Comitato Termotecnico Italiano
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Commissione Tecnica	UNI/CT 202 Isolanti e isolamento – Metodi di calcolo e di prova (UNI/TS 11300-1)
Gruppo di Lavoro	-
Coordinatore	
Funzionario Tecnico	
Codice progetto	Non ancora disponibile
Codice norma	**Appendice Nazionale UNI EN ISO 52018-1**
Titolo	**Energy performance of buildings - Indicators for partial EPI requirements related to thermal energy balance and fabri features - Part 1: Overview of options**
Note	

ABOUT THIS DOCUMENT

The following is a sample text showing how to compile a national application document of an EN-EPB standard (mandate M/480).

Each EN-EPB standard requires a national application document that provides the data listed in normative annex A by confirming or replacing default data given in informative annex B.

The following text has been taken from a draft produced during the editing process of the application document for EN 52.XXX being developed in Italy. It is not the final document and it is neither intended to represent the Italian position nor to give any preference and/or support to any option. It only shows a possible approach on how prepare such national annexes.

It is distributed on request of EPB-Center because it is deemed useful to give an example of the possible contents of a national application document.

The document was released without any comment and/or rationale of the choices.

Any comment and/or explanation added shall be clearly identified as not being part of the original text.

Annex NA
(normative)

Input and method selection data sheet — Choices for Italy

NA.1 General

The template in Annex A 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 this annex. Alternative values and choices can be imposed by national/regional regulations. If the default values and choices of this annex 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 (i.e. Annex NA) to this document, 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, … (i.e. 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 (i.e. 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 this annex

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/NA.1 provides a table to specify the modular references.

Table A.2/NA.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 shall 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/NA.3 to A.14/NA.17 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/NA.2, the numeric indicator that is chosen to express the quantitative requirement. An X-mark shall be set in the second 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/NA.2, then the format of generic Table A.14/NA.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 constructions (or equivalent) on the one hand and works on existing buildings on the other hand. 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 (see Note 3 above). The application domain of every set shall be clearly specified.

Specific information concerning this annex

This annex provides in NA.3 an example of the reporting of regulatory choices. The choices made can be considered "best guess" default choices, but each public authority should make a judicious choice of its own, based on such factors as the pursued policy objectives, the local climate, the local building styles and construction traditions, the technological state of advancement of the entire professional construction sector, etc. The example tables are elementary. Especially for (small and large) extensions and (simple and thorough) renovations, a great variety of differentiated requirements can be set, depending on the exact nature of the works.

NA.2 References

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

Table NA.1 — References

Reference	Reference document	
	Number	Title
M1-4	UNI EN ISO 52003-1	*Energy performance of buildings — Indicators, requirements and certification — Part 1: General aspects and application to the overall energy performance*
M1-6	UNI EN 16798–1	*Energy performance of buildings — Part 1: Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics — Module M1-6*
	ISO 17772-1	*Energy performance of buildings — Indoor environmental quality — Part 1: Indoor environmental input parameters for the design and assessment of energy performance of buildings*
M1-13	UNI 10349-1	*Heating and cooling of buildings - Climatic data - Part 1: Monthly means for evaluation of energy need for space heating and cooling and methods for splitting global solar irradiance into the direct and diffuse parts and for calculate the solar irradiance on tilted planes*
	UNI/TR 10349-2	*Heating and cooling of buildings - Climatic data - Part 2: Data for design load*

Table NA.1 *(continued)*

Reference	Reference document	
	Num	Title
M2-2	UNI EN ISO 52016-1	*Energy performance of buildings — Calculation of the energy needs for heating and cooling, internal temperatures and heating and cooling load in a building or building zone — Part 1: Calculation procedures*
M2-5.1	UNI EN ISO 13789	*Thermal performance of buildings — Transmission and ventilation heat transfer coefficients — Calculation method*
M2-5.2	UNI EN ISO 10211	*Thermal bridges in building construction – Heat flows and surface temperatures – Detailed calculations*
M2-5.3	UNI EN ISO 14683	*Thermal bridges in building construction — Linear thermal transmittance — Simplified methods and default values*
M2-5.4	UNI EN ISO 6946	*Building components and building elements — Thermal Resistance and thermal transmittance — Calculation methods*
M2-5.5	UNI EN ISO 10077-1	*Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Part 1: General*
M2-8.1	UNI EN ISO 52022-1	*Energy performance of buildings — Thermal, solar and daylight properties of building components and elements — Part 1: Simplified calculation method of the solar and daylight characteristics for solar protection devices combined with glazing*
M2-8.2	UNI EN ISO 52022-3	*Energy performance of buildings — Thermal, solar and daylight properties of building components and elements — Part 3: Detailed calculation method of the solar and daylight characteristics for solar protection devices combined with glazing*
M2-9	UNI EN ISO 13786	*Thermal performance of building components — Dynamic thermal characteristics — Calculation methods*
M5-8	UNI EN 16798–5-1 UNI EN 16798–5-2	*Energy performance of buildings — Modules M5-6, M5-8, M6-5, M6-8, M7-5, M7-8 — Ventilation for buildings — Calculation methods for en- ergy requirements of ventilation and air conditioning systems — Part 5-1: Distribution and generation (revision of EN 15241) — Method 1* *Energy performance of buildings — Modules M5-6, M5-8 — Ventilation for buildings — Calculation methods for energy requirements of ventilation systems — Part 5-2: Distribution and generation (revision of EN 15241) — Method 2*
M9-1	UNI EN 15193–1	*Energy performance of buildings — Module M9 — Energy requirements for lighting — Part 1: Specifications*

NA.3 Mix of partial energy performance requirements

NA.3.1 General

See Clause 6.

Table based on the template of Table A.2 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 placed 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 be easier to explain the

exceptions in conjunction with the detailed description of the actual requirements. In these instances, it suffices to give here the general synthesis, the motivation and a precise reference to the regulatory texts where the requirements and exceptions are described.

NA.3.2 Application: new buildings

Four different requirement mixes are distinguished depending on typical conditioning habits (i.e. commonly heated and/or cooled or not). The mix that is most appropriate for a certain building category (e.g. dwelling or office) obviously varies strongly with the local climate, typical internal gains, etc. It is clear that for a given geographical location, different building categories can best be served by different requirement mixes. For instance, in moderate summer climates, mix A may be best for dwellings, but for offices, mix D may be most appropriate.

Table NA.2a — Choices with respect to the mix of partial EPB requirements related to thermal energy balance and fabric features (see Clause 6)

Application: New constructions						
Partial EPB feature	Requirement?				Exceptions*?	Details in
	Mix A	Mix B	Mix C	Mix D		
Summer thermal comfort	X	X	—	—	—	Table NA.3
Winter thermal comfort	—	X	X	—	—	Table NA.4
Energy "need" for heating: give further specifications*	X (1)	—	—	X (1)	—	Table NA.5
Energy "need" for cooling: give further specifications*	—	—	X (2)	X (2)	—	Table NA.6
Combined energy "need" for heating and cooling (and possibly still other quantities): define precisely*	—	—	—	—	—	Table NA.7
Overall thermal insulation of the envelope	—	—	—	—	—	Table NA.8
Thermal insulation of individual elements of the thermal envelope	X	X	X	X	X (3)	Table NA.9
Thermal bridges	—	—	—	—	—	Table NA.10
Window energy performance	—	—	—	—	—	Table NA.11
Airtightness of the thermal envelope: mandatory measurement: give further specifications*	X (4)	X (4)	X (4)	X (4)	—	Table NA.12
Airtightness of the thermal envelope: quantitative requirement: give further specifications*	—	—	—	—	—	Table NA.12
Solar control	—	—	—	—	—	Table NA.13
Overall solar control of the envelope	—	—	—	—	—	Table NA.14
Thermal behaviour of individual elements of the envelope subject to variable boundary conditions	—	—	—	—	—	Table NA.15
Solar control of individual opaque elements	—	—	—	—	—	Table NA.16
Hygrothermal requirements of individual elements of the envelope	—	—	—	—	—	Table NA.17
*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. A clear explanation and motivation shall be given for each of these new elements below the table.						

Table NA.2a *(continued)*

Application: New constructions
Explanation: (a) If applicable, specify for the energy "need" for heating: — with the real or with a predefined fictitious ventilation system; — including/excluding the amount of heat needed for active preheating of the incoming hygienic ventilation air (if present); — including/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; — including/excluding the amount of cold needed for active precooling of the incoming hygienic ventilation air (if present); — including/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: The following types of requirement mixes are distinguished. — Type Mix A: building categories that do NOT generally have active space cooling (in the region where the regulation applies). For example, dwellings in cold climates. — Type Mix B: building categories that generally have NEITHER active space cooling NOR active space heating (in the region where the regulation applies). For example, many building categories in regions with a mild winter and mild summer climate. — Type Mix C: building categories that do NOT generally have active space heating (in the region where the regulation applies). For example, most building categories in tropical climates. — Type Mix D: building categories that commonly have BOTH active space cooling and active space heating (in the region where the regulation applies). For example, office buildings in moderate climates. Numbered references: (1) The energy need for heating is determined with a predefined fictitious ventilation system and includes, if applicable, the amount of heat needed for active preheating of the incoming hygienic ventilation air. Any latent heat need (on space level or for the incoming hygienic ventilation air) is not included in the heating need. (2) The energy need for cooling is determined with a predefined fictitious ventilation system and includes, if applicable, the amount of cold needed for active precooling of the incoming hygienic ventilation air. Any latent cold need (on space level or for the incoming hygienic ventilation air) is not included in the cooling need. (3) In case limited areas of reduced thickness are foreseen, such as sub-windows and other components, the limits must be respected with reference to the average transmittance of the respective façade. Designers also should heed the possible impact on indoor environment of any lesser insulated components elements (notably the possible consequences of low internal surface temperatures). (4) The air tightness measurement shall be performed according to UNI EN ISO 9972 and its method 3, with specifications consistent with the treatment of infiltration/exfiltration in the EPB assessment method, e.g. open combustion devices shall be sealed if the air flow through them is already separately taken into account in the EPB assessment method. The final result shall be reported as the mean of the pressurization and depressurization regression curves at the reference pressure needed for the EPB assessments.

Table NA.2a *(continued)*

Application: New constructions
Motivation for the chosen requirement mix: (in bottom-up order): — The mandatory measurement of the airtightness of the thermal envelope (upon sufficient completion of the works) creates a strong regulatory stimulus that due attention be paid to this aspect by all actors in the construction process (designers and contractors alike). The stimulus is all the stronger if the result of the measurement is properly valued in the EPB assessment methods. Not setting an actual, quantitative requirement avoids a too strict or too lax requirement for a given project. (It may be difficult to determine in a general manner in a regulation a differentiated, cost-optimal requirement, which depends upon the construction type, the state of know-how and the experience of the specific project team, etc.). It also avoids much contentious public discussion on the actual strictness of the requirement. — The requirement on the thermal insulation of all individual elements of the thermal envelope (apart from the possible odd exception, corresponding to limited areas of the thermal envelope area) ensures, first of all, that sufficiently high internal surface temperatures are achieved under winter conditions. Any minor area(s) that fall(s) within the exception rule does not waive the design team of its responsibility with respect to the potential issues related to low internal surface temperatures in these areas. Further, it guarantees that the thermal envelope, executed immediately at the time of the initial construction, conforms to the full technical requirements and is, economically speaking, state-of-the-art. (The thermal envelope is, generally speaking, practically and economically difficult to upgrade later on and it thus largely predestines the energy performance of the building over its entire lifetime.) — For the more integral requirements, a differentiation between four situations is made. The combination of separate winter and summer requirements (instead of a combined "needs" requirement) provides a certain assurance that a balanced design between both situations is achieved. Solar gains (influenced by window area and orientation, choice of glazing and solar protection devices, etc.) are a crucial point of attention in this respect, in particular for the summer situation. Each type of requirement mix has been chosen such that it corresponds to the actual situation of the majority of new projects in a certain building category. For instance, no heating and/or cooling need requirement is set if there is usually no such active conditioning, thus avoiding the potential misunderstanding that such active conditioning is considered standard. And no summer or winter thermal comfort requirement is set if reasonable comfort levels cannot be achieved under free floating conditions anyway. — Mix A. For building categories for which active space cooling is not standard (for instance in cold climates), a requirement on the summer thermal comfort seems appropriate. As explained in Clause 7, it is advised to complement it with the concept of (probability weighted) fictitious cooling above a strict threshold, so that a further stimulus for good summer design (better than the requirement) is integrated in the overall EPB assessment. The winter situation can be dealt with by means of a requirement on the heating "need". — Mix B. In situations where reasonable year round thermal comfort can be obtained with neither active space heating nor active space cooling, a requirement on the summer comfort and another on the winter thermal comfort seem advised, in combination with (probability weighted) fictitious cooling and heating in the overall EPB assessment. — Mix C. In situations where active space heating is not standard (e.g. in relatively warm climates), a requirement on the winter thermal comfort combined with (probability weighted) fictitious heating above a strict threshold appears a good approach. The summer situation can then be covered by a requirement on the cooling "need". — Mix D. For building categories for which both active space heating and active space cooling are common in new construction, separate heating and cooling need requirements may be appropriate.

NA.3.3 Application: existing buildings

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

Application: Works on existing buildings			
Partial energy performance feature	**Requirement?**	**Exceptions*?**	**Details in**
Summer thermal comfort	—	—	Table NA.3
Winter thermal comfort	—	—	Table NA.4
Energy "need" for heating: give further specifications (a)*	—	—	Table NA.5
Energy "need" for cooling: give further specifications (b)*	—	—	Table NA.6
Combined energy "need" for heating and cooling (and possibly still other quantities): define precisely*	—	—	Table NA.7
Overall thermal insulation of the envelope	—	—	Table NA.8
Thermal insulation of individual elements of the thermal envelope	X (1)	X (2)	Table NA.9
Thermal bridges	—	—	Table NA.10
Window energy performance	—	—	Table NA.11
Airtightness of the thermal envelope: mandatory measurement: give further specifications*	—	—	Table NA.12
Airtightness of the thermal envelope: quantitative requirement: give further specifications*	—	—	Table NA.12
Solar control	X (3)	—	Table NA.13
Overall solar control of the envelope	—	—	Table NA.14
Thermal behaviour of individual elements of the envelope subject to variable boundary conditions	—	—	Table NA.15
Solar control of individual elements of the roof	—	—	Table NA.16
Hygrothermal requirements of individual elements of the envelope	—	—	Table NA.17
* 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. A clear explanation and motivation shall be given for each of these new elements below the table.			

Table NA.2a *(continued)*

Specifications and motivations:
Explanation: (a) If applicable, specify for the energy "need" for heating: — with the real or with a predefined fictitious ventilation system; — including/excluding the amount of heat needed for active preheating of the incoming hygienic ventilation air (if present); — including/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; — including/excluding the amount of cold needed for active precooling of the incoming hygienic ventilation air (if present); — including/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) When elements of the thermal envelope (e.g. window, roof, wall, etc.) are completely replaced or when new elements are added to the thermal envelope (e.g. in an extension), maximum U-values apply. (2) Exception is allowed for 1 % of the envelope area that is subject to the requirements. NOTE 1 This exception with respect to the U_{max} values does not imply that these thermal envelope elements may be neglected in the further EPB assessments. All thermal envelope elements shall still be taken into account in all further EPB assessments. Designers also should heed the possible impact on indoor environment of any lesser insulated elements (notably the possible consequences of low internal surface temperatures). NOTE 2 For regulators, as in the case of some renovations, very small areas may be involved, the 1 % exception rule does not give much leeway for these cases. So, the requirements should be set such that in principle they are feasible for all possible cases, unless other explicit exceptions are defined. (3) Before active cooling is installed in a room of an existing building, all transparent elements shall comply with solar control requirements.
Motivation for the chosen requirement mix:
For reasons of practicality in the context of renovations, requirements are only set on element level and not on combinations of elements (which may involve existing elements). For extensive renovations (e.g. full stripping of, a large part of, the building), further reaching requirements may be appropriate.

NA.4 Partial energy performance requirements

NA.4.1 Application: new buildings

Table NA.3a is applicable for requirement mixes A and B:

Table NA.3 — a — Numeric indicator used for the requirement on the summer thermal comfort (see Clause 7)

Application: New constructions	
Numeric indicator	**Choice**
Time above a fixed reference operative temperature [h]	(1)
Temperature weighted time above a fixed reference operative temperate [K·h]	X (1)
Weighted PPD	X (1)
<free text> Other indicator; define*)	Not applicable
All indicators are referred to each single space.	
* 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:	
(1) All indicators derive from long-term evaluation for general thermal comfort conditions performed according to UNI EN ISO 7730. The operative temperature and the predicted percentage dissatisfied (PPD) are calculated according to UNI EN ISO 7730.	

Table NA.4a is applicable for requirement mixes B and C:

Table NA.4 — a — Numeric indicator used for the requirement on the winter thermal comfort (see Clause 8)

Application: New constructions	
Numeric indicator	**Choice**
Time below a fixed reference operative temperature [h]	(1)
Temperature weighted time below a fixed reference operative temperate [K·h]	X (1)
Weighted PPD	X (1)
<free text> Other indicator; define*)	Not applicable
All indicators are referred to each single space.	
* 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:	
Description in case of other indicator:	
(2) All indicators derive from long-term evaluation for general thermal comfort conditions performed according to UNI EN ISO 7730. The operative temperature and the predicted percentage dissatisfied (PPD) are calculated according to UNI EN ISO 7730.	

Table NA.5a is applicable for requirement mixes A and D:

Table NA.5 — a — Numeric indicator used for the requirement on the energy "need" for heating (see Clause 9)

Application: New constructions	
Numeric indicator	**Choice**
Total "need" [kWh]	
"Need" per useful floor area [kWh/m²]	X (1)
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:	
(1) The indicator is called thermal energy performance for space heating, symbol $EP_{H;nd}$, and is defined as: $EP_{H;nd} = \frac{Q_{H;nd;tot}}{A_{use}}$ (NA.1) where $EP_{H;nd}$ is the thermal energy performance, in hWh/m²; $Q_{H;nd;tot}$ is the total heat need for heating, in kWh; A_{use} is the useful floor area, in m². The indicator is compared with a target value, which could be determined by means of a notional reference building and shall for each building category closely reflect the cost optimal value (at the time of its definition and for a given scenario of the future energy price). The energy need for heating is determined assuming a reference natural ventilation flow rate and includes the amount of heat needed for active preheating of the incoming hygienic ventilation air. Any latent heat need (on space level or for the incoming hygienic ventilation air) is not included in the heating need.	

Table NA.6a is applicable for requirement mixes C and D:

Table NA.6 — a — Numeric indicator used for the requirement on the energy "need" for cooling (see Clause 10)

Application: New constructions	
Numeric indicator	**Choice**
Total "need" [kWh]	
"Need" per useful floor area [kWh/m²]	X (1)
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:	
(1) The indicator is called thermal energy performance for space cooling, symbol $EP_{C;nd}$, and is defined as: $$EP_{C;nd} = \frac{Q_{C;nd;tot}}{A_{use}} \quad \text{(NA.2)}$$ where $EP_{C;nd}$ is the thermal energy performance, in hWh/m²; $Q_{C;nd;tot}$ is the total heat need for cooling, in kWh; A_{use} is the useful floor area, in m². The indicator is compared with a target value, which could be determined by means of a notional reference building and shall for each building category closely reflect the cost optimal value (at the time of its definition and for a given scenario of the future energy price). The energy need for cooling is determined assuming a reference natural ventilation flow rate and includes the amount of cold needed for active precooling of the incoming hygienic ventilation air. Any latent cold need (on space level or for the incoming hygienic ventilation air) is not included in the cooling need.	

Table NA.7a is not applicable for any of the requirement mixes A to D.

Table NA.8 is only applicable if a requirement is set in Table NA.2 for this EPB feature.

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

Application: New constructions	
Numeric indicator	**Choice**
Overall transmission heat transfer coefficient H_{tr} [W/K]	
Mean thermal transmittance U_{mn} [W/(m²·K)]	X (1)
Thermal insulation homogeneity index	(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 a ratio or other indicator:	

(1) The indicator also called global average heat transfer coefficient for transmission per thermal envelope area surface, symbol H'_T, and is defined as:

$$U_{mn} = H'_T = H'_{tr;adj} / \sum_k A_k \qquad \text{(NA.3)}$$

where

H'_T is the thermal energy performance, in W/m²K;

$H_{tr;adj}$ is the overall heat transfer coefficient by transmission, adjusted for the indoor outdoor temperature difference , in W/K ;

A_k is the envelope element area, in m².

$H'_{tr;adj}$ shall be calculated in accordance with UNI EN ISO 13789.

The indicator is compared with a target value, which could be determined as a function of climatic zone and of the compactness ratio (A_{env}/V).

(2) The thermal insulation homogeneity index is defined as the coefficient of variation (or relative standard deviation) of the thermal transmission, weighted on area:

$$\sigma^* = \sqrt{\frac{\sum_{j=1}^{N} A_j \left(b_{tr} U'_j - H'_T\right)^2}{\left(\sum_{j=1}^{N} A_j\right) H'^2_T}} \qquad \text{(NA.4)}$$

where U_j also take into account blanket additional thermal transmittance for thermal bridges:

$$U'_j = U_j + \Delta U_{TB} \qquad \text{(NA.5)}$$

Table NA.9a is applicable for all requirement mixes A to D.

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

Application: New constructions	
Numeric indicator	**Choice**
Minimum temperature factor f_{Rsi} [-]	
Thermal transmittance U [W/(m²·K)]	X
Total thermal resistance R_{tot} [m²K/W]	
Intrinsic element thermal resistance $R_{c;op}$ [m²K/W]	
<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:	
The thermal transmittance (U) and the totale thermal resistance (R_{tot}) are calculated according to UNI EN ISO 6946 for opaque elements and to UNI EN ISO 10077-1 for windows, doors and shutters. But note the specific details provided in Table NA.2a for exceptions for this requirement: Exception is allowed for 1 % of the envelope area that is subject to the requirements. (Note that this exception with respect to the U_{max} values does not imply that these thermal envelope components elements may be neglected in the further EPB assessments. All thermal envelope components elements shall still be taken into account in all further EPB assessments.) Designers also should heed the possible impact on indoor environment of any lesser insulated components elements (notably the possible consequences of low	

Concerning Table NA.10a, Thermal bridges: no explicit requirement, but integrated into the EPB assessments in a practical manner that stimulates "good solutions", as discussed in ISO/TR 52018-2[7].

Table NA.10a — Numeric indicator used for the requirement on the thermal bridges (see Clause 14)

Application: New constructions	
Numeric indicator	**Choice**
Minimum temperature factor f_{Rsi} [-]	X
Linear thermal transmittance Ψ [W/(m·K)], possibly differentiated per type of junction	X
Point thermal transmittance χ [W/K], possibly differentiated per type of three dimensional thermal bridge	
Relative importance of thermal bridges compared to the overall heat transfer coefficient [-] $(\Sigma\Psi l + \Sigma\chi)/H_{tr}$	X
<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>	

Table NA.11a is not applicable for any of the requirement mixes A to D.

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

Application: New constructions	
Numeric indicator	**Choice**
Heating energy performance $P_{E;H;w}$ [kWh/m^2]	X
Cooling energy performance $P_{E;C;w}$ [kWh/m^2]	X
Combination of heating and cooling energy performance $P_{E;H+C;w}$ [kWh/m^2]	
For glazing only: energy balance value E [W/(m^2·K)]	
Minimal window area in certain types of rooms: specify*	
<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>	

Table NA.12a is applicable for all requirement mixes, A to D

Table NA.12a — Numeric indicator used for the requirement on the thermal envelope air tightness (see Clause 16)

Application: New constructions	
Numeric indicator	**Choice**
Specific leakage rate per thermal envelope area q_{Epr} [m^3/h/m^2]	—
Air change rate n_{pr} [h^{-1}]	X
Specific leakage rate per useful floor area q_{Fpr} [m^3/h/m^2]	—
<free text> Other indicator	—
…	—
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):	
The reference pressure difference is 50 Pascal. The leakage rate is assessed as the mean of pressurization and depressurization. The useful floor area is specified as for the whole set of EPB standards. Note the specific details provided in Table NA.2a for this requirement: The air tightness measurement shall be performed according to ISO 9972 and its method 3, with specifications consistent with the treatment of infiltration/exfiltration in the EPB assessment method, e.g. open combustion devices shall be sealed if the air flow through them is already separately taken into account in the EPB assessment method. The final result shall be reported as the mean of the pressurization and depressurization regression curves at the reference pressure needed for the EPB assessments.	
* 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>	

Tables NA.13a is not applicable for any of the requirement mixes A to D.

Table NA.13a — Numeric indicator used for the requirement on the solar control (see Clause 17)

Application: Works on new buildings	
Numeric indicator	**Choice**
Solar factor g or g_{tot} or F_{npss} [-]	X
<free text> Other indicator; define*)	Not applicable
…	
* 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:	
Not applicable. But note the specific details provided in Table NA.2a for this requirement: Before active cooling is installed in a room of an existing building, all transparent elements shall comply with solar control requirements.	

Table NA.14a is only applicable if a requirement is set in Table NA.2 for this EPB feature.

Table A.14a — Numeric indicator used for the requirement on the overall solar control of the envelope (see Table NA.2)

Application: New constructions	
Numeric indicator	**Choice**
Summer effective solar area [m²]	
"Summer effective solar area" per useful floor area [-]	X (1)
Ratio (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:	
(3) The indicator is the ratio of the summer effective solar area ($A_{sol,est}$) to the useful floor area (A_{use}). $A_{sol,est}$ is defined as: $$A_{sol,est} = \sum_k F_{sh,ob} \times g_{gl+sh} \times (1 - F_F) \times A_{wp} \times F_{sol,est} \quad \text{(NA.6)}$$ where $F_{sh,ob}$ is the shading reduction factor for external obstacles for the solar effective collecting area of surface; g_{gl+sh} is the total solar energy transmittance of the window in the month of July, when the solar shading is in use; F_F is the frame area fraction, ratio of the projected frame area to the overall projected area of the glazed element $A_{w,p}$ is the overall projected area of the glazed element (window area), in m²; $F_{sol,est}$ is the correction factor for the incident irradiation, obtained as a ratio between the average irradiance in the month of July, in the locality and on the considered exposure, and the average annual irradiance of a reference location, on the horizontal plane. The indicator is compared with a target value, which could be determined as a function of building category.	

Table NA.15a is applicable for …

Table A.15a — Numeric indicator used for the requirement on the thermal behaviour of individual elements of the envelope subject to variable boundary conditions (see Table NA.2)

Application: New constructions	
Numeric indicator	**Choice**
Areal mass [kg/m^2]	X (1)
Periodic thermal transmittance (module) [W/(m^2·K)]	X (2)
Decrement factor [-]	(2)
Time shift of the periodic thermal transmittance (time lag) [h]	(2)
…	
* 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 NA.2.	
Specification:	
(1) The areal mass is calculated as: $m = \sum_k d_k \times \rho_k$ (NA.7) where d_k is the thickness of layer k, in m; ρ_k is density of layer k, in kg/m^3; (2) The periodic thermal transmittance and the decrement factor are calculated according to UNI EN ISO 13786.	

Table NA.16a is applicable for …

Table A.16a — Numeric indicator used for the requirement on the solar control of individual opaque elements (see Table NA.2)

Application: New constructions	
Numeric indicator	**Choice**
Solar reflectance	
SRI	X
…	
* 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:	
The indicator should be compared with a target value, which is determined as a function of the kind of roof.	

Table NA.17a is applicable for requirement mixes A and D.

Table A.17a — Numeric indicator used for the hygrothermal requirements of individual elements of the envelope (see Table NA.2)

Application: New constructions		
EPB feature	**Numeric indicator**	**Choice**
Prevention of critical surface humidity	Temperature factor at the internal surface	X (1)
Prevention of interstitial condensation	Rate of condensation	X (1)
…		
* 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:		
(1) The indicators are calculated according to UNI EN ISO 13788.		

NA.4.2 Application: existing buildings

Tables NA.3b to NA.8b are not applicable because there are no requirements set in Table NA.2b for these EPB
features.

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

Application: Works on existing buildings	
Numeric indicator	**Choice**
Minimum temperature factor f_{Rsi} [-]	
Thermal transmittance U [W/(m²·K)]	X
Total thermal resistance R_{tot} [m²K/W]	
Intrinsic element thermal resistance $R_{c;op}$ [m²K/W]	
<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:	
The thermal transmittance (U) and the total thermal resistance (R_{tot}) are calculated according to UNI EN ISO 6946 for opaque elements and to UNI EN ISO 10077-1 for windows, doors and shutters. But note the specific details provided in Table NA.2b for this requirement: When elements of the thermal envelope (e.g. window, roof, wall, etc.) are completely replaced or when new elements are added to the thermal envelope (e.g. in an extension), maximum U-values apply. Note also the specific details provided in Table NA.2a for the exceptions for this requirement: Exception is allowed for 1 % of the envelope area that is subject to the requirements. NOTE 1 This exception with respect to the U_{max} values does not imply that these thermal envelope elements may be neglected in the further EPB assessments. All thermal envelope elements shall still be taken into account in all further EPB assessments. Designers also should heed the possible impact on indoor environment of any lesser insulated elements (notably the possible consequences of low internal surface temperatures). NOTE 2 For regulators, as in the case of some renovations, very small areas may be involved, the 1 % exception rule does not give much leeway for these cases. So, the requirements should be set such that in principle they are feasible for all possible cases, unless other explicit exceptions are defined.	

Tables NA.10b, NA.11b NA.12b are not applicable because there are no requirements set in Table NA.2b for these EPB features.

Table NA.13b — Numeric indicator used for the requirement on the solar control (see Clause 17)

Application: Works on existing buildings	
Numeric indicator	**Choice**
Solar factor g or g_{tot} or F_{npss} [-]	X
<free text> Other indicator; define*)	Not applicable
…	
* 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:	
Not applicable. But note the specific details provided in Table NA.2a for this requirement: Before active cooling is installed in a room of an existing building, all transparent elements shall comply with solar control requirements.	

Table NA.14b is not applicable because there are no requirements set in Table NA.2b for other EPB features.