Material toughness and through-thickness properties, with EN 1993-1-10 DK NA
- DS/EN 1994-1-1, Design of composite steel and concrete structures, General rules and rules for buildings, with DS/EN 1994-1-1 DK NA
- DS/EN 1994-1-2, Design of composite steel and concrete structures, Structural fire design, with DS/EN 1994-1-2 DK NA
- DS/EN 1995-1-1, Design of timber structures, Common rules and rules for buildings, with DS/EN 1995-1-1 DK NA
- DS/EN 1995-1-2, Design of timber structures, Structural fire design, with DS/EN 1995-1-2 DK NA

- DS/EN 1996-1-1, Design of masonry structures, General rules for reinforced and unreinforced masonry structures, with DS/EN 1996-1-1 DK NA
- DS/EN 1996-1-2, Design of masonry structures, Structural fire design, with DS/EN 1996-1-2 DK NA
- DS/EN 1996-2, Design of masonry structures, Design considerations, selection of materials and execution of masonry, with DS/EN 1996-2 DK NA
- DS/EN 1997-1, Geotechnical design, General rules, with DS/EN 1997-1 DK NA
- DS/EN 1999-1, Design of aluminium structures, General structural rules, with DS/EN 1999-1-1 DK NA
- DS/EN 1999-1-2, Design of aluminium structures, Structural fire design, with DS/EN 1999-1-2 DK NA
- DS/EN 1999-1-3, Design of aluminium structures, Structures susceptible to fatigue, with DS/EN 1999-1-3 DK NA

4.2(2) The design of concrete structures is subject to DS/EN 206-1, Concrete, specification, performance, production and conformity, and DS 2426, Concrete – Materials – Rules for application of DS/EN 206 in Denmark.

4.2(3) The design of lightweight concrete structures with lightweight aggregate is subject to DS/EN 1520, Prefabricated reinforced components of lightweight aggregate concrete with open structure; and to DS/EN 1520 DK NA.

4.2(4) The design of structures in autoclaved aerated concrete is subject to DS/EN 12602, Prefabricated reinforced com-

ponents of autoclaved aerated concrete; and to DS/EN 12602 DK NA.

4.2(5) Derogation from the provisions listed in 4.2(1) may be permitted provided that the municipal council is given documentary evidence that such derogation is safe.

4.2(6) When materials and constructions not covered by the Eurocodes listed in 4.2(1) are used, documentation must be provided demonstrating that satisfactory safety conditions are in place.

*(4.2(6)) It may be advantageous to include test results, standards or generally recognised guidance notes and guidelines in the documentation provided that the safety level, including any third party monitoring, is equivalent to that specified in 4.2(1)-(4).*

4.2(7) Garages, carports, roofed-over terraces, outbuildings, greenhouses and similar buildings; and equipment houses for electronic communications networks; or facilities with an area of no more than 50 m<sup>2</sup> may be built without figures and calculations demonstrating their strength and stability.

*(4.2(7)) These buildings are still covered by 4.1.*

4.2(8) The provisions of 4.2(1) apply to nursery/market garden hothouses/greenhouses and to canopied farm slurry lagoons, subject to the relaxation that the requirements in respect of snow loads may be reduced by 65%.

4.2(9) In the case of agricultural buildings, small-scale extensions adding a maximum floor area of 200 m<sup>2</sup> to existing agricultural buildings may, irrespective of the provisions of Part 4, be built in the same construction as the existing building.

### 4.3 Glazed panels, glass surfaces and structural glazing

4.3(1) Glazed panels, glass surfaces and structural glazing must be designed and constructed so as to provide satisfactory safeguards against personal injury.

*(4.3(1)) This provision covers design and construction of glass in roofs, walls, facades, doors, windows, ceilings, guardings etc.*

*Glazed panels in walls as well as glazed doors and glazed panels adjoining doors should be marked or screened. Manifestation should be positioned and designed so as to be conspicuous and clearly visible to all, including people with impaired vision. See 4.3 of SBi Guidelines 230, Guidelines on Building Regulations 2010.*

*Guarding fitted to glazed panels as a precaution against personal injury must be constructed in accordance with the provisions of Part 3.*

*See also DS/INF 119, Glass in buildings – Guidelines for the selection and the use of safety glass – Personal safety.*

### 4.4 Playground equipment etc.

4.4(1) Playground equipment etc. in playgrounds that are accessible to the public must be designed and built with satisfactory health and safety provision for the prevention of personal injury.

*(4.4(1)) See DS/EN 1176, parts 1-7, Playground Equipment and DS/EN 1177 – Impact-absorbing playground surfacing – Safety requirements and test methods, as well as DS/EN 12572, Artificial climbing structures – protection points, stability requirements and test methods. These state the specifications which must be met in order to provide as much protection as possible against the risks associated with children using playground apparatus. Other technical specifications may also be used provided they ensure equally satisfactory safety conditions. This provision also applies to skateboarding ramps etc.*

### 4.5 Accessible layout of user-operated installations

4.5(1) User-operated installations such as IT points, ATMs, self-service machines and similar installations for public-interfacing service functions must be erected so that they can be used by people with impaired functional abilities.

*(4.5(1)) The user-operated installations covered by these provisions also conform to the limitations specified in section 2(2) and (3) of the Building Act and the exceptions in 1.2.*

4.5(2) The access area in front of the user-operated installations must be at least 1.3 m wide and any differences in levels in the access area must be evened out.

*(4.5(2)) This requirement corresponds to the access requirement in respect of unbuilt areas for buildings specified in Part 2. This requirement may be complied with by evening out the ground level or by providing ramps as specified in Part 3.*

4.5(3) User-operated installations must be installed at a height that allows them to be operated by a person in a wheelchair.

*(4.5(3)) This requirement may also be satisfied by installing height-adjustable units.*

#### **4.6 Moisture and durability**

4.6(1) Buildings must be built so as to prevent water, moisture and damp from causing damage or undermining serviceability, impairing durability and vitiating health and safety conditions; see also Part 6 on indoor climate.

*(4.6(1)) Moisture effects may arise from rain, snow, surface water, groundwater, soil moisture, construction moisture, domestic water and humidity of the air, including moisture condensation.*

4.6(2) Buildings must be protected against detrimental accumulations of moisture condensation as a result of the movement of moisture-laden indoor air.

Buildings must also be protected against absorption of ground moisture.

4.6(3) Measures must be taken to divert surface water from around buildings, including any roof water discharged at ground level.

*(4.6(3)) For drainage systems, see 8.4.3.*

Measures must be taken to protect the building against ingress of water from groundwater and percolating surface water.

If drainage is used, this must be in accordance with the DS 436, Code of practice for the groundwater drainage of structures.

4.6(4) The building envelope must be built so as to seal it against ingress of rain and snow melt water.

Roofs must be built so as to allow rain and melt water from snow to run off in an appropriate manner. Roof water must be discharged into drains via gutters and/or rainwater downpipes. Unless the municipal council requires otherwise in individual cases, gutters may be omitted from buildings in particularly open locations, including holiday homes, and from garages, outbuildings and similar small buildings, provided the roof water does not represent a nuisance to a stretch of road or to an adjacent plot.

4.6(5) Wet rooms, including bathrooms, utility rooms and sanitary conveniences with floor gullies must comply with the following provisions:

- 1) Floors and walls must be constructed so as to resist the moisture and mechanical and chemical effects that normally occur in wet rooms.
- 2) Floors and flooring, including joints, connections, pipe penetrations etc. must be watertight.
- 3) Walls and wall linings, including joints, connections, pipe penetrations etc., must be watertight in the part of the room which is subject to the effects of water.
- 4) Water on the floor must drain away into a floor gully.

*(4.6(4)) The building envelope includes in this context roofs, external walls, doors, windows and ground slab (including any basement external walls and basement floors).*

*This will normally be achieved if the roof surface has a gradient of more than 1:40, corresponding to 2.5 cm per metre.*

*In the interests of groundwater resources and the operation of wastewater treatment plants, surface water and roof water may, subject to the approval of the municipal council, be discharged into a soakaway rather than the sewers; see the executive order on wastewater permits etc. issued by the Ministry of the Environment pursuant to Parts 3 and 4 of the Environmental Protection Act.*

*(4.6(5)) Note that sanitary accommodation without a floor gully is not deemed to be a wet room.*

*The areas in and around shower cubicles and bathtubs must be expected to be regularly subjected to the effects of water.*

*The By og Byg (SBi) Guidelines 200 set out guidance for building floors and walls in wet rooms, with examples of planning, design and construction of bathrooms in new and old dwellings.*

- 5) No pipe penetrations may be made in any part of a wet room which is expected to be regularly affected by water.
- 6) If stud walls and floor and wall constructions containing timber or other organic materials are used, an adequate waterproofing system must be in place.

#### 4.7 The building site

4.7(1) Building sites must be laid out so as to avoid causing nuisance to nearby plots or the public and private road and footpath areas.

Access to sites must be appropriately surfaced and maintained.

4.7(2) Satisfactory fire precautions must be in place on building sites and while building work is in progress.

*(4.7(1)) The executive order on the layout of building sites and similar places of work issued by the Danish Working Environment Authority also applies, as well as the executive order on building and civil engineering works during the period from 1 November to 31 March issued by the Danish Enterprise and Construction Authority.*

*(4.7(2)) See, inter alia, the National Building and Housing Agency circular giving instructions for fire precautions during building work on listed buildings; and Fire Technology Guideline no. 10, Hot work, issued by the Danish Institute of Fire and Security Technology (DBI).*

## 5. Fire safety

### 5.1 General

5.1(1) Buildings must be constructed, laid out and fitted out so as to achieve satisfactory protection against fire and the spread of fire to other buildings on the same and neighbouring plots. There must be appropriate provision for rescuing people and for fighting fires. Appropriate provision must be made in livestock housing for protecting livestock in the event of fire.

*(5.1(1)) The scope of fire safety documentation is specified in 1.3.*

*For fire safety measures in traditional buildings, including single-family houses, terraced houses and holiday homes as well as agricultural buildings, see the Danish Enterprise and Construction Authority's "Eksempelsamling om brandsikring af byggeri" [Collated examples of fire safety measures in buildings]; and for more non-traditional buildings see the Danish Enterprise and Construction Authority's "Information om brandteknisk dimensionering" [Information on structural fire design].*

*Buildings in which people assemble in large numbers and buildings used for activities involving a high risk of fire or for the storage of flammable items are also subject to current legislation in respect of emergency planning.*

*The basic premise of the provisions of the Building Act is the safety of people and animals. These provisions are therefore designed to ensure the means of evacuating people and acceptable arrangements for rescuing animals, as expressed in the provisions of the Building Regulations. This does not mean, however, that property in a building erected in accordance with the fire provisions is not protected. The requirements in respect of personal safety and facilitating firefighting and rescue activity are very closely linked with the risk of the spread of fire and the stability of the building, which is also critical to the protection of property. If a very high degree of protection of is required, however, it may be necessary to provide additional measures directed specifically at that.*

5.1(2) The fire safety of a building must be maintained throughout the lifetime of the building.

*(5.1(2)) For the fire safety of a building to be maintained throughout the lifetime of that building, the fire safety installations and building elements must be regularly checked and maintained. Note also that conversions of or other alterations to the*

*building must not be in breach of the rules governing fire safety. Note also that change of use of the building may necessitate modification of existing fire safety measures.*

*Agricultural buildings are exempt from the provisions of Part 5 except as they relate to*

- *General in 5.1,*
- *Escape routes in 5.2,*
- *Structural factors in 5.3 (apply only to livestock housing)*
- *Fire safety installations in 5.4 (apply only to livestock housing)*
- *Spread of fire and smoke in 5.5.*
- *Access for the emergency services in 5.6*

### 5.1.1 Usage categories

5.1.1(1) A building section must be assigned to one of the following usage categories depending on the use of the building section:

*(5.1.1(1)) A "building section" is one or more rooms with a comparable fire risk. Building sections also include corridors, staircases and rooms directly connected to the building section concerned; examples include small offices, stores and rooms containing sanitary conveniences.*

*A building may contain one or more building sections. "A modest number of people" normally means no more than 50 people in each room which constitutes its own fire-resisting unit.*

*A building section may consist of one or more fire-resisting units, which may be one or more fire compartments. A fire compartment is one or more rooms from which fire cannot spread to other fire compartments within the time required for evacuation and for the emergency services to rescue people and animals in adjacent fire compartments.*

*A fire-resisting unit may also consist of one or more fire sections. A "fire section" is a building or part of a building laid out such that fire cannot spread to other fire sections*

*in the time required for evacuation and for the emergency services to rescue people and extinguish the fire.*

*The following are examples of which building sections are typically assigned to which usage categories.*

*Note that it is the actual use that determines which usage category will apply to the building section.*

- Usage category 1 comprises building sections for day time occupancy, in which the people who normally occupy the building section are all familiar with the escape routes from the building section and capable of taking themselves unaided to a place of safety.
- Usage category 2 comprises building sections for day time occupancy by a modest number of people in each room, in which the people who occupy the building section are not necessarily familiar with the escape routes from the building section but are capable of taking themselves unaided to a place of safety.
- Usage category 3 comprises building sections for day time occupancy by large numbers of people, in which the people who occupy the building section are not necessarily familiar with the escape routes from the building section but are capable of taking themselves unaided to a place of safety.
- Usage category 4 comprises building sections for night time occupancy, in which the people who occupy the building section are familiar with the escape routes from the building section

*Usage category 1: Offices, industrial and warehouse buildings, agricultural buildings, garages, carports and outbuildings, equipment houses for electronic communications networks and services as well as certain car parks on one or more floors.*

*Usage category 2: Teaching rooms, school day-care centres and other after-school facilities, day centres and similar rooms occupied by no more than 50 people. Each room is a fire-resisting unit.*

*Usage category 3: Shops, places of public assembly, canteens, cinemas, restaurants, function rooms, certain parts of schools, sports halls, churches, discotheques, theatres, car parks in for example shopping centres, meeting rooms, concert halls, exhibition facilities, galleries and other similar rooms designed for more than 50 people.*

*Usage category 4: Blocks of flats, student and youth accommodation and single-family houses, semi-detached houses, terraced and linked houses, cluster houses and holiday homes.*

and are capable of taking themselves unaided to a place of safety.

- Usage category 5 comprises building sections for night time occupancy, in which the people who occupy the building section are not familiar with the escape routes from the building section but are capable of taking themselves unaided to a place of safety.
- Usage category 6 comprises building sections for day time occupancy, and in some cases also for night time occupancy, in which the people who occupy the building section are not capable of taking themselves unaided to a place of safety.

*Usage category 5: Hotels, student halls of residence/dormitories, youth hostels, inns and boarding houses.*

*Usage category 6: Assisted living facilities for the elderly, treatment and bedcare units in hospitals, care homes, prisons, residences and institutions for the physically or mentally disabled, day nurseries and pre-schools.*

## 5.2 Escape routes and rescue provisions

5.2(1) Buildings must be laid out so as to facilitate safe, easy evacuation via escape routes or directly to the outside. Evacuation must be to ground level outside or to a safe place in the building. Suitable provision must be made in livestock housing for both the livestock and the emergency services.

*(5.2(1)-(8)) Escape routes must also comply with the provisions of 3.2, Access/Accessibility.*

*A safe place in the building is a place where people/animals are not in imminent danger, and from which it is possible to evacuate them to ground level in the open air.*

5.2(2) Escape routes must be easy to identify, reach and use.

5.2(3) Exits and escape routes must be designed for the people whom the exits and escape routes are intended to serve. Doors on escape routes must be easy to open without keys or tools during the hours when the building is in use. Doors on escape routes which are used by large numbers of people must open in the direction of escape.

*(5.2(3)) In the context of escape routes, "large numbers of people" normally means more than 150 people using the escape route in question.*

5.2(4) Extreme temperatures, smoke concentrations, heat radiation or other factors that might obstruct evacuation must not be allowed to arise within the timescale within which the escape routes are used for evacuation.

5.2(5) Wall and ceiling finishes and flooring on escape routes must be formed such that they do not accelerate the spread of fire or smoke in the timescale within which the escape routes are used for evacuation.

5.2(6) A fire-resisting occupiable unit must have rescue openings as specified in 5.2(7) and 5.2(8) unless a corresponding safety level can be achieved by other means.

*(5.2(6)) A corresponding safety level can be achieved by, for example, providing at least two escape routes that are independent of each other.*

*In this context a fire-resisting unit might be a room, a fire compartment or a fire section.*

*In traditional buildings, exits to escape routes should be located at or immediately next to opposite ends of the room, and the distance from any point in the room to the nearest exit or door to an escape route should be no more than 25 m.*

5.2(7) The number of rescue openings in a fire-resisting unit must be appropriate for the number of people for which the room is designed. Rescue openings must be located and formed in such a way that people can make their presence known to the emergency services. They must also be formed such that people can be rescued via emergency services ladders or by themselves, unless the building is laid out as specified in 5.2(8).

*(5.2(7)) Rescue openings should be easy to identify, reach and use. Rescue openings cannot replace exits or escape routes.*

5.2(8) In a building in which the floor of the uppermost storey is more than 22 m above ground level, or in which not all rescue openings can be reached by emergency services ladders in accordance with 5.6.1(2), the design and fitting out of the building must make particular allowance for the evacuation of the building, the intervention time needed by the emergency services, and access to the storeys.

### 5.3 Structural factors

5.3(1) Construction products and building elements must be constructed such that people in or near the building can be brought to safety at ground level in the open air or to a safe place in the building, and such that the emergency services are able to rescue people, make satisfactory arrangements for animals and carry out firefighting work.

5.3(2) Building elements must be joined such that the entire structure is not inferior in fire-resisting terms to the requirements for the individual building elements in the structure.

5.3(3) Building elements must be made in such a way that fire cannot spread from a fire-resisting unit to a cavity which passes one or more fire-separating building elements.

*(5.2(8)) To comply with this provision, it may be necessary to provide facilities such as emergency stairs, a fire service lift, warning systems, automatic fire alarm systems, automatic sprinklers, riser pipes and constructional provision for residents to alert the emergency services etc. to their presence.*

*(5.3(1)) Load-bearing structures in traditional buildings may have a fire resistance as specified in "Eksempelsamling om brandsikring af byggeri" [Collated examples of fire safety measures in buildings]. For information on the design of the load-bearing capacity of structures subjected to fire, see the Eurocodes listed in 4.2. Other fire loads may be used if they are treated as parametric fires in accordance with DS/EN 1991-1-2, Actions on structures exposed to fire, with DS/EN 1991-1-2 DK NA and the fire load has been documented.*

*The national system for fire safety classification of construction products and building elements will be replaced over the coming years by the new European system. For each group of construction products, there will be a transition period when both the former and the new European systems may be used. During this period, the former and new European testing methods and classifications will exist side by side.*

5.3(4) In a building in which the floor of the uppermost storey is more than 22 m above ground level, the design of the load-bearing structures must take particular account of the evacuation of the building, of the intervention time needed by the emergency services and of access to storeys, the fire load etc.

## 5.4 Fire safety installations

5.4(1) Fire safety installations must be built to be reliable and so that they can be inspected and maintained throughout their lifetime.

5.4(2) Fire safety installations must be inspected and maintained such that they remain reliable throughout the lifetime of the building.

(5.4(1)-(2)) *"Fire safety installations" means:*

- *An automatic fire alarm system is a system that detects a fire in its initial phase and subsequently sends an alarm to the emergency services. The system can also activate other fire safety installations.*
- *An automatic sprinkler system is a system which uses water to extinguish a fire in its initial phase or to control a fire until other firefighting measures intervene, and which issues an alarm to the emergency services. The system can also activate other fire safety installations.*
- *A warning system warns people in the building in the event of fire. Warnings using spoken messages should be used in usage category 3. If warnings using spoken messages would be inadequate given the use to which the building section is put, the spoken message may be replaced by a more appropriate alarm, for example a high-pitched tone.*
- *A smoke alarm system may consist of linked smoke alarms. The smoke alarm system in a building should only give an alarm in the fire-resisting unit, for example a dwelling, in which the smoke has been detected. Smoke alarm systems do not issue an alarm to the emergency services.*
- *Escape lighting consists of illuminated, backlit or fluorescent (self-lit) escape route signs at exit doors on escape routes. Escape lighting also covers lighting of floor areas on escape routes and in large premises. Self-lit signs may only be used where sufficient charge for the appropriate light level is assured.*

- *Panic lighting is that part of the emergency lighting that serves to prevent panic and provide lighting which enables people to reach a point where there is an escape route.*
- *The purpose of hose reels is to enable people without special fire extinguishing qualifications to fight a fire during its initial phase.*

*Other fire safety installations such as riser pipes, fire ventilation and smoke vents are also covered by 5.4(1) and (2).*

5.4(3) When applying the provisions of 5.4(7) para 2, 5.4(9)-(11) and 5.4(14)-(15), two or more building sections in the same usage category connected by a shared escape route are deemed to be one section.

*(5.4(3)) In relation to the evacuation of people, it is often necessary to assess the need for fire safety installations on the basis of the total number of people who have to use the shared escape routes.*

*Therefore, when applying the provisions listed in 5.4(3), the total load from all building sections connected by shared escape routes should be factored in.*

*The same does not apply to the assessment of firefighting options in the individual fire-resisting units, for example the need for fire ventilation and sprinkler systems.*

*For information on multiple usage categories in the same building section, see 5.5.2(2).*

5.4(4) Building sections in usage category 1 must incorporate an automatic fire alarm system if the building section is used as an industrial or warehouse building and has a floor area of more than 2,000 m<sup>2</sup>. If the building section has an automatic sprinkler system, an automatic fire alarm system may be omitted.

This provision also applies to certain agricultural buildings used for livestock.

5.4(5) Building sections in usage category 1 used as industrial and warehouse buildings must incorporate automatic

sprinklers if the floor area is greater than 5,000 m<sup>2</sup>. If these building sections have a high fire load, they must have automatic sprinkler systems if the floor area is more than 2,000 m<sup>2</sup>. This provision does not apply to agricultural buildings.

5.4(6) Building sections in usage category 1 used as industrial and warehouse buildings and agricultural buildings used for livestock must be provided with hose reels if the floor area is greater than 1,000 m<sup>2</sup>.

5.4(7) Car parks in usage categories 1 and 3 must:

- 1) have independent mechanical ventilation that can remove explosive vapour and carbon monoxide if the floor area is greater than 150 m<sup>2</sup>,
- 2) have escape lighting and hose reels if the floor area is greater than 600 m<sup>2</sup>; and also panic lighting if the floor area is greater than 2,000 m<sup>2</sup>;
- 3) have automatic sprinkler systems if the floor area is greater than 2,000 m<sup>2</sup>.

5.4(8) Rooms in usage categories 1 and 3 with a floor area greater than 1,000 m<sup>2</sup> must incorporate an automatic fire ventilation system or an automatic sprinkler system.

(5.4(7)) See also 5.4(8).

*The ventilation system must comply with DS 428, Code for technical measures for fire protection in ventilation systems.*

*(5.4(8)) The purpose of this requirement is to ensure that the emergency services are given sufficient scope for intervention. This may be achieved by ensuring that a fire remains small, for example by limiting the spread using sprinklers, or, in the case of a fire ventilation system, by removing smoke and heat from the space/room.*

*In this context, a space/room need not be a fire-resisting unit.*

*This requirement may be deemed to have been satisfied in car parks with a floor area of between 1,000 and 2,000 m<sup>2</sup> if either automatic fire ventilation or automatic*

*sprinkler systems are in place, and in car parks with a floor area greater than 2,000 m<sup>2</sup> - see 5.4(7) - if automatic sprinkler systems are in place.*

5.4(9) Building sections and associated escape routes in usage categories 2 and 3 designed for more than 150 people must be provided with warning systems. In building sections in which all occupiable spaces/rooms have doors leading directly to ground level in the open air, and in which there are no rooms/spaces designed for more than 150 people, warning systems may be omitted.

5.4(10) Building sections for more than 150 people in usage category 2 must be provided with

- hose reels and
- escape and panic lighting

Escape and panic lighting may be omitted from escape routes if all occupiable spaces/rooms have direct access to the outside at ground level.

5.4(11) Escape routes designed for a total of more than 150 people in usage category 3 and in occupiable rooms/spaces for more than 150 people in usage category 3 must be provided with

- hose reels,
- escape and panic lighting and
- an automatic warning system if the way in which the building section is used undermines its evacuation options

*(5.4(11)) An automatic warning system is one which is connected to an automatic fire alarm system and therefore enables the alarm to be activated by sensors and alarm buttons.*

*Factors which can undermine evacuation options include loud music, darkness, stage smoke etc. The warning system should be connected to the music system, lighting system etc.*

In building sections in which all occupiable rooms/spaces have doors leading directly to the outside at ground level, and in which there are no rooms/spaces designed for more than 150 people, escape and panic lighting may be omitted.

5.4(12) Building sections in usage category 3 must incorporate an automatic sprinkler system if the building section has a total floor area greater than 2,000 m<sup>2</sup>.

5.4(13) Each residential unit in building sections in usage category 4 must have a smoke alarm system that is connected to the power supply and has battery backup.

*(5.4(13)) At least one smoke alarm should be fitted in each dwelling, but at least one on each floor. Fitting more than one smoke alarm in the dwelling permits the individual occupants to be given a quicker, more timely warning. It is important not to leave too great a distance between smoke alarms.*

5.4(14) Building sections in usage category 5 and associated escape routes must be provided with:

- 1) escape and panic lighting if the building section has a total floor area greater than 1,000 m<sup>2</sup>.
- 2) hose reels.
- 3) warning systems and automatic fire alarm systems if the building section has more than 10 bedrooms or is designed for more than 50 bedspaces.
- 4) smoke alarm systems connected to the power supply and using battery backup if the building section has no more than 10 bedrooms or is designed for no more than 50 bedspaces.
- 5) smoke alarm systems connected to the power supply and using battery backup if all bedrooms have doors leading directly outdoors at ground level. In this

case, hose reels, automatic fire alarm systems, escape and panic lighting and warning systems may be omitted.

5.4(15) Building sections in usage category 6 must be provided with:

*(5.4(15)) In the event of activation of a fire alarm system and/or automatic sprinkler system, the staff should also be alerted.*

- 1) hose reels.
- 2) automatic fire alarm systems, designed to give the alarm to staff.
- 3) automatic sprinkler systems if the building
  - has bedroom sections and
  - a total floor area greater than 1,000 m<sup>2</sup> and
  - is on more than one storey.The system must have the facility for giving the alarm to staff.
- 4) escape and panic lighting if the building
  - is on more than one storey or
  - has a bedroom section with a floor area greater than 1,000 m<sup>2</sup>.

5.4(16) Alarms from a warning system must be appropriate for the use and organisation of the building section. If the building is fitted with an automatic fire alarm system or an automatic sprinkler system, it must activate the warning system.

5.4(17) An automatic fire alarm system and an automatic sprinkler system must transmit an alarm to the emergency services.

5.4(18) The provisions of 5.4(4)–(17) may be derogated from if it can be demonstrated to the municipal council that the safety level specified in 5.1(1) can be achieved by other means.

### 5.5 Spread of fire and smoke

5.5(1) Buildings must be built, laid out and fitted out such that a fire can be contained within the fire-resisting unit in which the fire started. The spread of fire and smoke to other fire-resisting units must be prevented for the period of time needed for evacuation and for the work of the emergency services.

#### 5.5.1 Spread of fire and smoke in the room in which the fire starts

5.5.1(1) Internal surfaces must be such that they do not contribute significantly to fire or to smoke emission during the period of time needed to allow people occupying the room to reach safety.

#### 5.5.2 Spread of fire and smoke in the building in which the fire starts or to other buildings on the same plot

5.5.2(1) External surfaces and roofing must be built in such a way that they do not contribute significantly to the spread of fire.

5.5.2(2) Building sections in different usage categories must comprise independent fire-resisting units. Building sections must be further divided to make escape routes as safe as possible, and to allow people occupying rooms with only one escape route to remain safe until rescue can be expected. A building section may include several usage categories if compliance with the safety level specified in 5.1(1) can be ensured.

*(5.4(18)) Examples of permissible derogations from the provisions include:*

- *building sections built on the basis of structural fire design.*

*(5.5(1)) A building may usefully be subdivided into several fire-resisting units to ensure that fire and smoke cannot spread throughout the building.*

*(5.5.1(1)) Internal surfaces comprise wall and ceiling finishes and flooring. This provision also covers suspended ceilings, sound-absorbing products, decorations, notice boards, electrical cables, pipe lagging and similar surfaces in significant quantities.*

*(5.5.2(1)) The provisions of 5.5.2(1)–(4) also apply to agricultural buildings.*

5.5.2(3) Service shafts, stairwells, lift shafts etc. that connect several fire-resisting units must be separated in fire resistance terms from other parts of the building.

*(5.5.2(3)) If shafts etc. are not taken up through the roof space, a building element separating the fire sections should be provided between the shaft etc. and the roof space.*

5.5.2(4) Penetrations for services in fire-separating building elements must be sealed such that the fire-resisting properties of the compartmentations are not impaired.

*(5.5.2(4)) All penetrations for services in a fire-separating building element should be installed such that the fire resistance is not impaired.*

### **5.5.3 Spread of fire to buildings on other plots**

5.5.3(1) Buildings must be sufficiently far from common boundaries, roads or paths or must be so built as to eliminate the risk of the spread of fire to buildings on other plots.

*(5.5.3(1)) Note that the external surfaces of the building also have implications in terms of the risk of spread of fire to buildings on other plots.*

*This provision also applies to agricultural buildings.*

## **5.6 Access for the emergency services**

5.6(1) Buildings must be located on the plot and laid out in such a way as to give the emergency services sufficient scope for firefighting and rescuing people and animals. Access must be provided to the building itself and to its plot for the necessary fire appliances to rescue people and animals.

*(5.6(1)) The appropriate firefighting and rescue appliances are determined by the location, design, layout and use of the building.*

### **5.6.1 Access and facilities for the emergency services**

5.6.1(1) Unobstructed access for the emergency services to the building must be provided.

*(5.6.1(1)-(3)) The design and layout of fire rescue areas and vehicular access should, inter alia, take account of the surfacing and slope of the area and their location relative to the building, with the aim of ensuring the best possible working conditions for the emergency services.*

5.6.1(2) It must be possible for the emergency services to bring ladders to the rescue openings. In buildings where the rescue openings can only be reached by the emergency services' motorised ladders, fire rescue areas must be built and located such that the motorised ladders can reach all rescue openings. Buildings erected in accordance with 5.2(8) are not covered by this provision.

5.6.1(3) Buildings must be designed so as to enable the emergency services to take firefighting and rescue appliances to all parts of the building as appropriate. If hoses cannot be brought in via primary access routes such as staircases etc., riser pipes must be installed.

*(5.6.1(3)) See 8.4.*

### **5.6.2 Smoke venting**

5.6.2(1) The facility must be in place for smoke to be vented from the emergency services' primary access routes.

*(5.6.2(1)) The emergency services' primary access routes are normally the escape staircases.*

5.6.2(2) In building sections where smoke venting cannot be made by natural ventilation through windows in external walls or hatches in the roof, smoke venting must be established in some other way.

*(5.6.2(2)) The function of smoke venting is to give the emergency services the means of injecting cold smoke as part of a fire-fighting intervention.*

*Examples of sections in which it may be necessary to establish smoke venting, are basements, shafts and roof spaces. Venting must be provided for the section as a whole, for example in the form of cross-venting by means of openings at opposite ends of the section. Individual rooms do not necessarily have to be fitted with the means of venting smoke directly out into the open air.*

*An alternative to natural ventilation may be mechanical smoke venting.*

## 6. Indoor climate

### 6.1 General

6.1(1) Buildings must be constructed such that, under their intended operational conditions, a healthy, safe and comfortable indoor climate can be maintained in rooms occupied by any number of people for an extended period.

*(6.1(1)) Satisfactory health conditions in relation to buildings also include comfort and wellbeing.*

*The structural element of the indoor climate comprises thermal conditions (6.2), air quality (6.3), acoustic indoor climate (6.4) and light conditions (6.5). See SBi Guidelines 196, "Indeklimahåndbogen" [The Indoor Climate Handbook].*

*As far as the thermal indoor climate is concerned, the planning of buildings and the choice of materials, window areas, cooling options, orientation and solar screening must ensure that satisfactory temperature conditions are achieved, even in summertime.*

*Air quality is first and foremost determined by the ventilation achieved and by indoor pollution, including moisture production caused by the behaviour of the users. Building materials with the lowest possible emissions of pollutants should always be used.*

*As far as acoustic indoor climate is concerned, the structures must be designed and built such that they provide sufficient sound insulation between adjoining rooms and take external noise sources into account. Finally, satisfactory acoustic conditions in individual rooms require that the materials used for the surfaces in the rooms provide sufficient sound absorption to ensure the necessary sound attenuation.*

*With respect to light conditions, there should be an appropriate relationship between window sizes, room proportions and surface properties, taking the outdoor views into account. It is also important that the other factors which create the right visual environment should be suitable, which includes the facility for adjusting the lighting to suit the tasks carried out in the room.*

*With respect to risk of personal injury from electromagnetic radiation, building legislation contains no specific regulations, as they are not considered necessary: The problem is considered to be adequately addressed by other legislation.*

*There may, however, be particular circumstances of which a client should be aware when making structural alterations, for example when installing a roof terrace in the immediate vicinity of an existing mobile phone mast. In cases of doubt, the client should contact the operators of the mobile phone mast.*

6.1(2) Agricultural buildings are exempt from the requirements in respect of the indoor climate. The exemption does not apply to rooms/spaces where employees carry out ordinary commercial activities.

*(6.1(2)) Ordinary commercial activities do not include, for example, animal husbandry in livestock housing.*

## 6.2 Thermal indoor climate

6.2(1) Buildings must be constructed such that, under their intended operational conditions and at levels appropriate for the human activities to be carried out in them, comfortable, healthy temperatures can be maintained in the rooms occupied by any number of people for an extended period.

*(6.2(1)) Thermal indoor climate is determined by the temperature of the air and surfaces, the air velocity and turbulence intensity and, to a lesser extent, by the humidity of the air; and the level of thermal comfort can be determined in the context of the human activity and clothing. For functional requirements and methods of specification, verification and monitoring of the thermal indoor climate, see DS 474, Code for thermal indoor climate.*

*See also DS/EN ISO 7730, Ergonomics in the thermal environment – Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria.*

## 6.3 Air quality

### 6.3.1 Ventilation

#### 6.3.1.1 General

6.3.1.1(1) Buildings must be ventilated. Ventilation systems must be designed, built, operated and maintained such that they achieve no less than the intended performance while they are in use.

*(6.3.1.1(1)) Ventilation may be by systems for natural ventilation, mechanical or hybrid ventilation.*

*“Ventilation systems” refers to natural ventilation, hybrid and mechanical ventilation. “Ventilation installations” refers only to mechanical ventilation, including the mechanical part of hybrid ventilation. Ventilation systems must be built in accordance with 8.3.*

*The provisions on ventilation only address general ventilation needs. Additional ventilation may be needed in workrooms, for example, or rooms in a dwelling used for commercial activity. In such cases, requirements for additional ventilation apply pursuant to the Working Environment Act.*

*Provisions which address health-related factors, such as the ventilation provisions, must be complied with throughout the lifetime of a building.*

*Dwellings are normally deemed to be in use round the clock.*

*See also DS 447, Code of practice for mechanical ventilation installations; DS/EN ISO 7730, Ergonomics in the thermal environment – Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria; and WEA Guideline A.1.2, "Indeklima" [Indoor climate] issued by the Danish Working Environment Authority. For ventilation of rooms with heat producing appliances, see Part 8 and section A of the Danish Gas Regulations.*

*Cleaning standards in a room have a significant impact on air quality. See the executive order issued by the Ministry of Labour on the conditions at permanent places of work, as amended by Executive Order no. 721 of 22 June 2006 issued by the Ministry of Labour.*

6.3.1.1(2) Fresh air must be provided through openings directly to the external air or by ventilation installations with forced air supply.

*(6.3.1.1(2)) Ventilation openings directly to the external air may, for example, be fresh air vents or automatically controlled windows. The primary purpose of the openings is to ensure that fresh air enters the rooms in a controlled manner.*

*The openings should be able to filter incoming air as appropriate and should be located such that incoming air is as unpolluted as possible.*

*Ventilation openings directly to the external air should be made and should operate such that users are encouraged to use the openings as intended and to employ the options for adjusting the quantity and distribution of the intake fresh air correctly. A ventilation opening directly to the external air should therefore be adjustable, easy to regulate, and operable from room floor level.*

*See also 6.3.1.1(3) concerning draughts. There may also be a requirement for a degree of sound-proofing of ventilation openings; see 6.4.2(1). In cases where the fresh air supply is obtained through automatically controlled windows, the risk of burglary should be taken into consideration.*

6.3.1.1(3) The supply and removal of air must ensure that draughts do not arise during the heating season in rooms which are occupied by any number of people for extended periods.

*(6.3.1.1(3)) To avoid draughts, the air velocity in the occupiable zone in premises accommodating sedentary activity should not exceed 0.15 m/s. The draught limit depends on the level of activity and both the temperature and turbulence level of the air. The occupiable zone is that part of a room where people are expected to remain for an extended period. In the event of temperatures above 24°C in summer, higher air velocities are acceptable.*

6.3.1.1(4) Transfer of air from one room to another must not be from a more to a less air-polluted room.

*(6.3.1.1(4)) In dwellings, the rooms with higher air pollution will, for example, be kitchens, bathrooms, rooms containing sanitary conveniences and utility rooms. In industrial buildings, air should not be circulated from areas in which process-derived pollution is present in the air.*

6.3.1.1(5) Ventilation installations and ventilation openings directly to the external air must be designed and installed such that they do not transfer substances to the ventilated rooms, including micro-organisms, which render the indoor climate unhealthy.

### 6.3.1.2 Domestic buildings

6.3.1.2(1) Each habitable room, as well as the dwelling as a whole, must have a fresh air supply of no less than 0.3 l/s/m<sup>2</sup> of heated floor area. Kitchens must be provided with extractor hoods with exhaust ventilation above the cooker.

*(6.3.1.2(1)) In BR 10, the calculation of areas has been changed from the net internal area to the gross external area (floor area). The net internal area is the gross external area (floor area) with a deduction of the area of external walls and partitions. This does not therefore represent a reduction in the requirement for fresh air supply. The extractor hood must have adjustable mechanical extraction and vents to the external air and be sufficiently efficient to trap gaseous pollutants from food preparation.*

6.3.1.2(2) Single-family houses may be ventilated by natural or mechanical ventilation. 6.3.1.2(3) applies to single-family houses with mechanical ventilation.

(6.3.1.2(2)) *Single-family houses, which include holiday homes, semi-detached, terraced, cluster, linked houses etc., are buildings comprising one dwelling, where separation is not achieved by horizontal party walls.*

***Single-family houses ventilated by natural ventilation***

*Natural ventilation functions by air being supplied via valves in external walls and removed via natural updraught through exhaust ducts from kitchens and bathrooms/WCs above the roof.*

***Habitable rooms***

*Fresh air supply:*

*Opening windows, hatches or external doors and one or more fresh air vents with a total unobstructed opening of no less than 60 cm<sup>2</sup> per 25 m<sup>2</sup> room floor area. The opening area to the external air may be determined on the basis of ventilation engineering calculations.*

***Kitchens***

*Fresh air supply:*

*An opening of no less than 100 cm<sup>2</sup> onto an access space and an opening window, hatch or external door.*

*Removal of indoor air:*

*An exhaust duct with a cross section of no less than 200 cm<sup>2</sup>.*

***Bathrooms and rooms containing sanitary conveniences***

*Fresh air supply:*

*An opening of no less than 100 cm<sup>2</sup> onto an access space.*

*In addition, if the room comprises an external wall, an opening window, hatch or external door.*

*Removal of indoor air:*

*An exhaust duct with a cross section of no less than 200 cm<sup>2</sup>.*

***Separate utility rooms and rooms containing sanitary conveniences***

*Fresh air supply:*

*An opening of no less than 100 cm<sup>2</sup> onto an access space.*

*In addition, if the room comprises an external wall, it must have an opening window, hatch or external door.*

*Removal of indoor air:*

*An exhaust duct with a cross section of no less than 200 cm<sup>2</sup>.*

**Basement rooms**

*Supply of fresh air through one or more fresh air vents.*

*Removal of indoor air from at least one basement room via an exhaust duct with a cross section of no less than 200 cm<sup>2</sup>.*

6.3.1.2(3) In domestic buildings other than single-family houses with natural ventilation, the functional requirement in 6.3.1.2(1) applies; in addition, the background air changes in the housing unit must be provided by a ventilation installation with heat recovery, forced air supply in habitable rooms and extractors from bathrooms, sanitary conveniences, kitchens and utility rooms. In summer, air supply may be replaced by fresh air supply through windows, fresh air vents and the like

*(6.3.1.2(3)) In summer, there will be a need for additional ventilation to remove surplus heat. This ventilation may be natural, mechanical or hybrid ventilation.*

6.3.1.2(4) In domestic buildings other than single-family houses with natural ventilation, demand-controlled ventilation may be used provided that air changes by this means will be no lower than 0.3 l/s per m<sup>2</sup>.

*(6.3.1.2(4)) Demand control in dwellings will normally consist of control according to moisture conditions. Demand control can also, for example, include a manually operated extractor hood.*

6.3.1.2(5) It must be possible to increase air changes in kitchens, bathrooms, rooms containing sanitary conveniences, utility rooms and similar rooms to no less than the following: Extraction of a flow of 20 l/s from kitchens must be possible, and a minimum flow of 15 l/s from bathrooms and rooms containing sanitary conveniences. Extraction of a flow of 10 l/s must be possible from separate rooms containing sanitary conveniences, utility rooms and basement rooms.

6.3.1.2(6) For rooms other than those listed in 6.3.1.2(1)-(4), the approval of the municipal council is required for the design of the ventilation, taking account of the size and use of the room.

### 6.3.1.3 Buildings other than domestic buildings

6.3.1.3(1) Occupiable rooms in childcare institutions must be ventilated by ventilation installations comprising both forced air supply and exhaust and heat recovery. The ventilation must ensure a good, healthy indoor climate.

Fresh air supply and extraction must be no less than 3 l/s/child and no less than 5 l/s/adult plus 0.35 l/s/m<sup>2</sup> floor area. At the same time, it must be ensured that the CO<sub>2</sub> content of the indoor air does not exceed 0.1% for extended periods. If a ventilation system with demand-controlled ventilation is used, the specified air volumes may be deviated from when there is reduced demand. Ventilation during the

(6.3.1.2(5)) *In a 65 m<sup>2</sup> dwelling with one kitchen and one bathroom/WC, it must therefore be possible to increase ventilation to 0.54 l/s per m<sup>2</sup>, i.e. significantly more than the background air change in 6.3.1.2(1) of 0.3 l/s per m<sup>2</sup>.*

*In a 110 m<sup>2</sup> dwelling with one kitchen and two bathrooms/sanitary conveniences, it must be possible to increase ventilation to a total ventilation rate of 0.45 l/s per m<sup>2</sup>.*

*Supply of air to kitchens, bathrooms, rooms containing sanitary conveniences and any utility rooms:*

*An opening of no less than 100 cm<sup>2</sup> onto an access space.*

*In addition, if the room comprises an external wall, it must have an opening window, hatch or external door.*

(6.3.1.2(6)) *These may be, for example, washing and drying rooms, saunas, refuse rooms, lifts or car parks.*

(6.3.1.3(1)) *This applies, for example, to childcare institutions such as day nurseries, pre-schools, school day-care centres and other after-school facilities, day centres and other institutions with similar purposes.*

*The ventilation rate for the occupiable rooms is not in itself sufficient under all conditions to ensure that the CO<sub>2</sub> content of the indoor air does not exceed 0.1% CO<sub>2</sub> for extended periods. The ventilation system should therefore be fitted to provide variable output depending on the load, so that the air change rates are higher in the rooms that are most heavily loaded and lower in the rooms where there is less demand.*

hours of use may, however, not be less than 0.35 l/s per m<sup>2</sup> floor area.

*The ventilation rate for the building is specified on the basis of the assumption that low pollutant-emitting building materials are used. "Low pollutant-emitting building materials" means building materials catered for by the Danish Indoor Climate Labelling scheme and materials which comply with the conditions for labelling in accordance with the scheme. This provision must be read in conjunction with 3.4.2(2). The room floor area measured is the floor area.*

6.3.1.3(2) Teaching rooms in schools etc. must be ventilated by ventilation installations comprising both forced air supply and exhaust and heat recovery.

*(6.3.1.3(2)) The ventilation rate for normal classrooms is not in itself sufficient under all conditions to ensure that the CO<sub>2</sub> content of the indoor air does not exceed 0.1 percent for extended periods. The ventilation system should therefore be fitted with variable output depending on the load, so that the air change rates are higher in the rooms that are most heavily loaded and less in the rooms where the demand is less.*

Fresh air supply to and extraction from normal teaching rooms must be no less than 5 l/s/person plus 0.35 l/s/m<sup>2</sup> floor area. At the same time, the CO<sub>2</sub> content in the indoor air must not exceed 0.1% for extended periods.

*The ventilation rate for the building is specified on the basis of the assumption that low pollutant-emitting building materials are used. "Low pollutant-emitting building materials" means building materials catered for by the Danish Indoor Climate Labelling scheme and materials which comply with the conditions for labelling in accordance with the scheme. This provision must be read in conjunction with 3.4.2(2). The area measured is the floor area.*

If a ventilation system with demand-controlled ventilation is used, the specified air volumes may be deviated from when there is reduced demand. The ventilation during the hours of use may, however, not be less than 0.35 l/s per m<sup>2</sup> floor area.

Where special constructional allowances are in place, for example greater room volumes per person, the use of several extraction options, including cross-ventilation options, the requirement for mechanical ventilation may be waived provided that a comfortable, healthy indoor climate is maintained.

6.3.1.3(3) For rooms other than those listed in 6.3.1.3(1) and (2), the approval of the municipal council is required for the design of the ventilation, taking account of the size and use of the room.

*(6.3.1.3(3)) Note that natural ventilation may be sufficient in certain cases, but in other cases hybrid or mechanical ventilation should be stipulated in order to achieve a satisfactory indoor climate. Rooms whose ventilation needs can be met by natural ventilation may include offices, hotel rooms and certain types of shop premises. Rooms which require special consideration in respect of natural ventilation and which may require hybrid or mechanical ventilation might include office space for many people, assembly rooms, meeting rooms, canteens, restaurants and hospital rooms or wards. The capacity of the ventilation may, for example, be determined on the basis of DS 447, Code of practice for mechanical ventilation installations.*

*For ventilation in refuse rooms and lifts, see Part 8.*

## 6.3.2 Pollutants from building materials

### 6.3.2.1 General

6.3.2.1(1) Building materials must not emit gases, vapours, particles or ionising radiation that can result in an unhealthy indoor climate.

*(6.3.2.1(1)) Building materials with the lowest possible emissions of pollutants to the indoor climate should always be used. A labelling scheme for construction products, the Danish Indoor Climate Labelling scheme, has been set up; see [www.teknologisk.dk/dim](http://www.teknologisk.dk/dim)*

*The Danish Working Environment Authority has issued special regulations for handling certain building materials, such as those containing asbestos, mineral wool and fly ash, which must be complied with, whether the work is carried out for an employer or not.*

### 6.3.2.2 Formaldehyde

6.3.2.2(1). Wood-based sheets or panels, suspended ceilings and other construction products containing substances that emit formaldehyde may only be used if the emission of formaldehyde does not give rise to an unhealthy indoor climate.

*(6.3.2.2(1)) This provision covers construction products containing formaldehyde-emitting substances and therefore not construction products that are glued using products such as phenol, resorcinol or isocyanate glues without the addition of urea formaldehyde.*

*Construction products containing formaldehyde-emitting substances which are in contact with the indoor climate and are covered by a harmonised standard, must be CE marked and the CE marking must show that the construction product is covered by class E1.*

*When using timber sheets or panels glued with formaldehyde-emitting glues for floors, walls and ceilings, such as MDF and chipboard sheets, covering the sheets with a non-formaldehyde-emitting material is recommended, to minimise the quantity of formaldehyde in the indoor air. The covering could, for example, be plasterboard, roll flooring, timber floors or other flooring.*

*"Wood-based sheets or panels" means sheets or panels defined in DS/EN 13986 or similar sheets or panels containing formaldehyde-emitting glue.*

*WHO recommends that the total formaldehyde content of indoor air should not exceed 0.1 mg/m<sup>3</sup>.*

### 6.3.2.3 Asbestos

6.3.2.3(1) Materials containing asbestos are not to be used.

*(6.3.2.3(1)) The use of asbestos is universally prohibited; see the executive order on asbestos and WEA Guideline C.2.2, "Asbest" [Asbestos] issued by the Danish Working Environment Authority. See also SBi Guidelines 228, "Asbest i bygninger" [Asbestos in buildings] and SBi Guidelines 229, "Byggematerialer med asbest" [Building materials containing asbestos].*

### 6.3.2.4 Mineral wool

6.3.2.4(1) Mineral wool-containing materials with surfaces which are in contact with the indoor climate must be installed in a safe manner, and the materials used must be durable and fit for purpose, such that they do not emit mineral wool fibres into the indoor climate.

*(6.3.2.4(1)) This provision covers products with a woolly consistency and made of melted stone, slag or glass.*

*This provision covers, for example, certain ceilings, air supply ducts and sound attenuators in ventilation installations. This requirement does not apply to thermal insulation materials which are not directly connected to the indoor climate.*

*This requirement may be deemed to be satisfied if, for example, the materials have a surface treatment or are covered, encapsulated or otherwise sealed.*

### 6.3.2.5 Fly ash and slag from coal firing

6.3.2.5(1) Fly ash and slag from coal firing, used as a base for building, must be covered with a layer of gravel or similar, no less than 0.20 m deep and with a weight of 300 kg/m<sup>2</sup>.

*(6.3.2.5(1)) The waste from coal firing, for example from power stations, can contain radioactive substances from the coals which emit gamma radiation.*

*The indoor radiation contribution from a base comprising such material can be reduced by covering it, for example, with a gravel layer.*

*The backing must not cause damp problems to the structure.*

## 6.3.3 Other pollutants

### 6.3.3.1 Oxides of nitrogen

6.3.3.1(1) Oxides of nitrogen emitted to the indoor climate from combustion in cookers, central heating boilers etc. must be restricted by the removal of the flue gases.

*(6.3.3.1(1)) In the case of kitchens, this requirement will normally be met by the requirements stipulating an extractor hood; see 6.3.1.2(1). See also the Danish Gas Regulations*

### 6.3.3.2 Radon

6.3.3.2(1) Ingress of radon to the indoor climate must be limited by making the structure which is in contact with the sub-soil airtight or by using other measures to equal effect.

*(6.3.3.2(1)) Radon is a radioactive gas found in the soil. Radon must be prevented from entering buildings by making foundations, ground slabs, room floors, basement floors and basement external walls airtight, for example by forming the structures of carefully placed concrete to achieve a good, uniform and crack-free structure, and by sealing pipe and duct penetrations through these building elements.*

*See "Byggeteknisk Erfaringsformidling, BYG-ERFA blad SJB (99) 02 09 27, Radonforebyggelse og afhjælpning" [Construction Experience Sharing BYG-ERFA paper SJB (99) 02 09 27, Radon – prevention and remediation] and the Danish Enterprise and Construction Authority guidance "Radon i enfamiliehuse" [Radon and single-family houses].*

*The Danish Enterprise and Construction Authority makes the following recommendations for radon in the indoor climate in existing buildings:*

*International recommendations are that a national reference level for existing dwellings between 100 og 300 Bq/m<sup>3</sup> should be adopted.*

*On this basis, the Danish Enterprise and Construction Authority recommends that simple and cheap improvements be made to existing buildings when the radon level is between 100 Bq/m<sup>3</sup> and 200 Bq/m<sup>3</sup>, and that more effective measures be taken when the radon level exceeds 200 Bq/m<sup>3</sup>. See the Danish Enterprise and Construction Authority's guidance on radon and single-family houses.*

6.3.3.2(2) The building must be constructed to ensure that the radon content does not exceed 100 Bq/m<sup>3</sup>.

*(6.3.3.2(2)) If radon is to be measured, the measurements should be taken over at least 2 months in the heating season, and the measurements should result in a calculated mean radon concentration over the entire year – a mean annual value for the house.*

*See also the Danish National Institute of Radiation Protection, the National Board of Health; website:  
[www.sst.dk/straalebeskyttelse](http://www.sst.dk/straalebeskyttelse).*

### 6.3.3.3 Other pollution from the subsoil

6.3.3.3(1) Pollution from former refuse tips, gas works, polluted industrial sites etc., resulting in an unhealthy or unsafe indoor climate is not to be permitted. Should the plot be developed without full prior remediation of pollution in the soil, the influx of soil pollution to the indoor climate must be limited by ensuring that the structure which is in contact with the subsoil is airtight and impermeable or by using other measures to equal effect. In exceptional cases, where the plot, prior to construction work, is not remediated, partly for the protection of the groundwater and the upper layers of the subsoil, the municipal council may impose further requirements.

*(6.3.3.3(1)) Soil pollutants can seep up into buildings by convection and diffusion through foundations, ground slabs, room floors, basement floors and the external basement walls. Convection can be prevented by making the structure airtight, for example by careful construction in concrete to achieve a good, uniform and crack-free structure. Diffusion can be reduced by making the structure diffusion-proof, for example by using a moderate grade eco-friendly concrete with a content of no more than 5% of porous particles. See DS/EN 1992-1-1, Design of concrete structures.*

*See also the Soil Pollution Act and its requirements for outdoor areas.*

## 6.4 Indoor climate - acoustics

### 6.4.1 General

6.4.1(1) Buildings must be planned, designed, built and fitted out so as to ensure satisfactory sound conditions for the users.

*(6.4.1(1)) Definitions and concepts with regard to airborne sound insulation, impact sound and sound pressure levels are set out in DS 490, Sound classification of dwellings.*

*The concepts of reverberation time and absorption area are also used, as defined in DS/EN 12354-6, Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 6: Sound absorption in enclosed spaces.*

*Check measurements of sound conditions must be made in accordance with SBI Guidelines 217, “Udførelse af bygningssakustiske målinger” [Performing building acoustics measurements].*

*Regulations on sound conditions and noise are also set out in executive orders, guidance notes and guidelines issued by the Danish Working Environment Authority and the Danish Environmental Protection Agency.*

### 6.4.2 Domestic and similar buildings used for overnight accommodation

6.4.2(1) Domestic and similar buildings used for overnight accommodation, and ancillary services, must be designed such that those who occupy the buildings are not subjected to noise nuisance from rooms in adjoining residential and commercial units, from the building services or from nearby roads and railways.

*(6.4.2(1)-(4)) “Domestic buildings” in this context also includes hotels, student halls of residence/dormitories, boarding houses, inns, bedsits, boarding schools, sheltered housing, residential childcare institutions and similar buildings used for overnight accommodation.*

*“Common space” means, for example, occupiable space shared by several domestic buildings; and stairwells or corridors.*

*The functional requirement for domestic buildings is deemed to be met if they are built as class C in DS 490, Sound classification of dwellings.*

*For the limit values of the above standard for traffic noise indoors, the following applies for compliance with the functional requirement: The limit value applies to buildings along roads and railways where the traffic intensity generates a noise level at any individual building of more than 58 dB*

*for roads and 64 dB for railways. The limit value is expressed as the  $L_{den}$  value. The limit value applies separately to roads and railways.*

*In the case of domestic buildings, the functional requirement for the noise level indoors in habitable rooms generated by building services in commercial units in the same building is deemed to be met if the noise level does not exceed values corresponding to the guideline limit values specified in Table III of Guidance no. 5/1984 issued by the Danish Environmental Protection Agency.*

*Proposed limit values for low frequency noise and infrasound in habitable rooms are set out in Danish Environmental Protection Agency Orientation 9/1997.*

*The functional requirement for noise levels outdoors from building services is deemed to be met if the noise level does not exceed values corresponding to the guideline limit values for the night-time period specified in Table I of Guidance no. 5/1984 issued by the Danish Environmental Protection Agency.*

*DS 490, Sound classification of dwellings, also contains limit values for dwellings whose quality in terms of noise exceeds the minimum requirements of the Building Regulations – class B and class A.*

6.4.2(2) If rooms with particularly intrusive noise levels adjoin domestic buildings and common space, individual sound insulation measures must be taken.

6.4.2(3) Building services must not create uncomfortable noise levels immediately outside the windows of the buildings or in recreational areas, including balconies, roof terraces, outdoor spaces etc.

6.4.2(4) The reverberation time in common spaces must be adjusted to suit their use.

6.4.2(5) Only the above noise requirements for building services and traffic apply to rooms in detached single-family houses.

6.4.2(6) Only the above noise requirements for building services apply to holiday homes in designated “summer house” areas.

### 6.4.3 Buildings other than domestic buildings etc.

6.4.3(1) Buildings and their services must be designed so as to limit noise nuisance from adjoining rooms, from the services of the building and from nearby roads and railways. This must be to the extent required for the planned use of the buildings and such that the occupants of the buildings are not subjected to noise nuisance.

(6.4.3(1)) *Educational buildings include primary and secondary schools, educational institutions, universities etc.*

*In Part 6, “childcare buildings” means day nurseries, pre-schools, school day-care centres, after-school clubs etc.*

#### **Educational buildings**

*The functional requirement for educational buildings is deemed to be met if they are built in compliance with the following values:*

*Airborne sound insulation,  $R'_{w}$*

*Between teaching rooms and between teaching rooms and common space, horizontally  $\geq 48$  dB*

*Between teaching rooms and between teaching rooms and common space, vertically  $\geq 51$  dB*

*Between teaching rooms with connecting doors (total sound insulation of wall with a door, folding and mobile walls, glazed panels etc.)  $\geq 44$  dB*

*Between teaching rooms and common space with connecting doors (total sound insulation of wall with a door, folding and mobile walls, glazed panels etc.)  $\geq 36$  dB*

*For flexible partitions in open plan teaching areas  $\geq 20$  dB*

*Between teaching rooms for woodwork and other teaching rooms or common space  $\geq 60$  dB*

*Between teaching rooms for woodwork and common space with connecting doors (total sound insulation of wall with a door, folding and mobile walls, glazed panels etc.)  $\geq 44$  dB*

*Between teaching rooms for singing and music and between teaching rooms for singing and music and other teaching rooms or common space  $\geq 65$  dB*

*Between teaching rooms for singing and music with connecting doors (total sound insulation of wall with a door)  $\geq 55$  dB*

*Between teaching rooms for singing and music and common space with connecting doors (total sound insulation of wall with a door)  $\geq 50$  dB*

*Impact sound level,  $L'_{n,w}$*

*In teaching rooms  $\leq 55$  dB*

*In teaching rooms from room floors and slabs in teaching rooms for woodwork or for singing and music  $\leq 53$  dB*

### **Noise level**

*In teaching rooms from building services  $\leq 30$  dB*

*In teaching rooms from traffic  $\leq 33$  dB*

### *Childcare institutions*

*The functional requirement for childcare institutions is deemed to be met if they are built in compliance with the following values:*

*Airborne sound insulation,  $R'_{w}$*

*Between occupiable rooms used for quiet and/or noisy activities and between these rooms and other rooms  $\geq 48$  dB*

*Between occupiable rooms used for quiet and/or noisy activities and other rooms with connecting doors (total sound insulation for wall with a door etc.)  $\geq 40$  dB*

*Between occupiable rooms and between occupiable rooms and other rooms  $\geq 40$  dB*

*Between occupiable rooms with connecting doors and between occupiable rooms and other rooms with connecting doors (total sound insulation for wall with a door; etc.)  $\geq 30$  dB*

*Impact sound level,  $L'_{n,w}$*

*In occupiable rooms (from room floors of overlying rooms) and in occupiable rooms for quiet activities (from all floors)  $\leq 58$  dB*

*In occupiable rooms (from room floors in rooms on the same storey)  $\leq 63$  dB*

**Noise level**

*In occupiable rooms from building services*

$\leq 30$  dB

*In occupiable rooms from traffic  $\leq 33$  dB*

*See SBI Guidelines 218, "Lydforhold i undervisnings- og daginstitutionsbbygninger – Lydbestemmelser og anbefalinger" [Sound conditions in educational and childcare buildings – Sound requirements and recommendations].*

**Buildings for other purposes**

*In the case of buildings for other purposes, including office buildings, hospitals, medical centres and clinics, project-specific noise provisions should be determined in each individual case to comply with the requirements for the acoustic indoor climate.*

*Noise levels indoors in offices from businesses in the same building are subject to the guideline limits in Table III of Guidance no. 5/1984 issued by the Danish Environmental Protection Agency.*

*Proposed limit values for low frequency noise and infrasound in occupiable rooms and offices can be found in Orientation no. 9/1997 issued by the Danish Environmental Protection Agency.*

6.4.3(2) If rooms with particularly high noise nuisance limits adjoin teaching rooms or occupiable rooms, separate sound insulation measures must be taken.

*(6.4.3(2)) For teaching rooms or occupiable rooms in childcare in buildings in which there are rooms with noisy activities in commercial units or other educational and childcare institutions in the same or adjoining buildings, the functional requirement is deemed to be met if the building is built in compliance with the following values:*

*Airborne sound insulation,  $R'_{w}$*

*Between teaching rooms or occupiable rooms in childcare institutions and adjoining rooms in commercial units or other educational institutions or childcare institutions  $\geq 60$  dB*

*Impact sound level,  $L'_{n,w}$*

*In teaching rooms or occupiable areas in childcare institutions from room floors and slabs in adjoining rooms in commercial units or other educational institutions or childcare institutions  $\leq 48$  dB*

6.4.3(3) The reverberation time in rooms in buildings must be adjusted to suit the use of the rooms.

**(6.4.3(3)) Educational buildings**

*The functional requirement for educational buildings is deemed to be met if they are built in compliance with the following values:*

*Reverberation time,  $T$*

*Classrooms  $\leq 0.6$  s*

*Teaching rooms for woodwork  $\leq 0.6$  s*

*Teaching rooms for singing and music smaller than  $250 \text{ m}^3$  (choral and acoustic music)  $\leq 1.1$  s*

*Teaching rooms for singing and music smaller than  $250 \text{ m}^3$  (electrically amplified)  $\leq 0.6$  s*

*Gymnasia smaller than  $3500 \text{ m}^3$   $\leq 1.6$  s*

*Gymnasia larger than  $3500 \text{ m}^3$   $\leq 1.8$  s*

*Indoor swimming pools smaller than  $1500 \text{ m}^3$   $\leq 2.0$  s*

*Indoor swimming pools larger than  $1500 \text{ m}^3$   $\leq 2.3$  s*

*Common space and shared corridors used for group work etc.  $\leq 0.4$  s*

*Shared corridors not used for group work etc.  $\leq 0.9$  s*

*Stairwells  $\leq 1.3$  s*

*Absorption area,  $A$*

*Open plan teaching areas*

$\geq 1.3 \times \text{room floor area}$

*Common space with a ceiling height greater than  $4 \text{ m}$  and a room volume greater than  $300 \text{ m}^3$   $\geq 1.2 \times \text{room floor area}$*

**Childcare institutions**

*The functional requirement for childcare institutions is deemed to be met if they are built in compliance with the following values:*

*Reverberation time,  $T$*

*Occupiable rooms  $\leq 0.4$  s*

*Absorption area,  $A$*

*Occupiable rooms with a ceiling height greater than  $4 \text{ m}$  and a room volume greater than  $300 \text{ m}^3$*

$\geq 1.2 \times \text{room floor area}$

See SBi Guidelines 218, “Lydforhold i undervisnings- og daginstitutionsbbygninger – lydbestemmelser og anbefalinger” [Sound conditions in educational and childcare buildings – Sound requirements and recommendations].

#### **Buildings for other purposes**

*In the case of buildings for other purposes, including office buildings, hospitals, medical centres and clinics, project-specific noise provisions should be determined in each individual case to comply with the requirements for the acoustic indoor climate.*

## **6.5 Light conditions**

### **6.5.1 General**

6.5.1(1) Workrooms, occupiable rooms, habitable rooms and shared access routes must have satisfactory lighting without causing unnecessary heat loads.

*(6.5.1(1)) Satisfactory light must be assessed in the context of the activities and tasks intended to be carried out in the room.*

*The requirement for daylight must be viewed in the context of the general health aspects of daylight. The quantity of daylight also affects the energy consumption for electric lighting.*

### **6.5.2 Daylight**

6.5.2(1) Workrooms, occupiable rooms in institutions, teaching rooms, dining areas, hereinafter called “workrooms etc.”, and habitable rooms must have sufficient daylight for the rooms to be well lit. Windows must be made, located and, where appropriate, screened such that sunlight through them does not cause overheating in the rooms, and such that nuisance from direct solar heat gain is avoided.

*(6.5.2(1)) In workrooms etc., the daylight can usually be taken to be sufficient if the glazed area of side lights corresponds to a minimum of 10% of the room floor area or, in the case of rooflights, no less than 7% of the room floor area, assuming that the light transmittance of the glazing is no less than 0.75. The 10% and 7% are guidelines assuming a normal location of the building and a normal layout and fitting out of the rooms. If the type of window is not known at the time of design, the frame clear area can be converted to the glazed area by multiplying the clear frame area by a factor of 0.7. The glazed area must be increased in proportion to any reduction in light transmittance (for example solar control glazing) or reduced light ingress to the windows (for example nearby buildings). Daylight may similarly be deemed to be adequate when calculation or measurement can demonstrate that there is a daylight factor of 2% at the workplaces. When determining the daylight factor, account must be taken of actual conditions, including the design of the windows, the light transmittance of the*

*pane and the nature of the room and of the surroundings. See By og Byg (SBI) Guidelines 203, "Beregning af dagslys i bygninger" [Calculation of daylight in buildings] and SBI Guidelines 219, "Dagslys i rum og bygninger" [Daylight in rooms and buildings].*

6.5.2(2) Workrooms etc. must be fitted with windows providing those in the rooms with a view of the surroundings.

*(6.5.2(2)) The view of the surroundings is one of most important factors in the experience of the room. Workrooms etc. that are primarily illuminated via rooflights must always be fitted with windows in walls to provide views of the surroundings.*

6.5.2(3) Derogation from this requirement for daylight access is possible if compliance would be materially detrimental to the operation of the commercial activity, for example where the nature of the production does not permit daylight.

### 6.5.3 Electric lighting

6.5.3(1) Workrooms etc. and shared access routes must have artificial lighting as necessary. In the types of workrooms covered by the DS 700 series, Artificial lighting in workrooms, these standards must be used.

*(6.5.3(1)) See the following standards: DS 700, Artificial lighting in workrooms; DS 703, Directions for lighting in hospitals; DS 704, Lighting. Definitions; DS 705, Artificial lighting in dental consulting rooms; DS 707, Sports lighting. Semi-cylindrical illumination; DS/EN 12193, Light and lighting. Sports lighting.*

6.5.3(2) Workrooms etc. and shared access routes must be provided with energy-efficient lighting. If there is sufficient daylight, workrooms etc. and shared access routes must be fitted with daylight control.

*(6.5.3(2) and (3)) Energy-efficient lighting partly means the use of luminaires with an efficiency for general lighting of over 50 lm/W and for effect lighting and working lamps of over 15 lm/W.*

*Daylight control may be omitted in rooms with limited daylight entry.*

6.5.3(3) Workrooms etc. with occasional usage and shared access routes must be provided with movement sensors. The use of movement sensors may be omitted if switching off a light may lead to a risk of accidents, or if the luminaires are not suitable.

*(6.5.3(3)) This provision also applies to bathrooms and rooms containing sanitary conveniences associated with workrooms etc. In, for example, warehouses where trucks are used, movement sensors may constitute a risk of accidents. Energy-efficient luminaires such as vapour lamps are not suitable for daylight control or the use of movement sensors.*

6.5.3(4) Lighting systems in workrooms etc. must be divided into zones and be available for use as appropriate according to daylight conditions and activities.

*(6.5.3(4)) Zoning ensures the provision of the means of limiting the period of usage as far as possible. This provision means, for example, that light fittings near windows could form one zone, while fittings located within the room form one or more discrete zones. This provision can be complied with by installing manual and/ or automatic switches for each zone*

6.5.3(5) The provisions of 6.5.3(1)-(4) may be deviated from if compliance would seriously hinder the running of the enterprise.

6.5.3(6) The provisions of 6.5.3(1)-(5) also apply when replacing fittings etc. in existing workrooms.

## 7. Energy consumption

### 7.1 General

7.1(1) Buildings must be constructed so as to avoid unnecessary energy consumption for heating, hot water, cooling, ventilation and lighting while at the same time achieving healthy conditions.

The same applies to conversions and any other significant alterations to buildings covered by 7.4.

*(7.1(1)) 7.2 applies to new buildings with the exception of holiday homes.*

*7.3 covers change of use of existing buildings and new extensions to existing buildings.*

*7.4 covers conversions of and alterations to existing buildings.*

*7.5 covers new holiday homes, extensions and alterations to existing holiday homes.*

*7.6 covers minimum requirements for the individual building elements in new buildings or change of use and extensions to existing buildings and holiday homes.*

*Part 7 contains provisions derived from Directive 2002/91/EC on energy performance of buildings.*

*See SBI Guidelines 213, "Bygningers energibehov" [Energy demands of buildings].*

*Regulations on certification of the energy performance of new buildings and certification of conversions can be found in the relevant executive order issued by the Danish Energy Authority.*

7.1(2) Any cold bridges in building elements which face the outside, including windows and doors, must be insignificant. The energy implications of cold bridges must be factored into calculations of heat loss from each building element.

*(7.1(2)) This provision helps to minimise the risk of condensation and the growth of mould, and to limit heat loss through the individual building elements. This provision may be disregarded as far as handles and locks on windows and doors are concerned.*

7.1(3) Buildings and building elements, including windows and doors, must be built such that the heat loss is not significantly increased as a result of moisture, wind or unintended passage of air.

*(7.1(3)) Entrances to hotels, large shop premises and access to heated stairwells should normally be fitted with a storm porch.*

*Thermal insulation subject to wind loading should be covered with a windproof material.*

7.1(4) Heat loss through building elements in buildings heated to a minimum of 5°C must comply with the provisions of 7.

7.1(5) Building elements limiting rooms/spaces which are subjected to significant waste heat, such as boiler houses and bakeries, or which are only briefly, if ever, heated to above 5°C, must be thermally insulated as appropriate for their function.

*(7.1(5)) Building elements in rooms/spaces where temperatures are high must be insulated in order to achieve comfortable conditions.*

*Insulation of buildings which are heated for a short duration must be based on a cost-benefit analysis or comfort considerations.*

7.1(6) The calculation of transmission areas, transmission loss and heat loss framework must use the DS 418, Code of Practice, Calculation of heat loss from buildings.

The insulation properties of materials must be determined in accordance with relevant DS/EN standards.

7.1(7) The provisions of Part 7 do not apply to horticultural hothouses or greenhouses.

*(7.1(7)) This exemption applies to commercial hothouses/greenhouses. However, the exemption does not apply to sales areas, offices or communal spaces.*

7.1(8) Holiday homes are not covered by the provisions of 7.2, 7.3 and 7.4. Unheated buildings or buildings heated to below 5°C are not covered by 7.2-7.6.

## **7.2 Energy performance frameworks in new buildings**

### **7.2.1 General**

7.2.1(1) The energy performance framework covers the total requirements of the building for supplied energy for heating, ventilation, cooling, domestic hot water and, where appropriate, lighting.

*(7.2.1(1)) "Supplied energy" means purchased energy supplied to the property, for example in the form of natural gas, oil, district heating, district cooling, groundwater cooling, electricity or biomass.*

*As buildings normally have several types of energy supply, the total weighting is as stated in Appendix 6.*

Energy provided by different types of energy supply must be weighted. Appendix

6, containing design assumptions, must be used to demonstrate compliance with the energy performance framework.

7.2.1(2) Buildings must be designed such that the energy demand pursuant to 7.2.1(1) does not exceed the energy performance framework set out in 7.2.2 and 7.2.3.

*(7.2.1(2)) The calculation of the energy demand must take account of the envelope of the building, the location and orientation of the building, including daylight and outdoor climate, the heating system and hot water supply, the heat-accumulating properties of the building, ventilation installations and any cooling, sunlight entry and solar screening and the planned indoor climate.*

*Lighting must also be included in the energy demand of buildings covered by 7.2.3.*

*When determining the energy demand, account may also be taken of such factors as the use of solar heating, solar photovoltaic cells, heat pumps, mini CHP plants (combined heat and power), condensing boilers, district heating, district cooling, ground-water cooling, use of heat recovery and cooling by night ventilation.*

7.2.1(3) In mixed-use buildings to which different energy performance frameworks apply, the overall heated floor area of the building must be subdivided into building sections with the same usage. This subdivision must be used to determine the energy performance framework for the whole building.

*(7.2.1(3)) This provision applies, for example, to buildings used for both shops and dwellings.*

7.2.1(4) Air changes through leakage in the building envelope must not exceed 1.5 l/s/m<sup>2</sup> of the heated floor area when tested at a pressure of 50 Pa. In the case of low energy buildings air changes through the building envelope must not exceed 1.0 l/s pr. m<sup>2</sup>. The result of the pressure test must be expressed as the average of measurements using overpressure and un

*(7.2.1(4)) Testing of air changes must be determined on the basis of DS/EN 13829, Thermal performance of buildings – Determination of air permeability of buildings – Fan pressurisation method.*

*The municipal council may require documentation of air changes; see 1.4(2).*

derpressure. In the case of buildings with high ceilings, in which the surface area of the building envelope divided by the floor area is greater than 3, air changes must not exceed 0.5 l/s per m<sup>2</sup> of the building envelope and in the case of low energy buildings 0.3 l/s per m<sup>2</sup>.

7.2.1(5) If air change rates have been tested, the test results may be used to calculate the energy consumption through ventilation. If there is no documentation, 1.5 l/s/m<sup>2</sup> at 50 Pa must be used.

7.2.1(6) The provisions of 7.2.1(4) and (5) do not apply to buildings heated to below 15°C.

7.2.1(7) Insulation of individual building elements in the building envelope must be at least on a par with the values stated in 7.6.

7.2.1(8) Buildings covered by the requirements of 7.2.2 or 7.2.3 must be built such that the design transmission loss does not exceed 5 W per m<sup>2</sup> of the building envelope in the case of single-storey buildings, 6 W for two-storey buildings and 7 W for buildings with three storeys or more.

The calculation does not factor in the area of windows and doors nor transmission loss through them.

7.2.1(9) "Heated floor area" in 7.2-7.4 means the total floor area of the storeys or parts thereof which are heated.

*In the case of large-scale buildings, air changes through leakage may be demonstrated for individual building sections.*

*(7.2.1(5)) This provision may be used by, for example, builders of standard houses who can use ongoing checks to demonstrate that their houses have low rates of air change.*

*(7.2.1(6)) It is at the client's discretion to impose enhanced requirements for air tightness and air tightness checks.*

*(7.2.1(7)) "Building envelope" means the building elements that enclose the heated floor area.*

*The areas must be determined in accordance with DS 418, Calculation of heat loss from buildings.*

*(7.2.1(8)) This provision ensures that the building envelope as a whole has reasonable insulating properties. The design transmission loss must be determined as specified in DS 418, Calculation of heat loss from buildings. For buildings with high ceilings and which are comparable with two-storey buildings or buildings with three storeys or more, the corresponding transmission loss must be, respectively, 6 and 7 W/m<sup>2</sup> of the building envelope. "Windows" includes rooflights and skylight domes.*

*(7.2.1(9)) The heated floor area does not include rooms/spaces which do not fall within the floor area of the building.*

7.2.1(10) Buildings covered by the low energy performance framework set out in 7.2.4 must be built such that the design transmission loss does not exceed 4.0 W per m<sup>2</sup> of the building envelope in the case of single-storey buildings, 5.0 W per m<sup>2</sup> for two-storey buildings and 6.0 W for buildings with three storeys or more.

The calculation does not factor in the area of windows and doors nor transmission loss through them.

7.2.1(11) For buildings supplied with district heating, an energy factor of 0.8 for district heating applies to verification of compliance with low energy performance framework.

### **7.2.2 The energy performance framework for dwellings, student accommodation, hotels etc.**

7.2.2(1) In the case of dwellings, student accommodation, hotels etc., the total demand of the building for energy supply for heating, ventilation, cooling and domestic hot water per m<sup>2</sup> of heated floor area must not exceed 52.5 kWh/m<sup>2</sup>/year plus 1650 kWh/year divided by the heated floor area.

*(7.2.1(10)) This provision requires low energy construction to ensure that the building envelope as a whole has reasonable insulating properties. The design transmission loss must be determined as specified in DS 418, Calculation of heat loss from buildings. For buildings with high ceilings and which are comparable with two-storey buildings or buildings with three storeys or more, the corresponding transmission loss must be, respectively, 5.0 and 6.0 W/m<sup>2</sup> of the building envelope. "Windows" includes rooflights and skylight domes.*

*(7.2.1(11)) The energy factor is used to calculate the requirement for supplied energy to low energy buildings fitted with district heating. For more details, see Appendix 6 and SBi Guidelines 213, "Bygningers energibehov" [Energy demands of buildings].*

*(7.2.2(1)) The energy performance framework applies to buildings in which the lighting system is not normally determined at the time of erection.*

*Calculations must take account of solar heat gain, body heat and the heat accumulating properties of the building.*

*Verification must be on the basis of a simplified calculation method, using monthly average weather data etc.; see Appendix 6.*

*Verification must be on the basis of SBi Guidelines 213, "Bygningers energibehov" [Energy demands of buildings]. This provision also applies to buildings with balanced mechanical ventilation and cooling.*

*The energy performance framework for dwellings, student accommodation, hotels etc. is expressed as follows:  $(52.5 + 1650/A)$  kWh/m<sup>2</sup>/year; where A is the heated floor area.*

### 7.2.3 Energy performance frameworks for offices, schools, institutions etc. not covered by 7.2.2

7.2.3(1) For offices, schools, institutions etc., the total demand of the building for energy supply for heating, ventilation, cooling and domestic hot water and lighting per m<sup>2</sup> of heated floor area must not exceed 71.3 kWh/m<sup>2</sup>/year plus 1650 kWh/year divided by the heated floor area.

*(7.2.3(1)) For offices, schools, institutions and other buildings, the energy performance framework can be expressed as follows:*

*$(71.3 + 1650/A)$  kWh/m<sup>2</sup>/year, where  $A$  is the heated floor area.*

*For offices, schools, institutions and other buildings, the energy performance framework can be expressed as follows:*

*$(71.3 + 1650/A)$  kWh/m<sup>2</sup>/year, where  $A$  is the heated floor area.*

7.2.3(2) A building heated to more than 5°C and up to 15°C must not have a demand for energy supplied for heating, ventilation, cooling, domestic hot water and lighting per m<sup>2</sup> of heated floor area in excess of 71.3 kWh/m<sup>2</sup>/year plus 1650 kWh/year divided by the heated floor area.

*(7.2.3(2)) See WEA guideline on temperatures at permanent places of work.*

*Regardless of temperature level, the energy performance framework must be determined using an indoor temperature of 15°C.*

7.2.3(3) In the case of buildings or building sections whose requirements include, for example, a high level of lighting, extra ventilation and high consumption of domestic hot water, or which are used for extended periods, or buildings with high ceilings, the energy performance framework must be increased by the resulting calculated energy consumption. Process energy such as ventilation of fume cabinets is not included in the energy performance framework.

*(7.2.3(3)) For limits on high levels of lighting, extra ventilation, high consumption of domestic hot water or use for extended periods, see SBi Guidelines 213, "Bygningers energibehov" [Energy demands of buildings]. Appendix 6 contains assumptions for calculating increments to the energy performance framework for buildings with high ceilings.*

## 7.2.4 Low energy buildings

### 7.2.4.1 Low energy performance framework for dwellings, student accommodation, hotels etc.

7.2.4.1(1) A building may be classified as a class 2015 low energy building when the total demand for energy supply for heating, ventilation, cooling and domestic hot water per m<sup>2</sup> of heated floor area does not exceed 30 kWh/m<sup>2</sup>/year plus 1000 kWh/year divided by the heated floor area.

*(7.2.4.1(1)) For class 2015 low energy buildings, the low energy performance framework is:*

$$(30 + 1000/A) \text{ kWh/m}^2/\text{year},$$

*where A is the heated floor area. The low energy class is expected to become the minimum requirement in 2015.*

### 7.2.4.2 Low energy performance framework for offices, schools, institutions etc. not covered by 7.2.4.1

7.2.4.2(1) Offices, schools, institutions and other buildings not covered by 7.2.4.1 may be classified as class 2015 low energy buildings when the requirement for supplied energy for heating, ventilation, cooling, domestic hot water and lighting per m<sup>2</sup> heated floor area does not exceed 41 kWh/m<sup>2</sup>/year plus 1100 kWh/year divided by the heated floor area.

*(7.2.4.2(1)) For class 2015 low energy buildings, the low energy performance framework is:*

$$(41 + 1000/A) \text{ kWh/m}^2/\text{year},$$

*where A is the heated floor area. The low energy class is expected to become the minimum requirement in 2015.*

7.2.4.2(2) For buildings or building sections in low energy class 2015 whose requirements include, for example, a high level of lighting, extra ventilation and high consumption of domestic hot water, or which are used for extended periods, or buildings with high ceilings, the energy performance framework must be augmented in proportion to the calculated increase in energy consumption. Process energy such as ventilation of fume cabinets is not included in the energy performance framework.

*(7.2.4.2(2)) For limits on high levels of lighting, extra ventilation, high consumption of domestic hot water or use for extended periods, see SBi Guidelines 213, "Bygningers energibehov" [Energy demands of buildings]. Appendix 6 contains assumptions for calculating increments to the energy performance framework for buildings with high ceilings. It must be expected that the increments necessitated by the requirements of building services will be reduced in line with forthcoming tightening of these requirements as they keep step with technological developments in the area.*

## 7.3 Change of use and extensions

### 7.3.1 General

7.3.1(1) The provisions of 7.3 may be used as an alternative to the provisions of 7.2 for extensions, change of use and conversion associated with a change of use.

(7.3.1(1)) “Change of use” means use for a different purpose that involves significantly higher energy consumption. Examples are:

- conversion of an outbuilding for accommodation.
- conversion of useable roof space for accommodation.

*A new loft or new dwellings on flat roofs are extensions.*

*If the energy performance framework is applied to extensions, it must be calculated on the basis of the total area of the building. The energy demand, on the other hand, is only calculated for the extension; see Appendix 6.*

*Services and their energy consumption are included in the same way as for a new building. This means, for example, that hot water consumption is calculated for an extension in which there is no plumbing system.*

7.3.1(2) In the case of detached portable buildings for temporary use, the provisions of Appendix 6 apply.

(7.3.1(2)) “Temporary use” means erection for 0-3 years in connection with, for example, renovation of schools or other buildings and meeting an acute requirement for space.

### 7.3.2 Thermal insulation of building elements

7.3.2(1) Building elements around rooms/spaces that are normally heated to a minimum of 15°C must have a heat loss of no more than as stated in the column marked temperature  $T > 15^{\circ}\text{C}$ ; the limit for building elements around rooms/spaces that are normally heated to more than 5°C and up to 15°C is as stated in the relevant column. For windows, doors, hatches, rooflights and skylight domes, the U values for the actual size apply:

Table of U values	U value W/m <sup>2</sup> K	
Rooms/spaces heated to	T > 15°C	5°C < T < 15°C
External walls and basement walls in contact with the soil.	0.15	0.25
Partition walls and suspended upper floors adjoining rooms/spaces that are unheated or heated to a temperature more than 5 K lower than the temperature in the room/space concerned.	0.40	0.40
Ground slabs, basement floors in contact with the soil and suspended upper floors above open air or a ventilated crawl space.	0.10	0.15
Ceiling and roof structures, including jamb walls, flat roofs and sloping walls directly adjoining the roof.	0.10	0.15
Windows, including glass walls, external doors and hatches to the outside or to rooms/spaces that are unheated or heated to a temperature more than 5 K below the temperature in the room/space concerned (does not apply to ventilation openings of less than 500 cm <sup>2</sup> ).	1.40	1.50
Rooflights and skylight domes.	1.70	1.80

Table of linear losses	Linjetab	W/m K
Rooms/spaces heated to	0.12	0.20
External walls and basement walls in contact with the soil.	0.03	0.03
Partition walls and suspended upper floors adjoining rooms/spaces that are unheated or heated to a temperature more than 5 K lower than the temperature in the room/space concerned.	0.10	0.10

7.3.2(2) The use of the U values and linear losses stated for extensions heated to no less than 15°C is subject to the total area of windows and external doors, including rooflights and skylight domes, glass walls and hatches to the outside comprising no more than 22% of heated floor area in the extension.

(7.3.2(2)) The area of windows and external doors must be in accordance with the rules specified in DS 418, Calculation of heat loss from buildings.

The calculation does not include the floor area and the area of windows and external doors in shops etc. on the ground floor.

7.3.2(3) In the case of a change of use, constructional factors may prevent full compliance with 7.3.2(1)-(2). The shortfall in efficiency must be compensated for by other energy solutions.

*(7.3.2(3)) It may, for example, be difficult to comply with the requirements for linear loss for existing windows and foundations. By way of alternative, a corresponding amount of energy can be saved, for example by additional insulation or installation of solar heating, a heat pump or solar photovoltaic cells.*

7.3.2(4) Structural alterations that increase energy consumption may be carried out provided that compensatory energy savings are made. The changes must comply with the associated requirements of 7.3.2(1).

*(7.3.2(4)) This provision applies, for example, to a proposal to fit new windows to a facade or roof. The reduced energy performance is compensated for by, for example, extra insulation, solar heating, a heat pump or solar photovoltaic cells.*

### **7.3.3 Heat loss framework for extensions**

7.3.3(1) U values and linear losses for extensions heated to no less than 15°C can be altered and window areas etc. increased, provided that heat loss from the extension is not greater than if the requirements of 7.3.2 were satisfied.

*(7.3.3(1)) The heat loss framework in this context only covers the extension. However, previous heat loss through the covered part of the existing building may be allowed for in the heat loss framework. This does not apply to rooftop dwellings.*

However, insulation of the individual building elements must be at least on a par with the U values and linear losses specified in 7.6.

## **7.4 Conversion and other alterations to the building and replacement of boilers etc.**

### **7.4.1 General**

7.4.1(1) Churches, listed buildings and buildings which form part of a scheduled ancient monument; buildings worthy of preservation and covered by a protective town planning by-law, a local preserva-

*(7.4.1(1)) Section 22 of the Building Act provides that exemptions from the provisions of 7.4.2 and 7.4.3 may be granted if warranted by architectural or structural considerations.*

tion plan or a registered preservation order; and buildings designated in the municipal plan as worthy of preservation are exempt from the provisions of 7.4.2, 7.4.3 and 8.6.2(2).

7.4.1(2) Cost-effective energy-saving measures for insulation of external walls, room floors, ceilings and windows etc. are listed in 7.4.2.

Depending on the structural form and the extent of insulation of the building, there may be solutions that are not cost-effective; there may also be solutions which could not be carried out without detriment to moisture-proofing. Such works must not be carried out.

Appendix 6 contains guidance on the specification of works that are cost-effective.

In particular cases of complex building structures, the measures described in Appendix 6 cannot be carried out cost-effectively. In such cases the financial unviability must be verifiable.

7.4.1(3) For conversions, maintenance and replacement, the converted building element or component which is to be replaced must comply with the provisions of 7.4.2(1)–(7) and the provisions of Part 8. Regardless of cost-effectiveness, the work must not be carried out if it would be detrimental in terms of moisture-proofing.

Conversions carried out as part of a significant change of use are covered by 7.3 and must be implemented even if they may not be cost-effective.

*(7.4.1(2)) As a guide, structural measures are deemed to be cost-effective if the annual saving multiplied by the lifetime, divided by the investment, is greater than 1.33 which amounts to the measure concerned paying for itself within 75% of its expected lifetime. The design lifetimes are given in Appendix 6. In terms of moisture-proof insulation works, see SBi Guidelines 224, "Fugt i bygninger" [Moisture in buildings] and a range of construction experience of different solutions from BYG-ERFA [Construction Experience Sharing].*

*(7.4.1(3)) The implementation of energy-saving measures is limited to those measures that are sufficiently cost-effective provided they can be implemented without detriment to moisture-proofing.*

*Minimum requirements apply to a number of components and must be complied with regardless of cost-effectiveness.*

*If energy performance certification of the property has been carried out, cost-effective works will normally be those cited in the energy performance certificate (EPC)*

### 7.4.2 Specific measures for conversions, maintenance and replacement

7.4.2(1) Energy savings must be implemented if the conversion or alterations affect the building envelope. Specific measures only apply to that part of the building envelope which is affected by the alterations.

#### 7.4.2(2)

<b>Requirements for Insulation of the building envelope and linear losses</b>	
<b>Table of U values</b>	<b>W/m<sup>2</sup>K</b>
External walls and basement walls in contact with the soil.	0.20
Partition walls and suspended upper floors adjoining rooms/spaces that are unheated or heated to a temperature more than 5 K lower than the temperature in the room concerned.	0.40
Ground slabs, basement floors in contact with the soil and suspended upper floors	0,12
Ceiling and roof structures, including jamb walls, flat roofs and sloping walls directly adjoining the roof.	0.15
External doors, hatches, secondary windows and skylight domes	1.65
<b>Linear losses</b>	<b>W/mK</b>
Foundations.	0.12
Joint between external wall, windows or external doors and hatches.	0.03
Joint between roof structure and rooflights or skylight domes.	0.10

(7.4.2(2)-(7)) If it is decided to replace room floors, external walls, doors, windows or roof structure, 7.4.2(1), (2), (4), (5), (6) and (7) apply regardless of cost-effectiveness; but see 7.3.2(3).

The requirements of 7.4.2(2) apply to the actual sizes of external doors, hatches, secondary windows and skylight domes.

Cost-effective thermal insulation must be fitted in connection with maintenance of building elements.

Examples of retro-fitted insulation that is normally cost-effective can be found in Appendix 6 and on [www.bygningsreglementet.dk](http://www.bygningsreglementet.dk).

Examples of works where cost-effective insulation can be installed are:

- laying of new felt roof in the form of a new roof membrane or top felt on an existing roof
- a new tiled roof
- a new steel sheet roof on top of an old felted roof or a roof of fibre cement sheets

"Secondary windows" here means new or renovated windows with extra frame. "External doors" includes glazed external doors.

Linear losses are significant factors in relation to energy-efficiency and minimisation of indoor climate nuisances. The provisions relating to linear losses on replacement of windows, improvement of external walls or room floor constructions currently only apply if improvements are made at the same time to the elements that are causing the linear losses.

7.4.2(3) Constructional factors may render cost-effective compliance with the provisions of 7.4.2(2) impossible without detriment to moisture resistance.

There may, however, be less extensive work whereby energy demand can be reduced. If so, it is this work which is to be carried out.

7.4.2(4) When replacing windows, the energy gain through the window in the heating season must not be less than  $-33 \text{ kWh/m}^2/\text{year}$ .

7.4.2(5) When replacing rooflights, the energy gain through the window in the heating season must not be less than  $-10 \text{ kWh/m}^2/\text{year}$ .

7.4.2(6) The surface temperature of window frames in external walls must not be lower than  $9.3^\circ\text{C}$ .

*(7.4.2(3)) Cavity wall insulation is an example of a measure that does not comply with 7.4.2(2). Compliance will require external retro-fitted insulation with a new weathershield.*

*This may not be cost-effective in this particular case, whereas cavity wall insulation, which is less extensive work, may be highly cost-effective. Cavity wall insulation must therefore be installed.*

*(7.4.2(4)-(8)) The energy gain is calculated as stated in Appendix 6. The requirement applies to a reference window  $1.23 \text{ m} \times 1.48 \text{ m}$  fitted with the manufacturer's standard pane. For example, if a window is in the form of a "Dannebrog" type window or one fitted with a fresh air vent, the requirement for the reference window is still used, provided the window is fitted with the manufacturer's standard pane.*

*This provision also applies to the replacement of windows in commercial buildings.*

*In commercial buildings or other buildings with high solar gain, replacement of windows should be carried out in the context of a calculation or assessment of the indoor climate, in the interests of avoiding overheating. Window replacement can then be combined with, for example, external solar screening or solar control glass.*

*(7.4.2(5)) The energy gain for rooflights is based on the same window distribution as in Appendix 6 and a slope on the window of  $45^\circ$ .*

*(7.4.2(6)) The surface temperature requirement applies at  $20^\circ\text{C}$  indoors and  $0^\circ\text{C}$  outdoors.*

*Condensation on window frames is normally a result of high relative humidity in the room/space and areas around the window frames with low air movement. Poorly insulated window frames can exacerbate this problem. The surface temperature is calculated on the basis of DS/EN ISO 10077-2, Thermal performance of windows, doors and shutters – Calculation of thermal transmittance – Part 2: Numerical method for frames.*

7.4.2(7) There is no restriction in using noise-reducing and other functional glazing in connection with window replacement, provided the reference window using the manufacturer's standard pane complies with the requirement of energy gain. Other alternatives such as movable external solar screening should be considered before opting for solar control glass.

*(7.4.2(7)) In certain circumstances, special types of glazing are called for and may mean that the window concerned does not comply with the requirements for replacement in 7.4.2(4)-(6); but provided the window with the manufacturer's standard pane complies with the relevant provisions, the window may still be used.*

*Solar control glass may be an effective way of excluding solar heat gain. Unfortunately, solar control glass also means that solar heat gain is reduced at times of the year when it could be useful. Therefore, alternatives such as external solar screening should be considered.*

7.4.2(8) Provisions which are expected to be introduced in 2015

*(7.4.2(8)) Before the provision concerning surface temperature in 7.4.2(6) is amended, a detailed study will be carried out on condensation on window frames in dwellings with windows that comply with 7.4.2(6).*

In connection with the forthcoming tightening of the energy provisions in 2015, the following requirements are expected to be introduced:

- 1) When replacing windows after 1 January 2015, the energy gain in the heating season through the window must not be less than  $-17 \text{ kWh/m}^2/\text{year}$ .
- 2) When replacing rooflights after 1 January 2015, the energy gain in the heating season through the rooflight must not be less than  $0 \text{ kWh/m}^2/\text{year}$ .
- 3) When replacing rooflights after 1 January 2015, the U value of the rooflights including frames must not exceed  $1,40 \text{ W/m}^2\text{K}$ .
- 4) The provision for surface temperature of window frames in external walls will be re-assessed.

### 7.4.3 Major conversions and other energy-related alterations

7.4.3(1) In the case of major conversions and other energy-related alterations, the building envelope and services must be made to comply with the provisions of 7.4.2(1)-(8) and Part 8, provided that each individual measure is sufficiently cost-effective.

Conversion work which is necessitated by significant change of use is covered by 7.3 whose provisions must be implemented even if the alterations may not be cost-effective.

7.4.3(2) Major conversions and other alterations that are significant in terms of energy consumption are building works on the building envelope or installations which affect more than 25% of the building envelope, or whose value is higher than 25% of the value of the latest public property valuation, excluding the value of the plot.

7.4.3(3) In the case of single-family houses, the provisions of 7.4.3(1)-(2) only apply to that building element or installation work which is involved in the conversion or alteration.

*(7.4.3(1)) The implementation of energy-saving measures is limited to those measures that are sufficiently cost-effective.*

*If energy performance certification of the property has been carried out, such measures will usually be those cited on the energy performance certificate (EPC).*

*(7.4.3(2)) The most recent official valuation of the property and the plot must be used for this purpose. Any planned new extension is excluded from this figure.*

*Painting, rendering of facades and cavity wall insulation are examples of works that are not significant building works in this context.*

*"Services" means heating systems, ventilation installations, cooling systems and hot water systems.*

*For other works such as modernisation of kitchens or bathrooms, only the cost of the services listed must be included in the cost of the investment, while costs of such items as floor and wall covering, kitchen cupboards, white goods and sanitary appliances are excluded.*

*Fitting of lightweight partition walls in office buildings is not included in the cost of the works.*

*(7.4.3(3)) Single-family houses include detached single-family houses, semi-detached, terraced, linked, cluster houses etc.*

### 7.5 Holiday homes

7.5(1). Holiday homes and extensions to holiday homes must comply with the following requirements for U values and linear losses:

*(7.5(1)) U values for windows, external doors, rooflights and skylight domes apply to the actual size.*

<b>Table of U values</b>	<b>U value W/m<sup>2</sup> K</b>
External walls and basement walls in contact with the soil.	0.25
Partition walls and suspended upper floors adjoining unheated rooms/spaces.	0.40
Ground slabs, basement floors in contact with the soil and suspended upper floors above open air or a ventilated crawl space.	0.15
Ceiling and roof structures, including jamb walls and flat roofs.	0.15
Windows, external doors, rooflights and skylight domes facing the outside or facing unheated rooms/spaces.	1.80

<b>Table of linear losses</b>	<b>Linear loss W/mK</b>
Foundations.	0,15
Joint between external wall and windows or external doors, glazed walls, doors and hatches.	0.03
Joint between roof structure and windows in the roof.	0.10

7.5(2) U values and linear losses in 7.5(1) apply subject to a limitation of the window area of 30% of the floor area.

7.5(3) Derogation from these values may be possible provided that the design heat loss by transmission does not thereby become greater than if the requirements of 7.6(1)-(2) were satisfied.

7.5(4) For conversions, maintenance and replacement, the requirements of 7.5(1) apply subject to the necessary cost-effectiveness. Cost-effectiveness is assessed as in 7.4.1(2).

7.6 Minimum thermal insulation

7.6(1) If the energy performance framework set out in 7.2, the maximum permissible heat loss in 7.3.3 or the holiday home provisions in 7.5(3) is used, the individual building elements must be insulated such that the heat losses through them do not exceed the values in the following table.

Table of U values	U value W/m² K
External walls and basement walls in contact with the soil.	0.30
Suspended upper floors and partitions to rooms/spaces that are unheated or heated to a temperature more than 8 K lower than the temperature in the room/space concerned.	0.40
Ground slabs, basement floors in contact with the soil and suspended upper floors above open air or a ventilated crawl space.	0.20
Suspended floors below floors with underfloor heating adjoining heated rooms/spaces.	0.50
Ceiling and roof structures, including jamb walls, flat roofs and sloping walls directly adjoining the roof.	0.20
External doors, rooflights, doors and hatches to the outside or to rooms/spaces that are unheated and these as well as glass walls and windows to rooms that are heated to a temperature more than 5 K below the temperature in the room concerned.	1.80

*(7.5(4)) The assessment of cost-effectiveness must regard the holiday home as also being used as a dwelling during the winter half of the year.*

*(7.6(1)) The minimum insulation requirement is not only a response to the requirement for energy savings but also a means of providing comfort and avoiding the risk of condensation. The cited minimum heat loss applies to the whole building element. Any cold bridges in the building element must therefore be factored in. DS 418, Calculation of heat loss from buildings, details typical cold bridges and their contribution to heat loss.*

*In the case of windows and external doors, including glazed walls and hatches, the transmission area is calculated according to DS418, Calculation of heat loss from buildings. The stated U values thus apply to the overall building element, including frames and sills. (When estimating the difference in heat between two rooms/spaces, the requirement for 5 K means the same as 5°C).*

Table of linear losses	Linear loss W/mK
Foundations around rooms/ spaces that are heated to a mini- mum of 5°C.	0.40
Foundations around floors with underfloor heating.	0.20
Joint between external wall and windows or external doors and hatches.	0.06
Joint between roof structure and rooflights or skylight domes.	0.20

7.6(2) The energy gain through windows and glazed outer walls must not be less than – 33 kWh/m<sup>2</sup>/year.

*(7.6(2)-(3)) The calculation of energy gain through windows and rooflights must be in accordance with Appendix 6.*

7.6(3)The energy gain through rooflights must not be less than –10 kWh/m<sup>2</sup>/year.

7.6(4) In holiday homes, solid external walls of materials such as timber, lightweight concrete or clay blocks with a U value of more than 0.50 W/m<sup>2</sup>K may, however, be used provided the maximum permissible heat loss in 7.5(3) is observed.

*(7.6(4)) This provision allows the use of solid timber external walls for uninsulated holiday homes, as may lightweight concrete or solid block walling.*

## 8. Services

### 8.1 General

8.1(1) Services must be installed so as not to constitute any danger to persons nor cause damage to the building. Vibration nuisance must not be transmitted to the building.

*(8.1(1)) Part 8 covers services in a building or outside on the plot to supply it with power, gas, heating, cooling, drainage and water for heating, cooling, ventilation, water consumption, waste disposal and services for personal transport and equipment with the aim of making the buildings accessible.*

*In Part 8, "exhaust systems" means chimneys and flues with associated joints and any type of systems that receive combustion products from one or more combustion plants. Exhaust systems for heating appliances fuelled with oil or solid fuel must be cleaned by a chimney sweep; see Executive Order no. 239 of 27 April 1993 on fire precautions for chimneys and heating appliances.*

*See also the executive order on the use of pressure equipment, issued by the Danish Working Environment Authority and the executive order on the design of pressure equipment, issued by the Danish Working Environment Authority.*

*These executive orders apply to pipe systems, tanks, solar collectors, heat pumps, cooling systems, boilers etc. in which gases or vapours can occur at a pressure of more than 0.5 bar.*

*For information on excavations for services, see the Danish Register of Underground Cable Owners (LER), and DS/EN 1997-1, Geotechnical design.*

8.1(2) Systems must be installed such that they do not constitute a fire hazard or explosion hazard. Pipe penetrations, ducts etc. must incorporate measures to prevent the passage of noise, moisture, fire, gas, smoke and odours.

8.1(3) The surface temperature of combustible materials must be kept low enough to prevent the risk of ignition.

*(8.1(3)) This requirement for combustible materials is normally satisfied if the surface temperature does not exceed 85°C.*

*When this is not achieved, services of a temperature of between 85°C and 100°C should be kept at least 30 mm from woodwork or other combustible materials. At a temperature of between 100°C and 150°C, the separation distance should be no less than 50 mm.*

*For heat producing appliances and exhaust systems, the separation distance for combustible materials can be determined by the CE marking or by MK approvals (the approval scheme for materials and structures). If so, the specified separation distance from combustible materials must be observed.*

*If the separation distance from combustible materials is not specified, this requirement may be deemed to be satisfied if the distance from the outside of a heat-producing appliance to combustible materials in walls and ceilings is no less than 500 mm. For brick fireplaces and massive stoves, the distance must be measured from the inside of the fireplace.*

*Note that built-in light fittings can lead to discoloration of e.g. ceilings at temperatures as low as 60°C.*

8.1(4) Combustible materials must be kept at no less than the following separation distances from brick chimneys and small exhaust systems or components of steel not covered by the CE marking:

- 1) Chimneys: 100 mm.
- 2) Horizontal flues: 300 mm and vertical flues: 225 mm.
- 3) Pellet burner flues 80 -100 mm diameter: 225 mm.
- 4) Cleaning hatches: 200 mm.

*(8.1(4)) The separation distances must be measured from the outer surface.*

8.1(5) In the case of a 80-100 mm diameter flue pipe from a pellet burner the distance from the floor may be reduced to 150 mm if the floor is covered with a non-combustible plate.

8.1(6) Services must be installed such that they contribute to comfortable, healthy conditions.

*(8.1(6)) The intention of this provision is, inter alia, to prevent the penetration of smoke from combustion plants into the building. This provision also covers measures against rats and other pests.*

*See also Part 6 concerning radon and other pollution from the subsoil.*

*See also Part 6 concerning noise from energy-producing systems.*

8.1(7) Services which are at risk of exposure to frost must be frost-proofed.

8.1(8) Services must be installed so as to avoid any unnecessary risk of corrosion.

*(8.1(8)) For information on corrosion protection, see SBi Guidelines 227, "Korrosion i VVS-installationer" [Corrosion in plumbing systems].*

8.1(9) Services must be built so as to prevent unnecessary energy consumption. They must be insulated against heat loss and condensation in accordance with DS 452, Code of practice for thermal insulation and technical service and supply systems in buildings.

*(8.1(9)) Wherever possible, pipes and tanks should be fitted so that heat emitted from them benefits the building.*

8.1(10) Building services and equipment etc. that require servicing, frequent adjustments, inspections or maintenance, must be installed so as to allow such interventions to proceed in a suitable and appropriate manner.

*(8.1(10)) See rules and guidelines issued by the Danish Working Environment Authority.*

*For information on safety equipment and the design and fitting out of rooms housing cooling systems, see DS/EN 378 parts 2 and 3, Refrigerating systems and heat pumps.*

*Pipe systems which require servicing, frequent changes, inspection and maintenance should as a general rule be installed either in service galleries with a clear height of no less than 1.9 m and a clear width of no less*

*than 0.7 m, in shafts or ducts with good access arrangements, for example removable covers.*

*See DS 5129, Installations for signalling and communication. Part 2-1: Cable ducts in buildings for infrastructure cables for IT&T purposes.*

8.1(11) With the aim of making buildings accessible for persons with impaired mobility, installations and services in buildings which house places of public assembly must be designed and improved, taking account of what is technically feasible, to allow the installation and use of technical aids for the disabled.

*(8.1(11)) This provision ensures that even at the planning and design stages of building services, the greatest possible allowance is made for the use of technical aids for the disabled in the building without necessitating major modifications and their associated piping and wiring etc.*

8.1(12) Places of public assembly, including facilities designed for shared activities such as concerts, lectures and other entertainment, must have fixed induction loop systems or similar equipment for the hearing impaired which is at least as effective as an induction loop system.

*8.1(12)) "Places of public assembly" includes assembly halls, churches, libraries and concert halls which are publicly accessible to audiences. Ordinary teaching rooms in primary schools and, for example, meeting rooms in office buildings are not included.*

*All services should comply with DS/EN 60118-4, Electroacoustics – Hearing aids – Part 4: Induction loop systems for hearing aid purposes – Magnetic field strength.*

*If an equivalent hearing aid facility to a fixed induction loop system is chosen, the associated equipment must be appropriate for the size of the audience.*

*To ensure that the chosen system is operable when used, regular testing of the system is recommended.*

## **8.2 Distribution systems for heating, cooling and domestic hot water**

8.2(1) Heating systems must be appropriately designed and installed in terms of safety, energy and indoor climate considerations.

8.2(2) Heating systems using water as the heating medium must be designed, built, fully commissioned and handed over as required by DS 469, Heating systems with water as the heating medium.

*(8.2(2)) The code of practice contains, inter alia, functional requirements for the control and regulation of heat emitters.*

*The code of practice also contains functional requirements for the commissioning of heating systems and requirements for instructions for use, operation and maintenance.*

8.2(3) Electric and air heating systems in buildings must incorporate automatic regulation of heat transfer according to the heat demand in each individual room.

*(8.2, (3) and (4)) These provisions are designed to permit reasonable comfort to be achieved and output of the system to be reduced or interrupted during periods when heating is not required.*

The system must also be fitted with time and temperature control of heat transfer to the rooms.

8.2(4) Cooling systems and heat pumps must incorporate automatic regulation of the cooling or heating output according to the demand. Cooling systems must also be fitted with time and temperature control of cooling output to the rooms/spaces.

8.2(5) Heating systems must be designed and built for energy-efficient operation. The type, size and function of components must be compatible with each other and must be suited to the design heat loss of the building and the variation in consumption over the year. It must also be ensured that simultaneous cooling and heating do not occur in the same room/space.

*(8.2(5)) Heating systems must be designed for the lowest possible supply temperature, to achieve the highest possible efficiency in heat supply. For example, the efficiency of a heat pump system decreases by 2-3% for every degree by which the temperature is raised.*

*For information on heating systems fed by district heating, see the heating station's technical conditions of supply. If these are not available, Danish District Heating's technical conditions of supply can be used.*

8.2(6) Domestic water systems must be installed so as to minimise the risk of growth of legionella bacteria.

*(8.2(6)) Measures should be taken to minimise the risk of growth of legionella bacteria in the hot water; for example by ensuring that the water can be heated sufficiently; see DS 439, Code of practice for domestic water supply installations.*

8.2(7) Domestic water systems supplied by a domestic ventilation heat pump must have a minimum COP (coefficient of performance) at the draw-off point of 3.1.

*(8.2(7)) The useful efficiency is measured in accordance with DS/EN 255-3. Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors – Heating mode. Part 3: Testing and requirements for marking for sanitary hot water units.*

8.2(8) Circulating pumps in heating, hot water, geothermal heating and cooling systems must be A rated or must comply with the corresponding energy requirements. For information on large pumps not covered by A rating, see the provisions for pumps in DS 469, Heating systems with water as heating medium.

*(8.2(8)) The energy requirements for A rated pumps are shown in Europumps Industry Commitment to Improve the Energy Performance of Stand-Alone Circulators, January 2005. The provisions for pumps in DS 469 are also applicable to large pumps in cooling systems and domestic water systems.*

### 8.3 Ventilation systems

8.3(1) Ventilation systems must be appropriately designed and installed in terms of safety, energy and indoor climate considerations.

*(8.3(1)) Indoor climate-related ventilation provisions are stated in Part 6.*

8.3(2) Ventilation systems must be able to function without detrimental interference by other air-breathing apparatus, and without consuming unnecessary levels of energy.

*(8.3(2)) “Air-breathing apparatus” includes gas and oil-fired appliances, fireplaces, wood-burning stoves, tumble driers, airing cupboards, fume cabinets etc.*

Provision must be made for restricting the supply of fresh air during periods when the need for ventilation of the building is reduced. Provision must be made for adjusting the supply of fresh air to suit the loads in rooms/spaces with highly variable ventilation needs.

8.3(3) Ventilation installations must be installed, fully commissioned and handed over as stated in DS 447, Code of practice for mechanical ventilation installations.

*(8.3(3)) These provisions also apply to the construction of ventilation installations in existing buildings and to the renovation of installations. The requirements for ventilation installations also apply to single-family houses.*

8.3(4) Ventilation installations must be installed such that they do not constitute a fire hazard. Installations must comply with DS 428, Code of practice for technical measures for fire protection in ventilation systems.

8.3(5) Ventilation systems must be cleaned, operated and maintained so as to be kept in good technical and hygienic condition.

8.3(6) Ventilation installations must incorporate heat recovery with a dry temperature efficiency of no less than 70%.

This requirement may, however, be waived when the surplus heat from the exhaust air cannot reasonably be used. The heat recovery unit can be combined with a heat pump for heat recovery. This must have a minimum COP (coefficient of performance) of 3.6 in heating mode.

8.3(7) For ventilation installations that serve several dwellings or business units, and in which vapours or particles can arise, solutions must be selected that ensure good air quality.

*(8.3(6)) Recirculation is not deemed to be an alternative to a heat recovery system. Enhanced requirements apply to ventilation installations that only supply one dwelling; see 8.3(8).*

*The efficiency must be measured in accordance with DS/EN 308, Heat exchangers – test procedures for establishing performance of air-to-air and flue gas heat recovery devices, as net efficiency with no addition for condensation or moisture transfer with an internal leakage of no more than 3% and equal volume flows in and out.*

*This solution permits the use of systems such as cross-flow heat exchangers, contraflow heat exchangers, rotating heat exchangers and heat pumps, subject to any air quality requirements; see 8.3(7).*

*COP in heating mode must be documented in accordance with DS/EN 14511, Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling.*

*(8.3(7)) Transfer of smoke, cooking odours etc., which can be a problem in some multi-storey buildings, must be avoided. Requiring heat exchangers and heat exchangers with internal leakage can, for example, transfer smoke particles to the indoor air, creating a nuisance for residents.*

8.3(8) Ventilation installations that supply one dwelling must incorporate heat recovery with a temperature efficiency of no less than 80%.

8.3(9) For ventilation installations with a constant air volume, the power consumption for air movement must not exceed 1800 J/m<sup>3</sup> fresh air.

For installations with a variable air volume, the power consumption for air movement must not exceed 2100 J/m<sup>3</sup> fresh air at a maximum output and at maximum pressure drops.

For extraction systems without mechanical fresh air supply, the specific power consumption for air movement must not exceed 800 J/m<sup>3</sup>.

This provision does not apply to installations associated with industrial processes or installations whose annual power demand for air movement is less than 400 kWh.

8.3(10) For ventilation installations with a constant or variable air volume and heat recovery supplying a dwelling, the power demand for air movement must not exceed 1000 J/m<sup>3</sup> for the mode of operation with the maximum pressure drop. The installation must be provided with power via a connection that allows power consumption to be measured.

8.3(11) Equipment for humidifying intake air may only be installed if this is warranted by reasons of safety, production, preservation or health.

*(8.3(8)) This provision also applies to the installation of equipment in each housing unit in a multi-storey building.*

*(8.3(9)) "Power consumption for air movement" means the total power consumption per m<sup>3</sup> of air moved, calculated from air inlet to exhaust outlet.*

*The air may thus be moved by several fans. An "installation with a variable air volume" means an installation in which the air volume can be regulated manually or automatically when the plant is in operation so that consumption is significantly reduced.*

*Power consumption for air movement can be calculated for each individual installation or jointly for several installations in a building.*

*Power consumption for air movement is calculated as specified in DS 447, Code of practice for mechanical ventilation installations.*

8.3(12) Exhausts from natural ventilation must be taken above roof level, to a height and with a design that achieves satisfactory performance without causing nuisance to the surroundings.

*(8.3(12)) Exhaust ducts from kitchens, bathrooms and rooms containing sanitary conveniences must be taken up to the ridge.*

8.3(13) Ventilation ducts for natural ventilation must be sufficiently airtight.

*(8.3(13)) This requirement is deemed to be satisfied if airtightness class A in DS 447, Code of practice for mechanical ventilation installations, is used.*

## 8.4 Water and drainage systems

### 8.4.1 General

8.4.1(1) Water and drainage systems must be designed so as to provide satisfactory performance in terms of fire, safety, functional and health considerations.

*(8.4.1(1)) See DS 432, Code of practice for sanitary drainage – Wastewater installations; DS 439 Code of practice for domestic water supply installations; and guidance note: Rørcenter-anvisning 011 "Vakuumsystemer i bygninger" [Pipe Centre guidance 011, Vacuum systems in buildings].*

8.4.1(2) Water and drainage systems must be made of materials and components that are sufficiently durable for the stresses to which they are subjected.

*(8.4.1(2)) These stresses may be thermal or mechanical loads, corrosion etc. and may be both internal and external.*

8.4.1(3) Water and drainage systems must be sufficiently watertight to prevent accidental infiltration or exfiltration.

8.4.1(4) The siting of water and drainage systems relative to building elements such as foundations or fixings to building elements, must be such that damage cannot be caused to the services or building elements.

8.4.1(5) Components and materials must satisfy the requirements of 8.4.

8.4.1(6) Factory-made products used in or connected to plumbing systems must be approved by the Danish Enterprise and Construction Authority through

*(8.4.1(6)) A list of the products which are exempt from this requirement for approval is given on the ETA-Danmark A/S website ([www.etadanmark.dk](http://www.etadanmark.dk)).<http://www.etadanmark.dk/>*

ETA-Danmark A/S, unless the product concerned is exempted in accordance with the provisions of the approval scheme in force at the relevant time. This provision applies to characteristics which affect the quality of drinking water as defined by the executive order on water quality and supervision of water supply systems issued by the Danish Ministry of the Environment.

8.4.1(7) Factory-made products used in or connected to plumbing or drainage systems must, in terms of mechanical/physical characteristics, either:

(8.4.1(7)) See Appendix 7.

- 1) be CE marked to show that the products conform to a harmonised standard or are covered by a European Technical Approval (ETA) with the provisions which apply in Denmark; or
- 2) have undergone a process of production checks and tests, known as conformity attestation 3, which corresponds to the conformity attestation ii) variant 2 in Annex III of the Ministry of Housing executive order on the implementation of the EU Directive on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products, as amended by the EU Directive on the amendment of, inter alia, the EU Directive on construction products.

8.4.1(8) Rainwater systems in which rainwater from roofs is used for WCs and washing machines in dwellings and similar buildings must be designed in ac-

(8.4.1(8)) See guidance note: Rørcenter-anvisning 003, "Brug af regnvand og wc-skyl og vaskemaskiner i boliger" [Pipe Centre guidance 003, Use of rainwater for WC flushing and washing machines in dwellings].

cordance with the executive order on water quality and inspection of water supply systems issued by the Danish Ministry of the Environment.

8.4.1(9) Water and drainage systems must be designed so as to eliminate the risk of bursting or harmful pressures and water hammer.

8.4.1(10) Water and drainage systems must be designed so that they can be cleaned as necessary. There must be easy access for cleaning and for necessary maintenance work on components.

8.4.1(11) Water and drainage systems must be maintained so as to be kept in good technical and hygienic condition.

8.4.1(12) Operating and maintenance instructions must be prepared and must be available when the systems are taken into use. The instructions must contain a set of layout drawings with information on the location of all components that require maintenance and inspection. Maintenance and inspections must be described.

## **8.4.2 Plumbing systems**

### **8.4.2.1 General**

8.4.2.1(1) Plumbing systems must be designed and installed so as to achieve satisfactory water supply at each individual draw-off point, taking account of the supply conditions and the use of the building and the system.

8.4.2.1(2) At all draw-off points, cold water must comply physically, chemically and bacteriologically with the requirements in respect of water quality and the inspection of water supply systems issued by the Danish Ministry of the Environment.

*(8.4.2.1(2)) The requirement may be met in part by ensuring that there are no dead ends the system.*

Cold water must be provided at a sufficiently low temperature without undue waiting time. This provision does not apply to installations covered by 8.4.1(8), nor to special systems for water for technical purposes.

8.4.2.1(3) To protect the water supply system from impurities being drawn back into the drinking water system, a non-return valve must be fitted to the distribution pipe after the buried pipe enters the property and before any branch to another pipe.

*(8.4.2.1(3) and (4)) On drinking water systems, measures to guard against backflow of treated water must be commensurate with any health risk posed by the treated water and for the type and use of the systems.*

*See DS/EN 1717, Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow.*

*See guidance note: Rørcenter-anvisning 015, "Tilbagestrømningssikring af vandforsyningssystemer" [Pipe Centre guidance 015, Preventing backflow in water supply system].*

8.4.2.1(4) Plumbing systems must be designed such that treated water and water drawn off at a draw-off point cannot be drawn back into the drinking water system.

8.4.2.1(5) If drinking water systems can come into contact with substances which are hazardous to health, the systems must be designed to prevent ingress of such substances into the drinking water system by corrosion or diffusion, so that health hazards cannot arise.

8.4.2.1(6) Plumbing systems must be designed so as to avoid unnecessary water consumption, including waste of water.

*(8.4.2.1(6)) See guidance note: Rørcenter-anvisning 002 "Ressourcebesparende vandinstallationer i boliger" [Pipe Centre guidance 002, Resource-saving plumbing systems in dwellings].*

8.4.2.1(7) Plumbing systems must be designed so as to avoid overflow nuisance from the hot to the cold water system.

8.4.2.1(8) Plumbing systems must be designed so that the consumption of hot and cold water can be metered.

*(8.4.2.1(8)) See the executive order on individual metering of electricity, gas, water and heat issued by the National Building and Housing Agency and the executive order issued by the National Building and Housing Agency amending the executive order on individual metering of electricity, gas, water and heat.*

8.4.2.1(9)

Services for water for technical use and services which for other reasons are not compliant with the standards for drinking water quality must be marked in such a way that incorrect use can be avoided.

#### **8.4.2.2 Hot water**

8.4.2.2(1) Plumbing systems must be designed so as to function with the least possible risk of growth of bacteria.

8.4.2.2(2) Appliances for the production of domestic hot water must, taking account of the number and uses of the hot water draw-off points, be able to provide a sufficient volume and flow of water at an appropriate temperature for the purpose.

*(8.4.2.2(2)) The need for hot water at all draw-off points should be considered. In the case of draw-off points with low water consumption and long supply runs, local heating should be considered. At infrequently used draw-off points such as guest bathrooms in dwellings, the requirement to reduce waste of water may be waived.*

The hot water must be provided at an appropriate temperature without undue waiting time.

8.4.2.2(3) Plumbing systems must be designed such that drawing off hot water does not involve a risk of scalding, and such that surface temperatures that could cause personal injury do not arise.

8.4.2.2(4) The facility must be provided for tracing liquids other than water which are used in heat exchangers for domestic water and for detecting them in the domestic hot water supply.

### **8.4.2.3 Flooding**

8.4.2.3(1) Plumbing systems must be designed so as to provide adequate protection against water overflow or leakage of water which could damage the building. The design must facilitate prompt detection of leaks.

*(8.4.2.3(1)) This provision means that, for example, a shower unit designed to be built in, may be built into a concrete wall, provided that a duct is also built in to ensure that water from a leak can be run off without damaging the building and so that the leak can be detected before it damages the building.*

8.4.2.3(2) Draw-off points may only be provided where there is a drainage system with sufficient capacity, or where the water can be either discharged by another means or collected in a suitable manner.

8.4.2.3(3) Appliances with automatic water filling in rooms without a floor gully must have protection, either retro-fitted or built-in, against accidental discharge of water and must be located such that leakage of water can be detected.

### **8.4.2.4 Materials, components and workmanship**

8.4.2.4(1) Plumbing systems must be made of materials that do not leach health-hazardous substances into the water or give rise to odour, taste or discoloration nuisances or inappropriate growth of micro-organisms.

*(8.4.2.4(1)) This requirement applies to all materials used in the installation, such as pipes, fittings and gaskets.*

8.4.2.4(2) Installation parts fitted such that they cannot be replaced must be of such a quality that they can last as long as the building element in which they are fitted.

### 8.4.3 Drainage systems

#### 8.4.3.1 General

8.4.3.1(1) Each location and component on a plumbing system with a draw-off point must be provided with appropriate drainage.

*(8.4.3.1(1)) Floor gullies are not required in rooms in which all components of services are fitted with overflows; but see 4.6(5). See guidance note: Rørcenter-anvisning 001, "Ressourcebesparende afløb-sinstallationer i boliger" [Pipe Centre guidance 001, Resource-saving drainage systems in dwellings].*

8.4.3.1(2) Rainwater drainage must be provided such that seepage or rainwater harvesting does not constitute a risk to buildings or building elements, or other disadvantages such as disruption of traffic.

*(8.4.3.1(2)) In accordance with the environmental legislation the municipal council/utility company may require that rainwater must not be discharged to main sewers or must be dealt with on site by, for example, green roofs, ponds, ditches, rainwater beds, infiltration in green areas or soakaways (known as SUDS systems – sustainable urban drainage systems).*

*When rainwater is dealt with on site, a permit is required in accordance with environmental legislation. For information on infiltration 'see guidance note: Rørcenter-anvisning 009, "Nedsivning af regnvand i faskiner. [Pipe Centre guidance 009, Seepage of rainwater into soakaways. Guidance on the design, sizing, installation and operation of soakaways].*

*Regulations on the discharge of rainwater may be imposed by the local plan.*

8.4.3.1(3) Drainage systems must be designed and built so as to achieve satisfactory disposal of the discharged sewage and runoff, taking account of the connections and the surroundings and of the intended use of the system, the plot and the building.

*(8.4.3.1(3)) Foul water must be drained in proportion to the inflow so that flooding does not occur as a result of normal use of the systems.*

*Rainwater must be drained without causing flooding at the design rainfall intensity set by the municipal council.*

8.4.3.1(4) Drainage systems must be designed and built with sufficient factors of safety against:

*(8.4.3.1(4)) Drains should be provided from chimneys and flues from condensing boilers, small-scale CHP plants (combined heat and power) and from heat exchangers in heat pumps and cooling systems.*

- 1) flooding;
- 2) odour nuisance;
- 3) deposits that can reduce the drainage capacity.

*See guidance note: Rørcenter-anvisning 011, "Vacuumsystemer i bygninger. Vejledning i projektering, udførelse og drift" [Pipe Centre guidance 011, Vacuum systems in buildings. Guidance on the design, installation and operation].*

8.4.3.1(5) Drainage systems must be contained within the site.

#### **8.4.3.2 Materials, components and workmanship**

8.4.3.2(1) Substances with the potential to damage or impair the functioning of the main drainage system, wastewater treatment plant or recipient must not be discharged into drainage systems or main drainage systems.

*(8.4.3.2(1)) Pursuant to the Environmental Protection Act, the municipal council may impose requirements in respect of the foul water discharged to main drainage systems.*

*Substances that can damage or impair the functioning of drainage systems, wastewater treatment plants or recipients must be retained by separators or be neutralised.*

8.4.3.2(2) Covers must:

- 1) be made, located and fixed in such a way that there is sufficient protection against accidents;
- 2) have the strength to resist the loads to which they are subjected; and
- 3) be fitted such that the loads that arise do not damage the drainage systems.

*(8.4.3.2(2)) Provision must be made to permit covers to be handled appropriately in accordance with The Danish Working Environment Authority's regulations.*

8.4.3.2(3) If there is a risk of backing-up in the main drainage systems, drainage systems must be designed such that backing-up cannot cause harmful flooding in the building.

8.4.3.2(4) Drainage systems must be designed so as to prevent overflows into the water supply and plumbing systems, and into any other drainage system or other plumbing system component.

8.4.3.2(5) If the main drainage systems are built as a separate system, the drainage systems must also be built as a separate system.

8.4.3.2(6) If required by the municipal council, the necessary ventilation of main drainage systems must be provided through the drainage system of a property.

## 8.5 Combustion plants and exhaust systems

8.5(1) Central heating boilers, small-scale CHP plants (combined heat and power), generator systems, bio-fuel systems, wood-burning stoves, fireplaces and other combustion plants must be built and installed to prevent the danger of fire, explosion, poisoning and health nuisance.

*(8.5(1)) Central heating systems with boilers must be designed in accordance with the WEA Guideline, "Indretning og anvendelse af fyrede varmeanlæg" [Design and use of fired heating systems].*

*For combustion plants with motorised moving parts, see the executive order on the design and layout of technical equipment issued by the Danish Working Environment Authority.*

*See also executive orders on the design of pressure equipment and the use of pressure equipment issued by the Danish Working Environment Authority and executive order issued by the Danish Environmental Protection Agency on the design, construction and operation of oil tanks, pipe systems and pipelines.*

*For gas-fired systems, see the Danish Gas Regulations.*

8.5(2) Materials with the necessary resistance to flue gases, fire, heat and corrosion must be used.

### 8.5.1 Combustion plants

#### 8.5.1.1 General

8.5.1.1(1) Combustion plants must be designed and installed such that they can be cleaned without difficulty.

*(8.5.1.1(1)) See the executive order on the inspection of boilers and heating systems in buildings issued by the Danish Energy Authority.*

8.5.1.1(2) Combustion plants must be airtight and arranged to achieve good combustion.

8.5.1.1(3) The combustion plant must have an adequate supply of air for combustion.

*(8.5.1.1(3)) Adequate air for combustion can be achieved by installing the combustion plant in a room fitted with an adjustable fresh air vent or by supplying the combustion chamber with air through a duct from the outside.*

*See also 8.3(2).*

8.5.1.1(4) Combustion plants must be constructed such that, under normal operating conditions, there is underpressure in the combustion chamber and exhaust relative to the room/space in which the combustion plant is installed.

*(8.5.1.1(4)) Particularly airtight construction of the exhaust system is achieved by using an exhaust that meets at least airtightness class P1; see 8.5.3.2(1).*

*In overpressure combustion systems, double walls exhaust systems should be used.*

Derogation from this requirement is possible in the case of specially sealed boilers designed for overpressure combustion and fitted with an airtight exhaust or installed away from habitable rooms and workrooms in a special room with unblockable ventilation openings to the outside.

*It should be ensured on installation that the draught in the chimney meets the minimum requirements stated in the boiler installation instructions. If not, the chimney should be improved or fitted with a smoke extractor.*

8.5.1.1(5) Combustion plants must not be installed in rooms containing readily combustible material without a satisfactory fire-resisting separation.

*(8.5.1.1(5)) A fire-resisting separation may, for example, consist of walls and suspended upper floors of no less than building element class EI 60 A2-s1,d0 [BS 60 building element] and with fire doors of no less than fire door class EI2 30-C [BD 30 door].*

### 8.5.1.2 Small-scale CHP plants

8.5.1.2(1) These provisions apply to small-scale CHP plants (combined heat and power) with an output not exceeding 120 kW.

*(8.5.1.2(1)) For information on small-scale gas-fired CHP plants, see the Danish Gas Regulations.*

*For information in respect of electricity, see section 6 of the Danish Heavy Current Regulations. See especially part 551.*

8.5.1.2(2) CHP plants must be designed and built to achieve energy-efficient operation. The overall efficiency including heat production must be no less than 80% for installations using Sterling motors, piston motors or fuel cells.

*(8.5.1.2(2)) "Energy-efficient operation" means that the surplus heat generated in connection with electricity production is collected and used for heating purposes. It must therefore be possible to run the system without a separate cooling system while the heat of the flue gas, which is at above 180°C, is recycled.*

For other types of heat and power producing systems, such as thermoelectric systems, the requirement is deemed to be met if the thermal efficiency plus 2.5 times the electrical efficiency together exceeds 90%.

*The efficiency of equipment not exceeding 70 kW input power can be determined by reference to DIN 4709 or other corresponding European standards.*

8.5.1.2(3) Exhaust systems from small-scale CHP plants (combined heat and power) must not be connected to the flue from other combustion plants. Access must be provided for cleaning the flue.

8.5.1.2(4) Plants with a heat output of more than 30 kW must be installed in their own fire-resisting units.

*(8.5.1.2(4)) The unit may, for example, consist of surrounding walls and suspended upper floors of no less than building element class EI 60 A2-s1,d0 [BS 60 building element].*

*Fire doors to the fire-resisting unit must be of no less than fire door class EI2 30-C [BD 30 door].*

### 8.5.1.3 Wood-burning stoves, pellet stoves, massive stoves and fireplaces

8.5.1.3(1) The floor below and around wood-burning stoves, pellet stoves, massive stoves and fireplaces must be non-combustible or clad with a non-combustible material to prevent sparks from starting a fire.

*(8.5.1.3(1)) In respect of the separation distance from combustible materials, see 8.1.*

*Compliance with the provisions of 8.5.1.3(1) can be achieved by, for example, the non-combustible material extending no less than 300 mm in front of closed combustion plants and no less than 500 mm in front of open combustion plants (fireplaces).*

*The material should also extend no less than 150 mm to each side of the opening of the combustion plant.*

8.5.1.3(2) Wood-burning stoves may be fitted with manually operated smoke dampers which ensure an air passage of no less than 20 cm<sup>2</sup> in the closed position.

8.5.1.3(3) Water tanks in fireplaces and wood-burning stoves must not be connected to sealed central heating systems. However, this provision does not apply if each boiler (heat-emitting unit) is fitted with a safety valve.

*(8.5.1.3(3)) A “sealed central heating system” means an installation fitted with safety valves and connected to a pressure expansion tank.*

*Connection to a sealed system is prohibited because combustion in fireplaces and wood-burning stoves is not automatically controlled as in the case of oil or gas-fired boilers. There would therefore be a risk of periodic overheating and therefore a risk of explosion in the equipment.*

*For information on safety valves on boilers, see WEA Guideline B.4.8, “Indretning og anvendelse af fyrede varmtvandsanlæg” [Layout and use of fired hot water systems], issued by the Danish Working Environment Authority.*

8.5.1.3(4) Fireplaces and wood-burning stoves must not be connected to exhausts from gas-fired equipment or exhausts from oil-fired equipment complying with the requirements of 8.5.1.4(2), or to exhaust systems connected to boilers designed for overpressure combustion.

### 8.5.1.4 Requirements for central heating boilers, oil-fired boilers etc.

8.5.1.4(1) When central heating boilers with an oil-fired burner or forced-air gas burner are installed, the burner must be fully commissioned.

*(8.5.1.4(1)) For commissioning of forced air gas burners, see the Danish Gas Regulations.*

8.5.1.4(2) On CE marking, oil-fired boilers must have a fuel use efficiency of no less than 93% at full load and 98% at part load.

*(8.5.1.4(2)) The fuel use efficiency at full and part load is stated on the boiler's CE marking.*

*The fuel use efficiency is measured at 70°C at full load and at 30°C, 40°C or 50°C at part load depending on the type of boiler. This provision implies the use of condensing boilers.*

8.5.1.4(3) On CE marking, gas-fired boilers must have a fuel use efficiency of no less than 96% at full load and 105% at 30% part load.

*(8.5.1.4(3)) This provision involves the use of condensing gas boilers.*

*The fuel use efficiency is measured at 70°C at full load and at 30°C at part load.*

8.5.1.4(4) The provisions of 8.5.1.4(2) and (3) apply to boilers with an effective rated output of up to 400 kW.

8.5.1.4(5) When existing boilers are replaced, the useful efficiency at both full and part load must as a minimum correspond to the provisions of 8.5.1.4(2) and (3).

8.5.1.4(6) Oil-fired boilers that comply with the provisions of 8.5.1.4(2) must not be connected to chimneys that serve other heating appliances.

8.5.1.4(7) Boilers stoked by coal, coke, bio-fuels and biomass must have a useful efficiency of no less than boiler class 3 in DS/EN 303-5, Central heating boilers.

*(8.5.1.4(7)) See DS/EN 303-5, Central heating boilers. Part 5: Heating boilers for solid fuels, hand or automatically stoked, nominal heat output of up to 300 kW – Terminology, requirements, testing and marking.*

The efficiency requirements at 300 kW apply to boilers above 300 kW.

*The Danish Ministry of the Environment sets emission standards for a number of bi-fuel systems.*

8.5.1.4(8) The provisions of 8.5.1.4(7) do not apply to straw-fired boilers with an input power of below 130 kW, designed for firing with small bales.

8.5.1.4(9) Detachable, readily replaceable burners for solid fuel must comply with DS/EN 15270, Pellet burners for small heating boilers in terms of combustion quality, safety and suitability for the boiler.

*(8.5.1.4(9)) DS/EN 15270 states inter alia requirements for combustion chamber size.*

8.5.1.4(10) Oil-fired hot air units for heating buildings must meet the requirements for class A air heating systems in DS 2187, Oil burning, fan-assisted air heaters.

8.5.1.4(11) Oil burners must meet the requirements of DS/EN 230, Automatic burner control systems for oil burners, and DS/EN 267, Forced draught oil burners.

### **8.5.1.5 Large central heating boilers**

8.5.1.5(1) Large central heating boilers must be thermally insulated such that the surface temperature on their external surfaces, apart from hatches etc., does not exceed 35°C at a room temperature of 20°C.

*(8.5.1.5(1)) Large central heating boilers are boilers whose effective rated output exceeds 120 kW.*

*In most cases, the manufacturer will be able to provide information on the maximum output. A number of European standards set other limits with regard to boiler sizes.*

*Temperature conditions are advisory and apply to flue gas coolers if the following conditions exist:*

*Return temperature at – 12°C outdoors:*

*For gas boilers, no more than 45°C*

*For oil fired boilers, no more than 40°C*

8.5.1.5(2) Large oil and gas-fired central heating boilers with an effective rated output of more than 400 kW must have a flue gas loss of no more than 7% at full load and must be fitted with flue gas coolers if temperature conditions in the heating systems to which they are connected are appropriate.

8.5.1.5(3) Large central heating boilers must be provided with monitoring points and measuring equipment to monitor energy-efficient operation.

*(8.5.1.5(3)) The equipment may comprise, for example, a flue gas thermometer and a point for flue gas analysis, "hours run" meter and boiler thermometer.*

8.5.1.5(4) Large central heating boilers must be installed in rooms/spaces that form an independent fire-resisting unit. The fire-resisting unit must not have doors leading directly to a shared access route and must not be used as a workroom or for purposes that can constitute a fire hazard.

There must be easy, unobstructed access directly to the outside from systems above 400 kW.

8.5.1.5(5) Large central heating boilers designed for excess pressure combustion may only be installed in rooms fitted with unblockable ventilation openings to the outside.

#### **8.5.1.6 Combustion plants for commercial use and special bio-fuelled systems**

8.5.1.6(1) The municipal council may impose special requirements in respect of combustion plants etc. used for commercial purposes, and in respect of straw-fired systems and bio-fuelled central heating boilers.

8.5.1.6(2) Derogation from the provisions of 8.5.1.5(4) is possible for oil and gas-fired hot air units with an effective rated output not exceeding 400 kW used to heat workrooms and for combustion plants used in commercial production plants.

8.5.1.6(3) Combustion plants for commercial use and biofuel systems must be connected to their own exhaust systems, which do not receive exhausts from other appliances.

*(8.5.1.5(4)) The fire-resisting unit must have walls and suspended upper floors of no less than building element class EI 60 A2-s1,d0 [BS 60 building element] towards other rooms.*

*Fire doors to the fire-resisting unit must be no less than EI2 30-C doors [BD 30 door] for installations up to 400 kW and no less than EI2 60-C doors [BD 60 door] as fire door for installations above 400 kW.*

*(8.5.1.6(1)) For dryers for grain, seeds and green crops, flue plants, hot oil plants, straw-fired systems and bio-fuelled central heating boilers, see guidance nos. 8, 14, 20, 22 and 32 issued by the Danish Institute of Fire and Security Technology Fire (DBI).*

### 8.5.2 Connection to exhaust system

8.5.2(1) The cross-sectional area of an exhaust systems must be commensurate with the input power. If several combustion plants are connected to the same exhaust system, the cross-section must be calculated in proportion to the combined power of the appliances.

*(8.5.2(1)) In most cases, the manufacturer will be able to provide information on the input power.*

*It is important for the opening to match the input power. A wrongly sized opening can lead to poor combustion and thus a risk of carbon monoxide poisoning.*

*Generally, the opening should be no less than 50 cm<sup>2</sup> (80 mm diameter) for oil-fired combustion plants and no less than 175 cm<sup>2</sup> (150 mm diameter) for solid fuel combustion plants. This does not, however, apply to automatically fed combustion plants for bio-fuels.*

*The Danish Gas Regulations impose certain conditions for connection of gas-fired combustion plants to chimneys to which other combustion plants are also connected.*

8.5.2(2) Open combustion plants (fireplaces) may only be connected to their own discrete exhaust systems with no flues from other combustion plants.

*(8.5.2(2)) For gas-fired fireplaces, see the Danish Gas Regulations.*

The opening of the exhaust system must be no less than 300 cm<sup>2</sup>. If the opening of the fireplace is not greater than 2,500 cm<sup>2</sup>, the chimney opening may be reduced to 175 cm<sup>2</sup>.

### 8.5.3 Exhaust systems

#### 8.5.3.1 General

8.5.3.1(1) Exhaust systems must be made and installed so as to prevent the danger of fire, explosion, harmful condensation, poisoning and health hazards.

*(8.5.3.1(1)) Penetrations must not impair the fire resistance of building elements, as this increases the risk of spread of fire through the building.*

*If a building element is penetrated by a CE marked exhaust system, this must be tested for insulated (not ventilated) penetration-sof building elements. The testing must be shown in the manufacturer's documenta-*

*tion. If a building element of class REI 30 [BD 30 building element] is penetrated by a shaft containing a chimney, the shaft must consist of a class EI 30 building element [BD 30 building element]*

*Flues should be only installed in the installation room.*

8.5.3.1(2) Exhaust systems must not be used for combustion plants with an operating temperature higher than that shown on the CE marking or MK approval.

*(8.5.3.1(2)) The operating temperature must be the flue gas temperature measured at the flue gas outlet from the combustion plant. An operating temperature of 400°C must be used for solid fuel burners (chimney designated T 400). For oil-fired or automatic bio-fuelled burners, the operating temperature can be provided by the boiler manufacturer. For exhaust systems that are not CE marked, the operating temperature must be stated in either the MK approval (the approval scheme for materials and structures) or the manufacturer's documentation.*

8.5.3.1(3) Exhaust systems from oil and solid fuel boilers must be built such that flue gases are removed vertically and must have appropriate height, location, form, and opening to permit a satisfactory draught, and to prevent the smoke discharge from causing a nuisance in the surroundings.

*(8.5.3.1(3)) Exhaust systems from solid fuel burning equipment should always be higher than the highest point of the building. To comply with the requirements of the Environmental Protection Act, the dissipation conditions, i.e. turbulence from buildings and vegetation, distance from and height of surrounding buildings and the prevailing winds in relation to neighbours, should be taken into account when determining the height of flues, especially for wood-burning stoves and other solid fuel burners. If a combustion plant causes significant smoke nuisance to the surroundings, the Environmental Protection Act allows the municipal council to require combustion plants and exhaust systems or the fuel itself to be altered so as to terminate the nuisance. If the nuisance cannot be remedied, the municipal council may prohibit the use of the system.*

8.5.3.1(4) Access must be provided for cleaning the exhaust system. The size of a cleaning hatch must be no smaller than the opening of the exhaust systems.

*(8.5.3.1(4)) If the flue cannot be cleaned without hindrance, a cleaning flap must be installed on the flue.*

8.5.3.1(5) Provision must be made to permit external inspection of the exhaust system.

*(8.5.3.1(5)) To prevent carbon monoxide seeping into the building, it is important to be able to detect any cracks and leakage in the exhaust systems in good time.*

8.5.3.1(6) If the exhaust system is designed for cleaning from the top, safe access must be provided for the purpose.

### 8.5.3.2 Tightness and resistance

8.5.3.2(1) Exhaust systems must be sufficiently airtight to prevent flue gases and steam from escaping and damaging the exhaust system or building.

*(8.5.3.2(1)) Exhaust systems designed for a negative pressure should be no less than tightness class N1.*

*Chimney linings designed for a negative pressure should be no less than tightness class N2.*

*Exhaust systems designed for a positive pressure should be no less than tightness class P1.*

8.5.3.2(2) Exhaust systems forming part of oil or solid fuel systems must be able to withstand a soot fire. This provision does not apply to exhaust systems used for boilers run on pure mineral oil and fitted with flue gas temperature protection. The protection must under all conditions interrupt combustion at a flue gas temperature corresponding to the temperature classification of the exhaust system, but no more than 200°C. The protection must be manually connected when a fault is identified.

*(8.5.3.2(2)) An exhaust system is resistant to a soot fire if it has class G classification in accordance with the relevant product standards.*

*The flue gas temperature protection should be installed in the boiler's outlet stub and be electrically coupled to its safety circuits.*

8.5.3.2(3) Materials with the necessary resistance to flue gases, heat, corrosion and, as appropriate, soot fire must be used.

*(8.5.3.2(3)) This provision allows the use of plastic exhaust systems with boilers with low flue gas temperatures, typically lower than 120°C, and which will burn pure mineral oil.*

*If CE marked plastic exhaust systems are used, these must have a resistance to corrosion of no less than class 2 in accordance with the corrosion declaration of the product standard.*

*The flue must have the necessary resistance to environmental effects such as UV radiation. If CE marked steel exhaust systems are used, these must be of material type L40 or better with a wall thickness no less than 1.0 mm, or of material type L50 or better with a wall thickness no less than 0.40 mm.*

*Alternatively, corrosion resistance can be demonstrated by corrosion testing and certified according to fuel type. This provision does not, however, apply to flues connected to wood-burning stoves, pellet burners and fireplaces with a chimney, and where the risk of the occurrence of condensation can be excluded.*

*If CE marked concrete exhaust systems are used, they must have a corrosion resistance of no less than class 3 when connected to oil or solid fuel fired combustion plants.*

8.5.3.2(4) Exhaust systems used in connection with combustion plants with condensing operation or combustion plants whose flue gases condense in the flue, must be resistant to condensation and diffusion of moisture. Exhaust systems must be laid out such that condensation is collected and discharged.

*(8.5.3.2(4)) Exhaust systems can withstand condensation and diffusion of moisture if they are certified W.*

### **8.5.3.3 Protection against injury by contact**

8.5.3.3(1) The surface temperature of an exhaust system must not exceed the maximum permissible temperature set by the product standard in normal operation.

*(8.5.3.3(1)) For an exhaust system in a shaft, the shaft should be ventilated and should enclose the exhaust system at all points where the exhaust system is inside the building, including, for example, a non-habitable roof space.*

If the exhaust system is placed in a shaft to satisfy the temperature requirement, the shaft must be installed in accordance with the CE marking and the manufacturer's instructions.

This provision does not apply to that part of the exhaust system which is in the room/space in which the heating appliance is installed

#### **8.5.3.4 Small exhaust systems**

8.5.3.4(1) Series-produced small exhaust systems must be either CE marked if a relevant product standard exists, or MK approved (the approval scheme for materials and structures).

*(8.5.3.4(1)) The CE marking must state that the exhaust system is suitable for the proposed application. Thus, an exhaust system that is CE marked for use in connection with gas boilers is not suitable for other purposes. Small exhaust systems are exhaust systems of any type that receive the exhaust from one or more combustion plants whose total effective rated output does not exceed 120 kW. For exhaust systems that are not series-produced, the manufacturer must be able to demonstrate to the municipal council that the choice of materials, wall thickness, sizing etc. of the exhaust systems are adequate.*

#### **8.5.3.5 Roof cladding with insufficient fire resistance**

8.5.3.5(1) In connection with roof claddings which cannot be classified as roof cladding class Broof (t2) [class T roof cladding], exhaust systems must be made and installed in such a way that sufficient protection against fire is provided.

*(8.5.3.5(1)) Roof claddings are classified on the basis of DS/EN 13501-5, Fire classification of construction products and building elements. Part 5: Classification using data from external fire exposure to roofs tests. Class T roof cladding is classified in DS 1063.1, Fire classification – Roof coverings.*

### **8.6 Solar heating systems, solar photovoltaic arrays, cooling systems and heat pumps.**

#### **8.6.1 General**

8.6.1(1) Solar heating systems, solar photovoltaic arrays, cooling systems and heat pumps must be made and installed so as to avert any danger of fire, explosion, poisoning and health hazards, for example in the form of noise or vibrations.

*(8.6.1(1)) See also executive orders on the design of pressure equipment and the use of pressure equipment issued by the Danish Working Environment Authority.*

*See also the DS/EN 378 series on refrigerating systems and heat pumps.*

*For the installation of geothermal heating systems, see the executive order issued by the Danish Environmental Protection Agency.*

*For gas-fired systems, see the Danish Gas Regulations.*

8.6.1(2) Materials with the necessary resistance to flue gases, fire, heat and corrosion must be used.

8.6.1(3) Solar heating systems and solar photovoltaic arrays should be arranged to achieve maximum energy usage.

*(8.6.1(3)) Good orientation and slope of solar collectors and solar photovoltaic panels are crucially important to their performance.*

## 8.6.2 Solar heating systems

8.6.2(1) Solar heating systems must be built such that they do not give rise to temperature-related personal injury or damage to buildings.

*(8.6.2(1)) Solar heating pipes can reach over 85-100°C and should therefore not be placed in contact with combustible materials, including timber structures. Preventive measures must be taken against the risk of scalding from domestic hot water.*

8.6.2(2) On new buildings or on renovation of buildings outside existing district heating areas, in which the expected daily hot water consumption exceeds 2000 litres, solar heating systems must be provided which can meet an energy demand corresponding to the hot water consumption under normal operating conditions.

*(8.6.2(2)) The system must be designed to meet a demand corresponding to no less than 95% of the demand for hot water from May up to and including September. Hot water consumption must be based on SBI Guidelines 213. Supplementary heating may be provided by, for example, a heat supply system. A derogation may be granted if the suitable roof surface does not allow 95% of the demand to be met.*

*In the case of renovation, the system must be provided if the requirements for cost-effectiveness in 7.4 are met. The provisions of 7.4 do not apply to churches, listed buildings or buildings worthy of preservation.*

### 8.6.3 Solar photovoltaic arrays

8.6.3(1) Solar photovoltaic arrays must be built such that they do not give rise to temperature-related damage to buildings.

*(8.6.3(1)) Solar photovoltaic arrays are low voltage generator systems. See section 6, Electrical installations of the Danish Heavy Current Regulations. See also section 6A of the Danish Heavy Current Regulations.*

8.6.3(2) Solar photovoltaic arrays should be arranged to achieve maximum energy usage.

*(8.6.3(2)) Partial shade leads to cessation of output from the whole array. The output of solar photovoltaic cells rises with falling temperature, so good ventilation behind the array is important. The inverter should similarly be in a cool and well ventilated location.*

### 8.6.4 Heat pumps and cooling systems

8.6.4(1) If the system uses hazardous liquids or gases and the room is therefore classified as an explosion hazard, the system must be suitably and safely located.

*(8.6.4(1)) See the executive order on the classification of explosion hazard areas issued by the Ministry of Health and the executive order on the design of technical equipment for use in explosive atmospheres issued by the Danish Working Environment Authority.*

*See also WEA Guideline, "Tekniske hjælpemidler – B.4.4 Køleanlæg og varmepumper" [Technical equipment – B.4.4 Cooling systems and heat pumps] and DS/EN 378-1 and 2, Refrigerating systems and heat pumps – Safety and environmental requirements.*

*See also the requirements of the Danish Gas Regulations for room ventilation in section B-4.*

8.6.4(2) Heat pumps and cooling systems must be designed for the actual demand. It must be ensured that the systems are correctly designed for the building and the specific consumption, taking into account the proportions accounted for by space heating and domestic water, for example.

*(8.6.4(2)) Water-borne distribution systems for heating and cooling must be designed to have the lowest possible pressure losses. Requirements for power consumption for pumping must comply with DS 469, Heating systems with water as the heating medium, supplement 1.*

8.6.4(3) The system must be fully commissioned before use. DS 469, Heating systems with water as the heating medium, applies to water-borne systems.

*(8.6.4(3)) The system must be commissioned to ensure the maximum efficiency.*

8.6.4(4) For liquid/water heat pumps (geothermal heating systems), the system must have a nominal power factor no less than as stipulated by the Danish Energy Authority's energy labelling scheme depending on size and whether the system supplies underfloor heating:

*(8.6.4(4) - (6)) The method for calculating the normal efficiency of liquid/water and air/water heat pumps can be found on [www.ens.dk](http://www.ens.dk).*

Size	Nominal power factor
0 – 3 kW	3.0
3 – 6 kW	3.6
> 6 kW	3.7

8.6.4(5) For liquid/water heat pumps (geothermal heating systems), the system must have a nominal power factor of no less than as per the Danish Energy Authority's energy labelling scheme depending on size and whether the system supplies radiators:

Size	Nominal power factor
0 – 3 kW	2.6
3 – 6 kW	2.8
> 6 kW	3.0

8.6.4(6) Air/water heat pumps must have a nominal power factor of no less than 3.2 as per the Danish Energy Authority's energy labelling scheme when connected to underfloor heating.

Similarly, air/water heat pumps must have a nominal power factor of no less than 2.7 when connected to radiators.

8.6.4(7) Air/air heat pumps must have an efficiency in heating mode of no less than 3.6 in accordance with DS/EN 14511, corresponding to an A label as per the EU energy labelling of household air-conditioners.

*(8.6.4(7)) The energy labelling scheme is set out in Executive Order no. 1097 of 9 December 2002. Energy labelling covers systems of less than 12 kW.*

8.6.4(8) For heat pumps not covered by 8.6.4(4)-(6), the manufacturer must state the COP (coefficient of performance) and standby consumption

*(8.6.4(8)) Relevant examples include heat pumps with another heat source, e.g. as lake water, or heat pumps that use other refrigerants, e.g. CO<sub>2</sub>.*

## 8.7 Waste disposal facilities

### 8.7(1)

Waste disposal facilities must be installed with due regard to health and safety and make the greatest possible provision for refuse systems that promote recycling.

8.7(2) Provision must be made in or for all buildings for handling, sorting, storing, disposing of and transporting refuse safely. The number of containers, boxes etc. and the necessary amount of space for sorting refuse into several fractions must be determined by the municipal council.

*(8.7(2)) See WEA Guideline D.2.24/2009, "Indretning og brug af renovationssystemer" [Arrangement s for and use of refuse disposal systems].*

8.7(3) Refuse containers, boxes etc. must be located at the same level as the vehicular access for refuse collection or such that the refuse can readily be collected with the aid of suitable equipment.

8.7(4) If rooms are provided in the building for storage of refuse, the floor, walls and ceiling must as a minimum constitute a fire-resisting unit.

*(8.7(4)) Access doors must be to the outside. The room must be ventilated using ventilation installations which must be either an extraction system combined with openings to the outside or an injection and extraction system. The building elements that delimit the fire-resisting unit should consist of class REI 60 A2-s1,d0 building elements [BS 60 building element]. Ventilation ducts should consist of class 30/E 60 (ve ho i <-> o) A2-s1,d0 ducts [BS duct 30 with integrity as F duct 60].*

8.7(5) The requirements for ventilation in refuse storage rooms are:

- 1) Fresh air supply: grille or other opening to the outside at floor level. The opening area must be able to supply a flow corresponding to the extracted flow. In the case of an air supply system, the injection flow must correspond to the extracted flow.
- 2) Exhaust: flow 1 l/s per refuse container, but no less than 15 l/s.

8.7(6) Domestic buildings with three floors above ground level must have a refuse chute for each staircase.

*(8.7(6)) This requirement is aimed first and foremost at the construction of new domestic buildings. Where refuse chutes are being removed from existing domestic buildings, a number of special factors can, subject to a specific assessment, warrant exemption from 8.7(6). It may in particular be the case that the assessment finds the existing refuse chutes to be obsolescent in terms of an environmental and ecological provision, including sorting at source, and that refuse cannot be disposed of in accordance with current rules and legislation on working environment/health and safety.*

*Should it not, for example, be possible to modernise the refuse chutes within the existing structural framework, or if modernisation entails very high costs, exemption from this provision, possibly on a time-limited basis and subject to a specific assessment, may be warranted.*

*These issues are covered in greater detail in the National Building and Housing Agency guidelines of 25 October 1996 on permission to close refuse chutes in existing buildings; the guidance should be consulted.*

8.7(7) Refuse chutes and ventilation ducts must be of appropriate fire-resisting construction. Trap doors must be of non-combustible materials and must not be installed inside the flats themselves. Refuse chutes must be ventilated by an extraction system combined with openings to the outside in the collecting boxes.

*(8.7(7)) Refuse chutes should have walls of building element class EI 60 A2-s1,d0 [BS 60 building element]. Ventilation ducts should be of duct class EI 30/E 60 (ve ho i <-> o) A2-s1,d0 [BS duct 30 with integrity as F duct 60].*

8.7(8) The requirements for ventilation in refuse chutes are:

- 1) Fresh air supply: opening to the outside at floor level with an area of 25 cm<sup>2</sup> per collecting box.
- 2) Exhaust: flow 80 l/s when a rubbish trap or door to the collecting box is open.

## 8.8. Lifts

8.8(1) Lifts must be appropriately installed in terms of safety.

*(8.8(1)) See the executive order on the use of lifts etc. and on the design of lifts etc. issued by the Danish Working Environment Authority.*

*Note also 3.2.2(6).*

8.8(2) Lift shafts must have natural ventilation or mechanical extraction. Plant rooms must be ventilated.

8.8(3) The power consumption of lifts based on expected transport per day must be stated. Standby consumption must also be stated. Provision must be made for measuring consumption.

*(8.8(3)) The expected standby consumption and the energy consumption from operation of lifts will be included in the energy performance framework after 2015.*

## Appendix 1 Calculation rules

### B.1.1 Calculation rules

#### B.1.1.1 Calculation of plot ratio

B.1.1.1(1) The “plot ratio” means the floor area as a percentage of the plot area.

*(B.1.1.1(1)) Exemption may not be given from the calculation rules in the Building Regulations, nor may a local plan or a town planning by-law apply other calculation rules.*

#### B.1.1.2 Calculation of the plot area

B.1.1.2(1) The area of the plot is the area stated for the relevant title number.

*(B.1.1.2(1)) “Total real property” is defined in the Parcellation Act.*

*Calculation of the plot ratio for the area of the plot must take account of the area of roads and/or other land which cannot be built on because of radius of corners or building line requirements which protect the road layout, if such areas are shown on the Land Register as included in the total real property.*

B.1.1.2(2) The size of the plot includes:

*(B.1.1.2(2)) When determining the size of the plot in accordance with 2.2 and 2.7.5, the area of roads and/or other land which cannot be built on because of the radius of corners or building line requirements which protect the road layout must not be included.*

1) the proportion benefiting the plot in a separately registered area which is established as communal open space shared by several properties. The shares of the separately registered open space must be apportioned to the properties in direct proportion to the size of each plot unless the municipal council decides otherwise in each individual case; this may include using an alternative distribution norm or excluding the portions of the communal open space from the calculation;

*(B.1.1.2(2) para 1) The provision permitting the municipal council to apply a different distribution norm or to exclude shares of communal open space must be specifically set out in the local plan.*

- 2) areas surrendered for roads before 1 February 1977, but which may still be included in the area of the plot. Such areas must be included in accordance with the conditions of the permit; and

*(B.1.1.2(2) para 2) This provision ensures that previously established rights to include an area of road in the area of the plot are upheld, irrespective of whether the area has been surrendered for road purposes. The agreements between the municipal council and the owner of the plot are made available both as registered declarations on the individual properties and as registration of title, and are assumed to be used mainly in Copenhagen and Frederiksberg, typically in the case of roads whose width is greater than 20 m.*

- 3) the total area under several title numbers when together they form a single property and adjoin each other.

B.1.1.2(3) The size of the plot does not include:

*(B.1.1.2(3)) Areas that form part of a total real property, and which are separated by a road from the area on which the development is proposed, may be included in the size of the plot if the separation is solely due to the road or path. More distant areas, on the other hand, cannot be included.*

- 1) areas of the plot situated in another zone than the one in which building is to take place; and
- 2) title numbers that are a part of a total real property but which do not adjoin each other.

*(B.1.1.2(3) para 1) See the Planning Act for zoning.*

### **B.1.1.3 Calculation of floor area**

B.1.1.3(1) Floor area is calculated by adding the gross areas of all storeys, including basements and useable roof spaces, enclosed balconies, conservatories, connecting passages etc.

B.1.1.3(2) Rooms/spaces which rise through several storeys are included only in the storey on which the floor is situated. Both external and internal staircases, stairwells, access balconies and lift shafts are, however, included in each storey.

*(B.1.1.3(2)) Service shafts are included in each storey.*

B.1.1.3(3) The floor area does not include:

- 1) any part of the basement around which the surrounding ground level is less than 1.25 m below the ceiling of the basement;
- 2) open balconies;
- 3) small buildings with a surface area of up to 10 m<sup>2</sup>;
- 4) refuse rooms at ground level;
- 5) blast/fallout shelters for buildings of a prescribed size for which blast/fallout shelters are required and public, officially approved blast/fallout shelters;
- 6) mezzanine platforms (galleries/sleeping platforms) with an area of up to 4.5 m<sup>2</sup>;
- 7) the projection of external staircases and access balconies at ground level;
- 8) external fire escape stairs (emergency escape route stairs).

*(B.1.1.3(3) para 3): For private and public blast/fallout shelters, see the act on blast/fallout shelters, regulations for the design and fitting out of blast/fallout shelters and openings in masonry walls, together with the regulations for the design and construction of public blast/fallout shelters. Construction of more than two small buildings with a surface area of below 10 m<sup>2</sup> must be included in the floor area.*

*(B.1.1.3(3) para 6): The floors of mezzanine platforms (galleries/sleeping platforms) only include the area on a horizontal plane 1.5 m above the finished mezzanine floor within the intersection of the plane with the outer surface of the roof cladding. There may be two or more mezzanine platforms (galleries/sleeping platforms) with an area of 4.5 m<sup>2</sup>, but if they are not to be included in the floor area, they must not be internally connected, which means that there must be separate accesses to the mezzanine platforms (galleries/sleeping platforms).*

B.1.1.3(4) For garages, carports, outbuildings, greenhouses, sheds, open covered areas, including roofed-over terraces and similar buildings, only that part of the area need be included which exceeds:

*(B.1.1.3(4)) Covered areas and roofed-over terraces are deemed to be open if at least one wall is wholly or partially open and cannot be closed by a window, door etc. Equipment houses for electronic communications networks or services are not covered by this provision. (B.1.1.3(4) para 1) Semi-detached houses with vertical party walls must be dealt with in accordance with para 2 of this provision.*

- 1) 20 m<sup>2</sup> per dwelling in the case of multi-storey buildings and in the case of joined buildings with vertical and horizontal party walls as well as terraced houses, linked houses and similar types of wholly or partly joined single-family houses;

*(B.1.1.3(4) para 1) Semi-detached houses with vertical party walls must be dealt with in accordance with para 2 of this provision.*

- 2) 35 m<sup>2</sup> per dwelling in the case of detached single-family houses, semi-detached houses with vertical party walls and holiday homes; and

*(B.1.1.3(4) paras 1 and 2) The deductions must be calculated irrespective of registration of title.*

- 3) 25% of the remaining floor area of the building in the case of other buildings, but excluding garages/outbuilding areas in indoor or outdoor cellars/basements.

*(B.1.1.3(4) para 3) "Basements" is defined by the basement ceiling being less than 1.25 m above ground level. "Other buildings" means commercial or institutional buildings.*

B.1.1.3(5) The floor area is measured on a plane defined by the surface of the finished floor to the outer face of the limiting external walls, with the following exemptions:

- 1) In useable roof spaces, the area to be included is measured on a horizontal plane 1.5 m above the finished floor to the intersection of the plane with the outer surface of the roof cladding.
- 2) Open floors, doors/stairways, air locks etc. are included up to the line otherwise defined by the line of the external walls of the building.
- 3) In the case of common walls between rooms whose areas are to be included in their respective floor areas, measurements must be made to the middle of the wall. However, in the case of party walls located on a boundary, measurements are made to the boundary line.

*(B.1.1.3(5) para 1) Roof space is deemed to be useable if accommodation space can be created without significant alteration to the roof construction.*

**B.1.1.4 Calculation of height**

B.1.1.4(1) Heights are measured from the natural ground level. For buildings on sloping ground or sites with large differences in level planes, the municipal council determines one or more planes from which measurements are to be made. The location of the level planes must be shown in an unequivocal manner on the building permit, normally by giving the levels of the planes. Several level planes may, where necessary, be specified for the same plot. When determining the level planes, the municipal council must take account of:

- 1) the configuration of the ground of the adjoining plots and the nature of the surrounding buildings; and
- 2) creating reasonable development options and access conditions for the plot concerned.

B.1.1.4(2) Antennas whose upper point is not more than 5.5 m above the surface of the roof, dormers, chimney stacks, ventilation cowls, gables and roof overhangs are not factored into the calculation of a building height, provided they are not abnormally tall. When establishing the height of the building, the municipal council may also decide to discount stairwells, lift shafts, ventilation installations and signage and illuminated advertising.

**B.1.1.5. Calculation of separation distances.**

B.1.1.5(1) Separation distances are measured horizontally without reference to differences in levels. The distance is measured at right angles to the opposing

line (road line, common boundary) or buildings concerned, but may, for reasons of light conditions or in order to limit overlooking nuisances, be measured as the shortest clear distance between the building or building element and the opposing road line, common boundary or other buildings on the same plot. In the case of buildings without limiting external walls, the measurements are taken from the roof surface.

B.1.1.5(2) The following may be excluded when determining the distance from a building to a road, common boundary or path:

- 1) Basements, basement stairs, tanks, pipes and similar buried services etc.
- 2) Roof overhangs, barge boards, canopies over doors, cornices and similar ancillary building elements whose projection does not exceed 0.5 m.

B.1.1.5(3) When calculating the distance from a building to the road boundary, building projections over the road boundary are discounted as provided for in the Public Roads Act and in the Act on Private Roads with the following relaxations and limitations:

*(B.1.1.5(3)): See section 103(1) of the Public Roads Act.*

- 1) There must always be a clear passage of no less than 1.3 m between building projections and a carriageway or cycle track.
- 2) Up to 2.8 m above ground level, building projections may extend up to 0.3 m over the road boundary.

- 3) Light wells, foundations etc. located at or below ground level may extend up to 0.8 m over the road boundary.
- 4) Signs and lightweight awnings whose underside is no less than 2.2 m above ground level may extend up to 1.0 m from a carriageway or cycle track.
- 5) Stairways must always allow a clear passage of no less than 1.3 m between the stairway and a carriageway or cycle track.

#### **B.1.1.6 Calculation of number of storeys**

B.1.1.6(1) Each floor of the building, including the ground floor, is to be included in the number of storeys as stated in the Building and Housing Register (BBR). The number of storeys also includes:

- 1) useable roof spaces; and
- 2) basements whose ceilings are more than 1.25 m above ground level.

B.1.1.6(2). In the case of buildings with split-level or mezzanine floors etc., the municipal council determines the number of storeys on the basis of an individual assessment in the particular case. When counting occupiable areas in the roof-space of the buildings or on the roof of the buildings, the municipal council may, subject to a specific assessment in each individual case, decide that a mezzanine platform (gallery/sleeping platform) with an area in excess of 4.5 m<sup>2</sup> or balconies, conservatories, terraces and similar occupiable areas constitute a storey.

*(B.1.1.6(1) para 1) Roof space is deemed to be useable if accommodation space can be created without significant alteration to the roof construction; see B.1.1.3(5) para 1.*

*(B.1.1.6, (2)) The calculation of the number of storeys may inter alia take account of the size and possible uses of the relevant functions of the building in relation to the total size and use of the building. Similarly, the external appearance of the building may be a factor if, for example, the number and size of windows for the relevant function of the building may cause the building, by comparison with others in the area, to appear to have an extra storey; see 2.4. Significant overlooking nuisance associated with the relevant function of the building may also be a factor in relation to the area in which the building is situated. For example, greater tolerance of overlooking nuisance is to be expected in taller, denser and more urban buildings than in lower and more detached residential areas.*

**Appendix 2   Obsolete**

Go to [www.retsinfo.dk](http://www.retsinfo.dk) for the relevant executive order on the conditions at permanent places of work.

## Appendix 3 Certification of structural engineers

### A. Certification of structural engineers

The Danish Society of Engineers (IDA) is authorised by the Danish Enterprise and Construction Authority to certify structural engineers within the following terms of reference:

#### 1 Validity

##### *1.1 Scope*

Structural engineering certification is issued where the structural engineer is practising in Denmark and meets the criteria set out in 4.

##### *1.2 Definitions*

The following designations are used:

- ‘certified structural engineer’ for individuals who have been professionally assessed and certified in accordance with these guidelines;
- ‘outside Denmark’ for any other EU member state, any EEA country or any other country with which the EU has an agreement granting the right to practise as a certified structural engineer;
- ‘competent authority’ for the authority which governs the profession of certified structural engineers ‘outside Denmark’.

#### 2 Certification

##### *2.1 Purpose*

The purpose of certification of structural engineers is

- to ensure the quality of the design and execution of load-bearing structures in buildings;
- to facilitate the work of the building authorities without detriment to the structural documentation of construction projects.

##### *2.2 The title ‘certified structural engineer’*

The title ‘certified structural engineer’ may be conferred for limited periods at the discretion of the certifying body indicated in 3.1.

Such certification is personal and follows the certified structural engineer irrespective of his or her employment.

### *2.3 Terms of reference for certified structural engineers*

The certified structural engineer is responsible for working exclusively within the terms of reference specified by the certifying body (see 3.3) and not to make use of the certification outside these terms of reference.

## **3 Certifying body**

### *3.1 Certifying body*

The certifying body is the Executive Committee of The Danish Society of Engineers, whose role it is to set up a certification scheme and verify its compliance with DS/EN ISO/IEC 17024, Conformity assessment – General requirements for bodies operating certification of persons.

### *3.2 Certification committee*

For the performance of its duties the certifying body appoints a committee of 9 members as follows:

- 3 members nominated by the Danish Enterprise and Construction Authority mainly from employees of relevant research and educational institutions;
- 2 members nominated by the Danish Association of Consulting engineers (FRI)
- 2 members nominated by the National Association of Local Authorities in Denmark (KL);
- 1 member nominated by the Danish Association of Certified Structural Engineers; and
- 1 member nominated by the Danish Construction Association.

Members are appointed for terms of 4 years and can hold office for a maximum of 8 years in total.

Members must be suitably qualified within the field of load-bearing structures, for example as certified structural engineers.

### *3.3 Procedural rules*

The certifying body lays down detailed rules for the implementation of the scheme and describes them in procedural rules which must

- comply with DS/EN ISO 9001:2008, Quality systems, and DS/EN ISO/IEC 17024; see 3.1;
- be accessible to the public;
- provide guidance for applicants and notifiers on procedures, rights and obligations;
- provide guidelines for the practice of certified structural engineering; and
- advise certified structural engineers as to their obligations in respect of applications for building permits.

### *3.4 Details of certified structural engineers*

The certifying body must publish details of the individual certified structural engineer, including the duration of the certification, the country by which it was issued, the training and qualifications of the certified structural engineer concerned and his or her professional title.

If the certification was issued outside Denmark, the relevant competent authority in the country concerned must be identified.

## **4 Obtaining certification in Denmark**

### *4.1 Application*

Certification is granted at the discretion of the certification committee on the basis of the application received.

It is the responsibility of the certifying body to scrutinise and assess the information indicated in 4.2 and 4.3 and on that basis decide whether to issue certification.

The certifying body can seek further information from Danish and foreign authorities in support of the certification, which must be accepted by applicants.

The certification committee must deliver its decision on certification no later than six months from receipt of the application and all necessary documents.

This deadline may be extended once, if warranted by the complexity of the case. The applicant must be informed of any such extension, and of its duration, before the expiry of the original deadline.

On receiving an application for certification, the certification committee must send a receipt to the applicant, giving details of the deadline for a decision and the scope for appeals.

#### *4.2 Academic qualifications for certification*

Certification can be issued to engineers with one of the following Danish degrees: Master of Science in Engineering (M.Sc.(Eng.)), Bachelor of Science in Engineering with honours (B.Sc.Eng.(Hons.)) or Bachelor of Science in Engineering (BSc.(Eng.)).

The certifying body must give applicants who do not have any of the above qualifications the opportunity to take a test or examination to ascertain whether they have the requisite professional expertise.

#### *4.3 Details of practical experience required for certification*

Details of the applicant's work history in a given period leading up to the application are required for certification.

#### *4.4 Rejection*

Should the certifying body reject the application for certification, the applicant must be given reasoned written notification.

### **5 Certified structural engineers from outside Denmark**

#### *5.1 Practice as certified structural engineer*

Engineers who have evidence of competence, academic qualification or other certificate which in another country, as stated in 1.2, authorises them to practise structural engineering in that country may practise as certified structural engineers in Denmark provided that the qualification or other certificate has been issued by a competent authority in that other country.

#### *5.2 Temporary employment as or practice as a locum c.s.e. as certified structural engineer*

Certified structural engineers from outside Denmark (see 1.2) are entitled to practice on a temporary or casual basis as certified structural engineers in Denmark subject to confirmation by the certifying body in accordance with article 7, 1-2, of the Council Directive on recognition of professional qualifications. The certified structural engineer must notify the certifying body of any temporary or casual work undertaken.

### *5.3 Permanent appointment as certified structural engineer*

Certified structural engineers outside Denmark (see 1.2) may be authorised to work on a permanent basis as a certified engineer in Denmark, in accordance with the Council Directive on recognition of professional qualifications. Applications for such authorisation must be sent to the certifying body.

### *5.4 Competences*

Engineers covered by 5.2 and 5.3 must have

- professional qualifications corresponding to the requirements in this Appendix; and
- sufficient linguistic proficiency for proper practice as a certified structural engineer in Denmark in accordance with the Building Regulations.

The certifying body may verify qualifications and test knowledge.

### *5.5 Probationary period or proficiency test*

Applicants who cannot provide the requisite documentation substantiating their professional qualifications must be given the opportunity by the certifying body to choose between a probationary period and a proficiency test to determine whether they have the appropriate professional skills; see article 14 of the Council Directive on recognition of qualified professionals. The duration and elements of the probationary period and the test respectively are at the discretion of the certifying body.

### *5.6 Exchange of information*

The certifying body may exchange information with competent authorities outside Denmark about

- people from outside Denmark (see 1.2) who wish to work as certified structural engineers on a temporary, casual or permanent basis in Denmark; see 5.2 and 5.3;
- certified structural engineers in Denmark who wish to work as certified structural engineers on a temporary, casual or permanent basis outside Denmark.

## **6 Renewal of certification**

Certification can be renewed at the end of the period of validity on the basis of an application submitted by the certified structural engineer. Details of the applicant's work history in the period leading up to such application provide the basis for any renewal of certification.

## **7 Withdrawal of certification**

The certifying body may withdraw an individual's designation as 'certified structural engineer' in accordance with 2.3 subject to specific criteria.

## **8 Appeal**

Applicants may appeal in writing to the certifying body in the event of refusal or withdrawal of certification and are entitled to argue their case in person before the certifying body.

## **9 Charges**

The certifying body sets the costs of the certification scheme, including charges associated with the running of the scheme such that it is self-financing in the long term.

# **B. Certified structural engineers and building permits**

## **10 Structural engineer's declaration**

### *10.1 Format of structural engineer's declaration*

In the case of applications for building permit from Danish building authorities which require the input of a certified structural engineer, the certified structural engineer in person draws up and signs a certified structural engineer's declaration.

### *10.2 The purpose of the structural engineer's declaration*

The certified structural engineer's declaration certifies that he or she has

- worked within the terms of reference laid down by the certifying body;
- drafted the documents and appendices relating to the load-bearing structures of the building or verified that they comply with Appendix 4 of the Building Regulations;
- satisfied the requirements and guidelines of the certifying body in respect of certified structural engineering work and provided all such structural engineering services as may be appropriate for the project.

### *10.3 The substance of the structural engineer's declaration*

The structural engineer's declaration must

- describe what the certified structural engineer has drafted or verified in accordance with SBi Guidelines 223;

- comply with the requirements specified by the certifying body and conform to specimen structural engineer's declarations; and
- certify that the certified structural engineer has adhered to the provisions of 10.2.

### **11 Documentation provided by certified structural engineers**

The certified structural engineer must provide the recipient of the structural engineer's declaration with

- a structural engineer's certificate valid at the time of the signing of the structural engineer's declaration; this may include complying with any request by reference to legal rules for structural engineering practice;
- any information about the organisation where the certified structural engineer's practice is based and membership of any relevant professional organisations; and
- documentary evidence of professional and geographically adequate professional liability insurance and warranties for the structural engineer's work on the project in question.

Such documentation must include contact details of the insurance company and the competent authority.

## Appendix 4 Documentation for load-bearing structures

The purpose of the documentation for load-bearing structures, herein called "structural documentation", is to show that the load-bearing structures of the building comply with defined requirements for the strength and serviceability of load-bearing structures. The purpose of structural documentation is also to document those parts of the design which are significant in terms of the safety and usability of the building; this includes the organisation of the build, allocation of responsibilities and checks during design and inspections during construction.

The applicant is responsible for the structural documentation. The applicant must appoint a construction designer for the load-bearing structures with responsibility for collating and coordinating the structural documentation, such that it constitutes a coherent whole. The applicant may act as construction designer. The structural documentation must be prepared and checked in accordance with the principles of SBi Guidelines 223, Dokumentation af bærende konstruktioner [Documentation for load-bearing structures].

### The content of the structural documentation

The structural documentation consists of the following elements:

#### A. Structural documentation

- A1. Background data
- A2. Structural calculations
- A3. Structural drawings and models
- A4. Structural alterations

#### B. Design documentation

- B1. Structural design report
- B2. Structural check report
- B3. Structural inspection report

Appendices may be annexed to any of these elements.

The scope of structural documentation, and the parts that are relevant, depend on the project and the complexity and nature of the structures; see documentation classes in SBi Guidelines 223.

**Re A1. Background data**

A1. Background data must give a complete review of the basis of the project in all functional, technical and constructional terms, including the use of the building, functional requirements, fire, codes of practice, guidance notes/guidelines, IT tools, feasibility studies, main design of the structures, robustness, foundations, construction materials and loads. This serves both to ensure that all inputs into A2. Structural calculations are on a common basis, and to ensure subsequent understanding of the building. The document must be prepared at the commencement of the design stage and updated on an ongoing basis.

**Re A2. Structural calculations**

A2. Structural calculations must demonstrate that the safety and use of the constructions in the building comply with codes of practice and standards and the requirements of the applicant and users based on A1. Background data. A2. Structural calculations is one or more technical documents that use calculations, subsequent conclusions, test reports and references attesting to compliance with the requirements. Structural calculations must include such relevant sketches and models, including details of joints, as are not included in A3. Structural drawings and models, and which are necessary for the understanding of A2. Structural calculations.

**Re A3. Structural drawings and models**

A3. Structural drawings and models must give a comprehensive picture of the layout of the structure, showing the location and dimensions of all structural elements used. Structural drawings can comprise plans, sections, elevations, details, etc. They may also comprise digital models of the structures, both plane and spatial.

**Re A4. Structural alterations**

A4. Structural alterations must demonstrate that structural alterations made after completion of A1. Background data and A2. Structural calculations do not cause unacceptable deviations in terms of the safety, use, buildability and durability of the structures.

**Re B1. Structural design report**

B1. The structural design report must give an overview of the nature, scope, organisation, allocation of responsibilities and checks during the design process to ensure that all relevant matters are covered by the construction documents. The document must be prepared at the commencement of design and updated on an ongoing basis. B1. Structural design report must contain as a discrete item an account of the allocation of responsibilities in connection with the preparation of structural documentation.

**Re B2. Structural check report**

B2. The structural check report must demonstrate that the structural documentation has been checked in accordance with the provisions of the structural design report. If B1. Structural design report refers to the quality management systems of the organisations participating in the design, compliance with such systems must be demonstrated. The construction designer is responsible for checking that contributions by other parties to the design, for example suppliers of building elements, contractors and consulting engineers, comply with the requirements of A1. Background data and B1. Structural design report.

**Re B3. Structural inspection report**

B3. The structural inspection report must demonstrate that the completed construction corresponds to the assumptions of the structural documentation in general. B3. The structural inspection report includes a specification of the scope of inspection, method of inspection and records of discrepancies.

**The preparation and handling of the structural documentation**

The structural documentation must be complete, consistent and cover the relevant constructions. It must also be accessible, well structured and legible, and drawn up in Danish. A2. Structural calculations, A3. Structural drawings and models and B2. Checking of structural documentation may, however, be in English. Documents must be listed in document references, and all documents must be clearly identifiable and dated, all pages numbered and all references unequivocal etc.

If the structural documentation includes digital models and/or digital documents, these must also comply with the above requirements for the layout of the documentation. Separate documentation must state which technological platforms and systems are needed for reading and interpreting the digital information. If ICT tools are used for the structural calculations, printouts must be legible and comprehensible to an external structural engineer, and all necessary information, definitions and references to bases etc. must be stated in the documentation, for example assumptions, input data, algorithms and codes of practice used.

All parts of the structural documentation must be checked and documentary evidence supporting the outcome given. The requirements for such checks must be stated in B1. Structural design report.

All parts of the structural documentation, including any contributions from other parties participating in the design, must be signed by the individuals by whom they were prepared, checked and approved.

On completion of the building, and no later than on commissioning, the structural documentation must correspond to what has been built.

The construction designer coordinates and collates the structural documentation and signs B1. Structural design report.

**Appendix 5 Superseded**

Appendix 5 will be incorporated in the “Eksempelsamling om brandsikring af byggeri” (Collated examples of fire safety measures in buildings).

Please note that BR08, including Appendix 5, shall continue to apply until BR10 comes into effect.

## Appendix 6 Introduction

### Appendix 6 contains:

1. A summary of measures that are often cost-effective to implement
2. Assumptions used in the calculations associated with calculating the energy demands of buildings.
3. Various conditions for temporary moveable cabins

### 1. Cost-effective energy savings

Table 1 below lists solutions that are often cost-effective when carried out as part of a renovation or replacement. It only includes materials and labour for the energy-saving work and not, for example, costs of roofing, scaffolding or other costs that would be associated with completion if the work were not part of a renovation.

The solutions also apply to works included in major renovation work; see 7.4.3. For any works not included in the renovation work, but which may have to be carried out if they are cost-effective, all consequential works need to be included and a calculation of financial viability may be therefore necessary.

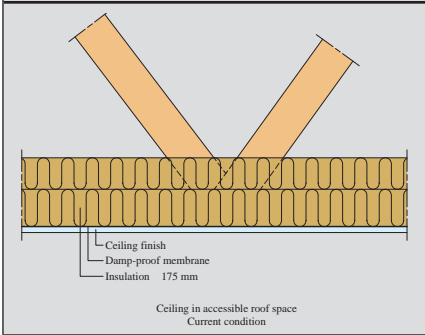
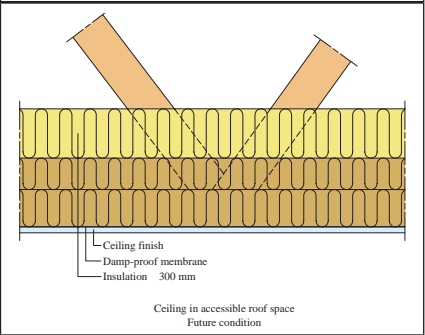
If home-grown straw or firewood from one's own woodland is used as fuel, the solutions listed below will not be cost-effective.

Table 1 lists U values for building elements and insulation in mm. This is based on existing constructions often including mineral wool with a thermal conductivity ( $\lambda$ ) of 0.037 W/mK, but there may also be other insulation materials with corresponding properties.

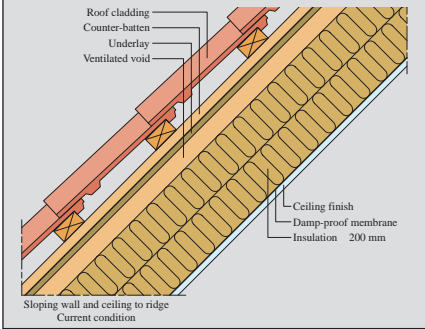
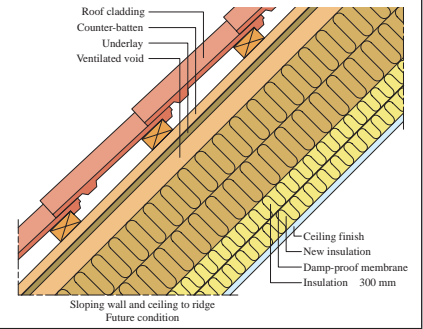
If the building element is in poor condition, or conditions exist which will lead to moisture damage, mould or rot, these matters should be remedied. Damp-proof membranes in the ceiling construction of many old buildings have been penetrated in connection with cabling for electrical systems and installation of built in spotlights. To avoid further damage, the damp-proof membrane should therefore be reinstated. Retro-fitting insulation to underfloor voids can be problematic due to moisture problems. See BYG-ERFA [Construction Experience Sharing] sheets about fresh air vents to underfloor voids and mould in buildings.

There may be conditions in a specific building which mean that insulation works are difficult to implement, so the work may not be viable. The same applies if, for example, very cheap energy in the form of one's own straw or wood is used. If the cost-effectiveness of the work is calculated as:  $(\text{lifetime} \times \text{savings}) / \text{investment} < 1.33$  the work is not cost-effective. The owner is therefore not obliged to implement the work. Table 2 lists the lifetime of different energy-saving works.

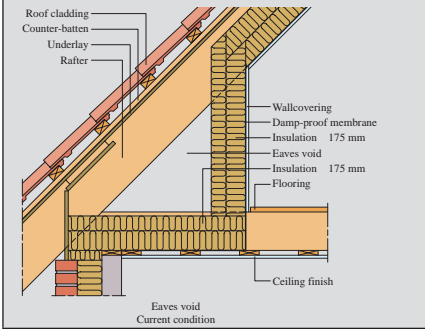
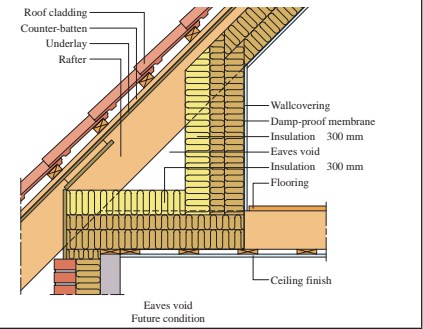
**Table 1. Constructions and services to which it is normally cost-effective to retro-fit insulation.**

<b>Ceiling and roof constructions<sup>1</sup></b>	
<b>Ceiling in accessible attic</b>	
<b>Current condition/ Intact insulation</b>	<b>Action: Insulation, thicknesses approximately corresponding to the requirements of Table 7.4.2</b>
$U > 0,20 \text{ W/m}^2 \text{ K}$ Insulation $\leq 175 \text{ mm}$	Level of insulation: BR 10 Table 7.4.2 Insulation 300 mm
 <p>Ceiling in accessible roof space Current condition</p>	 <p>Ceiling in accessible roof space Future condition</p>

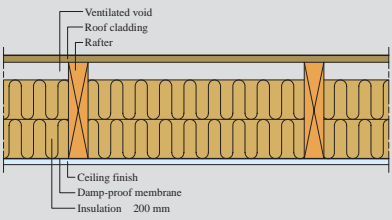
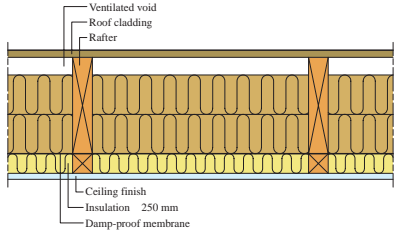
<sup>1</sup> Requirements for retro-fitted insulation met by replacement roofing. The summary shows where it is cost-effective to retro-fit insulation. If the the building element or component is replaced, the requirements of the Building Regulations for the building element or component must be complied with.

Ceiling and roof constructions <sup>2</sup>	
Sloping wall and ceiling to ridge	
Current condition/ Intact insulation	Action: Insulation, thicknesses approximately corresponding to the requirements of Table 7.4.2
$U > 0,20 \text{ W/m}^2 \text{ K}$ Insulation $\leq 200 \text{ mm}$	BR 10 Table 7.4.2 Insulation 300 mm
	

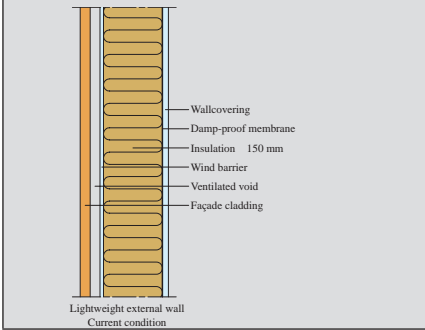
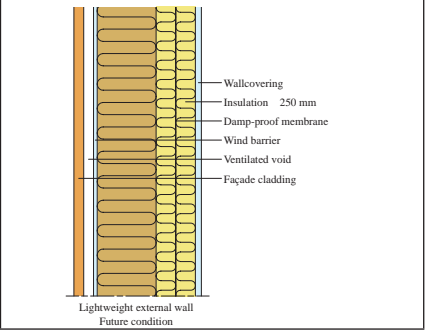
<sup>2</sup> Requirements for retro-fitted insulation met by replacement roofing. The summary shows where it is cost-effective to retro-fit insulation. If the the building element or component is replaced, the requirements of the Building Regulations for the building element or component must be complied with.

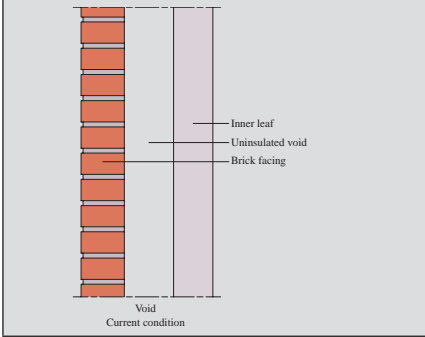
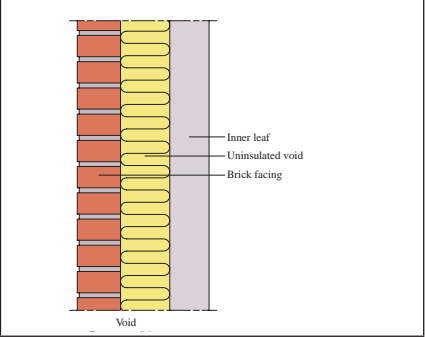
Ceiling and roof constructions <sup>3</sup>	
Eaves void	
Current condition/ Intact insulation	Action: Insulation, thicknesses approximately corresponding to the requirements of Table 7.4.2
$U > 0,20 \text{ W/m}^2 \text{ K}$ Insulation $\leq 175 \text{ mm}$	BR 10 tabel 7.4.2 Insulation 300 mm
	

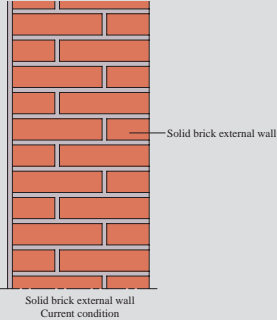
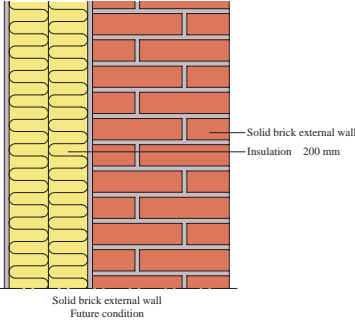
<sup>3</sup> Requirements for retro-fitted insulation met by replacement roofing. The summary shows where it is cost-effective to retro-fit insulation. If the the building element or component is replaced, the requirements of the Building Regulations for the building element or component must be complied with.

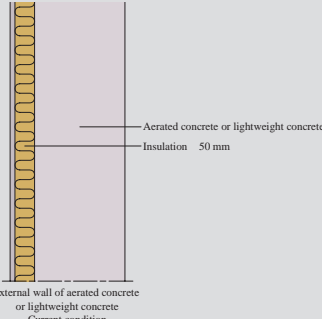
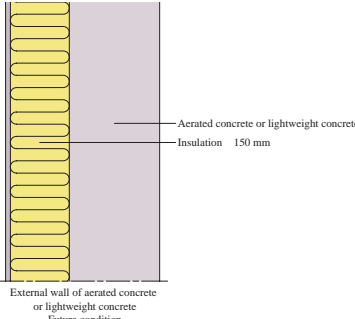
Ceiling and roof constructions <sup>4</sup>	
Flat roof	
Current condition/ Intact insulation	Action: Insulation, thicknesses approximately corresponding to the requirements of Table 7.4.2
$U > 0,20 \text{ W/m}^2 \text{ K}$ Insulation $\leq 200 \text{ mm}$	BR 10 tabel 7.4.2 Insulation 250 mm
 <p>Flat roof Current condition</p>	 <p>Flat roof Future condition</p>

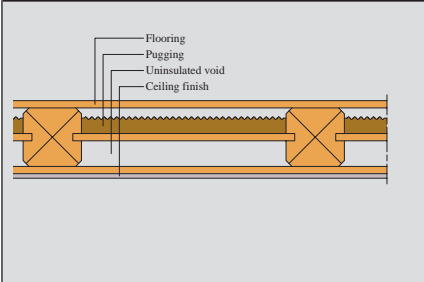
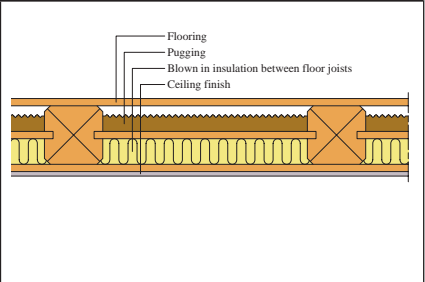
<sup>4</sup> Requirements for retro-fitted insulation met by replacement roofing. The summary shows where it is cost-effective to retro-fit insulation. If the the building element or component is replaced, the requirements of the Building Regulations for the building element or component must be complied with.

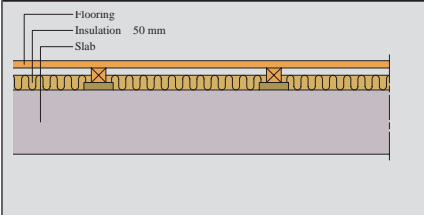
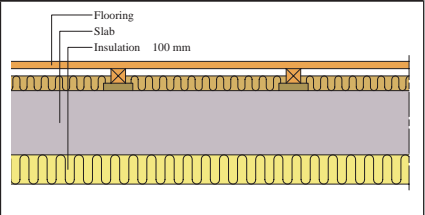
External walls	
Lightweight external wall (skeleton construction) incl. spandrels and infill panels	
Current condition/ Intact insulation	Action: Insulation, thicknesses approximately corresponding to the requirements of Table 7.4.2
$U > 0,25 \text{ W/m}^2 \text{ K}$ Insulation $\leq 150 \text{ mm}$	BR 10 tabel 7.4.2 Insulation 250 mm
 <p>Lightweight external wall Current condition</p>	 <p>Lightweight external wall Future condition</p>

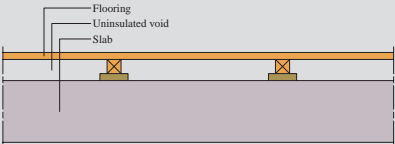
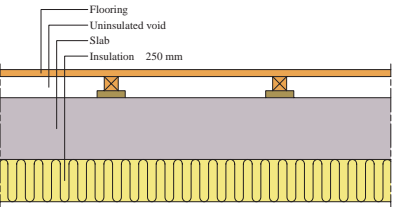
External walls	
Cavity wall	
Current condition/ Intact insulation	Action: Insulation, thicknesses approximately corresponding to the requirements of Table 7.4.2
Uninsulated	Blown in insulation
 <p>Void Current condition</p>	 <p>Void</p>

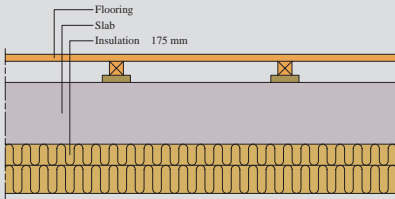
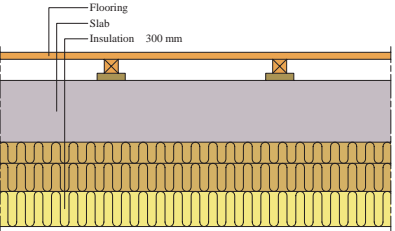
External walls	
Solid brick external wall, brick cladding	
Current condition/ Intact insulation	Action: Insulation, thicknesses approximately corresponding to the requirements of Table 7.4.2
Uninsulated	BR 10 Table 7.4.2, normally not cost-effective but can be, for example in connection with uninsulated gables. Insulation 200 mm
	

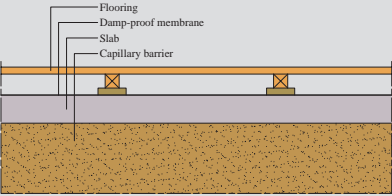
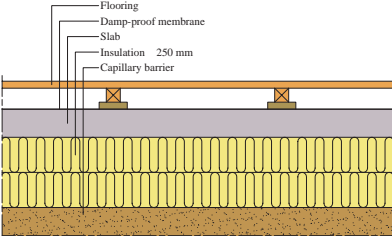
External walls	
External walls of aerated concrete or lightweight concrete	
Current condition/ Intact insulation	Action: Insulation, thicknesses approximately corresponding to the requirements of Table 7.4.2
$U > 0,70 \text{ W/m}^2 \text{ K}$ Insulation $\leq 50 \text{ mm}$	BR 10 table 7.4.2, normally only cost-effective in connection with renovation of, for example, a damaged building envelope. Insulation 150 mm
	


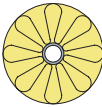
Floor and ground slab	
Floor joists over unheated basement	
Current condition/ Intact insulation	Action: Insulation, thicknesses approximately corresponding to the requirements of Table 7.4.2
Uninsulated	Blown in insulation between floor joists
 <p>Floor joists over unheated basement</p>	 <p>Floor joists over unheated basement Future condition</p>

Floor and ground slab	
Other slabs above unheated basements	
Current condition/ Intact insulation	Action: Insulation, thicknesses approximately corresponding to the requirements of Table 7.4.2
$U > 0,70 \text{ W/m}^2 \text{ K}$ Insulation $\leq 50 \text{ mm}$	BR 10 table 7.4.2, if the ceiling of the basement can be insulated. Insulation 100 mm
 <p>Slab above unheated basement Current condition</p>	 <p>Slab above unheated basement Future condition</p>


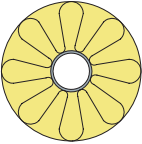
Floor and ground slab	
Slab above accessible crawl space	
Current condition/ Intact insulation	Action: Insulation, thicknesses approximately corresponding to the requirements of Table 7.4.2
$U > 0,25 \text{ W/m}^2 \text{ K}$ Insulation $\leq 150 \text{ mm}$	BR 10 tabel 7.4.2
 <p>Slab above accessible crawl space Current condition</p>	 <p>Slab above accessible crawl space Future condition</p>

Floor and ground slab	
Slab above the open air, slab accessible for insulation from below	
Current condition/ Intact insulation	Action: Insulation, thicknesses approximately corresponding to the requirements of Table 7.4.2
$U > 0,20 \text{ W/m}^2 \text{ K}$ Insulation $\leq 175 \text{ mm}$	BR 10 table 7.4.2, if possible to insulate from below. Insulation 300 mm
 <p>Slab above the open air Current condition</p>	 <p>Slab above the open air Future condition</p>

Floor and ground slab	
Ground slab	
Current condition/ Intact insulation	Action: Insulation, thicknesses approximately corresponding to the requirements of Table 7.4.2
Uninsulated	BR 10 table 7.4.2, if the ground slab is being broken up to, for example, install underfloor heating. Insulation 250 mm
 <p>Ground slab Current condition</p>	 <p>Ground slab Future condition</p>

Pipes <sup>5</sup>	
Heating pipes, distribution pipes and branches outside rooms/spaces	
Current condition/ Intact insulation	Action:
Uninsulated	Insulation 40 mm
 <p>Diameter 22 mm Current condition</p>	 <p>Insulation 40 mm Future condition</p>

<sup>5</sup> Insulation is on the assumption that pipes, containers and units are located such that insulation can be retro-fitted.

<b>Pipes<sup>6</sup></b> <b>Pipes for hot domestic hot water, distribution and circulation pipes</b>	
<b>Current condition/ Intact insulation</b>	<b>Action:</b>
<b>Uninsulated</b>	<b>Insulation 50 mm</b>
 22 mm < Diameter 42 mm Current condition	 Insulation 50 mm Future condition

<sup>6</sup> Insulation is on the assumption that pipes, containers and units are located such that insulation can be retro-fitted.

For external walls, floors and building services, table 1 shows when it is cost-effective to retro-fit insulation. If the external wall, floor or building service is being replaced, the insulation provisions for replacement apply regardless of cost-effectiveness.

There may be good reasons to use more insulation than stated in Table 1, if the insulation works are simple to carry out, if it is considered that energy prices will rise more in future than ordinary inflation and because the specific structural form makes it advantageous to select a greater insulation thickness. Guidance on the choice of solutions with better insulation can be obtained from Videncenter for energibesparelser i bygninger [Knowledge centre for energy saving in buildings] on the website:

<http://www.byggeriogenergi.dk/25872>

**Table 2. Lifetimes that can be used to calculate cost-effectiveness:**

Energy-saving measure	Years
Retro-fitted insulation to building elements	40
Windows with secondary windows and coupled frames	30
Heating systems, radiators and underfloor heating and ventilation ducts and fittings including insulation	30
Heat appliances etc., for example boilers, heat pumps, solar heating systems, ventilation units	20
Light fittings	15
Automation for heating and climatic control equipment	15
Joint sealing works	10

### 1.1. Windows

When replacing windows, it is cost-effective to use windows complying with the provisions of 7.4.2.

#### *Facade windows*

For facade windows, the window manufacturer calculates the energy gain as:

$$E_{\text{ref}} = I \times g_w - G \times U_w = 196,4 \times g_w - 90,36 \times U_w$$

where:

I: Sunlight corrected for the variation of g value with angle of entry

$g_w$ : Total solar energy transmittance of the window.

G: Degree hours in the heating season based on an indoor temperature of 20°C.

$U_w$ : Thermal transmission coefficient of the window.

The solar heat gain I and the number of degree hours G during the heating season are determined on the basis of the reference year DRY. The solar heat gain through windows depends on the orientation of the windows, and therefore a single-family house with the following distribution of windows is used as a point of reference:

North	26%
South	41%
East/west	33%

The calculation uses a single-light opening reference window 1.23 m x 1.48 m. The energy gain  $E_{\text{ref}}$  is an appropriate expression to use in comparisons of the efficiency of different windows during the heating season. A separate assessment

may need to be made with regard to nuisance due to solar heat gain and any overheating in summer.

Even though  $E_{\text{ref}}$  is based on exploitation of solar heat gain through windows in a single-family house,  $E_{\text{ref}}$  is also used to compare windows for replacement in buildings other than dwellings. This does not apply to holiday homes as, according to the provisions of the planning law, they are only used for a short time in the heating season.

New windows can lead to problems with overtemperature on sunny days, so an assessment should be made in many cases of the potential need for solar screening.

### *Rooflights*

For rooflights, the window manufacturer calculates the energy gain as:

$$E_{\text{ref}} = I \times g_w - G \times U_w = 345 \times g_w - 90.36 \times U_w$$

where:

I: Sunlight corrected for the variation of g value with angle of entry

$g_w$ : Total solar energy transmittance of the window with a roof slope of 45°.

G: Degree hours in the heating season based on an indoor temperature of 20°C.

$U_w$ : Thermal transmission coefficient of the window.

The calculation uses an opening reference window 1.23 m x 1.48 m. The calculation of  $E_{\text{ref}}$  applies to the reference house with 45° roof slope and orientation as for facade windows. Due to the roof slope, the solar heat gain in both the heating season and in summer may be significant, so the need for screening should also be considered.

$E_{\text{ref}}$  is also used as an argument for replacing rooflights in buildings other than dwellings.  $E_{\text{ref}}$  is not, however, used for holiday homes, as, according to the provisions of the Planning Act, they are only used for a short time in the heating season.

## **2. Calculation of energy demands of buildings**

### *Power supply to the property*

The energy performance framework covers energy supplied to the property for heating, ventilation, hot water, cooling and any lighting.

No account is therefore taken of distribution losses in district heating pipes, conversion losses in or efficiency of CHP (combined heat and power) plants etc., over which the individual building owner has no influence.

For a building with a shared block plant or central heating boiler from which heat is internally distributed, any losses in the heating boiler and distribution losses from heating pipes are included in the calculations.

#### *Shared renewable energy systems (RES)*

If a new building is provided with shared renewable energy systems, this may be taken account of in the energy performance framework. The calculation must take account of all losses. For example, a central solar heating system may have heat losses from the accumulator tank, pipe losses up to the individual building, and power consumption for the various pumps and automation. This provision applies to the renewable energy system installed or provided as part of construction of a new building outside a district heating area. It is not a prerequisite that the owners of the new building jointly own the system.

#### *Combined energy supplies*

Most buildings are provided with at least two different types of energy supply.

For the assessment of the energy performance frameworks of the buildings, a factor of 2.5 is used to compare electricity with heating.

In connection with class 2015 low energy buildings supplied by district heating, an energy factor of 0.8 applies to district heating for joint assessment with another power supply.

#### *Room temperature*

All heated rooms/spaces in dwellings, offices, schools, institutions etc. are assumed to be kept at a monthly average temperature of no less than 20°C in all months of the year. Rooms/spaces in such buildings that are heated to between 5°C and 15°C can either be regarded as unheated or heated to no less than 20°C. Rooms/spaces regarded as unheated are not included in the heated floor area.

In the case of buildings used for industrial purposes, for example, and which are heated to between 5°C and 15°C, the energy demand must be calculated at a monthly average temperature of 15°C.

In rooms/spaces with mechanical cooling, a maximum room temperature not exceeding 25°C is assumed.

In rooms/spaces whose temperature periodically exceeds 26°C, it is assumed that (in terms of keeping the room temperature at a maximum of 26°C) the surplus heat is removed by electrically powered mechanical cooling. This also applies to rooms/spaces without mechanical cooling.

It can be advantageous to try to lower excessively high temperatures by such means as mobile external solar screening and possibly by increased venting. In many buildings, this can be done by means of special ventilation windows automatically controlled by the room temperature.

### *Design assumptions*

The energy demand of buildings is calculated using the methodology stipulated in SBi Guidelines 213, Bygningers energibehov [Energy demands of buildings]. Unless other design assumptions can be justified for the project concerned, the assumptions stated in SBi Guidelines 213 are used.

### *Mixed-use buildings*

In mixed-use buildings, for example where the same building accommodates both dwellings and shops, the total heated floor area of the building is subdivided into building sections used for the same purposes. When establishing the energy performance framework of the building, the same division into building sections with different usages is applied.

For mixed-use buildings in which the main usage accounts for at least 80% of the total floor area, the usage as a whole is deemed to be the part occupying the main use. For example, a block of flats in which shops occupy 15% of the floor area is deemed to be a residential property.

### *Extensions*

If the energy performance framework is applied to extensions, the energy performance framework applies only to the extension. The existing building need thus not comply with the energy performance framework. The energy performance framework for the extension is calculated on the basis of the area of the entire building. If an extension of 20 m<sup>2</sup> is added to a 130 m<sup>2</sup> house, the energy performance framework will be 63.5 Kwh/m<sup>2</sup>. If, on the other hand, the energy performance framework had been calculated on the basis of the extension, it would have been 145 Kwh/m<sup>2</sup>, which would have been a significant relaxation compared with the alternative requirements in the form of U values.

Regardless of whether there are plumbing systems in the extension or not, the standard assumptions with regard to domestic water consumption must be used for the extension. Should a new heat supply not be provided for the extension, the minimum requirements of the Building Regulations for the heating system can be applied. If there is natural ventilation in the extension, it must be included in the calculation. If the extension is fitted with balanced mechanical ventilation, it must be included in the calculations.

*Tall buildings*

For buildings with high-ceilinged rooms/spaces, i.e. buildings with ceiling heights of more than 4.0 m, the energy performance framework can be increased by a supplement. The supplement is allowed, for example, for industrial buildings and sports halls, provided the area of the building envelope divided by the floor area exceeds 3.0 m. The supplement is calculated as the difference between the energy demand for the building with a notional ceiling height of 2.8 m that complies with the energy performance framework, and the energy demand of the building with the actual ceiling height.

If a tall building has windows and doors etc. comprising more than 22% of the room floor area, the area of the windows and doors is scaled down in the ratio of 2.8m/actual height.

*Presentation of input data and results*

The design assumptions and input data used for calculating the energy performance framework must be clearly stated in the calculations.

*Specification of input data*

Calculated input data and relevant input data stated by manufacturers are listed here.

For a number of construction products, the information can be found alongside the CE marking of the construction product.

For windows, however, the issue is more complex. The information used in the calculations is the U value of the actual window. It is therefore not enough only to obtain information on a standard dimension window in accordance with the European standard for windows (the standard includes 1230 mm x 1480 mm windows). Information is also needed on the solar heat transmittance through the window and possibly the daylight transmittance.

For skylight domes, information on the correct U value may be based on calculations in accordance with DS 418.

*Specification of results*

In addition to the necessary energy supply to the building per m<sup>2</sup> heated floor area, the results of the calculation must include sufficient information in support of the result. In addition to the demand for supplied energy included in the energy performance framework, the results must show a specification of the calculated power consumption, heat usage and consumption of domestic hot water, including losses from the systems.

In addition, the assumed U-values and linear losses must be stated such that compliance with 7.6 of the Building Regulations can be demonstrated, and the calculated transmission loss through the building envelope, excluding doors and windows, must be stated in the results.

### **3. Temporary portable cabins**

Temporary portable cabins are cabins erected in connection with, for example, renovation of a school or children's institution or to meet an acute demand for space. Temporary here means 0-3 years. Permanent cabins or cabins used for more than 0-3 years must comply with the current requirements for new buildings.

Temporary portable cabins must comply with the provisions of the Building Regulations. The provisions of Table 3 apply to insulation of the building envelope. In addition, temporary portable cabins may have electric heating up to 2015.

It is expected that the requirements for the building envelope of temporary portable cabins will remain unchanged after 2015. Thereafter, electric heating will have to be replaced by another heat supply, or the power consumption must be compensated for by provision of a corresponding sustainable energy source. An alternative heat supply could be, for example, heat pumps. The heat pumps must comply with the relevant requirements of the Building Regulations.

It is a precondition of the use of the U values and linear losses in Table 3 that the total area of windows and doors does not exceed 22% of the heated floor area.

U values and linear losses can be altered and window areas etc. increased, provided that heat loss from the portable building is not greater than if the requirements of Table 3 were satisfied.

**Table 3. U values and linear losses for temporary portable cabins**

Table of U values for cabins	W/m <sup>2</sup> K
External walls.	0,20
Partition walls adjoining rooms that are unheated or heated to a temperature which is more than 5 K below the temperature in the room concerned	0,40
Ground slabs and suspended upper floors above open air or a ventilated crawl space.	0,12
Ceiling and roof constructions, including jamb walls, flat roofs and sloping walls directly adjoining the roof.	0,15
Windows, including glass walls, external doors and hatches to the outside or to rooms/spaces that are unheated or heated to a temperature which is more than 5 K below the temperature in the room/space concerned (does not apply to ventilation openings below 500 cm <sup>2</sup> ).	1,50
Rooflights and skylight domes.	1,80
<b>Linear loss</b>	<b>W/mK</b>
Foundations.	0,20
Joint between external wall, windows or external doors and hatches.	0,03
Joint between roof construction and rooflights or skylight domes.	0,10

## Appendix 7 Description of Attestation

### **Description of Attestation of Conformity 3 in accordance with the Construction Products Directive (Council Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products).**

The requirement for national approval of factory-made products for water and drainage systems has been amended such that only products which affect the quality of drinking water are required to have national approval. For the other products which are not yet covered by a technical specification under the Construction Products Directive, a quality control system is required in order to verify compliance with the technical specifications which have hitherto been the basis for national approval whose structure corresponds broadly to that of the Construction Products Directive.

This system requires both an initial type-testing of the product carried out by an accredited laboratory, and the factory's own production control.

#### **The factory's own production control**

The manufacturer is required to have its own production checking system. These are ongoing internal production checks carried out by the manufacturer. The manufacturer must have systematic documentary evidence of all specified conditions, requirements and provisions for this scheme in a written account of the methods and procedures.

This documentation must demonstrate that the quality control system is applied uniformly. The documentation makes it possible to check that the required product specifications are achieved, and that the checking system is being implemented as intended.

The factory's production checks combine production technology with the means necessary to maintain and check compliance of the product with the technical specifications which apply.

Production control covers both checking and testing of measuring equipment, raw materials, components used, processes, machines, production equipment and the finished products, including their material properties. Finally, the control covers the use to which the results obtained are put.

**Requirements for production control**

The manufacturer is responsible for organising the factory's production control system. Duties and responsibilities under the scheme must be documented, and this documentation must be kept up to date. The manufacturer may delegate the competence to a person who has the necessary authority to:

- organise the procedures that can verify compliance of the product at relevant stages of the process;
- identify and record all cases of non-compliance;
- find methods of rectifying cases of non-compliance.

The manufacturer should describe the control system in detail and keep this documentation up to date. The manufacturer's documentation and the factory's control system must be tailored to the product and the manufacturing process.

The reliability of the control systems should be established in relation to the compliance of the product; i.e.:

- the planning of procedures and instructions associated with checking routines in accordance with the requirements of the technical specifications;
- specification of duties, responsibilities and results;
- the results must be used to correct discrepancies, make good the effects of discrepancies and revise the production control system to remove the cause of non-compliance with the technical specification if this proves to be necessary.

Checking covers one or more of the following measures:

- specification and control of the raw materials and parts used;
- checking and testing during production, within a pre-determined framework (checking and testing cover both production of the product and adjustment of production machinery and equipment etc. Checks, tests and their frequency depend on the type and composition of the product, complexity of the production processes, sensitivity of the properties of the product to variations in production parameters etc.);
- checking and testing of the finished products as required by the technical specifications, and as appropriate for the specific product and the conditions under which it is produced.

If the finished products are not checked once they are on the market, the manufacturer must ensure that packaging, handling and transport are arranged in such a way that the product remains compliant with the technical specification.

The manufacturer is responsible for ensuring that the necessary calibration of measuring and testing equipment is carried out.

**Verification**

The manufacturer must be in possession of or have access to the measuring equipment and staff needed for carrying out the requisite verifications and testing. The manufacturer can comply with this requirement by making an agreement with one or more companies or individuals who have the necessary knowledge and equipment.

The manufacturer must calibrate or verify and maintain checking, measuring and testing equipment in good, serviceable condition so as to be ready to verify compliance of the product with the technical specification. The equipment must be used in accordance with the provisions or the reference system to which the technical specification refers.

**Monitoring of compliance**

For certain products, it may be appropriate for compliance to be monitored both at the initial stages of production and at the most important stages of the production phase. This means that only products which have passed the initial checks and tests are allowed further in the production process.

**Testing**

Testing must be carried out in accordance with a programme, using the methods set out in the technical specification.

Testing methods must generally be direct methods.

The manufacturer must set up and maintain records which show that tests on the product have been carried out. These records must show that the product complies with the defined acceptance criteria.

**Ensuring compliance**

If check or test results show that the product does not meet the requirements, the manufacturer must immediately take the necessary measures to bring production back into compliance.

This may be the case if, for example, the statistical variation of test results exceeds limits permitted by the technical specification.

Products and series of products which do not comply with the technical specification must be kept separate so that they can be identified. When the defect has been corrected, testing and verification may be repeated.

If the product has been delivered before the results are known, the manufacturer must have a procedure in place for ensuring that the customers are informed in such a way that the necessary steps can be taken.

**The manufacturer's records**

The factory's own production control must be well documented by the manufacturer. A description of the product, date of manufacture, testing methods used, test results and acceptance criteria must be recorded, with the signature of the person who was responsible for the verification.

The manufacturer must also record any steps taken to bring the product into compliance with the requirements of the technical specification. This could, for example, be further testing, changes to the production process, rejection or repair of the product.

**Traceability**

The manufacturer is responsible for maintaining a comprehensive schedule of individual products or series of products with details of production and properties. The manufacturer must also record to whom the products were first sold. This information must enable conclusive identification and tracing of individual products or series of products. In certain cases, for example when dealing with raw materials, this is not always possible.

## **Appendix 8 Guidance for applicants for building works**

### **Guidance for applicants for building works covered by 1.3.1 and 1.3.2**

Applicants are responsible for the erection of the building in accordance with the requirements of the Building Act and compliance with the provisions of the Building Regulations

Applicants' applications for a building permit must show that the building is covered by section 16(3) of the Building Act.

Before taking the building into use, applicants must send the municipal council all requisite documentation relating to technical requirements. Applicants are responsible for ensuring that all relevant material is sent to the municipal council. The municipal council is obliged to store such documentation but does not undertake any quality assurance or processing of the material for the application. Applicants are encouraged to collaborate with a consultant to clarify which is the appropriate documentation for the building project in question. To clarify any uncertainties, applicants can also hold preliminary discussions with the municipal council.

On taking the building into use, applicants must provide a signed declaration to the effect that the building has been erected in compliance with the provisions of the Building Act and Building Regulations and that the requisite documentation relating to technical requirements are appended to the declaration.

Examples of such documents relating to technical requirements as it may be appropriate to send to the municipal council are listed on Page 2 of this declaration.

### **Declaration concerning technical documentation**

**The undersigned applicant hereby declares:**

That the building has been erected in accordance with the requirements of the Building Act and the provisions of the Building Regulations.

That the requisite documentation relating to technical requirements is appended to this declaration.

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Date:

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Place:

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Signature:

**Examples of documentation relating to technical requirements:**

- Drawings showing level access
- Drawings showing any sound insulation against neighbouring properties
- Drawings showing the tightness of the building where it is in contact with the soil
- Documentation showing that the load-bearing structures of the building satisfy the provisions of Part 4 of the Building Regulations and Appendix 4 relating to structural documentation, and that the structures have been erected in accordance with best building practice, such as indicated in SBi Guidelines 230 etc.
- Documentation showing that rafters were supplied ex factory
- Stability calculations
- Documentation showing that structures and materials are free of any moisture content which would risk the development of mould in the building once occupied (engineer's report)
- Documentation showing that fire safety requirements have been met, achieving satisfactory levels of safety, e.g. in accordance with "Eksempelsamling for brandsikring af byggeri 2010" [Collated examples of fire safety measures in buildings 2010]
- Energy performance framework calculations
- Heat loss calculations (for conversions)
- Documentation relating to sewers/drainage
- Documentation relating to ventilation