The Danish Energy Performance of Buildings Calculation Methodology

Description of the methodology in Annex A of the five core EPB standards

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Introduction

The purpose of this note is to describe the Danish Energy Performance of Buildings Calculation Methodology using annex A of the five core EPB standards:

- ISO 52000-1:2017 Energy performance of buildings — Overarching EPB assessment – Part 1: General framework and procedures.
- ISO 52003-1:2017 Energy performance of buildings – Indicators, requirements, ratings and certificates– Part 1: General aspects and application to the overall energy performance.
- ISO 52010-1:2017 Energy performance of buildings — External climatic conditions — Part 1: Conversion of climatic data for energy calculations.
- ISO 52016-1:2017 Energy performance of buildings — Energy needs for heating and cooling, internal temperatures and sensible and latent heat loads — Part 1: Calculation procedures.
- ISO 52018-1:2017 Energy performance of buildings — Indicators for partial EPB requirements related to thermal energy balance and fabric features — Part 1: Overview of options.

The description is on the conditions autumn 2019 and based on the following documents:

- Danish Buildings Regulations 2018. Ministry of Transport and Housing. 1 July 2019. (in Danish) [Bygningsreglement 2018. Transport- og Boligministeriet. 1. juli 2019.]
- Low on Energy Saving in Buildings. Ministry of Climate, Energy and Utilities. 19 June 2012. Inklusive addendums. (in Danish) [Lov om fremme af energibesparelser i bygninger. Energi-, Forsynings- og Klimaministeriet. 19. juni 2012. Inkl. senere ændringer.]
- Executive order on energy labelling of buildings. Ministry of Climate, Energy and Utilities. 26 August 2017. Inklusive addendums. (in Danish) [Bekendtgørelse om energimærkning af bygninger. Energi-, Forsynings- og Klimaministeriet. 26. august 2017. Inkl. senere ændringer.]
- Executive order on Hand Book for Energy Consultans. Ministry of Climate, Energy and Utilities. 29 May 2018. (in Danish) [Bekendtgørelse om Håndbog for Energikonsulenter. Energi-, Forsynings- og Klimaministeriet. 29 maj 2018.]
- SBi-Direction 213 Buildings Energy Demand, 6. Edition. Danish Building Research Institute. October 2018. (in Danish) [SBi-anvisning 213 Bygningers energibehov, 6. udgave. Statens Byggeforskningsinstitut. Oktober 2018.]
- DS418:2012 Calculation of Heat Loss from Buildings, 7. Edition. Danish Standard. (in Danish) [DS 418:2012 Beregning af bygningers varmetab, 7. udgave. Dansk Standard.]
- 2001 - 2010 Danish Design Reference Year. Update and supplementary datasets. DMI Report No. 18-20. Danish Meteorological Institute. 2018.
- 2001 - 2010 Danish Design Reference Year - Reference Climate Dataset for Technical Dimensioning in Building, Construction and other Sectors. DMI Report No. 13-19. Danish Meteorological Institute. 2013.

Only tables from annex A of the five core EPB standards relevant to the Danish Energy Performance of Buildings Calculation Methodology is completed in the note.

ISO 52000-1
Overarching EPB assessment

Annex A
(normative)
Input and method selection data sheet — Template

A.1 General

The template in Annex A to this standard shall be used to specify the choices between methods, the required input data and references to other standards.

NOTE 1 Following this template is not enough to guarantee consistency of data.

NOTE 2 Informative default choices are provided in Annex B. Alternative values and choices can be imposed by national / regional regulations. If the default values and choices of Annex B are not adopted because of the national / regional regulations, policies or national traditions, it is expected that:

— national or regional authorities prepare data sheets containing the national or regional values and choices, in line with the template in Annex A; or
— by default, the national standards body will add or include a national annex (Annex NA) to this standard, in line with the template in Annex A, giving national or regional values and choices in accordance with their legal documents.

NOTE 3 The template in Annex A is applicable to different applications (e.g. the design of a new building, certification of a new building, renovation of an existing building and certification of an existing building) and for different types of buildings (e.g. small or simple buildings and large or complex buildings). A distinction in values and choices for different applications or building types could be made:

— by adding columns or rows (one for each application), if the template allows;
— by including more than one version of a Table (one for each application), numbered consecutively as a, b, c, … For example: Table NA.3a, Table NA.3b;
— by developing different national / regional data sheets for the same standard. In case of a national annex to the standard these will be consecutively numbered (Annex NA, Annex NB, Annex NC, …).

NOTE 4 In the section "Introduction" of a national / regional data sheet information can be added, for example about the applicable national / regional regulations.

NOTE 5 For certain input values to be acquired by the user, a data sheet following the template of Annex A, could contain a reference to national procedures for assessing the needed input data. For instance, reference to a national assessment protocol comprising decision trees, tables and pre-calculations.

The shaded fields in the tables are part of the template and consequently not open for input.

A.2 References

The references, identified by the module code number, are given in a table complying with the format given in Table A.1 (a template).

Table A.1 — References (See Clause 2)

Reference	Reference document	
	Number	Title
M1-2		
M1-3		

Remark: The modulization is not used in the Danish Energy Performance of Buildings Calculation Methodology.

A.3 Overarching preparation steps

Table A.2 — Energy performance assessment types according to building category and application [a] (See 5.3)

Application	Building category	Assessment type	Conditions
Building permit	All categories	Design	
Permit to use	All categories	As build	
Certification	All categories	As is	
[a] Add rows in case of more assessment purposes.			

Table A.3 — Object types (See Clause 6 and 10.1)

EPB_OBJECT_TYPE			
Type [a]	**Description**	**Subset [b]**	**Comments**
All types	Whole Building		
The type of object may have an effect on the choices in this overarching document and in the other EPB standards. This property is therefore inherited by the other EPB standards, where relevant. a) One choice is possible per subset. b) Definition of the calculation case, one selection shall be done for each subset.			

Table A.4 — Building categories (See Clauses 6 and 9)

BLDNGCAT_TYPE		
Type	**Description**	**Comments**
Residential	Residential	
Non-residential	Non-residential	
The building category may have an effect on the choices in this overarching document and in the other EPB standards. This property is therefore inherited by the other EPB standards, where relevant.		

Table A.5 — Which building categories are included in EPB assessment (See 6.2.2)

Building categories (see Table A.3)	Identifier	Included in EPB assessment[a] Yes/No
Residential		Yes
Non-residential - Heated		Yes
Non-residential – Non-heated		No
[a] Building category for which this document applies, e.g. because there is an EPB requirement for this building category.		

Table A.6 — Differentiation of space categories (See Clauses 6, 9 and 10.1)

Choice		
Type	**Choice**	**Comments**
Differentiation of space categories in a building	No	

In case of differentiation Table A.7 has to be completed. Otherwise the list of space categories is equal to the list of building categories: (SPACECAT_X = BLDNGCAT_X).

Table A.7 — Space categories (See Clauses 6 and 9)

SPACECAT_TYPE		
Type	**Description**	**Comments**
		Not relevant
NOTE Each space category requires a set of conditions of use (temperature settings, ventilation, and lighting requirements, domestic hot water needs, etc.). The space category may have an effect on the choices in this overarching document and in the other EPB standards. This property is therefore inherited by the other EPB standards, where relevant.		

Table A.8 — Application types (See Clauses 6 and 9)

EPB_APPLIC_TYPE		
Type	**Description**	**Comments**
	To obtain building permit	
	To obtain permit to use	
	Energy performance certification	
The type of application may have an effect on the choices in this overarching document and in the other EPB standards. This property is therefore inherited by the other EPB standards, where relevant.		

Table A.9 — EPB assessment types (See Clauses 6 and 9)

EPB_ASSESS_TYPE (see Table 6)		
Type	**Description**	**Comments**
All	Calculated	
The type may be different for different object types, building or space categories. The type of assessment may have an effect on the choices in this overarching document and in the other EPB standards. This property is therefore inherited by the other EPB standards, where relevant.		

Table A.10 — Combination of services types (See Clauses 6 and 9)

EPB_LISTSERVICES_**TYPE**		
Type	**Description**	**Comments**
Residential	Artificial light not included	
Non-residential	Artificial light included	
The combination may be different for different building or space categories The type of service mix may have an effect on the choices in this overarching document and in the other EPB standards. This property is therefore inherited by the other EPB standards, where relevant.		

A.4 Method

Table A.11 — Electricity use types (See 7.3.3.4.)

Electric energy use type	Identifier
Electricity use description	*identifier for that use*

Remark: Identifiers are not used in the Danish Energy Performance of Buildings Calculation Methodology.

Table A.12 — Electricity generation types (See 7.3.3.6 and 9.6.6.2.4)

Electric energy generation type	Identifier
Electricity generation description	*identifier for that type*

Remark: Identifiers are not used in the Danish Energy Performance of Buildings Calculation Methodology.

Table A.13 — Gross calorific value of some common solid fuels (See 7.3.4 and 9.6.2)

Fuel	Gross calorific value kWh/kg
a)	
a) Add the rows of the energy carriers.	

Remark: Gross calorific values are not included in the Danish Energy Performance of Buildings Calculation Methodology.

Table A.14 — Gross calorific value of some common liquid fuels (See 7.3.4 and 9.6.2)

	Fuel	Density kg/l	Gross calorific value kWh/kg
	a)		
a) Add the rows of the energy carriers.			

Remark: Gross calorific values are not included in the Danish Energy Performance of Buildings Calculation Methodology.

Table A.15 — Gross calorific values of some gaseous energy carriers (See 7.3.4 and 9.6.2)

Fuel	Density kg/m³	Gross calorific value kWh/m³
[a] Add the rows of the energy carriers.		

Remark: Gross calorific values are not included in the Danish Energy Performance of Buildings Calculation Methodology.

Table A.16 — Weighting factors (based on gross or net calorific value) (See 7.3.5, 9.5.1, 9.6.2, 9.6.5 and 9.6.6.3)

Energy carrier	f_{Pnren}	f_{Pren}	f_{Ptot}	[a]
Delivered from distant				
Electricity			1,90	
District heating			0,85	
All other heating			1,00	
Delivered from nearby				
Electricity			1,90	
District heating			0,85	
All other heating			1,00	
Delivered from on-site				
Electricity			0	
Heating			0	
Exported				
Not relevant				
[a] Add a column in case of other requirements, e.g. CO_2 requirement. [b] Add rows for each relevant energy carrier				

Remark: Weighting factors are rounded values for total primary energy in the Danish Energy Performance of Buildings Calculation Methodology.

Table A.17 — k_{exp}-factor (See 7.3.5 and 11.6.2.1)

Description	Value
k_{exp} factor that is used to control which part of the exported energy is included in the energy performance of the building	0…1

Remark: The factor is not used in the Danish Energy Performance of Buildings Calculation Methodology.

Table A.18 — Building services considered in the energy performance calculation (See 8.2 and 8.5)

Combination of services type	**Choice: included in the energy performance calculation *<one column per listservices type, see Table A.10>***	
Building service [a)]	***Residential***	***Non-residential***
Heating	Yes	Yes
Cooling	Yes	Yes
Ventilation	Yes	Yes
Humidification	No	No
Dehumidification	No	No
Domestic hot water	Yes	Yes
Lighting	No	Yes
External lighting	No	No
People transport (e.g. elevators, escalators)	No	No
Other services consuming electricity (e.g. appliances)	No	No
Others (please specify)	No	No
[a)]: Add rows or edit the lines in case of other/more differentiated services		

Table A.19 — Principle assumed presence of systems (See 9.2)

Method		**Choice Yes/No** [a)]
1	Principle "Assumed system"	No
2	Principle "Presence of system"	Yes
3	Other principle	No
In case of method 3:		
	Reference to procedure:	<reference>
a) Only one choice possible; choice may be differentiated per service		
NOTE Consistency with the conditions of use (module M1-6) is required.		

Table A.20 — Specification of the useful floor area (See 9.3)

Specification and / or reference to document with more information
Gross floor area (BR18)

Table A.21 — Type or types of metric for the building size (See 9.3 and 9.4)

Quantity	Unit	**Specification and/or reference to document with more information**
Gross floor area	m2	BR18
Add rows for each metric		

Table A.22 — Which space categories are contributing to the reference size (See 9.4)

Space categories	**Contributing?**	**If YES:** **(Optional) fraction of size contributing to ref. size ($f_{ref;cat,}$).** **Default value = 1** [a)]
Spaces included in the gross floor area	Yes	1
Spaces NOT included in the gross floor area	No	0
[a)] The choices in this table are choices that actually cannot be made without the holistic view on all EPB standards. The categorization of spaces is directly related to the assumed conditions of use for each space category and to the specific rules for combining spaces into zones. For instance, a fine subdivision into different space categories, with for each space category different conditions of use (such as temperature settings, ventilation rates, lighting levels, etc.) could easily lead to unwanted complexities in the assessment.		

Table A.23 — Perimeter specification (9.5.1 and 9.6.1)

Energy carrier		**Specification of nearby perimeter (see 3.4.24)**
Bio fuels	Solid	Nearby is the same as distant for all energy carriers
	Liquid	
	Gaseous	
Electricity		
District heating		
District cooling		

Table A.24— Perimeter choice (See 9.5.1 and 9.7)

Perimeter choice	**Choice – RER calculation (renewable energy)**	**Choice – RER calculation (total energy)**	**Choice - EPB calculation (delivered energy)**
On-site	Yes/No	Yes/No	Yes/No
Nearby	Yes/No	Yes/No	Yes/No
Distant	Yes/No	Yes/No	Yes/No

Remark: Renewable energy ratio is not calculated in the Danish Energy Performance of Buildings Calculation Methodology.

Table A.25 — Conversion factors for net to gross calorific values for energy carriers (See 9.6.2)

Energy carrier [a)]	**conversion factor $f_{GCV/NCV}$**
All carriers	1,00
[a)] Add the rows of the energy carriers.	

Table A.26 — Overheads included in the primary energy and CO_2 emission factors (See 9.6.2 and 9.6.3)

		Primary energy factors	CO_2 emission coefficients
Included overheads	Energy to extract the primary energy carrier	No	Not relevant
	Energy to refine and/or to transform the primary energy carrier	No	Not relevant
	Energy to transport the primary energy carrier	No	Not relevant
	Energy used for any other operations necessary for the delivery to the building (e.g. storage)	No	Not relevant
	Energy to build, operate and dismantle the refinery units and/or the transformation units	No	Not relevant
	Energy to build, operate and dismantle the transportation system	No	Not relevant
	Energy to clean up or dispose the wastes	No	Not relevant
	Energy embedded in materials	No	Not relevant
Other greenhouse gases than CO_2 included [a]		No	Not relevant
Applicable for ratings based on		All	Not relevant
[a] It is possible to list the other greenhouse gases.			

Table A.27 — Basis for energy performance of buildings (See 9.6.2)

Basis for the building energy performance	Choice	Application type (see Table A.8/B.8)
Total energy performance ($E_P = E_{Ptot}$) or non-renewable energy performance ($E_P = E_{Pnren}$)	$E_P = E_{Ptot}$	
Add lines in case of more assessment purposes.		

Table A.28 — Priority for generation system, export (See 9.6.6.2.4)

Priority level to export	Priority identifier	Generation type identifier

Remark: Export of energy is not included in the Danish Energy Performance of Buildings Calculation Methodology.

Table A.29 — Subdivision rules (see 10.5.1)

Type of zone or service area	General rule	Specific rules (if any)
Thermal zone	Gross floor area	
Heating system service area	Gross floor area	
Cooling system service area	Gross floor area	
Ventilation service area	Gross floor area	
DHW service area	Gross floor area	
Lighting service area	Gross floor area	
[a] Add lines in case of more service areas.		

Table A.30 — Energy flows taken into account in the building balance (See 11.6.2.1)

System or component	Counted as delivered energy? (Yes/No) [a)]	Exported energy taken into account under Step B of the energy performance assessment (11.6.2.1) [b)] (Yes/No)
Needs		
On-site		
Nearby	[c)]	
(One row per additional category)		
Distant	[d)]	
(One row per additional category)		

[a)] A "No" in the second column implies "not applicable" in the third column.
[b)] Only relevant if $k_{exp} > 0$, see Table A.29/B.29.
[c)] If choice of perimeter is "nearby" (see Table A.19).
[c)] If choice of perimeter is "distant" (see Table A.19).
Rows may be deleted or added.

Remark: Cannot be specified in relation to the Danish Energy Performance of Buildings Calculation Methodology.

Table A.31 — Electrical uses not satisfied by on-site electricity production (See 11.6.2.4)

On-site electricity production type	Not allowed uses	Comment
All	None	

Table A.32 — Matching factor of produced and used electricity (See 11.6.2.4)

Calculation interval	Case	Matching factor function and parameters
Monthly	All building categories	

ISO 52003-1
Indicators, requirements, ratings and certificates

Annex A
(normative)
Input and method selection data sheet — Template

A.1 General

The template in Annex A to this standard shall be used to specify the choices between methods, the required input data and references to other standards.

NOTE 1 Following this template is not enough to guarantee consistency of data.

NOTE 2 Informative default choices are provided in Annex B. Alternative values and choices can be imposed by national / regional regulations. If the default values and choices of Annex B are not adopted because of the national / regional regulations, policies or national traditions, it is expected that:

— national or regional authorities prepare data sheets containing the national or regional values and choices, in line with the template in Annex A; or
— by default, the national standards body will add or include a national annex (Annex NA) to this standard, in line with the template in Annex A, giving national or regional values and choices in accordance with their legal documents.

NOTE 3 The template in Annex A is applicable to different applications (e.g. the design of a new building, certification of a new building, renovation of an existing building and certification of an existing building) and for different types of buildings (e.g. small or simple buildings and large or complex buildings). A distinction in values and choices for different applications or building types could be made:

— by adding columns or rows (one for each application), if the template allows;
— by including more than one version of a Table (one for each application), numbered consecutively as a, b, c, … For example: Table NA.3a, Table NA.3b.
— by developing different national / regional data sheets for the same standard. In case of a national annex to the standard these will be consecutively numbered (Annex NA, Annex NB, Annex NC, …).

NOTE 4 In the section "Introduction" of a national / regional data sheet information can be added, for example about the applicable national / regional regulations.

NOTE 5 For certain input values to be acquired by the user, a data sheet following the template of Annex A, could contain a reference to national procedures for assessing the needed input data. For instance, reference to a national assessment protocol comprising decision trees, tables and pre-calculations.

The shaded fields in the tables are part of the template and consequently not open for input.

Specific information concerning Annex A and Annex B of this standard:

The reporting tables allow full freedom of choice at national or regional level.

Typically, different choices will be made according to the type of work, notably for new constructions (or equivalent) or works on existing buildings. Furthermore, there may be differentiations according to other criteria, such as between residential and non-residential buildings. Each different application area will thus have its own set of tables if different choices are made. The application domain of every set shall be clearly specified.

A.2 References

The references, identified by the EPB module code number, are given in a table complying with the format given in Table A.1 (template).

Table A.1 —References

Reference	Reference document[a]	
	Number	Title
M1–6 [b]		
M1–14 [b]		
M2–4 [b]		
M3–4 [b]		
M4–4 [b]		
M5–4 [b]		
M6-4 [b]		
M7-4 [b]		
M8-4 [b]		
M9–4 [b]		
M10–4 [b]		

[a] If a reference comprises more than one document, the references may be differentiated.
[b] Informative

Remark: The modulization is not used in the Danish Energy Performance of Buildings Calculation Methodology.

A.3 Energy performance requirements

Table A.2 — Default choices with respect to the overall EPB requirements (See 9.5)

Application: All….		
Overall energy performance feature	**Requirement?**	**Exceptions*?**
Total primary energy use	X	No
Non-renewable primary energy use		
Renewable primary energy use		
Renewable energy ratio		
Greenhouse gas emissions		
Energy policy factors (define*)		

The columns or cells that are marked with an asterisk * (i.e. any cell involving a specific national/regional element) shall be marked with a numbered reference. Clear explanation and motivation shall be given for each of these new elements.

Complete:

Explanations according to each of the numbered references:

(1) ... < free text >

(2) ...

Motivation for the requirement mix: ... < free text >

As explained in Clause 9, the numerical value of the requirement on the total primary energy use (notably whether variable or constant) should be set with great care.

Table A.3 — Numeric indicator used for the requirement on the total primary energy use (See 9.5)

Numeric indicator	Choice
Total primary energy use per useful floor area [kWh/m^2]	X
Total primary energy use E_{Ptot} [kWh]	
Ratio (define)	
< free text > (Other: define*)	
...	
If another indicator is used, it shall be clearly described and precise reference shall be made to the determination method: (1) ... < free text > (2) ...	

Table A.4 — Numeric indicator used for the requirement on the non-renewable primary energy use (See 9.5)

Numeric indicator	Choice
Non-renewable primary energy use per useful floor area [kWh/m^2]	
Non-renewable primary energy use E_{Pnren} [kWh]	
Ratio (define)	
< free text > (Other: define)	
...	
If another indicator is used, it shall be clearly described and precise reference shall be made to the determination method: (1) ... < free text > (2) ...	

Table A.5 — Numeric indicator used for the requirement on the renewable primary energy use (See 9.5)

Numeric indicator	Choice
Renewable primary energy use per useful floor area [kWh/m^2]	
Renewable primary energy use E_{Pren} [kWh]	
Ratio (define)	
< free text > (Other: define)	
..	
If another indicator is used, it shall be clearly described and precise reference shall be made to the determination method: (1) ... < free text > (2) ...	

A.4 Rating

Table B.6 — Energy rating methods (See 10.2)

Method	**Choice** [a]
1. Default energy rating method with two reference points (see 10.2)	NO
2. Default energy rating method with a single reference point (see 10.2)	NO
3. Other energy rating method (see 10.2)	YES
In case of method 3:	**Reference**
Classes (Existing buildings)	B-G
	Equal distributed
Class: new building 2010	A2010
Class: new building 2015	A2015
Class: Low energy building	A2020
[a] Only one "YES" is possible	

Table B.7 – Graphical representation of the rating

Method	**Choice** [a]
1. Default model for the graphical representation of the rating (see11.3)	YES
2. Other model for the graphical representation of the rating (see 11.3)	NO
In case of method 2:	
Reference to procedure:	<free text>
[a] Only one "YES" is possible	

ISO 52010-1
External climatic conditions

Annex A
(normative)

Input and method selection data sheet

A.1 General

The template in Annex A to this standard shall be used to specify the choices between methods, the required input data and references to other standards.

NOTE 1 Following this template is not enough to guarantee consistency of data.

NOTE 2 Informative default choices are provided in Annex B. Alternative values and choices can be imposed by national / regional regulations. If the default values and choices of Annex B are not adopted because of the national / regional regulations, policies or national traditions, it is expected that:

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— by adding columns or rows (one for each application), if the template allows;
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— by developing different national / regional data sheets for the same standard. In case of a national annex to the standard these will be consecutively numbered (Annex NA, Annex NB, Annex NC, …).

NOTE 4 In the section "Introduction" of a national / regional data sheet information can be added, for example about the applicable national / regional regulations.

NOTE 5 For certain input values to be acquired by the user, a data sheet following the template of Annex A, could contain a reference to national procedures for assessing the needed input data. For instance, reference to a national assessment protocol comprising decision trees, tables and pre-calculations.

The shaded fields in the tables are part of the template and consequently not open for input.

A.2 References

The references, identified by the EPB module code number, are given in Table A.1 (template).

Table A.1 — References

Reference	Reference document	
	Number	Title
Mx-y [a]	…	…
	…	…

[a] In this standard there are no choices in references to other EPB standards. The Table is kept to maintain uniformity between all EPB standards

Remark: The modulization is not used in the Danish Energy Performance of Buildings Calculation Methodology.

A.3 Climatic input data

Table A.2 — Weather station and climatic data set (See 6.3.2)

Name	Value					
Identifier for climatic data set	DK-DRY					
Station and/or name of dataset	Holbæk (Sjælsmark)					
	Symbol	**Unit**	**Value**	**Validity interval** [a]	**Origin**	**Varying** [b]
latitude	φ_w	°	55,7	-90 to +90	station	No
longitude [c]	λ_w		11,6	-180 to +180	station	No
time zone	*TZ*	h	CET (UTC +1)	-12 to +12	station	No
First day of time series (day of the year)	$n_{day;start}$	-	1/1	1 to 366	station	No
Last day of time series (day of the year)	$n_{day;end}$	-	31/12	1 to 366	station	No
Day of the week for January 1		-	Friday	Monday to Sunday (day 1 to 7)	station	No
Daylight saving time? [c]	Example of possible input: - Applicable for this station and taken into account - Applicable for this station but disregarded - Not applicable for this station					
Leap day included	Yes/No					
Specific other information	<free text>					
Name	**Value**					

Name	Value
Reference to documentation on application range and type of data	2001 - 2010 Danish Design Reference Year - Reference Climate Dataset for Technical Dimensioning in Building, Construction and other Sectors. DMI Report No. 13-19. Danish Meteorological Institute. 2013.

[a] Practical range, informative

[b] "Varying": value may vary over time: different values per time interval, for instance: hourly values or monthly values (not constant values over the year).

[c] If Yes: additional information to be added

A.4 Calculation method

Table A.3 — Method to assess direct (beam) irradiance if not available from weather station (See 6.4.2)

Method		Choice Yes/No [a]
1	Default method	YES or NO
2	Other method	YES or NO
In case of method 2:		
	Reference to procedure:	<Reference>
[a] Only one choice possible		

Remark: The standard weather data set includes data for direct (beam) irradiation.

Table A.4 — Solar reflectivity of the ground ($\rho_{sol;grnd}$) (See 6.4.3)

Name	Value [a]
Fixed value	YES
Dependent on ground condition, listed in climatic data file	NO
Dependent on local ground condition (near the inclined surface)	NO
Values available in climatic data file	YES
[a] Only one choice possible	

If fixed value:

Table A.5 — Solar reflectivity of the ground; if fixed value

Name	Value
Solar reflectivity of the ground, $\rho_{sol;grnd}$ [-]	0,20

If dependent on ground condition:

Table A.6 — Solar reflectivity of the ground; if dependent on ground conditions

Description of ground condition [a]	Value for solar reflectivity of the ground, $\rho_{sol;grnd}$ [-]
Dry or wet ground snow free	0 to 1
…	0 to 1
[a] Example; rows can be added or deleted	

Table A.7 — Choice between options and methods for calculation of shading by external objects (See 6.4.5.1)

Application [b]	**…..**	**….**
Description	**Choice**	**Choice**
Effect of shading calculated in this standard?	Yes	Yes/No
If Yes:	**Choice [a]**	**Choice [a]**
Only method 1, Simplified method (shading of direct radiation)	No	Yes/No
Only method 2, Detailed method (shading of direct and diffuse radiation)	Yes	Yes/No
Both methods are allowed	No	Yes/No
[a] Only one Yes per column possible. [b] Add more columns if needed to differentiate between applications (e.g. building categories, new or existing buildings, etc.)		

Table A.8 — Number of skyline segments, $n_{sh;segm}$ for input solar shading objects (See 6.4.5.2)

Application [b]	**.....**	**....**
Description	**Value of $n_{sh;segm}$** [a]	**Value of $n_{sh;segm}$** [a]
Maximum number of segments over 360 degrees	8	8 to 36
Fixed width (= 360 / $n_{sh;segm}$) [c]	Yes	Yes/No

[a] Practical range, informative

[b] Add more columns if needed to differentiate between applications (e.g. building categories, new or existing buildings, etc.)

[c] If not fixed, the width of each segment can be adapted to the width of the shading object, with limitation of maximum number of segments $n_{sh;segm}$.

Table A.9 — Choice between methods for calculation of illuminance (See 6.4.6)

Application [a]	**.....**	**....**
Description	**Choice**	**Choice**
Method 1, Default method, or Method 2, Alternative method	Method 1	Method 1 or method 2
If choice is method 2:	**Description**	**Description**
Describe method 2	Reference or formula	Reference or formula

[a] Add more columns if needed to differentiate between applications (e.g. building categories, new or existing buildings, etc.)

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Annex A
(normati
ve)

Input and method selection data sheet — Template

A.1 General

The template in Annex A to this standard shall be used to specify the choices between methods, the required input data and references to other standards.

NOTE 1 Following this template is not enough to guarantee consistency of data.

NOTE 2 Informative default choices are provided in Annex B. Alternative values and choices can be imposed by national / regional regulations. If the default values and choices of Annex B are not adopted because of the national / regional regulations, policies or national traditions, it is expected that:

— national or regional authorities prepare data sheets containing the national or regional values and choices, in line with the template in Annex A; or
— by default, the national standards body will add or include a national annex (Annex NA) to this standard, in line with the template in Annex A, giving national or regional values and choices in accordance with their legal documents.

NOTE 3 The template in Annex A is applicable to different applications (e.g. the design of a new building, certification of a new building, renovation of an existing building and certification of an existing building) and for different types of buildings (e.g. small or simple buildings and large or complex buildings). A distinction in values and choices for different applications or building types could be made:

— by adding columns or rows (one for each application), if the template allows;
— by including more than one version of a Table (one for each application), numbered consecutively as a, b, c, … For example: Table NA.3a, Table NA.3b.
— by developing different national / regional data sheets for the same standard. In case of a national annex to the standard these will be consecutively numbered (Annex NA, Annex NB, Annex NC, …).

NOTE 4 In the section "Introduction" of a national / regional data sheet information can be added, for example about the applicable national / regional regulations.

NOTE 5 For certain input values to be acquired by the user, a data sheet following the template of Annex A, could contain a reference to national procedures for assessing the needed input data. For instance, reference to a national assessment protocol comprising decision trees, tables and pre-calculations.

The shaded fields in the tables are part of the template and consequently not open for input.

A.2 References

The references, identified by the EPB module code number, are given in Table A.1.

Table A.1 — References

Reference	Reference document [a]	
	Number	Title
M1-4		
M1-6		
M1-8		

Remark: The modulization is not used in the Danish Energy Performance of Buildings Calculation Methodology.

A.3 Selection of main method

Table A.2 — Choice between hourly or monthly calculation method (see 5.2)

Type of object and / or application	All [b]	.... [b]
Description	**Choice [a]**	**Choice [a]**
Only hourly method allowed	No	Yes/No
Only monthly method allowed	Yes	Yes/No
Both methods are allowed	No	Yes/No

[a] Only one Yes per column possible.

[b] Add more columns if needed to differentiate between type of object, type of building or space, type of application or type of assessment. Use the list of identifiers from Tables A.2 to A.7 (normative template, with informative default choices in Tables B.2 to B.7) of ISO 52000-1

A.4 Zoning

Table A.3 — Thermal zoning rules (see 6.4.2.12)

	Application: ..... [a]	
Description	**Apply the described method?**	**If "No": Alternative method** If the described method is not used, describe details of the alternative method or give reference to source document
Zoning step 1. Assessment of thermal envelope	No	<free text>
Zoning step 2. Grouping according to space category	No	<free text>
Zoning step 3. Grouping in case of large openings	No	<free text>
Zoning step 4. Split to have same combination of services	No	<free text>
Zoning step 5. Further grouping according to similar thermal conditions of use	No	<free text>
Zoning step 6. Split according to specific system or subsystem properties	No	<free text>
Zoning step 7. (Further) split to have sufficient homogeneity in thermal balance	No	<free text>
Zoning step 8. (Further) grouping of thermally unconditioned zones	No	<free text>
Zoning step 9. Simplification in case of small thermal zones	No	<free text>
Zoning step 10. Simplification in case of very small thermal zones	No	<free text>
[a] Add more columns to differentiate per application, if needed		

Table A.4 — Options of thermally unconditioned zone types and default values (see 6.4.5)

Situation	**Default value of $b_{ztu;m}$ in case of a thermally unconditioned zone, type: external** [a]
Default	0,3
Calculated	0 to 1
Internal thermally unconditioned zone type allowed?	
Choice	Yes
If Yes: (optionally) specify default values for the adjustment factor (free text)	
Situation	**Default value of $b_{ztu;m}$ in case of a thermally unconditioned zone, type: internal** [a]
All	1
[a] Add more rows if needed	

Table A.5 — Default contribution of ventilation in external construction of a thermally unconditioned zone (see 6.4.5.4)

Application	**All** [a]	**....** [a]
Description	**Choice**	**Choice**
Default allowed?	No	Yes/No
If Yes:		
Coefficient for default contribution of ventilation, $c_{ztu;ve}$	0 to 1	0 to 1
[a] Add more columns if needed		

Table A.6 — Choice of spatial temperature averaging in residential buildings (see 6.4.6)

Description		**Choice** [a]
Application of the given formula for spatial temperature averaging		No
If No:		
No application of the given formula for spatial temperature averaging	It is assumed that the same temperature set-point for heating applies also to partly or moderately thermally conditioned residential spaces.	Yes
	Calculate the fully and partly or moderately thermally conditioned residential spaces as separate, thermally uncoupled thermal zones.	No

	Calculate the fully and partly or moderately thermally conditioned residential spaces as separate, thermally coupled thermal zones.	No

[a] Only one Yes possible.

In case of application of the formula	Value
$f_{mod;t}$	Not used
$f_{mod;sp}$	Not used
$H_{int;spec}$ (W/K)	Not used

Table A.7 — Choice between calculation with thermally coupled or uncoupled thermal zones (see 6.4.7)

Application	**All [b]**	**.... [b]**
Description	**Choice [a]**	**Choice [a]**
Thermally uncoupled calculations	Yes	Yes/No
Thermally coupled calculations	No	Yes/No
Both methods are allowed	No	Yes/No

[a] Only one Yes per column possible.

[b] Add more columns if needed to differentiate between applications (e.g. building categories, new or existing buildings, etc.). Note the link with the choice in Table A.9

Table A.8 — Default thermal coupling properties in case of thermally coupled zones (see 6.4.7)

		Choice	
Heat transfer part	**Quantity**	**Default value**	**Unit**
Transmission heat transfer between zones *z* and *y*	<free text>	0 to ∞	...
ventilation heat transfer from zone *z* to zone *y*		0 to ∞	...
ventilation heat transfer from zone *y* to zone *z*		0 to ∞	...

[a] Add more rows if needed

Remark: Not relevant to the Danish Energy Performance of Buildings Calculation Methodology.

A.5 Hourly calculation procedures

Remark: Hourly calculation procedure are not included in the Danish Energy Performance of Buildings Calculation Methodology.

A.6 Monthly calculation procedures

Table A.27 — Monthly ventilation heat transfer coefficient (see 6.6.6.2)

Application	**All** [b]	**....** [b]
Description	**Choice** [a]	**Choice** [a]
Method A	Yes	
Method B [c]	No	
Both methods [c]	No	

[a] Only one Yes per column possible.

[b] Add more columns if needed to differentiate between applications (e.g. building categories, new or existing buildings, etc.)

[c] Method B is only allowed outside the CEN area.

Table A.28 —Dynamics correction factor for ventilation (see 6.6.6.2)

Dynamics correction factor for monthly mean air flow	**Value**
$f_{ve;dyn;k}$	Not used

Table A.29 — Solar absorption coefficient of external opaque surfaces (see 6.6.8.2)

	Choice
Differentiation in solar absorption coefficient?	Yes/No
If Yes: specify the procedure to classify the three categories (free text)	
Category	**Specification**
Category **1** α_{sol} **= 0,3 (light colour)**	[free text]
Category 2 α_{sol} **= 0,6 (intermediate colour)**	[free text]
Category 3 α_{sol} **= 0,9 (dark colour)**	[free text]
	Choice
If No: choose the default category	1, 2 or 3

Remark: Not included in the Danish Energy Performance of Buildings Calculation Methodology.

Table A.30 — View factor to the sky (see 6.6.8.2)

	Unshaded horizontal roof	Unshaded vertical wall
F_{sky}		

Remark: Not included in the Danish Energy Performance of Buildings Calculation Methodology.

Table A.31 — Difference between external air temperature and sky temperature (see 6.6.8.3)

Climatic region [a]	All
$\Delta\theta_{sky;m}$ (K)	0 K
[a] Add more columns if needed to differentiate between climatic regions	

Table A.32 — Choice between detailed or simple method to determine the internal effective heat capacity (see 6.6.9)

Application	All [b]	.... [b]
Description	**Choice [a]**	**Choice [a]**
Only detailed method allowed	Yes	Yes/No
Only simple method allowed	No	Yes/No
Both methods allowed	No	Yes/No
[a] Only one Yes per column possible. [b] Add more columns if needed to differentiate between applications (e.g. construction types or building categories)		

Table A.33 — Simple method to determine the internal effective heat capacity. Specification of the classes (see 6.6.9)

Class	Specification of the class
Very light	<free text>
Light	<free text>
Medium	<free text>
Heavy	<free text>
Very heavy	<free text>

Remark: Not allowed in the Danish Energy Performance of Buildings Calculation Methodology.

Table A.34 — Values of the reference numerical parameter $a_{H,0}$ and the reference time constant $\tau_{H,0}$ for the gain utilization factor (see 6.6.10.2)

	$a_{H,0}$	$\tau_{H,0}$ h
Dwellings	0,8	70
Non-domestic	1,0	15

Table A.35 — Values of the reference numerical parameter $a_{C,0}$ and the reference time constant $\tau_{C,0}$ for the loss utilization factor (see 6.6.10.3)

	$a_{C,0}$	$\tau_{C,0}$ h
Dwellings	1,0	15
Non-domestic	1,83	83

Table A.36 — Choice between methods A and B for heating intermittency (see 6.6.11.3)

Application	**All** [b]	**....** [b]
Description	**Choice** [a]	**Choice** [a]
Only method A	No	Yes/No
Only method B	Yes	Yes/No
Both methods are allowed	No	Yes/No
[a] Only one Yes per column possible. [b] Add more columns if needed to differentiate between applications (e.g. building categories, new or existing buildings, etc.)		

Remark: Average temperature is used.

Table A.37 — Choice between methods A and B for cooling intermittency (see 6.6.11.4)

Application	**All** [b]	**....** [b]
Description	**Choice** [a]	**Choice** [a]
Only method A	No	Yes/No
Only method B	Yes	Yes/No
Both methods are allowed	No	Yes/No
[a] Only one Yes per column possible. [b] Add more columns if needed to differentiate between applications (e.g. building categories, new or existing buildings, etc.)		
If method A applies		
Correlation factor for method A for intermittent cooling	**Value**	
$b_{C;red}$	(value between 0 and 1)	

Remark: Average temperature is used.

Table A.38 — Choice between methods A and B for overheating indicator (see 6.6.12)

Application	**All** [b]	**....** [b]
Description	**Choice** [a]	**Choice** [a]
Method A	No	Yes/No
Method B	Yes	Yes/No
[a] Only one Yes per column possible. [b] Add more columns if needed to differentiate between applications (e.g. building categories, new or existing buildings, etc.)		
If method B applies		
Provide details or reference to details	Overheating is anticipated removed by an imaginary (low efficient) cooling system	

Table A.39 — The monthly fraction of energy need for humidification (see 6.6.14)

	Monthly fraction of energy need for humidification $f_{HU;m}$		
Formula?	Yes/No		
If Yes, give formula	<free text>		
If No, give fraction for each month (total = 1)	**Monthly fraction of energy need for humidification $f_{HU;m}$**		
January	0 to 1	July	0 to 1
February	0 to 1	August	0 to 1
March	0 to 1	September	0 to 1
April	0 to 1	October	0 to 1
May	0 to 1	November	0 to 1
June	0 to 1	December	0 to 1

Remark: Humidification is not included in the Danish Energy Performance of Buildings Calculation Methodology.

Table A.40 — Efficiency of latent heat recovery (see 6.6.14)

Type of heat recovery unit	Efficiency of latent heat recovery $\eta_{HU;rvd}$
<Type>	0 to 1
<Type>	0 to 1
[a] Add more rows if needed to differentiate between types	

Remark: De-humidification is not included in the Danish Energy Performance of Buildings Calculation Methodology.

Table A.41 — Annually accumulated amount of moisture to be supplied per kg dry air supply (see 6.6.14)

Space category [a]	Annually accumulated amount of moisture to be supplied per kg dry air supply $\Delta x \cdot t_{a;sup}$ (kg h/kg)
<SPACECAT_TYPE_XXX identifier in capitals>	0 to ∞
<SPACECAT_TYPE_XXX identifier in capitals>	0 to ∞
[a] Add more rows if needed to differentiate between types	

Remark: Humidification is not included in the Danish Energy Performance of Buildings Calculation Methodology.

Table A.42 — Choice of glazing area or frame area fraction (see E.2.1)

Description	Choice [a]
For each window: free choice between glazing area or fixed frame fraction	Yes/No
For all windows the same choice: either glazing area or fixed frame fraction	Yes/No
For all windows: only glazing area allowed	Yes/No
For all windows: only fixed frame fraction	Yes/No
[a] Only one Yes per column possible.	
In case of frame fraction:	F_{fr}
Frame fraction fixed value	(value between 0 and 1)

Remark: In the Danish Energy Performance of Buildings Calculation Methodology the frame fraction is calculated individually per window. Typically based finally on supplier's data.

Table A.43 — Factors related to the solar energy transmittance (see E.2.2.1)

Correction and weighting factor for *g*-value non-scattering and scattering transparent glazings and blinds:		
F_w	a_g	alt_g °
0 to 1	0 to 1	0 to 80

Default values of the total solar energy transmittance at normal incidence, g_n, for typical types of glazing [a]	
Type	**g_n**
<free text>	0 to 1
<free text>	0 to 1

Default values of the reduction factor, for typical types of blinds [a]				
Blind type	**Optical properties of blind**		**Reduction factor with**	
	absorption	**transmission**	**blind inside**	**blind outside**
<free text>	0 to 1	0 to 1	0 to 1	0 to 1
<free text>	0 to 1	0 to 1	0 to 1	0 to 1

[a] Add more rows or columns if needed

Remark: Based on supplier's data.

Table A.44 — Movable shutter reduction factor, $f_{sht;with}$, and movable solar shading reduction factor $f_{sh;with}$ (see G.2.2.2.2)

Month	**Location**				
	$f_{sht;with}$ [a]	$f_{sh;with}$ [a]			
		N	**E**	**S**	**W**
1					
2					
3					
11					
12					
Annual					

[a] Add more columns or rows if needed to differentiate between e.g. applications (e.g. building categories, new or existing buildings, etc.), orientations or climates

Remark: Based on supplier's data.

Table A.45 — Choices between options and methods for calculation of shading by external objects (see F.1)

Application [b]	.....			....		
Description	**Choice**			**Choice**		
Calculation of the effect of shading by distant objects includedin this standard?	Yes			Yes/No		
When calculating solar shading on building elements: which types of distant shading objects (not on site) may or shall be taken into account or ignored NOTE For instance landscape (such as hills or dikes), vegetation (such as trees), other constructions (such as buildings)	Shall be taken into account:	May be taken into account:	Shall be ignored:	Shall be taken into account:	May be taken into account:	Shall be ignored:
	<free text>	<free text>	<free text>	<free text>	<free text>	<free text>
When calculating solar shading on opaque building elements such as roofs or facades: which types of on site shading objects can or shall be ignored NOTE For instance rebates, overhangs or other shading objects from the own building(s) on site	Shall be taken into account:	May be taken into account:	Shall be ignored:	Shall be taken into account:	May be taken into account:	Shall be ignored:
	<free text>	<free text>	<free text>	<free text>	<free text>	<free text>
When calculating solar shading on transparent building elements: NOTE For instance window rebates, overhangs and side fins	Shall be taken into account:	May be taken into account:	Shall be ignored:	Shall be taken into account:	May be taken into account:	Shall be ignored:
	Yes	<free text>	<free text>	<free text>	<free text>	<free text>
Specific subdivision rules for the calculation of solar shading on building elements	<free text>			<free text>		
Choice between the two methods for the solar shading calculation:	**Choice** [a]			**Choice** [a]		
Method 1, Shading of direct radiation	No			Yes/No		
Method 2, Shading of direct and diffuse radiation	Yes			Yes/No		
In case of method 2: give reference to calculation procedure	BSim simulations			<Reference>		

[a] Only one Yes per column possible.

[b] Add more columns if needed to differentiate between applications (e.g. building categories, new or existing buildings, etc.)

Table A.46 — Parameters for monthly solar shading due to overhangs (See F3.5.1.2)

Location:	<latitude>			
Period:	<month or months>			
Orientation	A_1	B_1	A_2	B_2
S				
SE-SW				
E-W				
NE-NW				
N				

Remark: See values on the next pages.

Table A.47 — Parameters for monthly solar shading due to fins (See F3.5.1.2)

Location:	<latitude>			
Period:	<month or months>			
Orientation	A_1	B_1	A_2	B_2
S				
SE-SW				
E-W				
NE-NW				
N				

Remark: See values on the next pages.

Table A.48 — Parameters for monthly solar shading by obstacles or overhangs; more detailed method (See F.3.1.2 and F3.5.2.2)

Location:	<latitude>								
Period:	<month or months>								
Orientation	**Weight, $w_{obst;m;i}$ per sector**				**Solar altitude, $\alpha_{sol;m;i}$ per sector**				**Fraction direct solar irradiation $f_{sol;dir;m}$**
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**	
N	0 to 1				0 to 90				0 to 1
NE									
E									
SE									
S									
SW									
W									
NW									

Remark: See values on the next pages.

Skyggefaktorer

Reduktionfaktorerne er beregnet af JRO med Babelstårnet.

Vinkelfaktor: F_W 0,86 -

Horisontvinkel

	10	°	Skyggefaktor											
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec
1	90	n	1,00	1,00	1,00	0,99	0,95	0,96	0,96	0,98	1,00	1,00	1,00	1,00
2	90	nø/nv	1,00	0,98	0,94	0,94	0,95	0,97	0,97	0,96	0,94	0,96	1,00	1,00
3	90	ø/v	0,78	0,90	0,93	0,95	0,97	0,98	0,98	0,98	0,95	0,92	0,85	0,78
4	90	sø/sv	0,78	0,94	0,96	0,98	0,99	1,00	1,00	0,99	0,98	0,96	0,88	0,71
5	90	s	0,75	0,95	0,99	1,00	1,00	1,00	1,00	1,00	1,00	0,97	0,88	0,67
6	45	n	1,00	1,00	1,00	0,99	0,95	0,96	0,96	0,98	1,00	1,00	1,00	1,00
7	45	nø/nv	1,00	0,98	0,94	0,94	0,95	0,97	0,97	0,96	0,94	0,96	1,00	1,00
8	45	ø/v	0,78	0,90	0,93	0,95	0,97	0,98	0,98	0,98	0,95	0,92	0,85	0,78
9	45	sø/sv	0,78	0,94	0,96	0,98	0,99	1,00	1,00	0,99	0,98	0,96	0,88	0,71
10	45	s	0,75	0,95	0,99	1,00	1,00	1,00	1,00	1,00	1,00	0,97	0,88	0,67
11	0	-	0,87	0,96	0,97	0,98	0,97	0,98	0,98	0,98	0,98	0,97	0,93	0,83

	20	°	Skyggefaktor (interpoleret, behøves ikke i endeligt program)) - Kommentar JRO: Korrekte værdier indsat!											
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec
1	90	n	1,00	1,00	1,00	0,98	0,92	0,88	0,89	0,97	1,00	1,00	1,00	1,00
2	90	nø/nv	1,00	0,97	0,88	0,81	0,84	0,86	0,85	0,87	0,86	0,94	1,00	1,00
3	90	ø/v	0,71	0,65	0,75	0,82	0,88	0,90	0,88	0,89	0,83	0,69	0,68	0,76
4	90	sø/sv	0,41	0,58	0,83	0,90	0,95	0,97	0,96	0,95	0,90	0,73	0,42	0,45
5	90	s	0,36	0,55	0,89	0,99	1,00	1,00	1,00	1,00	0,96	0,74	0,37	0,39
6	45	n	1,00	1,00	1,00	0,98	0,92	0,88	0,89	0,97	1,00	1,00	1,00	1,00
7	45	nø/nv	1,00	0,97	0,88	0,81	0,84	0,86	0,85	0,87	0,86	0,94	1,00	1,00
8	45	ø/v	0,71	0,65	0,75	0,82	0,88	0,90	0,88	0,89	0,83	0,69	0,68	0,76
9	45	sø/sv	0,41	0,58	0,83	0,90	0,95	0,97	0,96	0,95	0,90	0,73	0,42	0,45
10	45	s	0,36	0,55	0,89	0,99	1,00	1,00	1,00	1,00	0,96	0,74	0,37	0,39
11	0	-	0,69	0,76	0,89	0,93	0,93	0,93	0,92	0,95	0,93	0,83	0,69	0,71

	30	°	Skyggefaktor											
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec
1	90	n	1,00	1,00	1,00	0,98	0,92	0,87	0,88	0,97	1,00	1,00	1,00	1,00
2	90	nø/nv	1,00	0,97	0,87	0,74	0,74	0,78	0,74	0,75	0,81	0,94	1,00	1,00
3	90	ø/v	0,71	0,63	0,58	0,68	0,76	0,82	0,77	0,73	0,63	0,55	0,68	0,76
4	90	sø/sv	0,41	0,43	0,55	0,79	0,87	0,92	0,88	0,84	0,72	0,38	0,42	0,45
5	90	s	0,36	0,38	0,54	0,92	0,99	1,00	1,00	0,96	0,78	0,33	0,37	0,39
6	45	n	1,00	1,00	1,00	0,98	0,92	0,87	0,88	0,97	1,00	1,00	1,00	1,00
7	45	nø/nv	1,00	0,97	0,87	0,74	0,74	0,78	0,74	0,75	0,81	0,94	1,00	1,00
8	45	ø/v	0,71	0,63	0,58	0,68	0,76	0,82	0,77	0,73	0,63	0,55	0,68	0,76
9	45	sø/sv	0,41	0,43	0,55	0,79	0,87	0,92	0,88	0,84	0,72	0,38	0,42	0,45
10	45	s	0,36	0,38	0,54	0,92	0,99	1,00	1,00	0,96	0,78	0,33	0,37	0,39
11	0	-	0,69	0,68	0,73	0,86	0,88	0,89	0,88	0,88	0,82	0,65	0,69	0,71

	90	°	Skyggefaktor (ultimative værdier, bruges ikke i regneark)											
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec
1	90	n	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2	90	nø/nv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
3	90	ø/v	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
4	90	sø/sv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
5	90	s	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
6	45	n	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
7	45	nø/nv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
8	45	ø/v	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
9	45	sø/sv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
10	45	s	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
11	0	-	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Udhæng			~~Be10 programmet bruger nye skyggefaktorer for udhæng fra JRO fra version 7 af. Er ikke implementeret he~~												
	45	°	Skyggefaktor		50	%									
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec	
1	90	n	0,76	0,76	0,76	0,77	0,76	0,76	0,76	0,76	0,76	0,76	0,76	0,76	
2	90	nø/nv	0,76	0,76	0,76	0,75	0,74	0,74	0,74	0,73	0,75	0,76	0,76	0,76	
3	90	ø/v	0,78	0,77	0,75	0,73	0,72	0,71	0,72	0,71	0,73	0,75	0,76	0,77	
4	90	sø/sv	0,82	0,78	0,74	0,69	0,65	0,64	0,65	0,66	0,70	0,75	0,80	0,82	
5	90	s	0,84	0,80	0,73	0,63	0,58	0,57	0,58	0,58	0,67	0,77	0,82	0,84	
6	45	n	0,34	0,34	0,34	0,35	0,33	0,31	0,31	0,34	0,35	0,34	0,34	0,34	
7	45	nø/nv	0,34	0,34	0,35	0,35	0,34	0,34	0,35	0,33	0,34	0,34	0,34	0,34	
8	45	ø/v	0,41	0,41	0,41	0,39	0,37	0,36	0,38	0,38	0,38	0,41	0,40	0,39	
9	45	sø/sv	0,55	0,49	0,45	0,39	0,35	0,32	0,34	0,36	0,41	0,48	0,52	0,54	
10	45	s	0,60	0,53	0,46	0,37	0,31	0,28	0,28	0,34	0,43	0,52	0,57	0,59	
11	0	-	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
	63	°	Skyggefaktor		100	%									
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec	
1	90	n	0,56	0,56	0,56	0,56	0,56	0,56	0,55	0,56	0,56	0,56	0,56	0,56	
2	90	nø/nv	0,56	0,56	0,56	0,55	0,53	0,53	0,53	0,52	0,55	0,55	0,56	0,56	
3	90	ø/v	0,58	0,57	0,55	0,52	0,49	0,49	0,49	0,48	0,51	0,54	0,56	0,58	
4	90	sø/sv	0,66	0,58	0,51	0,44	0,40	0,39	0,40	0,40	0,45	0,53	0,61	0,66	
5	90	s	0,71	0,61	0,48	0,31	0,35	0,40	0,39	0,29	0,37	0,55	0,66	0,70	
6	45	n	0,20	0,20	0,20	0,21	0,20	0,19	0,19	0,21	0,20	0,20	0,20	0,20	
7	45	nø/nv	0,20	0,20	0,21	0,21	0,20	0,20	0,20	0,19	0,20	0,20	0,20	0,20	
8	45	ø/v	0,26	0,25	0,24	0,23	0,20	0,19	0,21	0,20	0,21	0,24	0,24	0,24	
9	45	sø/sv	0,41	0,32	0,26	0,19	0,15	0,13	0,14	0,16	0,21	0,29	0,36	0,40	
10	45	s	0,48	0,37	0,26	0,12	0,10	0,11	0,11	0,09	0,19	0,33	0,43	0,47	
11	0	-	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
	90	°	Skyggefaktor		250	%	(ultimative værdier, bruges ikke i regneark)								
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec	
1	90	n	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
2	90	nø/nv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
3	90	ø/v	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
4	90	sø/sv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
5	90	s	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
6	45	n	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
7	45	nø/nv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
8	45	ø/v	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
9	45	sø/sv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
10	45	s	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
11	0	-	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	

Skygge på sydsiden

	30	°	Skyggefaktor											
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec
1	90	n	1,00	1,00	1,00	0,99	0,98	0,97	0,97	0,99	1,00	1,00	1,00	1,00
2	90	nø/nv	1,00	0,98	0,94	0,91	0,92	0,94	0,92	0,91	0,92	0,96	1,00	1,00
3	90	ø/v	0,87	0,88	0,91	0,94	0,96	0,97	0,97	0,94	0,91	0,87	0,87	0,88
4	90	sø/sv	0,88	0,92	0,94	0,96	0,97	0,98	0,98	0,96	0,94	0,92	0,89	0,88
5	90	s	0,97	0,96	0,95	0,95	0,95	0,96	0,96	0,95	0,95	0,95	0,97	0,98
6	45	n	1,00	1,00	1,00	0,99	0,98	0,97	0,97	0,99	1,00	1,00	1,00	1,00
7	45	nø/nv	1,00	0,98	0,94	0,91	0,92	0,94	0,92	0,91	0,92	0,96	1,00	1,00
8	45	ø/v	0,87	0,88	0,91	0,94	0,96	0,97	0,97	0,94	0,91	0,87	0,87	0,88
9	45	sø/sv	0,88	0,92	0,94	0,96	0,97	0,98	0,98	0,96	0,94	0,92	0,89	0,88
10	45	s	0,97	0,96	0,95	0,95	0,95	0,96	0,96	0,95	0,95	0,95	0,97	0,98
11	0	- (s)	0,96	0,96	0,95	0,96	0,96	0,96	0,96	0,95	0,95	0,95	0,96	0,96

	60	°	Skyggefaktor											
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec
1	90	n	1,00	1,00	1,00	0,99	0,97	0,95	0,95	0,99	1,00	1,00	1,00	1,00
2	90	nø/nv	1,00	0,98	0,91	0,85	0,86	0,89	0,87	0,85	0,88	0,95	1,00	1,00
3	90	ø/v	0,80	0,81	0,85	0,90	0,93	0,95	0,95	0,90	0,85	0,79	0,80	0,82
4	90	sø/sv	0,80	0,87	0,90	0,94	0,96	0,97	0,97	0,94	0,90	0,86	0,82	0,81
5	90	s	0,95	0,93	0,92	0,91	0,92	0,94	0,94	0,91	0,91	0,92	0,95	0,96
6	45	n	1,00	1,00	1,00	0,99	0,97	0,95	0,95	0,99	1,00	1,00	1,00	1,00
7	45	nø/nv	1,00	0,98	0,91	0,85	0,86	0,89	0,87	0,85	0,88	0,95	1,00	1,00
8	45	ø/v	0,80	0,81	0,85	0,90	0,93	0,95	0,95	0,90	0,85	0,79	0,80	0,82
9	45	sø/sv	0,80	0,87	0,90	0,94	0,96	0,97	0,97	0,94	0,90	0,86	0,82	0,81
10	45	s	0,95	0,93	0,92	0,91	0,92	0,94	0,94	0,91	0,91	0,92	0,95	0,96
11	0	- (s)	0,93	0,93	0,93	0,93	0,93	0,94	0,94	0,93	0,92	0,92	0,93	0,94

	180	°	Skyggefaktor (ultimative værdier, bruges ikke i regneark)											
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec
1	90	n	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2	90	nø/nv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
3	90	ø/v	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
4	90	sø/sv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
5	90	s	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
6	45	n	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
7	45	nø/nv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
8	45	ø/v	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
9	45	sø/sv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
10	45	s	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
11	0	- (s)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Skygge på nordsiden

	30	°	Skyggefaktor											
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec
1	90	n	1,00	1,00	1,00	0,99	0,98	0,97	0,97	0,99	1,00	1,00	1,00	1,00
2	90	nø/nv	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
3	90	ø/v	1,00	1,00	1,00	1,00	0,99	0,99	0,99	1,00	1,00	1,00	1,00	1,00
4	90	sø/sv	1,00	1,00	0,99	0,96	0,95	0,95	0,94	0,96	0,98	0,99	1,00	1,00
5	90	s	0,97	0,96	0,95	0,95	0,95	0,96	0,96	0,95	0,95	0,95	0,97	0,98
6	45	n	1,00	1,00	1,00	0,99	0,98	0,97	0,97	0,99	1,00	1,00	1,00	1,00
7	45	nø/nv	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
8	45	ø/v	1,00	1,00	1,00	1,00	0,99	0,99	0,99	1,00	1,00	1,00	1,00	1,00
9	45	sø/sv	1,00	1,00	0,99	0,96	0,95	0,95	0,94	0,96	0,98	0,99	1,00	1,00
10	45	s	0,97	0,96	0,95	0,95	0,95	0,96	0,96	0,95	0,95	0,95	0,97	0,98
11	0	- (s)	0,99	0,99	0,98	0,98	0,97	0,97	0,97	0,98	0,98	0,99	0,99	0,99
	60	°	Skyggefaktor											
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec
1	90	n	1,00	1,00	1,00	0,99	0,97	0,95	0,95	0,99	1,00	1,00	1,00	1,00
2	90	nø/nv	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
3	90	ø/v	1,00	1,00	1,00	1,00	0,99	0,98	0,98	1,00	1,00	1,00	1,00	1,00
4	90	sø/sv	1,00	0,99	0,98	0,94	0,92	0,92	0,90	0,93	0,97	0,99	1,00	1,00
5	90	s	0,95	0,93	0,92	0,91	0,92	0,94	0,94	0,91	0,91	0,92	0,95	0,96
6	45	n	1,00	1,00	1,00	0,99	0,97	0,95	0,95	0,99	1,00	1,00	1,00	1,00
7	45	nø/nv	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
8	45	ø/v	1,00	1,00	1,00	1,00	0,99	0,98	0,98	1,00	1,00	1,00	1,00	1,00
9	45	sø/sv	1,00	0,99	0,98	0,94	0,92	0,92	0,90	0,93	0,97	0,99	1,00	1,00
10	45	s	0,95	0,93	0,92	0,91	0,92	0,94	0,94	0,91	0,91	0,92	0,95	0,96
11	0	- (s)	0,99	0,98	0,97	0,96	0,96	0,95	0,95	0,96	0,97	0,98	0,98	0,99
	180	°	Skyggefaktor (ultimative værdier, bruges ikke i regneark)											
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec
1	90	n	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2	90	nø/nv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
3	90	ø/v	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
4	90	sø/sv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
5	90	s	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
6	45	n	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
7	45	nø/nv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
8	45	ø/v	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
9	45	sø/sv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
10	45	s	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
11	0	- (s)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Vindueshullets dybde

	10	%	Skyggefaktor											
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec
1	90	n	0,98	0,98	0,98	0,98	0,96	0,95	0,95	0,97	0,98	0,98	0,98	0,98
2	90	nø/nv	0,98	0,97	0,95	0,94	0,94	0,95	0,94	0,93	0,95	0,96	0,98	0,98
3	90	ø/v	0,93	0,93	0,93	0,94	0,94	0,94	0,94	0,93	0,93	0,92	0,93	0,93
4	90	sø/sv	0,93	0,94	0,93	0,92	0,92	0,92	0,92	0,92	0,92	0,93	0,93	0,93
5	90	s	0,96	0,94	0,92	0,90	0,90	0,91	0,91	0,89	0,91	0,93	0,95	0,96
6	45	n	0,98	0,98	0,98	0,98	0,96	0,95	0,95	0,97	0,98	0,98	0,98	0,98
7	45	nø/nv	0,98	0,97	0,95	0,94	0,94	0,95	0,94	0,93	0,95	0,96	0,98	0,98
8	45	ø/v	0,93	0,93	0,93	0,94	0,94	0,94	0,94	0,93	0,93	0,92	0,93	0,93
9	45	sø/sv	0,93	0,94	0,93	0,92	0,92	0,92	0,92	0,92	0,92	0,93	0,93	0,93
10	45	s	0,96	0,94	0,92	0,90	0,90	0,91	0,91	0,89	0,91	0,93	0,95	0,96
11	0	- (s)	0,96	0,96	0,95	0,94	0,93	0,93	0,93	0,93	0,94	0,95	0,96	0,96

	20	%	Skyggefaktor											
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec
1	90	n	0,94	0,94	0,94	0,93	0,90	0,89	0,89	0,93	0,94	0,94	0,94	0,94
2	90	nø/nv	0,94	0,93	0,89	0,87	0,87	0,88	0,87	0,86	0,88	0,91	0,94	0,94
3	90	ø/v	0,84	0,85	0,86	0,87	0,87	0,88	0,88	0,86	0,85	0,83	0,84	0,85
4	90	sø/sv	0,86	0,87	0,86	0,84	0,83	0,83	0,83	0,83	0,84	0,85	0,86	0,86
5	90	s	0,91	0,87	0,84	0,80	0,80	0,81	0,81	0,78	0,81	0,85	0,90	0,92
6	45	n	0,94	0,94	0,94	0,93	0,90	0,89	0,89	0,93	0,94	0,94	0,94	0,94
7	45	nø/nv	0,94	0,93	0,89	0,87	0,87	0,88	0,87	0,86	0,88	0,91	0,94	0,94
8	45	ø/v	0,84	0,85	0,86	0,87	0,87	0,88	0,88	0,86	0,85	0,83	0,84	0,85
9	45	sø/sv	0,86	0,87	0,86	0,84	0,83	0,83	0,83	0,83	0,84	0,85	0,86	0,86
10	45	s	0,91	0,87	0,84	0,80	0,80	0,81	0,81	0,78	0,81	0,85	0,90	0,92
11	0	- (s)	0,91	0,90	0,88	0,86	0,85	0,86	0,86	0,85	0,87	0,88	0,90	0,91

	30	%	Skyggefaktor (ekstrapoleret, bruges ikke i regneark). Kommentar JRO: Korrekte værdier indsat.											
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec
1	90	n	0,88	0,89	0,89	0,87	0,84	0,82	0,82	0,87	0,88	0,88	0,88	0,88
2	90	nø/nv	0,88	0,87	0,82	0,79	0,79	0,81	0,80	0,78	0,80	0,84	0,88	0,88
3	90	ø/v	0,75	0,77	0,78	0,80	0,80	0,81	0,81	0,79	0,77	0,75	0,75	0,76
4	90	sø/sv	0,78	0,80	0,79	0,76	0,74	0,74	0,74	0,74	0,76	0,78	0,78	0,78
5	90	s	0,86	0,80	0,75	0,71	0,70	0,72	0,72	0,68	0,72	0,77	0,84	0,87
6	45	n	0,88	0,89	0,89	0,87	0,84	0,82	0,82	0,87	0,88	0,88	0,88	0,88
7	45	nø/nv	0,88	0,87	0,82	0,79	0,79	0,81	0,80	0,78	0,80	0,84	0,88	0,88
8	45	ø/v	0,75	0,77	0,78	0,80	0,80	0,81	0,81	0,79	0,77	0,75	0,75	0,76
9	45	sø/sv	0,78	0,80	0,79	0,76	0,74	0,74	0,74	0,74	0,76	0,78	0,78	0,78
10	45	s	0,86	0,80	0,75	0,71	0,70	0,72	0,72	0,68	0,72	0,77	0,84	0,87
11	0	- (s)	0,84	0,83	0,81	0,79	0,77	0,78	0,78	0,77	0,79	0,81	0,84	0,85

	100	%	Skyggefaktor (ultimative værdier, bruges ikke i regneark)											
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec
1	90	n	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2	90	nø/nv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
3	90	ø/v	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
4	90	sø/sv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
5	90	s	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
6	45	n	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
7	45	nø/nv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
8	45	ø/v	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
9	45	sø/sv	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
10	45	s	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
11	0	- (s)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Solafskærmning

	0,00	-	Skyggefaktor		(afskærmning 100% ved 150 W/m2 eller mere indvendigt. g-rude = 0,66)										
			jan	feb	mar	apr	maj	jun	jul	aug	sep	okt	nov	dec	
1	90	n	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	
2	90	nø/nv	1,00	1,00	1,00	0,91	0,84	0,84	0,83	0,90	0,99	1,00	1,00	1,00	
3	90	ø/v	0,99	0,86	0,77	0,66	0,65	0,70	0,68	0,67	0,75	0,84	0,98	1,00	
4	90	sø/sv	0,75	0,66	0,61	0,59	0,63	0,70	0,69	0,61	0,60	0,62	0,79	0,82	
5	90	s	0,64	0,60	0,58	0,59	0,68	0,76	0,75	0,63	0,56	0,56	0,69	0,73	
6	45	n	1,00	1,00	1,00	1,00	1,00	0,99	1,00	1,00	1,00	1,00	1,00	1,00	
7	45	nø/nv	1,00	1,00	0,99	0,84	0,73	0,72	0,72	0,79	0,96	1,00	1,00	1,00	
8	45	ø/v	1,00	0,88	0,75	0,60	0,56	0,59	0,59	0,58	0,67	0,81	0,98	1,00	
9	45	sø/sv	0,81	0,70	0,58	0,50	0,50	0,53	0,54	0,49	0,53	0,61	0,82	0,88	
10	45	s	0,72	0,63	0,54	0,48	0,49	0,52	0,53	0,48	0,49	0,55	0,74	0,80	
11	0	-	0,48	0,49	0,52	0,55	0,56	0,57	0,56	0,56	0,54	0,50	0,48	0,48	

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Indicators for partial EPB requirements related to thermal energy balance and fabric features

Annex A

(normative)

Input and method selection data sheet — Template

A.1 General

The template in Annex A to this standard shall be used to specify the choices between methods, the required input data and references to other standards.

NOTE 1 Following this template is not enough to guarantee consistency of data.

NOTE 2 Informative default choices are provided in Annex B. Alternative values and choices can be imposed by national / regional regulations. If the default values and choices of Annex B are not adopted because of the national / regional regulations, policies or national traditions, it is expected that:

- national or regional authorities prepare data sheets containing the national or regional values and choices, in line with the template in Annex A; or
- by default, the national standards body will add or include a national annex (Annex NA) to this standard, in line with the template in Annex A, giving national or regional values and choices in accordance with their legal documents.

NOTE 3 The template in Annex A is applicable to different applications (e.g. the design of a new building, certification of a new building, renovation of an existing building and certification of an existing building) and for different types of buildings (e.g. small or simple buildings and large or complex buildings). A distinction in values and choices for different applications or building types could be made:

- by adding columns or rows (one for each application), ifthe template allows;
- by including more than one version of a Table (one for each application), numbered consecutively as a, b, c, … For example: Table NA.3a, Table NA.3b.
- by developing different national / regional data sheets for the same standard. In case of a national annex to the standard these will be consecutively numbered (Annex NA, Annex NB, Annex NC, …).

NOTE 4 In the section "Introduction" of a national / regional data sheet information can be added, for example about the applicable national / regional regulations.

NOTE 5 For certain input values to be acquired by the user, a data sheet following the template of Annex A, could contain a reference to national procedures for assessing the needed input data. For instance, reference to a national assessment protocol comprising decision trees, tables and pre-calculations.

The shaded fields in the tables are part of the template and consequently not open for input.

Specific information concerning Annex A and Annex B of this standard:

Although the tables in this Annex cover most EPB requirements that currently apply in various countries, they are of course not necessarily exhaustive, also in view of possible new developments in the future. Still other variables can possibly be considered for setting regulatory EPB requirements, and the tables have been conceived flexibly to allow to report such other choices.

Table A.1/B.1 provides a table to specify the modular references.

Table A.2/B.2 provides a table for regulators to report in a uniform manner the chosen mix of partial EPB features for which regulatory requirements are set, in as far as they fall within the scope of this document. Extra features can be added at the bottom of the table. The table must be seen in conjunction

with all other overall and partial EPB requirements (which are beyond the scope of this document, e.g. concerning technical building systems); see also the relevant standard under EPB module M1-4.

Tables A.3/B.3 to A.14/B.14 provide tables to report in a uniform manner, for each of the partial EPB features selected for setting requirements, as reported in Table A.2/B.2, the numeric indicator that is chosen to express the quantitative requirement. An X-mark shall be set in the 2nd column corresponding to the row of the chosen indicator. Still other numeric indicators can be added at the bottom of each of the tables. For partial EPB features that are not subjected to a requirement, the corresponding table will of course remain empty. If requirements are set for extra EPB features, as reported in additional rows in Table A.2/B.2, then the format of generic Table A.14/B.14 shall be used for reporting the corresponding indicators that are used.

Due to their open-endedness, all the reporting tables allow full freedom of choice by the regulators.

Typically, different choices will be made according to the type of work, notably for new

A.2 References

The references, identified by the module code number, are given in Table A.1.

Table A.1 — References

Reference	Reference document	
	Number	Title
M1–4		
M1–6		
M1–13		
M2–2		
M2–5.1		
M2–5.2		
M2–5.3		
M2–8.1		
M2–8.2		
M5–8		
M9–1		

A.3 The mix of partial energy performance requirements

A.3.1 General

See Clause 6.

The following table shall be filled out as follows:

— The first column lists the partial EPB features that can be considered for setting requirements. The motivation for the mix that is chosen shall be reported below the Table. If needed, still other partial EPB features can be added at the bottom of the table. By means of a numbered reference a precise description of each additional EPB feature will then be given below the table. If possible, the description of the extra feature shall be taken from an EPB standard. Also, for each extra partial EPB feature the motivation shall be described in a clear manner.

— In the second column an X-mark is put at each of the features that is chosen to set a requirement.

— In the third column, for each exception a numbered reference is made to a full, detailed and clear explanation below the table, including the motivation for the exception. For some types of (detailed) requirements (e.g. on element level, such as thermal insulation), it may

A.3.2 Application: ....

NOTE This subclause may be repeated for different applications.

Table A.2 — Choices with respect to the partial EPB requirements related to thermal energy balance and fabric features (See Clause 6)

Application:			
Partial energy performance feature	**Requirement?**	**Exceptions*?**	**Details in Table**
Summer thermal comfort	Yes	No	A.3/B.3
Winter thermal comfort	Yes	No	A.4/B.4
Energy "need" for heating: give further specifications (a)*	No		A.5/B.5
Energy "need" for cooling: give further specifications (b)*	No		A.6/B.6
Combined energy "need" for heating and cooling (and possibly still other quantities): define precisely*	No		A.7/B.7
Overall thermal insulation of the envelope	Yes	No	A.8/B.8
Thermal insulation of individual elements of the thermal envelope	Yes	No	A.9/B.9
Thermal bridges	Yes	No	A.10/B.10
Window energy performance	Yes	No	A.11/B.11
Airtightness of the thermal envelope: mandatory measurement: give further specifications*	Yes	No	A.12/B.12
Airtightness of the thermal envelope: quantitative requirement: give further specifications*	Yes	No	A.12/B.12
Solar control	No		A.13/B.13
<free text> Other requirement 1; define*)			A.14/B.14
<free text> Other requirement 2; define*)			A.14/B.14
...			A.14/B.14
* The columns or cells that are marked with an asterisk * (i.e. any cell involving a specific national/regional element) shall be marked with a numbered reference. Below in the table a clear explanation and motivation shall be given for each of these new elements.			
Specifications and motivations:			

Explanation:

(a) If applicable, specify for the energy "need" for heating:

— with the real or with a predefined fictitious ventilation system?

— in/excluding the amount of heat needed for active preheating of the incoming hygienic ventilation air (if present)?

— in/excluding the latent heat need? (i.e. the sensible heat need only, or not)

— still other aspects

(b) If applicable, specify for the energy "need" for cooling:

— with the real or with a predefined fictitious ventilation system?

— in/excluding the amount of cold needed for active precooling of the incominghygienic ventilation air (if present)?

— in/excluding the latent cold need? (i.e. the sensible cold need only, or not)

— still other aspects

Specifications according to each of the numbered references:

(1) : ... <free text>

(2) : ... <free text>

...

<free text>

Motivation for the chosen requirement mix:

... <complete: free text>

A.3.3 Application: ....

NOTE This subclause may be repeated for different applications.

A.4 The partial energy performance requirements

A.4.1 Application: ....

NOTE This subclause may be repeated for different applications.

The following table is only applicable if a requirement is set in Table A.2/B.2 for this EPB feature.

Table A.3 — Numeric indicator used for the requirement on the summer thermal comfort (See Clause 7)

Application: …	
Numeric indicator	**Choice**
Time above a fixed reference temperate [h]	Yes
Temperature weighted time above a fixed reference temperate [K·h]	No
<free text> Other indicator; define*)	
…	
* If another indicator is used, it shall be clearly described below. And precise reference shall be made to its definition and its assessment method:	
Description in case of Other indicator:	
<free text>	

The following table is only applicable if a requirement is set in Table A.2/B.2 for this EPB feature.

Table A.4 — Numeric indicator used for the requirement on the winter thermal comfort (See Clause 8)

Application: …	
Numeric indicator	**Choice**
Time below a fixed reference temperate [h]	No
Temperature weighted time below a fixed reference temperate [K·h]	No
Fixed temperatures	Yes
…	
* If another indicator is used, it shall be clearly described below. And precise reference shall be made to its definition and its assessment method:	
Description in case of Other indicator:	
<free text>	

The following table is only applicable if a requirement is set in Table A.2/B.2 for this EPB feature.

Table A.5 — Numeric indicator used for the requirement on the energy "need" for heating (See Clause 9)

Application: ...	
Numeric indicator	**Choice**
Total "need" [kWh]	
"Need" per useful floor area [kWh/m^2]	
Ratio (define*)	
<free text> Other; define*)	
...	
* If a ratio or another indicator is used, it shall be clearly described below. And precise reference shall be made to its definition and its assessment method:	
Description in case of Ratio or Other indicator:	
<free text>	

The following table is only applicable if a requirement is set in Table A.2/B.2 for this EPB feature.

Table A.6 — Numeric indicator used for the requirement on the energy "need" for cooling (See Clause 10)

Application: ...	
Numeric indicator	**Choice**
Total "need" [kWh]	
"Need" per useful floor area [kWh/m^2]	
Ratio (define*)	
<free text> Other; define*)	
...	
* If a ratio or another indicator is used, it shall be clearly described below. And precise reference shall be made to its definition and its assessment method:	
Description in case of Ratio or Other indicator:	
<free text>	

The following table is only applicable if a requirement is set in Table A.2/B.2 for this EPB feature.

Table A.7 — Numeric indicator used for the requirement **on the combined energy "need" for heating and cooling (and possibly still other quantities) (See Clause 11)**

Application: ...	
Numeric indicator	**Choice**
Total "need" [kWh]	
"Need" per useful floor area [kWh/m^2]	
Ratio (define*)	
<free text> Other; define*)	

...	

* If a ratio or another indicator is used, it shall be clearly described below. And precise reference shall be made to its definition and its assessment method:
Description in case of Ratio or Other indicator:
<free text>

The following table is only applicable if a requirement is set in Table A.2/B.2 for this EPB feature.

Table A.8 — Numeric indicator used for the requirement
on the overall thermal insulation of the thermal envelope (See Clause 12)

Application: ...	
Numeric indicator	**Choice**
Overall transmission heat transfer coefficient H_{tr} [W/K]	No
Mean thermal transmittance U_{mn} [W/(m²·K)]	No
Ratio [define*]	No
Mean heat loss W/ m²·at -12 C external temperature	Yea
...	
* If a ratio or another indicator is used, it shall be clearly described below. And precise reference shall be made to its definition and its assessment method:	
Description in case of a Ratio or Other indicator:	
<free text>	

The following table is only applicable if a requirement is set in Table A.2/B.2 for this EPB feature.

Table A.9 — Numeric indicator used for the requirement
on the thermal insulation of individual elements of the thermal envelope (See Clause 13)

Application: ...	
Numeric indicator	**Choice**
Minimum temperature factor f_{Rsi} [-]	No
Thermal transmittance U [W/(m²·K)]	Yes
Total thermal resistance R_{tot} [m²K/W]	No
Intrinsic element thermal resistance $R_{c;op}$ [m²K/W]	No
<free text> Other indicator; define*)	
...	
* If another indicator is used, it shall be clearly described below. And precise reference shall be made to its definition and its assessment method:	

Description in case of Other indicator:
<free text>

The following table is only applicable if a requirement is set in Table A.2/B.2 for this EPB feature.

Table A.10 — Numeric indicator used for the requirement on the thermal bridges (See Clause 14)

Application: ...	
Numeric indicator	**Choice**
Minimum temperature factor f_{Rsi} [-]	No
Linear thermal transmittance Ψ [W/(m·K)], possibly differentiated per type of junction	Yes
Point thermal transmittance χ [W/K], possibly differentiated per type of three dimensional thermal bridge	No
Relative importance of thermal bridges compared to the overall heat transfer coefficient [-] $(\Sigma \Psi l + \Sigma \chi)/H_{tr}$	No
<free text> Other indicator; define*)	
...	
* If another indicator is used, it shall be clearly described below. And precise reference shall be made to its definition and its assessment method:	
Description in case of Other indicator:	
<free text>	

The following table is only applicable if a requirement is set in Table A.2/B.2 for this EPB feature.

Table A.11 — Numeric indicator used for the requirement on the window energy performance (See Clause 15)

Application: ...	
Numeric indicator	**Choice**
Heating energy performance $P_{E;H;w}$ [kWh/m^2]	Yes
Cooling energy performance $P_{E;C;w}$ [kWh/m^2]	No
Combination of heating and cooling energy performance $P_{E:H+C:w}$ [kWh/m^2]	No
For glazing only: energy balance value E [W/(m^2·K)]	No
Minimal window area in certain types of rooms: specify*	No
<free text> Other indicator; define*)	
...	
* If another indicator is used, it shall be clearly described below. And precise reference shall be made to its definition and its assessment method:	
Description in case of Other indicator:	
<free text>	

The following table is only applicable if a requirement is set in Table A.2/B.2 for this EPB feature.

Table A.12 — Numeric indicator used for the requirement on the thermal envelope air tightness (See Clause 16)

Application: …		
Method number	**Numeric indicator**	**Choice**
1	Specific leakage rate per thermal envelope area q_{Epr} [$m^3/h/m^2$]	No
2	Air change rate n_{pr} [h^{-1}]	No
3	Specific leakage rate per useful floor area q_{Fpr} [$m^3/h/m^2$]	Yes
4	<free text> Other indicator; define*)	
..	…	
Specify for the chosen method of the air tightness measurement: — the precise definition of the reference area or volume for the indicator used — the reference pressure pr — result of pressurization, depressurization or mean? — other, if needed		
Specification (if method 1, 2 or 3): <free text>		
* If another indicator is used, it shall be clearly described below. And precise reference shall be made to its definition and its assessment method:		
Description in case of Other indicator: <free text>		

The following table is only applicable if a requirement is set in Table A.2/B.2 for this EPB feature.

Table A.13 — Numeric indicator used for the requirement on the solar control (See Clause 17)

Application: …	
Numeric indicator	**Choice**
Solar factor g or g_{tot} or F_{npss} [-]	
<free text> Other indicator; define*)	
…	
* If another indicator is used, it shall be clearly described below. And precise reference shall be made to its definition and its assessment method:	
Description in case of Other indicator:	

<free text>

If requirements on other EPB features within the scope of this document are set, as reported in Table A.2/B.2, the indicators that are used are reported in the following table.

Table A.14 — Numeric indicator used for other requirements (See Table A.2/B.2)

Application: ...	
EPB feature	**Numeric indicator**
<free text> Other requirement 1; define*)	<free text>
<free text> Other requirement 2; define*)	...
...	
* All EPB features and their corresponding indicator shall be clearly described and precise reference shall be made to their definition and their assessment method. The numbers (1), (2), .. refer to the numbers of Other requirements in Table A.2/B.2	
Specification:	
Other requirement 1: ... <free text> Other requirement 2: ...	
<free text>	

A.4.2 Application: ....

NOTE This subclause may be repeated for different applications.