WORKING DOCUMENT

Delegated Regulation under DIRECTIVE 2010/30/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products (recast).

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products[1], and in particular Article 10 thereof,

Whereas:

1. Directive 2010/30/EU requires the Commission to adopt delegated acts as regards the labelling of energy-related products that offer significant potential for energy savings and present a wide disparity in performance levels with equivalent functionality.
2. The energy consumption of heating and cooling equipment that can be attributed to the use of windows in building accounts for a significant part of total energy demand in the Union. In addition to the energy efficiency improvements already achieved, the scope for further reducing the energy performance of windows, thus reducing associated energy consumption, is substantial.
3. Technological development in the field of windows has been rapid in recent years. The ecodesign preparatory study showed that the energy performance of windows shows significant potential for improvement.
4. The provisions of this Regulation should apply to residential windows, for both vertical (facade windows, including window doors) and inclined (roof window) installation.
5. This Regulation should introduce an energy performance scale from A [C] to D for all windows concerned.
6. The effect of the provisions set out in this Regulation is expected to result in annual primary energy savings of 100 PJ/yr to 188 PJ/yr in 2030 for façade and roof windows combined, depending on the consumer response on the window energy labelling introduced by this Regulation.
7. The information provided on the respective labels should be obtained through reliable, accurate and reproducible calculation and measurement methods that take into account the recognised state-of-the-art calculation and measurement methods including, where available, harmonised standards adopted by the European standardisation organisations, as listed in Annex I to Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation[2].

[1] OJ L 153, 18.6.2010, p.1.
[2] OJ L 316, 14.11.2012, p. 12.

8. This Regulation should specify a uniform design and content for the labelling of windows.
9. This Regulation should specify requirements as to the technical documentation and the fiche for windows, also when used for non-residential purposes.
10. This Regulation should specify requirements as to the information to be provided for any form of distance selling, advertising and technical promotional material of windows, also when used for non-residential purposes.
11. It is appropriate to provide for a review of the provisions of this Regulation taking into account technological progress, and in particular the effectiveness and the appropriateness of the approach followed for the determination of the energy performance of windows,

HAS ADOPTED THIS [proposed measure]

1) Subject matter and scope

1. This Regulation establishes requirements for the labelling and the provision of supplementary product information for windows [TO DECIDE: add "..for residential applications"].
2. This Regulation shall not apply to:
    a) windows subject to regulations on smoke leakage and resistance to fire;
    b) windows for escape routes;
    c) roof lights;
    d) curtain walling;
    e) windows used in means for transport.

2) Definitions

In addition to the definitions set out in Article 2 of Directive 2010/30/EC, the following definitions shall apply for the purposes of this Regulation:

1) 'Window' means a building component for closing an opening in a wall or pitched roof of a building, separating the internal climate from the external climate of the construction, and that will admit light and may provide ventilation and incorporates at least:
    a) frame;
    b) transparent filling element, made out of glass;

    and may incorporate (optionally):
    c) opaque filling element;
    d) internal, integrated or external adaptive element(s).
2) 'Facade window' means a window intended for installation in wall or the like which has an angle to the horizontal of 75º degrees or more;

3) 'Window door' means a façade window allowing passage of persons, but not an external pedestrian door set;

4) 'Roof window' means a window intended for installation in a roof or the like which is inclined at an angle to the horizontal between 15º to 75º degrees;

5) 'Frame' means that part (or parts) of the window that holds the transparent or opaque filling element and allows the window to be attached to the building fabric;

6) 'Transparent filling element' means that part of the window that allows light to pass through the window;

7) 'Opaque filling element' means that part of the window that does not allow light to pass;

8) 'Adaptive element' means a part of the window that allows or results in a modification of the solar transmittance and/or the thermal transmittance of the complete window by user interaction of following user settings that govern solar transmittance. Examples of adaptive elements are shutters, roller shutters, screens, glazing units that allow modification of the solar transmittance, etc. Window parts that are not movable, adjustable or otherwise allow modification, such as a fixed solar screen, are not adaptive elements;

9) 'Pedestrian door set' means a door set which separates the internal climate from the external climate of a construction for which the main intended use is the passage of pedestrians;

10) 'Roof light' means a building component for closing an opening in a flat roof (installation at an angle to the horizontal of 0º to 15º degrees), separating the internal climate from the external climate of a construction, and that will admit light and may provide ventilation and incorporates at least:

    a) frame;

    b) transparent filling element, made out of polymer or glass;

    and may incorporate (optionally):

    c) internal, integrated or external adaptive element(s).

11) 'Curtain walling' means an external building facade produced with framing made mainly of metal, timber or plastics, usually consisting of vertical and horizontal structural members, connected together and anchored to the supporting structure of the building, which provides, by itself or in conjunction with the building construction, all the normal functions of an external wall, but does not contribute to the load bearing characteristics of the building structure.

For the purposes of Annexes II to IX, additional definitions are set out in Annex I.

3) Responsibilities of suppliers

Suppliers shall ensure that:

(1) as regards labels, fiches and technical documentation

a) each window is supplied with a printed label containing information in the format set out in Annex III;

b) a product fiche, as set out in Annex IV, is made available for windows placed on the market;

c) the technical documentation, as set out in Annex V, is made available on request to the authorities of the Member States and to the Commission;

d) any advertisement for a specific model of window contains the energy efficiency class, if the advertisement discloses energy-related or price information;

e) any technical promotional material concerning a specific model of window which describes its specific technical parameters includes the energy efficiency class of that model;

f) an electronic label in the format and containing the information set out in point 1 of Annex III is made available to dealers;

g) an electronic product fiche as set out in point 1 of Annex IV is made available to dealers.

(2) as regards efficiency classes, the energy efficiency class of the window shall be determined in accordance with Annex II;

(3) as regards format of the label, it shall be as set out in Annex III for products placed on the market from [insert date].

4) Responsibilities of dealers and timetable

Dealers shall ensure that:

1) each window presented at the point of sale bears the label provided by suppliers in accordance with Section 1.3(1)(a) displayed on the outside of the product or hung on it, so as to be clearly visible and identifiable as the label belonging to the model without having to read the brand name and model number on the label;

2) windows offered for sale where the end-user cannot be expected to see the product displayed, as specified in Article 7 of Directive 2010/30/EU, are marketed with the information provided by suppliers in accordance with Annex VI to this Regulation except where the offer is made through the internet in which case the provisions of Annex VII shall apply;

3) any advertisement for a specific model of windows contains a reference to the energy efficiency class, if the advertisement discloses energy-related or price information;

4) any technical promotional material concerning a specific model of window which describes its specific technical parameters includes a reference to the energy performance class of the model.

5) Measurement methods

The information to be provided under Sections 1.3 and 1.4 shall be obtained by reliable, accurate and reproducible measurement and calculation methods, which take into account the recognised state-of-the-art measurement and calculation methods, as set out in Annex VIII.

6) Verification procedure for market surveillance purposes

When assessing the conformity of the window, Member States shall apply the procedure laid down in Annex IX.

7) Review

The Commission shall review this [*Regulation*] in light of technological progress no later than 10 years after its entry into force.

The review shall in particular assess:

- possible inclusion of other types of fenestration products such as roof lights;
- the method for determining the energy performance of the product;

8) Transitional provision

[not relevant at this stage]

9) Entry into force

[not relevant at this stage]

ANNEX I - DEFINITIONS APPLICABLE FOR ANNEXES II TO IX

1) 'Climate condition' is the condition to which the performance of the window pertains and which can be either 'North', 'Central' or 'South';

2) 'Energy performance for heating ' ($P_{E,H,W}$) for each climate condition means the calculated annual energy need for heating caused by the window divided by window area, as established by Equation 2 in Annex VIII, expressed in kWh/(m^2.yr);

3) 'Energy performance for cooling' means [to be decided – one of the below options]

   a) the solar transmittance of the window with consideration of adaptive elements gW,eff as established by Equation 7 in Annex VIII (dimensionless);

   b) the calculated annual energy need for cooling caused by the window divided by window area, $P_{E,C,W}$ as established by Equation 9 in Annex VIII, expressed in kWh/(m^2.yr);

4) 'Combined energy performance' (PE,A,W) means the sum of the energy performance for heating and of the energy performance for cooling, expressed in kWh/(m^2.yr) as established by Equation 1 in Annex VIII;

5) 'Thermal transmittance of the window' (U_W) means the heat flow rate through the window in the steady state divided by the area of the window and by the temperature difference between the surroundings on each side of the window …, expressed in W/m^2.K;

6) 'Thermal transmittance of the window with a shutter' ($U_{W,S}$) means the thermal transmittance of the window considering the effect of the inclination, as established by Equation 14 in Annex VIII , expressed in W/m^2.K;

7) 'Design value of the thermal transmittance of the window' ($U_{W,des}$) means the heat flow rate through the window with adaptive element (if applicable) activated in the steady state divided by the area of the window and by the temperature difference between the surroundings on each side of the window, as established by Equation 4 in Annex VIII, expressed in W/m^2.K;

8) 'Change in thermal transmittance of the transparent filling element of the window due to inclined installation' (ΔU_g) is the change in the thermal transmittance of the transparent element of the window due to inclined installation, expressed in W/m^2.K;

9) 'Additional thermal resistance due to the adaptive element' (Δ R) means the additional thermal resistance due to the air layer enclosed between the closed adaptive element and the window and the closed adaptive element itself, expressed in (m^2.K)/W;

10) 'Solar factor' (g) means the total solar energy transmittance of the transparent filling element, without adaptive elements (if applicable) activated (dimensionless);

11) 'Solar factor with adaptive element activated' (g_t) means the total solar energy transmittance of the transparent element with adaptive elements activated (dimensionless);

12) 'Solar factor of the window' (g_W) means the total solar energy transmittance of the complete window, based on the solar energy transmittance of the glazing g corrected by the frame fraction F_F as established by Equation 6 in Annex VIII (dimensionless);

13) 'Effective total solar energy transmittance of the window' ($g_{W,eff}$) is the sum of the total solar energy transmittance of the window g_w weighted by a factor related to the fraction of the cooling period without adaptive element activated and the total solar transmittance of the window with adaptive element activated weighted by a factor related to the fraction of the cooling period without adaptive element activated as established by Equation 7 in Annex VIII;

14) 'Light transmittance of the transparent filling element, without adaptive element activated' (τ_v) is the share of the irradiated light that passes the transparent filling element, without adaptive elements (if applicable) activated (dimensionless);

15) 'Light transmittance of the transparent filling element, with adaptive element activated' ($\tau_{v,t}$) is the share of the irradiated light that passes the transparent filling element, with adaptive elements (if applicable) activated (dimensionless);

16) 'Daylight potential' (τ_{DP}) is the potential of a window to supply a building with daylight, based on the light transmittance of the transparent filling element without adaptive element activated and the frame fraction of the window (dimensionless);

17) 'Daylight potential with adaptive element' ($\tau_{DP,t}$) is the potential of a window to supply a building with daylight, based on the light transmittance of the transparent filling element with adaptive element activated and the frame fraction of the window (dimensionless);

18) 'Class of the air permeability' (L) means the classification of air permeability of the window at 100 Pa test pressure according to EN 12207, (dimensionless). L can be a number between 0 to 4;

19) 'Reference air permeability' (Q_{100}) means the air permeability at 100 Pa test pressure according to the class of air permeability, as established by Table 13 in Annex VIII, in $m^3/h.m^2$;

20) 'Frame fraction' (F_F) means the ratio of area of the opaque elements of a window (frames and opaque panels (if applicable) to the total area of the window (dimensionless);

21) 'Sound insulation' means the sound reduction index (R_W) which is the common logarithm of the ratio of the sound power which is incident on the window to the sound power transmitted through the window multiplied by ten and expressed in dB;

22) 'Effective thermal transmittance of the window' ($U_{W,eff}$) is the sum of the thermal transmittance of the window weighted by a factor related to the period without adaptive element activated and the thermal transmittance of the window weighted by a factor related to the period with adaptive element activated as established by Equation 3 in Annex VIII, expressed in $W/m^2.K$,

23) 'Ventilation losses' ($H_{ve,w}$) is the energy losses due to air leakage of the window, as established by Equation 5 and Equation 10 in Annex II, expressed in $W/(m^2.K)$;

24) 'Thermal capacitance of air' ($\rho * c_p$) means the density of air (ρ) multiplied by the air enthalpy (c_p) expressed in $Wh/(m^2.K)$. The value is 0.344 $Wh/(m^3.K)$,

25) 'Pressure difference' (Δ p) means the fixed pressure difference for the calculation of the air infiltration of the window, expressed in Pa. The value is 6 Pa;

26) 'double IGU' means an assembly consisting of two panes of glass, separated by one or more spacers, hermetically sealed along the periphery;

27) 'triple IGU' means an assembly consisting of three panes of glass, separated by one or more spacers, hermetically sealed along the periphery;

28) 'cavity width' is the width of the hermetically sealed cavity or space between two sheets of the transparent filling element, expressed in mm;

29) 'low e coating' means a coating reducing the emissivity of the surface of the glass sheet of the transparent filling element.

ANNEX II - ENERGY PERFORMANCE CLASSES

1) The [to be decided: heating/cooling/combined] performance of windows shall be determined on the basis of measurements and calculations set out Annex VIII.

2) The energy performance class of a window shall be determined in accordance with its energy performance as set out in Table 1 or Table 2 for heating performance (P), Table 3 for cooling performance OR Table 4 or Table 5 for combined performance (P).

Table 1 Heating performance classes, 'bare' window

	Facade windows and window doors (kWh/m^2)			Roof windows (kWh/m^2)		
Class	North	Central	South	North	Central	South
A	P≤-27	P≤-50	P≤-99	P≤-54	P≤-76	P≤-134
B	-27<P≤-14	-50<P≤-37	-99<P≤-87	-54<P≤-33	-76<P≤-58	-134<P≤-119
C	-14<P≤-1	-37<P≤-24	-87<P≤-75	-33<P≤-12	-58<P≤-40	-119<P≤-104
D	-1<P≤12	-24<P≤-11	-75<P≤-64	-12<P≤9	-40<P≤-23	-104<P≤-89
E	12<P≤25	-11<P≤3	-64<P≤-52	9<P≤30	-23<P≤-5	-89<P≤-74
F	25<P≤39	3<P≤16	-52<P≤-41	30<P≤51	-5<P≤12	-74<P≤-59
G	P>39	P>16	P>-41	P>51	P>12	P>-59

Table 2 Heating performance classes, adaptive elements considered

	Facade windows and window doors (kWh/m^2)			Roof windows (kWh/m^2)		
Class	North	Central	South	North	Central	South
A	P≤-35	P≤-54	P≤-101	P≤-62	P≤-80	P≤-137
B	-35<P≤-22	-54<P≤-42	-101<P≤-89	-62<P≤-42	-80<P≤-64	-137<P≤-122
C	-22<P≤-9	-42<P≤-30	-89<P≤-77	-42<P≤-22	-64<P≤-48	-122<P≤-106
D	-9<P≤4	-30<P≤-18	-77<P≤-65	-22<P≤-2	-48<P≤-32	-106<P≤-91
E	4<P≤17	-18<P≤-6	-65<P≤-53	-2<P≤18	-32<P≤-16	-91<P≤-75
F	17<P≤30	-6<P≤6	-53<P≤-41	18<P≤38	-16<P≤0	-75<P≤-60
G	P >30	P>6	P>-41	P>38	P>0	P>-60

Table 3 Cooling performance classes

Class	Class boundaries (-)
A	$g_{W,eff} \leq 0.10$
B	$0.10 < g_{W,eff} \leq 0.13$
C	$0.13 < g_{W,eff} \leq 0.19$
D	$0.19 < g_{W,eff} \leq 0.28$
E	$0.28 < g_{W,eff} \leq 0.40$
F	$0.40 < g_{W,eff} \leq 0.55$
G	$0.55 < g_{W,eff}$

Table 4 Combined performance classes, 'bare' window

	Facade windows and window doors (kWh/m^2)			Roof windows (kWh/m^2)		
Class	North	Central	South	North	Central	South
A	P≤8	P≤2	P≤46	P≤20	P≤17	P≤117
B	8<P≤21	2<P≤14	46<P≤73	20<P≤39	17<P≤33	117<P≤151
C	21<P≤34	14<P≤26	73<P≤101	39<P≤58	33<P≤49	151<P≤185
D	34<P≤46	26<P≤38	101<P≤129	58<P≤77	49<P≤65	185<P≤218
E	46<P≤59	38<P≤50	129<P≤156	77<P≤96	65<P≤81	218<P≤252
F	59<P≤72	50<P≤63	156<P≤184	96<P≤116	81<P≤98	252<P≤286
G	P>72	P>63	P>184	P>116	P>98	P>286

Table 5 Combined performance classes, adaptive elements considered

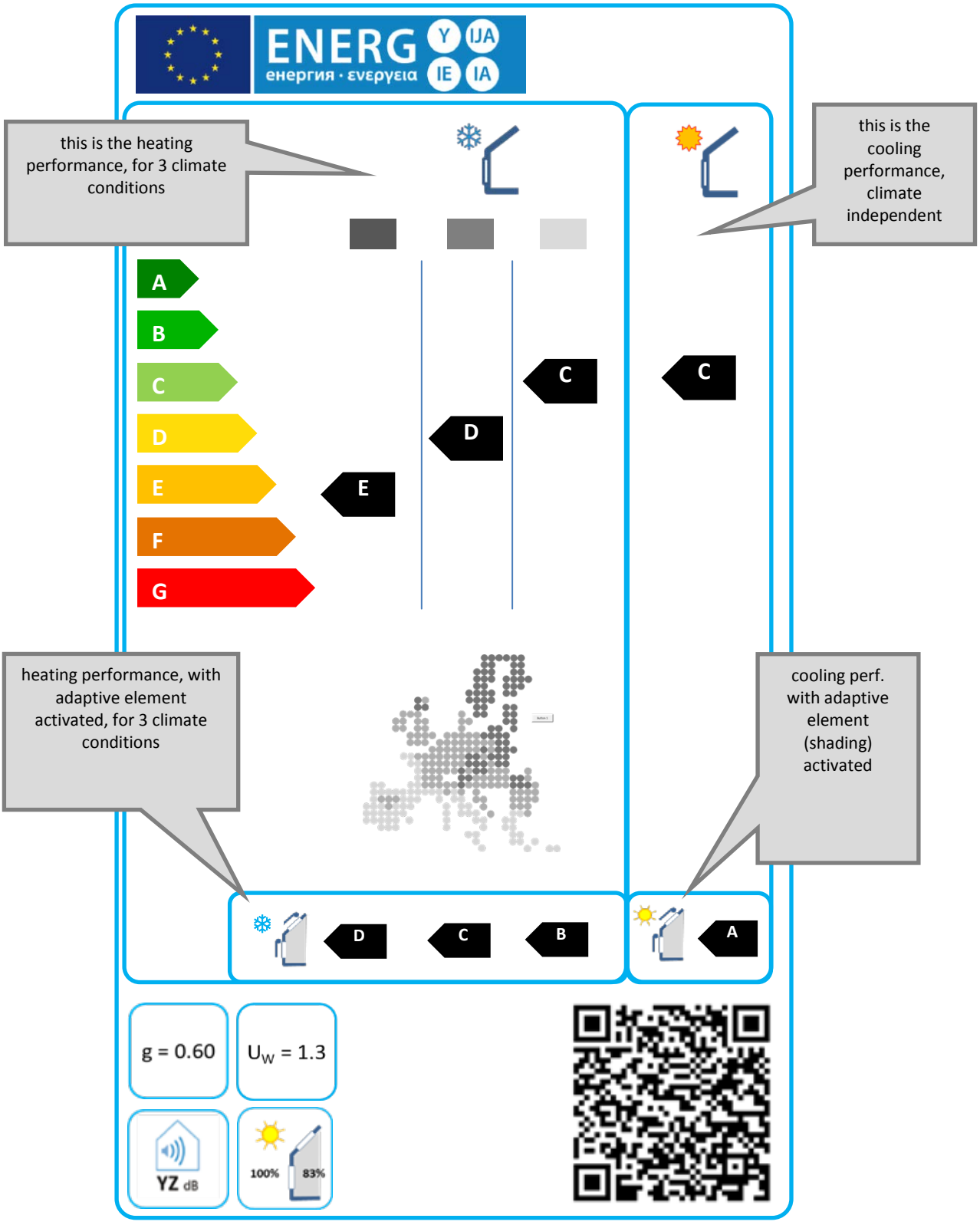
	Facade windows and window doors (kWh/m^2)			Roof windows (kWh/m^2)		
Class	North	Central	South	North	Central	South
A	P≤3	P≤-7	P<11	P≤-7	P≤-18	P<11
B	3<P≤14	-7<P≤3	11<P≤22	-7<P≤24	-18<P≤2	11<P≤22
C	14<P≤25	3<P≤13	22<P≤33	24<P≤55	2<P≤22	22<P≤33
D	25<P≤36	13<P≤23	33<P≤44	55<P≤85	22<P≤41	33<P≤44
E	36<P≤47	23<P≤32	44<P≤55	85<P≤116	41<P≤61	44<P≤55
F	47<P≤58	32<P≤42	55<P≤66	116<P≤146	61<P≤80	55<P≤66
G	P>58	P>42	P>66	P>146	P>80	P>66

ANNEX III – THE LABEL

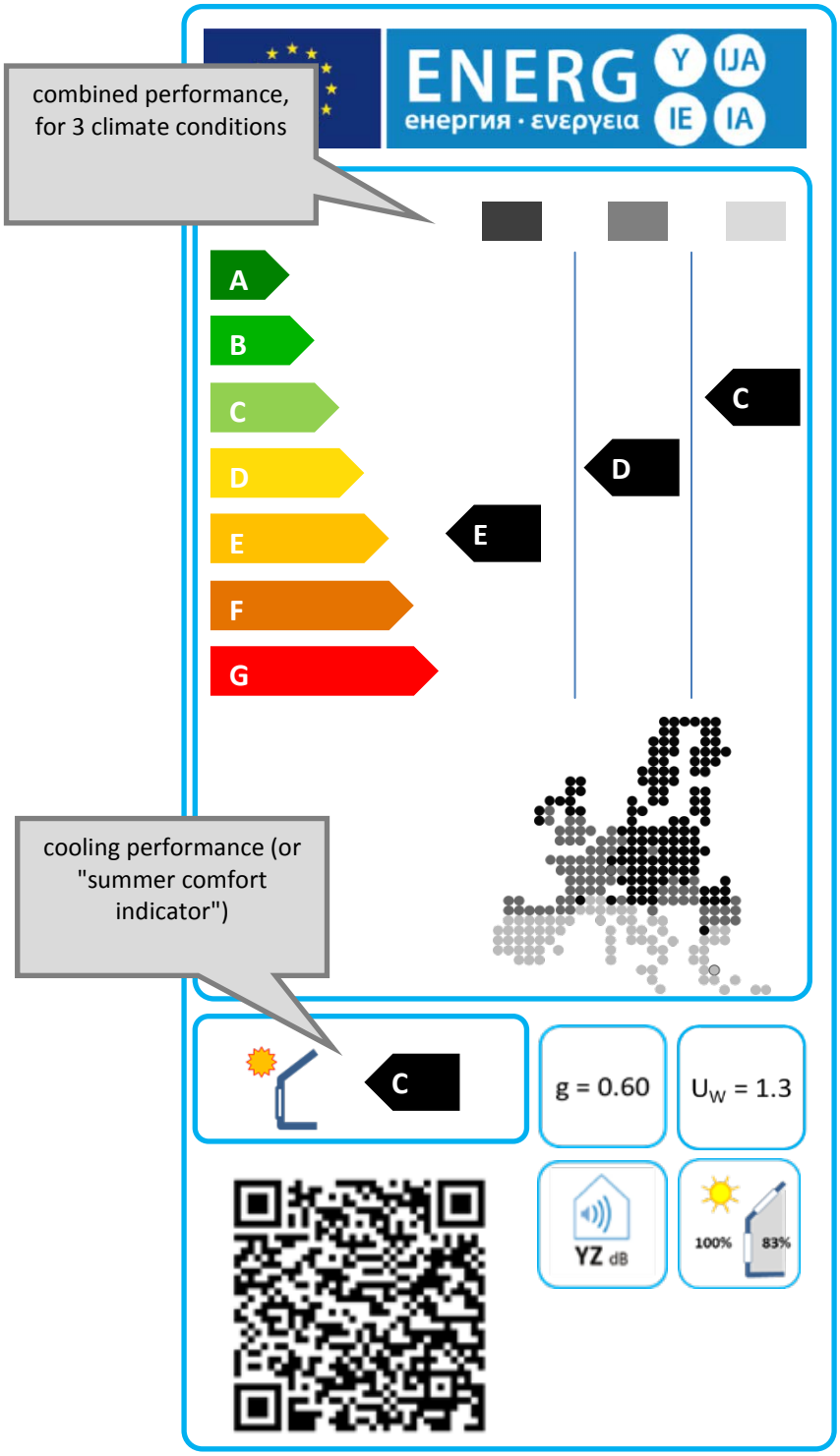
a) Façade windows, window doors and roof windows

1. Label information

Shown below is [a possible] design for a separate heating and cooling performance label, with performance shown for inactivated and activated adaptive elements



Shown below is [a possible] design for a combined performance label



The following information shall be included in the label:

I. Supplier's name or trade mark;

II. Supplier's model identifier, where 'model identifier' means the code, usually alphanumeric, which distinguishes a specific window model from other models with the same trade mark or supplier's name;

III. TO DISCUSS: The energy performance class [for heating/cooling/combined] as defined in Annex II without consideration of adaptive elements; the head of the arrow containing the energy performance class of the window shall be placed at the same height as the head of the arrow of the relevant energy performance class;

IV. TO DISCUSS: The energy performance class [for heating/cooling/combined] as defined in Annex II with consideration of adaptive elements;

V. TO DISCUSS: the solar factor of the window [without/with adaptive elements activated – also depends on presence of cooling performance];

VI. TO DISCUSS: the thermal transmittance of the window;

VII. TO DISCUSS: the sound insulation of the window

VIII. TO DISCUSS: the daylight potential of the window with and without adaptive element activated (if applicable)

The design of the labels shall be in accordance with point [..] of this Annex. By way of derogation, where a model has been awarded an 'EU eco-label' under Regulation (EC) No 66/2010 of the European Parliament and of the Council, a copy of the EU eco-label may be added.

2. Label design

The design of the labels for windows shall be the following:

[insert figure with measurements]

Whereby:

a) The label shall be at least [xx] mm wide and [xx] mm high. Where the label is printed in a larger format, its content shall nevertheless remain proportionate to the specifications above.

b) The background shall be white.

c) Colours are coded as CMYK — cyan, magenta, yellow and black, following this example: 00-70-X-00: 0 % cyan, 70 % magenta, 100 % yellow, 0 % black.

d) The label shall fulfil all of the following requirements (numbers refer to the figure above):

EU label border stroke: 3,5 pt – colour: Cyan 100 % – round corners: 2,5 mm.

EU logo: Colours: X-80-00-00 and 00-00-X-00.

Energy logo: Colour: X-00-00-00. Pictogram as depicted: EU logo + energy logo: width: 62 mm, height: 12 mm.

Sub-logos border: 1 pt – colour: cyan 100 % – length: 62 mm.

A-G scales:

— Arrow: height: 6 mm, gap: 1 mm – colours:

Highest class: X-00-X-00

Second class: 70-00-X-00,

Third class: 30-00-X-00,

Fourth class: 00-00-X-00,

Fifth class: 00-30-X-00,

Sixth class: 00-70-X-00,

Last class: 00-X-X-00,

— Text: Calibri bold 13 pt, capitals, white.

Energy performance class

— Arrow: width: 17 mm, height: 9 mm, 100% black;

— Text: Calibri bold 18,5 pt, capitals, white; '+' symbols: Calibri bold 11 pt, white aligned on a single row.

Energy

— Text: Calibri regular 6 pt, capitals, black.

[other information: to be decided]

Supplier’s name or trademark

Supplier’s model identifier

The suppliers’ name or trade mark and model identifier shall fit in a space of 62 × 10 mm

Numbering of the Regulation and label:

— Text: Calibri bold 8.

ANNEX IV – PRODUCT INFORMATION SHEET

1) The information in the product fiche of the window shall be given in the following order and shall be included in the product brochure or other literature provided with the product:
   a) supplier's name or trade mark;
   b) supplier's model identifier which means the code, usually alphanumeric, which distinguishes a specific window model from other models with the same trade mark or supplier's name;
   c) TO DISCUSS: The energy performance class [for heating/cooling/combined] as defined in Annex II without consideration of adaptive elements; the head of the arrow containing the energy performance class of the window shall be placed at the same height as the head of the arrow of the relevant energy performance class;
   d) TO DISCUSS: The energy performance class [for heating/cooling/combined] as defined in Annex II with consideration of adaptive elements;
   e) TO DISCUSS: the solar factor of the window [without/with adaptive elements activated – also depends on presence of cooling performance];
   f) TO DISCUSS: the thermal transmittance of the window;
   g) TO DISCUSS: the sound insulation of the window
   h) TO DISCUSS: with and without adaptive element activated (if applicable)
   i) [other information: to be decided].
2) One fiche may cover a number of window models supplied by the same supplier.
3) The information contained in the fiche may be given in the form of a copy of the label, either in colour or in black and white. Where this is the case, the information listed in point 1 not already displayed on the label shall also be provided.

Table 6 Product fiche

Aspect or characteristic	value (+ unit)	
Heating energy performance	Energy performance	Label rating
	.. kWh/(m^2.yr)	A-G
Cooling energy performance	Energy performance	Label rating
	.. kWh/(m^2.yr)	A-G
OR … Combined energy performance	Energy performance	Label rating
	.. kWh/(m^2.yr)	A-G
Thermal transmittance of window, without adaptive element activated (U_w)	(W/(m^2.K))	
Thermal transmittance of window, with adaptive element activated ($U_{W,S}$)	(W/(m^2.K))	
Solar factor, without adaptive element activated (g)	(-)	
Solar factor, with adaptive element activated (g_t)	(-)	
Daylight potential factor, without adaptive element activated (τ_v)	(-)	
Daylight potential factor, with adaptive element activated ($\tau_{v,t}$)	(-)	
Class of air permeability	(class 1, 2, 3 or 4)	
Frame fraction (F_F)	(-)	
Sound insulation (R_W)	(dB)	

ANNEX V – TECHNICAL DOCUMENTATION

The technical documentation to be made available on request to the authorities of the Member States and to the Commission shall be the same documentation that is required for the same products under Regulation (EU) No 305/2011 of the European parliament and of the council of 9 March 2011laying down harmonised conditions for the marketing of construction products.

1) Where the information in the label or product information sheet refers to parameters identical to parameters covered by the declaration of performance for the same product, issued under Regulation (EU) No 305/2011 of the European parliament and of the council of 9 March 2011 laying down harmonised conditions for the marketing of construction products, this declaration of performance shall be considered the technical documentation as requested,

2) Where the information in the label or product information sheet is not covered by the declaration of performance for the same product, the technical documentation referred to in Article 3 shall include:

   a) Name, registered name or trade mark and contact address of the supplier;

   b) Reference of the product type;

   c) Where appropriate, the references of the harmonised standards applied;

   d) Where appropriate, the other technical standards and specifications used;

   e) The performance or value for the technical parameters set out in [the technical information sheet], measured and calculated in accordance with Annex VIII:

      [parameters: see technical information sheet];

   f) Results of calculations performed in accordance with Annex VIII.

   g) Identification and signature of the person empowered to bind the supplier;

3) Where the information included in the technical documentation file for a particular window model has been obtained by calculation on the basis of an equivalent window, the technical documentation shall include details of such calculations and of tests undertaken by suppliers to verify the accuracy of the calculations undertaken. The technical information shall also include a list of all other equivalent window models where the information was obtained on the same basis.

ANNEX VI - INFORMATION TO BE PROVIDED WHERE END-USERS CANNOT BE EXPECTED TO SEE THE PRODUCT DISPLAYED, EXCEPT ON THE INTERNET

1) The information referred to in Section 1.4.2 shall be provided in the following order:
   a) the energy performance class, determined in accordance with Annex VIII;
   b) [other information: to be decided].

2) Where other information contained in the product information sheet is also provided, it shall be in the form and order specified in Annex IV.

3) The size and font in which the information referred in this Annex is printed or shown shall be legible.

ANNEX VII - INFORMATION TO BE PROVIDED IN THE CASE OF SALE THROUGH THE INTERNET

1. For the purpose of points 2 to 5 of this Annex the following definitions shall apply:

a) ‘display mechanism’ means any screen, including tactile screen, or other visual technology used for displaying internet content to users;

b) ‘nested display’ means visual interface where an image or data set is accessed by a mouse click, mouse roll-over or tactile screen expansion of another image or data set;

c) ‘tactile screen’ means a screen responding to touch, such as that of a tablet computer, slate computer or a smartphone;

d) ‘alternative text’ means text provided as an alternative to a graphic allowing information to be presented in non- graphical form where display devices cannot render the graphic or as an aid to accessibility such as input to voice synthesis applications.

2. The appropriate label made available by suppliers in accordance with Section 1.3(1)(a) shall be shown on the display mechanism in proximity to the price of the product in accordance with the timetable set out in Section 1.3(3). The size shall be such that the label is clearly visible and legible and shall be proportionate to the size specified in Annex III. The label may be displayed using a nested display, in which case the image used for accessing the label shall comply with the specifications laid down in point 3 of this Annex. If nested display is applied, the label shall appear on the first mouse click, mouse roll- over or tactile screen expansion on the image.

3. The image used for accessing the label in the case of nested display shall:

a) be an arrow in the colour corresponding to the energy efficiency class of the product on the label;

b) indicate on the arrow the energy efficiency class of the product in white in a font size equivalent to that of the price; and

c) have one of the following two formats:

Figure 1 Format for arrow in the case of nested display

4. In the case of nested display, the sequence of display of the label shall be as follows:

a) the image referred to in point 3 of this Annex shall be shown on the display mechanism in proximity to the price of the product;

b) the image shall link to the label;

c) the label shall be displayed after a mouse click, mouse roll-over or tactile screen expansion on the image;

d) the label shall be displayed by pop up, new tab, new page or inset screen display;

e) for magnification of the label on tactile screens, the device conventions for tactile magnification shall apply;

f) the label shall cease to be displayed by means of a close option or other standard closing mechanism;

g) the alternative text for the graphic, to be displayed on failure to display the label, shall be the energy efficiency class of the product in a font size equivalent to that of the price.

5. The appropriate product fiche made available by suppliers in accordance with Section 1.3(1)(b) shall be shown on the display mechanism in proximity to the price of the product. The size shall be such that the product fiche is clearly visible and legible. The product fiche may be displayed using a nested display, in which case the link used for accessing the fiche shall clearly and legibly indicate ‘Product fiche’. If nested display is used, the product fiche shall appear on the first mouse click, mouse roll-over or tactile screen expansion on the link.

ANNEX VIII – MEASUREMENT AND CALCULATION METHODS

A. For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using a reliable, accurate and reproducible methods that take into account the generally recognised state-of-the-art measurement and calculation methods, including harmonised standards the reference numbers of which have been published for the purpose in the Official Journal of the European Union. They shall meet the technical definitions, conditions, equations and parameters set out this Annex.

B. Energy performance

The [heating/cooling/combined] performance of the window is calculated, in kWh/(m^2.yr) and rounded to zero decimal place, as follows:

1) Combined performance

The combined performance $P_{E,A,W}$ [A is for 'annual'] for each climate condition is calculated as the summation of the heating ($P_{E,H,W}$) and cooling ($P_{E,C,W}$) performance as follows:

Equation 1

$$P_{E,A,W} = P_{E,H,W} + P_{E,C,W} \text{ [in kWh/(m}^2\text{.yr)]}$$

[this only applies if cooling performance is also defined and calculated in kWh/m^2.yr]

2) Heating performance

The heating performance ($P_{E,H,W}$) for each climate condition is calculated as:

Equation 2

$$P_{E,H,W} = A \cdot (U_{W,eff} + H_{ve,w}) - B \cdot g_W \text{ [in kWh/(m}^2\text{.yr)]}$$

Where:

- A is a factor for annual heating degree hours, in 1000 K.h/yr,
- $U_{W,eff}$ is the effective thermal transmittance of the window, in W/(m^2.K),
- $H_{ve,W}$ is the ventilation losses, in W/(m^2.K),
- B is a factor for the useable solar radiation, in kWh/m^2.yr,
- g_W is the solar factor of the window, dimensionless.

The effective thermal transmittance of the window is calculated as:

Equation 3

$$U_{W,eff} = (1 - C) \cdot U_W + C \cdot U_{W,S} \text{ [in W/(m}^2\text{.K)]}$$

Where:

- C is a factor for the time the adaptive element is activated, dimensionless,
- U_W is the thermal transmittance of the window, in W/(m^2.K) (for roof windows the design value $U_{W,des}$ shall be used),
- $U_{W,S}$ is the thermal transmittance of the window with a shutter (or: adaptive element) activated.

The thermal transmittance of the window with a shutter (adaptive element) is calculated as:

Equation 4

$$U_{W,S} = (1/U_W + \Delta R)^{-1} \text{ [in W/(m}^2\text{.K)]}$$

Where:

- U_W is the thermal transmittance of the window, in W/(m^2.K) (for roof windows the design value $U_{W,des}$ shall be used),
- ΔR is the additional thermal resistance due to the adaptive element, in (m^2.K)/W.

The ventilation losses are calculated as:

Equation 5

$$H_{ve,w} = \left(\frac{\Delta p}{100Pa}\right)^{2/3} \rho \cdot c_p \cdot Q_{100} \text{ [W/(m}^2\text{.K)]}$$

Where:

- Δ p is the pressure difference, is 6 Pa,
- $\rho * c_p$ is the thermal capacitance of air, is 0.344 Wh/(m^3.K)
- Q_{100} is the reference air permeability at a pressure difference of 100 Pa, in m^3/(h.m^2).

The solar factor of the window is calculated as:

Equation 6

$$g_W = g \cdot (1 - F_F) \text{ [-]}$$

Where:

- g is the solar factor (dimensionless);
- F_F is the frame fraction (dimensionless).

The values for A, B and C are as established in Table 7 and Table 8 for façade and roof windows, for the shown climate conditions, respectively.

Table 7 ABC values for façade window and window doors

	A	B	C (dimensionless)	
	(1000 Kh/yr)	(kWh/(m^2.yr))	no adaptive element considered	adaptive element considered
North	103	267	0	0,66
Central	67	238	0	0,65
South	23	256	0	0,65

Table 8 ABC values for roof window

	A	B	C (dimensionless)	
	(1000 Kh/yr)	(kWh/(m^2.yr))	no adaptive element considered	adaptive element considered
North	103	336	0	0,66
Central	67	304	0	0,65
South	23	340	0	0,65

[if indeed an 'installer label' or similar tool is to be developed, also values for other orientations can be included in these tables]

3) Cooling performance

[As it is not yet decided on which basis the cooling performance will be established, this Working Document shows both calculation methods]

IF the cooling performance is based on g_W or $g_{W,eff}$, then the following equations are relevant.

The cooling performance is defined as the 'Effective total solar energy transmittance of the window' ($g_{W,eff}$, dimensionless) and calculated as:

Equation 7

$$g_{W,eff} = (1 - F_F) \cdot [(1 - Z) \cdot g + Z \cdot g_t] \quad [-]$$

Where:

- F_F is the frame fraction (dimensionless),
- Z is a factor for the share of time the adaptive element is activated (dimensionless),
- g is the solar factor of the transparent filling element (dimensionless);

- g_t is the solar factor of the transparent filling element with the adaptive element activated (dimensionless)

[In case the adaptive elements will not be considered, the cooling performance can be based on the solar factor of the window (g_W, dimensionless), calculated as:]

Equation 8

$$g_W = g \cdot (1 - F_F) \text{ [-]}$$

Where:

- g is the solar factor of the transparent filling element (dimensionless),
- F_F is the frame fraction (dimensionless).

IF the cooling performance is to be climate dependent and based on calculation of annual performance (energy balance calculations) then the following equations and parameters AB (and C) are relevant. This also applies if the performance is expressed as the combined (heating + cooling) performance.

The cooling ($P_{E,C,W}$) performance for each climate condition is calculated as:

Equation 9

$$P_{E,C,W} = -X \cdot (U_W + H_{ve,w}) + Y \cdot g_{W,eff} \text{ [in kWh/m}^2\text{.yr]}$$

Where:

- X is a factor for annual cooling degree hours, in 1000 K.h/yr,
- U_W is the thermal transmittance of the window, in W/m^2.K (for roof windows the design value $U_{W,des}$ shall be used),
- $H_{ve,W}$ is the ventilation losses, in W/(m^2.K),
- Y is a factor for the useable solar radiation, in kWh/(m^2.yr),
- $g_{W,eff}$ is the effective total solar energy transmittance of the window (dimensionless)

The ventilation losses are calculated as:

Equation 10

$$H_{ve,w} = \left(\frac{\Delta p}{100 Pa} \right)^{2/3} \rho \cdot c_p \cdot Q_{100} \text{ [W/(m}^2\text{.K)]}$$

Where:

- Δ p is the pressure difference, is 6 Pa,
- $\rho * c_p$ is the thermal capacitance of air, is 0.344 Wh/(m^3.K),
- Q_{100} is the reference air permeability at a pressure difference at 100 Pa, in m^3/(h.m^2).

The effective total solar energy transmittance of the window is calculated as:

Equation 11

$$g_{W,eff} = (1 - F_F) \cdot [(1 - Z) \cdot g + Z \cdot g_t] \text{ [-]}$$

Where:

- F_F is the frame fraction (dimensionless),
- Z is a factor for the share of time the adaptive element is activated (dimensionless),
- g is the solar factor (dimensionless);
- g_t is the solar factor with adaptive element activated (dimensionless)

The values for X, Y and Z are as established Table 9 and Table 10 for façade and roof windows respectively, for the climate conditions indicated.

The values for X, Y and Z are based on the preparatory study Table 51 and 52.

Table 9 XYZ values for cooling performance of facade window and window doors[3]

	X	Y	Z (dimensionless)	
	(1000 K.h/yr)	(kWh/(m^2.yr))	no adaptive element considered	adaptive element considered
North	0.5	23	0	0.71
Central	0.2	57	0	0.57
South	-4.1	341	0	0.68

Table 10 XYZ values for cooling performance of roof windows[4]

	X	Y	Z (dimensionless)	
	(1000 K.h/yr)	(kWh/(m^2.yr))	no adaptive element considered	adaptive element considered
North	1.3	56	0	0,75
Central	1.2	127	0	0,75
South	-3.0	659	0	0,88

[if indeed an 'installer label' or similar tool is to be developed, also values for other orientations can be included in these tables]

[3] Based on the preparatory study task 7, 3 June 2015, Table 51.
[4] Based on the preparatory study task 7, 3 June 2015, Table 52.

4) Daylight potential

The daylight potential can be expressed with or without an adaptive element considered.

The daylight potential without adaptive element activated is calculated as:

Equation 12

$$\tau_{DP} = \tau_v \cdot (1 - F_F) \text{ [-]}$$

Where:

- τ_v is the light transmittance of the transparent filling element, without adaptive element activated (dimensionless),
- F_F is the frame fraction (dimensionless),

The daylight potential with adaptive element activated is calculated as:

Equation 13

$$\tau_{DP,t} = \tau_{v,t} \cdot (1 - F_F) \text{ [-]}$$

Where:

- $\tau_{v,t}$ is the light transmittance of the transparent filling element, with adaptive element activated (dimensionless),
- F_F is the frame fraction (dimensionless),

5) Thermal transmittance of inclined windows (roof windows)

To consider the effect of the inclination of the roof window on the thermal transmittance a correction of the declared U_W-value into the design value $U_{W,des}$ is applied.

The design value of the thermal transmittance of the window' ($U_{W,des}$) is calculated, and shall be rounded to two significant figures, as:

Equation 14

$$U_{W,des} = U_W + (1 - F_F) \cdot \Delta U_g \text{ [in W/m}^2\text{.K]}$$

Where:

- U_W is the thermal transmittance of the window, in W/m^2.K (for roof windows the design value $U_{W,des}$ shall be used),
- F_F is the frame fraction (dimensionless),
- ΔU_g is the change in thermal transmittance of the transparent filling element of the window due to inclined installation

The ΔU_g value shall be calculated in accordance with standards the references of which have been published in the Official Journal [according to EN 673 as the difference of the U_g value for vertical installation and the U_g value for an inclination of 40°].

As an alternative, the ΔU_g can be taken from the following tables assuming:

- one low e coating in the cavity of a double IGU and two low e coatings in the cavities of a triple IGU (one coating in each cavity);
- the cavity width of the first and second cavity of a triple IGUs is equal.

The resulting ΔU_g are shown below.

Table 11 ΔU_g in W/(m^2.K) for double IGUs for an inclination of 40°

Cavity width in mm	Air filling without low e coating	Air filling of cavity with low e coating	Argon gas filling of cavity with low e coating	Krypton gas filling of cavity with low e coating
$\leq$ 8				0.33
$\leq$ 10	0.34	0.19	0.20	0.45
$\leq$ 12	0.43	0.38	0.35	0.42
$\leq$ 14	0.50	0.52	0.46	0.40
$\leq$ 16	0.54	0.58	0.47	
$\leq$ 18	0.53	0.56	0.45	

Table 12 ΔU_g in W/(m^2.K) for triple IGUs for an inclination of 40°

Cavity width in mm	Air filling of cavity with low e coating	Argon gas filling of cavity with low e coating	Krypton gas filling of cavity with low e coating
2 x $\leq$ 8	0.05	0.03	0.06
2 x $\leq$ 10	0.04	0.02	0.16
2 x $\leq$ 12	0.04	0.06	0.22
2 x $\leq$ 14	0.13	0.13	0.22
2 x $\leq$ 16	0.20	0.19	
2 x $\leq$ 18	0.27	0.23	

The ΔUg value for a transparent filling element consisting of one single glass pane shall be ΔUg = 1.2 W/(m^2.K).

If the actual cavity widths do not make an exact match with values shown in Table 11 and/or Table 12 or the values are not equal in size in case of triple IGU's, the values for ΔUg resulting from product testing shall be used.

6) Reference air permeability at a test pressure of 100 Pa: Q_{100}

The class of air permeability (L, being class 0-4) determines the reference air permeability at a test pressure of 100 Pa (Q_{100}) to be used in the relevant equations.

The applicable value for Q_{100} follows from the table shown below.

Table 13 Reference air permeability at a test pressure of 100 Pa: Q_{100}

Class of air permeability (L)	Reference air permeability at a test pressure of 100 Pa: Q100 ($m^3/h \cdot m^2$)
0 or npd[5]	50
1	50
2	27
3	9
4	3

[5] 'npd' means: no performance determined, in accordance with hEN 14351-1

ANNEX IX – PRODUCT COMPLIANCE VERIFICATION BY MARKET SURVEILLANCE AUTHORITIES

For the purposes of assessing conformity of products with the requirements laid down in this Regulation, the authorities of the Member States shall apply the following procedure:

1. The Member State authorities shall test one single unit of the model[6].
2. The model shall be considered to comply with the applicable requirements:
    a. if the values for the energy performance and classes on the label and in the product fiche, are not more favourable for the supplier than the values in the technical documentation file, including in the test reports; and
    b. if, when Member State authorities test the unit of the model, the values for the energy performance results in the same energy performance class as declared.
3. If the results referred to in points 2(a) are not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.
4. If the result referred to in point 2(b) is not achieved, the Member State authorities shall select three additional units of the same model for testing.
5. The model shall be considered to comply with the applicable requirements if for these three units the arithmetical mean of the energy performance values calculated from these measurement(s) results in the same energy performance class as declared.
6. If the result referred to in point 5 is not achieved, the model and all equivalent models shall be considered not to comply with this Regulation. The Member State authorities shall provide the test results and other relevant information to the authorities of the other Member States and to the Commission within one month of the decision being taken on the non-compliance of the model according to points 3 and 6.
7. Member States' authorities shall use measurement procedures, which take into account the generally recognised, state-of-the-art, reliable, accurate and reproducible measurement methods, including methods set out in documents whose reference numbers have been published for that purpose in the Official Journal of the European Union. Member State authorities shall use the measurement and calculation methods set out in Annex VIII.

[6] The 'unit' shall be a window with standard frame dimensions in accordance with hEN 13451-1. The 'model' shall be the window, or window range, to which the declared energy performance applies.