HRN EN 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

Subject: **National Datasheet conforming to the template in Annex A**

Version: 2019-12-20

HRN EN ISO 52016-1/ National Datasheet
(informative)

Input and method selection data sheet — Choices for Croatia

NA.1 General

This National Datasheet gives the choices to be used with respect to values, methods and references in Croatia when using the national methodology for assessment of energy performance of buildings for the purpose of issuing energy performance certificate, building permit and permit to use and for energy audit.

This National Datasheet is in line with the template in Annex A of the standard HRN EN ISO 52016-1:2017.

This National Datasheet takes into account national regulations, climatic conditions, traditions and a specific range of validity.

The specific national or regional regulations referred to in this document are:

- Technical regulation on energy economy and heat retention in buildings (Official Gazette 128/15, 70/18, 73/18, 86/18);
- Ordinance on energy audits and energy certification of buildings (Official Gazette 88/17);
- Methodology on energy audit (2017);
- Algorithms for assessment of energy performance of buildings (2017);
- Type solutions of application of alternative systems (2015);
- Handbook for energy certification of buildings (2010).

NA.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 NA.1 — References

Reference	Reference document [a]	
	Number	Title
M1–4	EN ISO 52003-1	*Energy performance of buildings -- Indicators, requirements, ratings and certificates -- Part 1: General aspects and application to the overall energy performance*
M1–4	Official Gazette 88/17	*Ordinance on energy audits and energy certification of buildings*
	HRN EN 15217:2008	*Energy performance of buildings -- Methods for expressing energy performance and for energy certification of buildings*
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*
	EN 16798-1	*Energy performance of buildings - Ventilation for 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)*

Reference	Reference document [a]	
	Number	Title
M1–6	HRN EN 15251:2007	*Algorithms for assessment of energy performance of buildings (2017)* *Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics*
~~M1-8~~	~~ISO 52000-1~~	~~*Energy performance of buildings – Overarching EPB assessment – Part 1: General framework and procedures*~~
M1-1	HRN EN 15603:2008	*Algorithms for assessment of energy performance of buildings (based on HRN EN 15603:2008)* *Energy performance of buildings -- Overall energy use and definition of energy ratings*
~~M1-13~~	~~ISO 52010-1~~	~~*Energy performance of buildings - External climatic conditions - Part 1: Conversion of climatic data for energy calculations*~~
~~M2-4~~	~~ISO 52018-1~~	~~*Energy performance of buildings — Indicators for partial EPB requirements related to thermal energy balance and fabric features — Part 1: Overview of options*~~
M2–4	Official Gazette 128/15, 70/18, 73/18, 86/18	*Technical regulation on energy economy and heat retention in buildings*
M2-5.1	HRN EN ISO 13789:2008	*Thermal performance of buildings - Transmission and ventilation heat transfer coefficients - Calculation method*
M2-5.2	HRN EN ISO 13370:2008	*Thermal performance of buildings – Heat transfer via the ground – Calculation methods*
M2-5.3	HRN EN ISO 6946:2008	*Building components and building elements – Thermal resistance and thermal transmittance – Calculation method*
M2-5.4	HRN EN ISO 10211:2008	*Thermal bridges in building construction – Heat flows and surface temperatures – Detailed calculations*
M2-5.5	HRN EN ISO 14683:2008	*Thermal bridges in building construction – Linear thermal transmittance – Simplified methods and default values*
M2-5.6	HRN EN ISO 10077-1:2008	*Thermal performance of windows, doors and shutters – Calculation of thermal transmittance – Part 1: General*
M2-5.7	HRN EN ISO 10077-2:2004	*Thermal performance of windows, doors and shutters – Calculation of thermal transmittance – Part 2: Numerical method for frames*
~~M2-8~~	~~ISO 9050~~ ~~ISO 15099~~ ~~ISO 52022-3~~	~~*Glass in building – Determination of light transmittance, solar direct transmittance, total solar energy transmittance, ultraviolet transmittance and related glazing factors* [for non-scattered glazings]~~ ~~*Thermal performance of windows, doors and shading devices – Detailed calculations* [for windows with scattering glazing and/or solar shading devices]~~ ~~*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* [for normal incidence angle]~~ ~~(or see Subjects 4, 5 and 6 in Table C.1)~~
M2-8	HRN EN 410:2011 HRN EN 673:2011 HRN EN 13363-	*Glass in building -- Determination of luminous and solar characteristics of glazing* *Glass in building -- Determination of thermal transmittance (U value) -- Calculation method* *Solar protection devices combined with glazing Calculation of total solar energy transmittance and light transmittance Part 2: Detailed calculation*

Reference	Reference document [a]	
	Number	Title
	2:2008	*method*
M3-1	EN 15316-1	*Energy performance of buildings – Method for calculation of system energy requirements and system efficiencies – Part 1: General and Energy performance expression, Module M3–1, M3–4, M3–9, M8–1, M8–4*
M3-4[b]	EN 15316-1	See M3-1
M3-5	HRN EN 15316–2-1:2008	*Heating systems in building– Method for calculation of system energy requirements and system efficiencies – Part 2-1: Space emission systems ~~(heating and cooling), Module M3–5, M4–5~~*
~~**M4-1**~~	~~EN 16798-9~~	~~*Energy performance of buildings — Ventilation for buildings — Part 9: Calculation methods for energy requirements of cooling systems (Modules M4-1, M4-4, M4-9) — General*~~
M4–1	HRN EN 15243:2008	*Algorithms for assessment of energy performance of buildings (2017)* (hourly method) *Ventilation for buildings. Calculation of room temperatures and of load and energy for buildings with room conditioning systems*
M4-4[b]	EN 16798-9	See M4-1
M4-5	EN 15316-2	See M3-5
~~**M5-1**~~	~~EN 16798-3~~	~~*Energy performance of buildings — Ventilation for buildings — Part 3:For non-residential buildings – Performance requirements for ventilation and room-conditioning systems (Modules M5-1, M5-4)*~~
M5–1	*HRN EN 13779:2008* *DIN V 18599-10:2007*	*Algorithms for assessment of energy performance of buildings (2017)* *Ventilation for non-residential buildings. Performance requirements for ventilation and room-conditioning systems* *Energy efficiency of buildings - Calculation of the net, final and primary energy demand for heating, cooling, ventilation, domestic hot water and lighting - Part 10: Boundary conditions of use, climatic data (Table 4, nominal flow rates, operating hours)*
~~**M5-5**~~	~~EN 16798-7~~	~~*Energy performance of buildings — Ventilation for buildings — Part 7: Calculation methods for the determination of air flow rates in buildings including infiltration (Module M5-5)*~~
M5–5	HEN EN 15242:2008 DIN V 18599-2:2007 HRN EN ISO 13789:2008	*Algorithms for assessment of energy performance of buildings (2017)* *Ventilation for buildings. Calculation methods for the determination of air flow rates in buildings including infiltration (AHU leakage)* *Energy efficiency of buildings - Calculation of the net, final and primary energy demand for heating, cooling, ventilation, domestic hot water and lighting - Part 2: Net energy demand for heating and cooling of building zones (infiltration)* *Thermal performance of buildings — Transmission and ventilation heat transfer coefficients — Calculation method (infiltration)*
~~**M5-6**~~	~~EN 16798-5-1~~ ~~EN 16798-5-2~~	~~*Energy performance of buildings — Ventilation for buildings – Part 5-1: Calculation methods for energy requirements of ventilation and air conditioning systems (Modules M5-6, M5-8, M6-5, M6-8, M7-5, M7-8) – Method 1: Distribution and generation*~~ ~~*Energy performance of buildings — Ventilation for buildings — Part 5-2: Calculation methods for energy requirements of ventilation systems (Modules M5-6, M5-8, M6-5, M6-8, M7-5, M7-8) — Method 2: Distribution and generation*~~
M5–6	HRN EN	*Algorithms for assessment of energy performance of buildings (2017)*

Reference	Reference document [a]	
	Number	Title
	15241:2008	*Ventilation for buildings. Calculation methods for energy losses due to ventilation and infiltration in buildings*
M6-1	~~EN 16798-3~~	See M5-1
M6-4[b]	~~EN 16798-3~~	See M5-1
M6-5	~~EN 16798-5-1~~ ~~EN 16798-5-2~~	See M5-6
M7-1	~~EN 16798-3~~	See M5-1
M7-4[b]	~~EN 16798-3~~	See M5-1
M7-5	~~EN 16798-5-1~~ ~~EN 16798-5-2~~	See M5-6
M9–1	HRN EN 15193~~-1~~:2008	*Energy performance of buildings – Energy requirements for lighting ~~– Part 1: Specifications, Module M9~~*
M10–1	HRN EN 15232~~-1~~:2012	*Energy performance of buildings -- Impact of Building Automation, Controls and Building Management~~– Modules M10–4,5,6,7,8,9,10~~*
a If a reference comprises more than one document, the references can be differentiated. b Informative.		

NA.3 Selection of main method

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

Type of object and/or application	All applications	[b]
Description	Choice [a]	
Only hourly method allowed	Yes*	
Only monthly method allowed	No	
Both methods are allowed	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 ISO 52000-1:2017, Tables A.2 to A.7 (normative template, with informative default choices in Tables B.2 to B.7).		
*The procedure is based on Simple hourly method of HRN EN ISO 13790:2008		

NA.4 Zoning

Table NA.3 — Thermal zoning rules (see 6.4.2.~~12~~2)[1]

	Application: ….. [a]	
Description [b]	**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

[1] Suspected erratum in (EN) ISO 52016-1:2017 here corrected.

Zoning step 1. Assessment of ~~thermal envelope~~ space categories	Yes	Not applicable
Zoning step 2. Grouping according to space category	Yes	Not applicable
Zoning step 3. Grouping in case of large openings	~~Yes~~ No	The size of the opening is not defined in (1)
Zoning step 4. Split to have same combination of services	~~Yes~~ No	Not specifically mentioned in (1)
Zoning step 5. Further grouping according to similar thermal conditions of use	Yes	Not applicable
Zoning step 6. Split according to specific system or subsystem properties	Yes	Not applicable
Zoning step 7. (Further) split to have sufficient homogeneity in thermal balance	~~Yes~~ No	Not specifically mentioned in (1)
Zoning step 8. (Further) grouping of thermally unconditioned zones	Yes	Not applicable
Zoning step 9. Simplification in case of small thermal zones	~~Yes~~ No	Not specifically mentioned in (1)
Zoning step 10. Simplification in case of very small thermal zones	~~Yes~~ No	Not specifically mentioned in (1)
[a] Add more columns to differentiate per application, if needed. [b] Additional rows may be added for alternative steps.		
(1) The procedure is described in Methodology on energy audit (2017) and Algorithms for assessment of energy performance of buildings (2017).		

Table NA.4 — Choice of method for thermally unconditioned zones (see 6.4.5)

Situation	**Default value of $b_{ztu;m}$ in case of a thermally unconditioned zone, type: external** [a]
	No default values provided
Internal thermally unconditioned zone type allowed?	
Choice	~~Yes~~ No
~~**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]
	~~No default values provided~~
[a] Add more rows if needed.	
The procedure to asses energy need in Algorithms for assessment of energy performance of buildings (2017) is based on HRN EN ISO 13790:2008. The adjustment factor b_u is determined according to HRN EN 13789:2008 (Eq.5). No default values of b_u are provided.	

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

Application	All applications [a]	
Description	**Choice**	
Default allowed?	~~Yes~~ No	
~~**If Yes:**~~		
~~Coefficient for default contribution of ventilation, $c_{ztu;ve}$~~	~~0,5~~	
[a] Add more columns if needed.		
The procedure to asses energy need in Algorithms for assessment of energy performance of buildings (2017) is based on HRN EN ISO 13790:2008. The ventilation heat transfer coefficient $H_{Ve,ue}$ is determined according to HRN EN 13789:2008 (Eq.7).		

Table NA.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		~~Yes~~ 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**~~
~~$f_{mod;t}$~~		~~0,8~~
~~$f_{mod;sp}$~~		~~0,5~~
~~$H_{H;int;spec}$ (W/m².K)~~[2]		~~2,0~~

[2] Suspected erratum in (EN) ISO 52016-1:2017 here corrected.

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

Application	All applications	
Description	Choice [a]	[b]
Thermally uncoupled calculations	~~Yes~~No	
Thermally coupled calculations	~~No~~Yes	
Both methods are allowed	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 NA.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*	$H_{Tr,zy}$		W/K
ventilation heat transfer from zone *z* to zone *y*	$H_{Ve,z\rightarrow y}$		W/K
ventilation heat transfer from zone *y* to zone *z*	Not applicable		…[a]

[a] Add more rows if needed.

NA.5 Hourly calculation procedures

Table NA.9 — Factor for consideration of internal heat gains in design heat load calculation (see 6.5.~~5.5~~4.5.2)~~²~~6.5.5.5.4

Application	All applications	…. [a]
Description	**Choice**	**Choice**
Value for factor $f_{H;ig}$	~~0,5~~ 0	Not applicable

[a] Add more rows if needed.

Table NA.10 — Alternative choices in modelling (see 6.5.5.2, 6.5.6.3.1 and 6.5.7.1)

Description	Choice	If choice is No, describe or give reference to the applied alternative method
Use the method in 6.5.5.2 to calculate the actual temperatures and loads	Yes	Not applicable
~~Use method in 6.5.6.3.1 for the calculation of the thermal (longwave) radiation exchange~~	~~Yes~~	~~Not applicable~~
~~Use method in 6.5.7.1 for the conversion of physical properties of building elements into properties~~	~~Yes~~	~~Not applicable~~

~~per layer (node)~~		
NOTE In case of one or more "No", the procedures are validated using the validation cases in 7.2, as described in that subclause.		
The procedure to asses energy need in Algorithms for assessment of energy performance of buildings (2017) is based on HRN EN ISO 13790:2008.		

Table B.11 — Convective fractions (see 6.5.6.2)

~~$f_{int;c}$~~ [a]	~~$f_{sol;c}$~~	~~$f_{H;c}$~~	~~$f_{C;c}$~~
~~0,40 for all source types~~	~~0,10~~	~~0,40~~	~~0,40~~
~~[a] Can be differentiated per source type.~~			
NOT APPLICABLE The procedure to asses energy need in Algorithms for assessment of energy performance of buildings (2017) is based on HRN EN ISO 13790:2008.			

Table B.12 — Specification of internal partitions (see 6.5.6.3.1)

	~~**Choice**~~
~~**Internal partitions need to be specified?**~~	~~No~~
~~**If by default:** specify the default thermal characteristics~~	
~~**Default characteristics**~~	~~**Specification** [a]~~
~~Not applicable~~	~~Not applicable~~
~~[a] Add more rows if needed.~~	
NOT APPLICABLE - see NA.14-bis The procedure to asses energy need in Algorithms for assessment of energy performance of buildings (2017) is based on HRN EN ISO 13790:2008.	

Table B.13 — Distribution of mass of opaque and ground floor elements (see 6.5.7.2 and 6.5.7.3)

~~**Class**~~	~~**Specification of the class**~~
~~Class I (mass concentrated at internal side)~~	~~Construction with external thermal insulation (main mass component near inside surface), or equivalent~~
~~Class E (mass concentrated at external side)~~	~~Construction with internal thermal insulation (main mass component near outside surface), or equivalent~~
~~Class IE (mass divided over internal and external side)~~	~~Construction with thermal insulation in between two main mass components, or equivalent~~
~~Class D (mass equally distributed)~~	~~Uninsulated construction (e.g. solid or hollow bricks, heavy or lightweight concrete, or lightweight construction with negligible mass (e.g. steel sandwich panel), or equivalent~~
NOT APPLICABLE – see NA.14-bis The procedure to asses energy need in Algorithms for assessment of energy performance of buildings (2017) is based on HRN EN ISO 13790:2008.	

Table NA.14 — Specific heat capacity of opaque and ground floor elements (see 6.5.7.2 and 6.5.7.3)

Class	$\kappa_{m;op}$ J/(m^2·K)	Specification of the class
Very light	~~50 000~~	~~Construction containing no mass components, other than e.g. plastic board and/or wood siding, or equivalent~~ Envelope: Assembly and semi-assembly construction made of wood or metal filled with insulation materials. Final thin cladding or insulating panels. Internal walls: dry assembly, poroconcrete, hollow or solid brick, thickness ≤ 15 cm
Light	~~75 000~~	~~Construction containing no mass components other than 5 to 10 cm lightweight brick or concrete, or equivalent~~ Envelope: poroconcrete, hollow brick of density ≤900 kg/m^3 Internal walls: dry assembly, poroconcrete, brick, thickness ≤ 15 cm
Medium	~~110 000~~	~~Construction containing no mass components other than 10 to 20 cm lightweight brick or concrete, or less than 7 cm solid brick or heavy weight concrete, or equivalent~~ Envelope: mostly hollow brick of density ≤900 kg/m^3, solid brick, reinforced concrete share ≤15% of external walls surface area. Internal walls: lightweight or massive
Heavy	~~175 000~~	~~Construction containing 7 to 12 cm solid brick or heavy weight concrete, or equivalent~~ Envelope: solid brick of density >900 kg/m^3, thickness >20 cm, reinforced concrete share > 15% of external walls surface area. Internal walls: massive
Very heavy	~~250 000~~	~~Construction containing more than 12 cm solid brick or heavy weight concrete, or equivalent~~ Envelope: reinforced concrete, thickness ≥20 cm Internal walls: massive

Table NA.14-bis — Specific heat capacity of opaque and ground floor elements (see 6.5.7.2 and 6.5.7.3)

Class	C_m kJ/K	Specific mass kg/m^2
Very light	80 x A_f	m′ ≤100
Light	110 x A_f	250 ≥ m′ ≥ 100
Medium	165 x A_f	400 ≥ m′ ≥ 250
Heavy	260 x A_f	550 ≥ m′ ≥ 400
Very heavy	370 x A_f	m′ ≥ 550
C_m - thermal capacity A_f - useful floor area of the zone with external dimensions		

Table NA.15 — Solar absorption coefficient of external opaque surfaces (see 6.5.7.2)

	Choice
Differentiation in solar absorption coefficient?	~~No~~ Yes
If Yes: specify the procedure to classify the three categories (free text)	
Category	**Specification**
~~**Category 1**~~ ~~α_{sol} = 0,3~~ ~~**(light colour)**~~	Not applicable
~~**Category 2**~~ ~~α_{sol} = 0,6~~ ~~**(intermediate colour)**~~	Not applicable
~~**Category 3**~~ ~~α_{sol} = 0,9~~ ~~**(dark colour)**~~	Not applicable
	Choice
~~**If No:** choose the default category~~	~~2~~

Table NA.15-bis — Solar absorption coefficient of external opaque surfaces (see 6.5.7.2)

Surface	**Solar absorption coefficient $\alpha_{S,c}$ [-]**
Walls	
- light colour	0,4
- intermediate colour	0,6
- dark colour	0,8
Roofs	
- tile	0,6
- dark colour	0,8
- metal (high gloss)	0,2
- shingle	0,6

Table B.16 — Coefficient to limit assumed temperature in adjacent thermally unconditioned zone (see 6.5.910)

~~Application~~	~~All applications~~	~~....~~ [a]
	~~$\epsilon_{ztu,h;max}$~~	~~$\epsilon_{ztu,h;max}$~~
~~Value~~	~~1,0~~	~~Not applicable~~
~~a Add more columns if needed to differentiate between applications (e.g. building categories, new or existing buildings, etc.).~~		
NOT APPLICABLE		

Table B.17 — Specific heat capacity of air and furniture (see 6.5.11)

~~$\kappa_{m;int}$ J/(m²·K)~~
~~10 000~~

Table NA.18 — View factor to the sky (see 6.5.1334.3)

	Unshaded horizontal roof	Unshaded vertical wall
$F_{sky,k}$	1,0	0,5

Table NA.19 — Difference between external air temperature and sky temperature (see 6.5.1334.3)

Climatic region [a]	~~Sub-polar areas~~	~~Tropics~~	Intermediate zones
$\Delta\theta_{sky;t}$ (K)	~~9 (fixed value)~~	~~13 (fixed value)~~	~~11~~ 10 (fixed value)
[a] Add more columns if needed to differentiate between climatic regions.			

Table NA.20 — Choice of method for moisture absorption and desorption in materials (see 6.5.1415.1)

Application	All applications	.... [a]
Description	**Choice**	**Choice**
Moisture absorption and desorption calculated?	No	Not applicable
If No:	$G_{abs;zt;t} = 0$	$G_{abs;zt;t} = 0$
If Yes: give reference to method	Not applicable	Not applicable
[a] Add more columns if needed.		

Table NA.21 — 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	No
For all windows the same choice: either glazing area or fixed frame fraction	~~Yes~~ No
For all windows: only glazing area allowed	No
For all windows: only fixed frame fraction	~~No~~ Yes
[a] Only one Yes per column possible.	
In case of frame fraction:	**F_{fr}**
Frame fraction fixed value	0,2~~5~~-0.3

Table NA.22 — 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** °
0,90	0,75	45
Default values of the total solar energy transmittance at normal incidence, g_n, for typical types of glazing [a]		
Type		**g_n**
Single glazing		0,8~~5~~7
Double glazing		0,~~75~~80
Double glazing with selective low-emissivity coating		0,6~~7~~0
Triple glazing		0,7
Triple glazing with two selective low-emissivity coatings		0,5
~~Double window~~		~~0,75~~
[a] Assuming a clean surface and normal, untainted and non-scattering glazing.		
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**
~~White venetian blinds~~	~~0,1~~	~~0,05~~ / ~~0,25~~ / ~~0,10~~
		~~0,1~~ / ~~0,30~~ / ~~0,15~~
		~~0,3~~ / ~~0,45~~ / ~~0,35~~
~~White curtains~~	~~0,1~~	~~0,5~~ / ~~0,65~~ / ~~0,55~~
		~~0,7~~ / ~~0,80~~ / ~~0,75~~
		~~0,9~~ / ~~0,95~~ / ~~0,95~~

Coloured textiles	0,3	0,1 0,3 0,5	0,42 0,57 0,77	0,17 0,37 0,57
Aluminium-coated textiles	0,2	0,05	0,20	0,08
[a] Add more rows or columns if needed.				

Table NA.22-bis — Factors related to the solar energy transmittance (see E.2.2.1)

Blind type	*Reduction factor* F_C [-]
Blind inside or between glazing	
- white or non-reflective surfaces and low transparency	0,75
- light colours or low transparency	0,80
- dark colours or high transparency	0,90
Blind outside	
- venetian blinds, rotating/adjustable lamellae, ventilated from the back	0,25
- roller blind, window lid	0,30
Eave, loggia	0,50
Marquee, side and from above ventilated	0,40

Table B.23 — Rules for operation of shutters (see G.2.2.1.2)

Application	All applications [a]	... [a]
Control level	**Rules**	**Rules**
0 Manual operation	Closed: after sunset, if occupied Open: after sunrise, if occupied, but not during sleeping hours	Not applicable
1 Motorized operation with manual control	Same	Not applicable
2 Motorized operation with automatic control	Closed: after sunset Open: after sunrise	Not applicable
3 Combined light/blind/HVAC control	Same [b]	Not applicable
[a] Add more columns if needed.		
[b] Conservative rule; a level 3 combined control is not covered in this table.		
NOT APPLICABLE		

Table NA.24 — Rules for operation of solar shading devices (see G.2.2.1.2)

Application	All applications [a]	.... [a]
Control level	**Rules**	**Rules**
0 Manual operation	Closed: if solar irradiance > 300 W/m^2 Open: if solar irradiance < 200 W/m^2	Not applicable
1 Motorized operation with manual control	Same	Not applicable
~~**2 Motorized operation with automatic control**~~	~~Closed: if solar irradiance > 200 W/m^2~~ ~~Open: if solar irradiance < 200 W/m^2 and ≥ 2 hours passed since closing~~	~~Not applicable~~
~~**3 Combined light/blind/HVAC control**~~	~~Same~~ [b]	~~Not applicable~~

[a] Add more columns if needed.

[b] Conservative rule; a level 3 combined control is not covered in this table.

Table NA.25 — Choices between options and methods for calculation of shading by external objects (see F.1)

Application [b]	**All applications**			**Not applicable**		
Description	**Choice**			**Choice**		
Calculation of the effect of shading by distant objects included in this document?	Yes			n.a.		
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:
	Landscape (such as hills or dikes), other constructions (such as buildings)	Vegetation (such as trees)	-	n.a.	n.a.	n.a.
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:
	- not defined	-not defined	~~Rebates, overhangs or other shading objects from the own building(s) on site~~ not defined	n.a.	n.a.	n.a.
When calculating solar shading on transparent	Shall be taken into account:	May be taken into	Shall be ignored:	Shall be taken	May be taken	Shall be ignored:

building elements: NOTE For instance window rebates, overhangs and side fins		account:		into account:	into account:	
	Window rebates, overhangs and side fins~~— if depth larger than 20% of window height resp. width~~	~~Other window rebates, overhangs and side fins~~ not defined	-not defined	n.a.	n.a.	n.a.
Specific subdivision rules for the calculation of solar shading on building elements	None			n.a.		
Choice between the two methods for the solar shading calculation:	Choice [a]			Choice [a]		
Method 1, Shading of direct radiation	Yes			n.a.		
Method 2, Shading of direct and diffuse radiation	No			n.a.		
In case of method 2: give reference to calculation procedure	n.a.			n.a.		

[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 B.26 — Number of skyline segments, $n_{sh;segm}$ for input solar shading objects (see F.~~3.3~~5.3.7)

~~**Application** [b]~~	~~**All applications**~~	~~**...**~~
~~**Description**~~	~~Value of $n_{sh;segm}$ [a]~~	~~Value of $n_{sh;segm}$ [a]~~
~~Maximum number of segments over 360 degrees~~	~~15~~	
~~Fixed width (= 360 / $n_{sh;segm}$)~~ [c]	~~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 $n_{sh;segm}$.~~

NOT APPLICABLE

The procedure to calculate solar shading due to shading objects in Algorithms for assessment of energy performance of buildings (2017) is based on HRN EN ISO 13790:2008 (G2)

NA.6 Monthly calculation procedures

Table NA.27 —Monthly ventilation heat transfer coefficient (see 6.6.~~6.2~~7.3)

Application	All applications	….[b]
Description	Choice [a]	Choice [a]
Method A	~~Yes~~ No	Not applicable
Method B [c]	No	Not applicable
Both methods [c]	No	Not applicable
[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.		
The procedure to asses ventilation heat transfer in Algorithms for assessment of energy performance of buildings (2017) is based on and DIN V 18599-2:2007, HRN EN 15242:2008 and HRN EN 13789:2008		

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

~~Dynamics correction factor for monthly mean air flow~~	~~Value~~
$f_{ve;dyn;k}$	~~1,0~~
NOT APPLICABLE See NA.27	

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

	Choice
Differentiation in solar absorption coefficient?	~~No~~ Yes
If Yes: specify the procedure to classify the three categories (free text)	
Category	**Specification**
~~**Category 1**~~ ~~α_{sol} = 0,3~~ ~~**(light colour)**~~	Not applicable
~~**Category 2**~~ ~~α_{sol} = 0,6~~ ~~**(intermediate colour)**~~	Not applicable
~~**Category 3**~~ ~~α_{sol} = 0,9~~ ~~**(dark colour)**~~	Not applicable
	Choice
~~**If No:** choose the default category~~	~~2~~

Table NA.30 — View factor to the sky (see 6.6.8.3)

	Unshaded horizontal roof	Unshaded vertical wall
$F_{\text{sky,k}}$	1,0	0,5

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

Climatic region [a]	Sub-polar areas	Tropics	Intermediate zones
$\Delta\theta_{\text{sky};m}$ (K)	9 (fixed value)	13 (fixed value)	11 10 (fixed value)
[a] Add more columns if needed to differentiate between climatic regions.			

Table NA.32 — Choice between detailed or simple method to determine the internal effective heat capacity (monthly method; see 6.6.910)

Application	All applications	
Description	Choice [a]	[b]
Only detailed method allowed	No	
Only simple method allowed	Yes	
Both methods allowed	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 NA.33 — Simple method to determine the internal effective heat capacity. Specification of the classes (monthly method; see 6.6.9)

Class	Specification of the class
Very light	Construction type is dominated by very light constructions as specified in Table B.14 Envelope: Assembly and semi-assembly construction made of wood or metal filled with insulation materials. Final thin cladding or insulating panels. Internal walls: dry assembly, poroconcrete, hollow or solid brick, thickness ≤ 15 cm
Light	Construction type is dominated by light constructions as specified in Table B.14 Envelope: poroconcrete, hollow brick of density ≤900 kg/m^3 Internal walls: dry assembly, poroconcrete, brick, thickness ≤ 15 cm
Medium	Construction type is dominated by medium constructions as specified in Table B.14 Envelope: mostly hollow brick of density ≤900 kg/m^3, solid brick, reinforced concrete share ≤15% of external walls surface area. Internal walls: lightweight or massive
Heavy	Construction type is dominated by heavy constructions as specified in Table B.14

Class	Specification of the class
	Envelope: solid brick of density >900 kg/m³, thickness >20 cm, reinforced concrete share > 15% of external walls surface area. Internal walls: massive
Very heavy	~~Construction type is dominated by very heavy constructions as specified in Table B.14~~ Envelope: reinforced concrete, thickness ≥20 cm Internal walls: massive
See Tables NA.14 and NA.14-bis	

Table NA.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
1,0	15

Table NA.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
1,0	15

Table NA.36 — Choice between methods A and B for heating intermittency (see 6.6.~~11.3~~12.4)

Application	All applications	
Description	**Choice** [a]	[b]
Only Method A	~~Yes~~ No	
Only Method B	No	
Both methods are allowed	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.).		
The procedure to asses energy need in Algorithms for assessment of energy performance of buildings (2017) is based on HRN EN ISO 13790:2008.		

Table NA.37 — Choice between methods A and B for cooling intermittency (see 6.6.~~11.4~~12.5)

Application	All applications	
Description	**Choice** [a]	[b]
Only method A	~~Yes~~ No	
Only method B	No	
Both methods are allowed	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
$b_{C;red}$	0,3
The procedure to asses energy need in Algorithms for assessment of energy performance of buildings (2017) is based on HRN EN ISO 13790:2008.	

Table B.38 — Choice between methods A and B for overheating indicator (see 6.6.123)

	….. [b]	…. [b]
Description	**Choice** [a]	**Choice** [a]
Method A	Yes/No	Yes/No
Method B	Yes/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 B applies		
Provide details or reference to details	<free text>	
NOT APPLLICABLE		

Table B.39 — The monthly fraction of energy need for humidification (see 6.6.1415)

	Monthly fraction of energy need for humidification $f_{HU;m}$		
Formula?	Yes		
If Yes, give formula	for each month m: $f_{HU;m} = Q_{H;nd;m}/Q_{H;nd;an}$ where $Q_{H;nd;m/an}$ is the monthly / annual energy need for heating, as determined in6.5.4.1, in kWh		
If No, give fraction for each month (total = 1)	**Monthly fraction of energy need for humidification $f_{HU;m}$**		
January	Not applicable	July	Not applicable
February	Not applicable	August	Not applicable
March	Not applicable	September	Not applicable
April	Not applicable	October	Not applicable
May	Not applicable	November	Not applicable
June	Not applicable	December	Not applicable
NOT APPLICABLE The procedure to asses energy need for humidification is defined in Algorithms for assessment of energy performance of buildings (2017) (partially based on developed national procedure and on DIN V 18599-3)			

Table NA.40 — Efficiency of latent heat recovery (see 6.6.~~14~~15)

Type of heat recovery unit	Efficiency of latent heat recovery $\eta_{HU;rvd}$
Provisions specifically made for transporting moisture from exhaust to supply air (such as a heat recovery wheel with moisture absorbing surface)	~~0,55~~ 0,7
Other provisions	0
-	-
- [a]	-
[a] Add more rows if needed to differentiate between types.	

Table B.41 — Annually accumulated amount of moisture to be supplied per kg dry air supply (monthly method; see 6.6.~~14~~15)

~~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_RES_LIV*~~	~~0,17~~
~~*SPACECAT_RES_INDIV_OTHER*~~	~~0,17~~
~~*SPACECAT_RES_COLL*~~	~~0,17~~
~~*SPACECAT_TH.UNCOND_OTHER*~~	~~0~~
~~*SPACECAT_TH.UNCOND_SUN*~~	~~0~~
~~*SPACECAT_TH.UNCOND_CORR*~~	~~0~~
~~*SPACECAT_OFF*~~	~~4,2~~
~~*SPACECAT_EDUC*~~	~~4,2~~
~~*SPACECAT_HOSP_BED*~~	~~4,2~~
~~*SPACECAT_HOSP_OTHER*~~	~~4,2~~
~~*SPACECAT_HOTEL*~~	~~0,17~~
~~*SPACECAT_REST*~~	~~0,17~~
~~*SPACECAT_REST_KITCH*~~	~~0~~
~~*SPACECAT_MEET*~~	~~0,17~~
~~*SPACECAT_AUDIT*~~	~~0,17~~
~~*SPACECAT_THEAT*~~	~~0,17~~
~~*SPACECAT_SERVER*~~	~~0~~
~~*SPACECAT_SPORT_TH.COND*~~	~~0,17~~
~~*SPACECAT_SPORT_TH.UNCOND*~~	~~0~~
~~*SPACECAT_RETAIL*~~	~~0,17~~
~~*SPACECAT_NONRES_BATH*~~	~~0~~
~~*SPACECAT_STOR_HEAT*~~	~~0~~
~~*SPACECAT_STOR_COOL*~~	~~0~~

~~*SPACECAT ENGINE*~~	~~0~~
~~*SPACECAT_CAR*~~	~~0~~
~~*SPACECAT_BARN*~~	~~0~~
~~[a] Add more rows if needed to differentiate between types.~~	
~~NOTE The space categories are inherited from ISO 52000-1:2017, Annex B. The values are based on NEN 7120 (The Netherlands).~~	
NOT APPLICABLE The absolute humidity for systems with humidity control with or without tolerances is provided in Tables 3.5 and 3.6 (based on DIN V 18599-3) in Algorithms for assessment of energy performance of buildings (2017)-Part: HVAC systems.	

Table NA.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	~~No~~ Yes
[a] Only one Yes per column possible.	
In case of frame fraction:	F_{fr}
Frame fraction fixed value	0,2~~5~~-0.3

Table NA.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 °
0,90	0,75	45
Default values of the total solar energy transmittance at normal incidence, g_n, for typical types of glazing [a]		
Type		g_n
Single glazing		0,8~~5~~7
Double glazing		0,~~75~~80
Double glazing with selective low-emissivity coating		0,6~~7~~0
Triple glazing		0,7
Triple glazing with two selective low-emissivity coatings		0,5
~~Double window~~		~~0,75~~
[a] Assuming a clean surface and normal, untainted and non-scattering glazing.		
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
~~White venetian blinds~~	~~0,1~~	~~0,05~~ ~~0,1~~ ~~0,3~~	~~0,25~~ ~~0,30~~ ~~0,45~~	~~0,10~~ ~~0,15~~ ~~0,35~~
~~White curtains~~	~~0,1~~	~~0,5~~ ~~0,7~~ ~~0,9~~	~~0,65~~ ~~0,80~~ ~~0,95~~	~~0,55~~ ~~0,75~~ ~~0,95~~
~~Coloured textiles~~	~~0,3~~	~~0,1~~ ~~0,3~~ ~~0,5~~	~~0,42~~ ~~0,57~~ ~~0,77~~	~~0,17~~ ~~0,37~~ ~~0,57~~
~~Aluminium-coated textiles~~	~~0,2~~	~~0,05~~	~~0,20~~	~~0,08~~
[a] Add more rows or columns if needed.				

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

Blind type	*Reduction factor* F_C [-]
Blind inside or between glazing	
- white or non-reflective surfaces and low transparency	0,75
- light colours or low transparency	0,80
- dark colours or high transparency	0,90
Blind outside	
- venetian blinds, rotating/adjustable lamellae, ventilated from the back	0,25
- roller blind, window lid	0,30
Eave, loggia	0,50
Marquee, side and from above ventilated	0,40

Table NA.44a — Movable shutter reduction factor, $f_{sht;with}$, and movable solar shading reduction factor $f_{sh;with}$ (see G.2.2.2.~~24~~)

Month	Zagreb (Croatia)								
	~~*f*sht;with~~ [a]	*f*sh;with [a]							
		N	E	S	W	NE	NW	SE	SW
1	~~0,5~~	0,00	0,29	0,75	0,33	0,00	0,00	0,67	0,69
2	~~0,5~~	0,00	0,38	0,72	0,37	0,00	0,00	0,69	0,66
3	~~0,5~~	0,00	0,44	0,66	0,41	0,06	0,06	0,63	0,60
4	~~0,5~~	0,00	0,53	0,65	0,51	0,17	0,19	0,65	0,62

5	~~0,5~~	0,00	0,51	0,55	0,51	0,28	0,28	0,60	0,57
6	~~0,5~~	0,00	0,56	0,50	0,51	0,32	0,34	0,55	0,53
7	~~0,5~~	0,00	0,55	0,62	0,57	0,29	0,33	0,62	0,64
8	~~0,5~~	0,00	0,58	0,72	0,62	0,28	0,25	0,70	0,71
9	~~0,5~~	0,00	0,57	0,76	0,54	0,10	0,11	0,72	0,73
10	~~0,5~~	0,00	0,48	0,71	0,40	0,00	0,00	0,68	0,65
11	~~0,5~~	0,00	0,20	0,71	0,20	0,00	0,00	0,61	0,67
12	~~0,5~~	0,00	0,14	0,62	0,26	0,00	0,00	0,49	0,55
~~Annual~~									

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

Table NA.44b — Movable shutter reduction factor, $f_{sht;with}$, and movable solar shading reduction factor $f_{sh;with}$ (see G.2.2.2.~~24~~)

Month	Split (Croatia)								
	~~$f_{sht;with}$ [a]~~	$f_{sh;with}$ [a]							
		N	E	S	W	NE	NW	SE	SW
1	~~0,5~~	0,00	0,42	0,86	0,45	0,00	0,00	0,80	0,81
2	~~0,5~~	0,00	0,53	0,85	0,48	0,00	0,00	0,82	0,77
3	~~0,5~~	0,00	0,59	0,82	0,61	0,03	0,09	0,79	0,77
4	~~0,5~~	0,00	0,62	0,76	0,60	0,26	0,28	0,75	0,73
5	~~0,5~~	0,00	0,68	0,69	0,63	0,42	0,45	0,71	0,70
6	~~0,5~~	0,00	0,65	0,63	0,67	0,46	0,53	0,64	0,67
7	~~0,5~~	0,00	0,71	0,70	0,70	0,56	0,55	0,74	0,75
8	~~0,5~~	0,00	0,67	0,74	0,68	0,37	0,41	0,77	0,77
9	~~0,5~~	0,00	0,69	0,86	0,67	0,16	0,17	0,81	0,82
10	~~0,5~~	0,00	0,66	0,88	0,59	0,00	0,01	0,84	0,84
11	~~0,5~~	0,00	0,41	0,83	0,49	0,00	0,00	0,76	0,83
12	~~0,5~~	0,00	0,47	0,88	0,45	0,00	0,00	0,85	0,84
~~Annual~~									

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

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

~~Month~~	~~Stockholm (Sweden)~~				
	~~$f_{sht;with}$ [a]~~	~~$f_{sh;with}$ [a]~~			
		~~N~~	~~E~~	~~S~~	~~W~~
~~1~~	~~0,5~~	~~0,00~~	~~0,10~~	~~0,71~~	~~0,00~~
~~2~~	~~0,5~~	~~0,00~~	~~0,42~~	~~0,76~~	~~0,18~~

3	0,5	0,00	0,56	0,77	0,47
4	0,5	0,00	0,74	0,80	0,59
5	0,5	0,02	0,70	0,71	0,59
6	0,5	0,05	0,69	0,66	0,56
7	0,5	0,03	0,67	0,65	0,53
8	0,5	0,00	0,61	0,70	0,54
9	0,5	0,00	0,58	0,70	0,44
10	0,5	0,00	0,47	0,74	0,24
11	0,5	0,00	0,19	0,62	0,00
12	0,5	0,00	0,00	0,59	0,00
Annual	0,5	0,02	0,62	0,71	0,50

[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.

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

Application [b]	**All applications**			**Not applicable**		
Description	**Choice**			**Choice**		
Calculation of the effect of shading by distant objects included in this document?	Yes			n.a.		
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:
	Landscape (such as hills or dikes), other constructions (such as buildings)	Vegetation (such as trees)	-	n.a.	n.a.	n.a.
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:
	- not defined	-not defined	~~Rebates, overhangs or other shading objects from the own building(s) on site~~ not defined	n.a.	n.a.	n.a.

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:
	Window rebates, overhangs and side fins ~~— if depth larger than 20% of window height resp. width~~	~~Other window rebates, overhangs and side fins~~ not defined	-not defined	n.a.	n.a.	n.a.
Specific subdivision rules for the calculation of solar shading on building elements	None			n.a.		
Choice between the two methods for the solar shading calculation:	Choice [a]			Choice [a]		
Method 1, Shading of direct radiation	Yes			n.a.		
Method 2, Shading of direct and diffuse radiation	No			n.a.		
In case of method 2: give reference to calculation procedure	n.a.			n.a.		

[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 B.46 — Parameters for monthly solar shading due to overhangs (See F.~~3.5.1.2~~5.5.1.6)

~~Period:~~		~~summer: June - September~~			
~~Orientation~~		$~~A_1~~$	$~~B_1~~$	$~~A_2~~$	$~~B_2~~$
~~North hemisphere~~	~~South hemisphere~~				
~~S~~	~~N~~	~~-3,023~~	~~0,045~~	~~1,285~~	~~-0,006~~
~~SE-SW~~	~~NE-NW~~	~~-1,255~~	~~0,015~~	~~0,905~~	~~-0,008~~
~~E-W~~	~~E-W~~	~~-0,684~~	~~0,005~~	~~0,610~~	~~-0,004~~
~~NE-NW~~	~~SE-SW~~	~~-0,654~~	~~0,006~~	~~0,616~~	~~-0,006~~
~~N~~	~~S~~	~~-0,726~~	~~0,007~~	~~0,616~~	~~-0,007~~
NOT APPLICABLE The procedure to calculate solar shading due to shading objects in Algorithms for assessment of energy performance of buildings (2017) is based on HRN EN ISO 13790:2008 (G2)					

Table B.47 — Parameters for monthly solar shading due to fins (See F.~~3.5.1.2~~5.5.1.7)

~~Period:~~		~~summer: June - September~~			
~~Orientation~~		A_1	B_1	A_2	B_2
~~North hemisphere~~	~~South hemisphere~~				
~~S~~	~~N~~	~~-1,175~~	~~0,012~~	~~0,860~~	~~-0,008~~
~~SE-SW~~	~~NE-NW~~	~~-0,799~~	~~0,009~~	~~0,684~~	~~-0,006~~
~~E-W~~	~~E-W~~	~~0,118~~	~~-0,014~~	~~0,005~~	~~0,010~~
~~NE-NW~~	~~SE-SW~~	~~0,155~~	~~-0,041~~	~~-0,680~~	~~0,009~~
~~N~~	~~S~~	~~0,275~~	~~-0,133~~	~~0,641~~	~~0,039~~
NOT APPLICABLE The procedure to calculate solar shading due to shading objects in Algorithms for assessment of energy performance of buildings (2017) is based on HRN EN ISO 13790:2008 (G2)					

Table B.48a — Parameters for monthly solar shading by obstacles; more detailed method (See F.~~3.1.2~~ 5.1.2 and F.~~3.5.2.2~~ 5.5.2.5)

~~Location:~~	~~40º north latitude~~								
~~Period:~~	~~winter: October - May~~								
~~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~~	~~0~~	~~0~~	~~0~~	~~-~~	~~-~~	~~-~~	~~-~~	~~0~~
~~NE~~	~~0~~	~~0~~	~~0~~	~~1,00~~	~~-~~	~~-~~	~~-~~	~~7,6~~	~~0,10~~
~~E~~	~~0~~	~~0~~	~~0,31~~	~~0,69~~	~~-~~	~~-~~	~~9,0~~	~~20,8~~	~~0,50~~
~~SE~~	~~0~~	~~0,14~~	~~0,58~~	~~0,28~~	~~-~~	~~9,2~~	~~22,2~~	~~24,0~~	~~0,70~~
~~S~~	~~0,06~~	~~0,40~~	~~0,47~~	~~0,07~~	~~9,4~~	~~22,8~~	~~22,6~~	~~9,7~~	~~0,75~~
~~SW~~	~~0,22~~	~~0,63~~	~~0,15~~	~~0~~	~~24,2~~	~~22,0~~	~~9,6~~	~~-~~	~~0,70~~
~~W~~	~~0,70~~	~~0,30~~	~~0~~	~~0~~	~~20,6~~	~~9,5~~	~~-~~	~~-~~	~~0,50~~
~~NW~~	~~1,00~~	~~0~~	~~0~~	~~0~~	~~8,7~~	~~-~~	~~-~~	~~-~~	~~0,10~~
NOT APPLICABLE The procedure to calculate solar shading due to shading objects in Algorithms for assessment of energy performance of buildings (2017) is based on HRN EN ISO 13790:2008 (G2)									

Table B.48b — Parameters for monthly solar shading by obstacles; more detailed method (See F.3.1.2 and F.3.5.2.2)

~~Location:~~	~~40º north latitude~~		
~~Period:~~	~~summer: June - September~~		
~~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	0	0	1,00	-	-	-	17,4	0,10
NE	0	0	0,62	0,38	-	-	20,9	50,2	0,30
E	0	0,48	0,48	0,04	-	21,8	52,5	74,4	0,45
SE	0,33	0,53	0,10	0,03	23,2	54,0	74,4	74,4	0,55
S	0,30	0,20	0,21	0,29	60,5	74,4	74,4	60,7	0,50
SW	0,03	0,11	0,52	0,34	74,4	74,4	54,2	23,1	0,55
W	0,04	0,47	0,49	0	74,4	52,7	21,8	-	0,45
NW	0,37	0,63	0	0	50,3	20,9	-	-	0,30

NOT APPLICABLE

The procedure to calculate solar shading due to shading objects in Algorithms for assessment of energy performance of buildings (2017) is based on HRN EN ISO 13790:2008 (G2)