Overview of amendments to technical regulations MB EPB-EPC

CONTENTS

1 ANNEX 1: DIMENSIONING NOTE

1.1 §1.1

The first bullet from §1.1 is replaced by:

- A heat demand calculation of the building and of each space separately. The heat demand must be calculated as the designer sees fit:
    - Either according to the expanded methodology from NBN EN 12831-1:2017 with input data according to the national annex from NBN EN 12831-1 ANB:2020
    - Or according to the simplified method with input data according to the national annex from NBN EN 12831-1 ANB:2020

1.2 §2.1

The second to last point under 'FOR EACH SPACE' is replaced by:

room temperature design in °C. This temperature is a design value, but must never be lower than the following values:

- Bathroom: 20 °C
- Living room: 18 °C
- Kitchen: 18 °C
- Bedroom: 16 °C
- Corridor: 12 °C
- WC: 12 °C
- Spaces not for human occupation; 5 °C;

1.3 §3.1

The first bullet from §3.1 is replaced by:

Spaces not intended for human occupation: spaces that are provided to allow people to remain for a relatively short period of time during normal use. Spaces for human occupation mean the following spaces: dry room provided with hygienic ventilation, kitchen, bathroom and laundry room. All the others are not spaces for human occupation, such as hallway, corridor, WC, storage room, attic, etc.

2 ANNEX 2: FORMULA STRUCTURE EPC RES, KNR, GD

- In section 2.5.1.1.1, sprayed cork has been added to Table 3 as an insulating material:

Name on construction screen	Lambda value W/(m.K)
PUR/PIR	0.035
XPS	0.045
PF	0.045
MW	0.050

EPS	0.050
PEF	0.050
Cork	0.050
CG	0.055
PUR/PIR in situ	0.055
Pearlite	0.060
Cellulose	0.060
Natural materials	0.060
PF in situ	0.065
MW in situ	0.070
EPS in situ	0.070
UF in situ	0.075
Pearlite in situ	0.080
Vermiculite	0.090
Cellulose in situ	0.080
Sprayed cork	**0.080**
Natural materials in situ	0.080
Vermiculite in situ	0.11
Clay granules in situ	0.150
Insulating mortar	0.150

- In section 2.5.1.1.1., before the sentence ‘If underfloor heating is present, 30 mm insulation is maintained regardless of the limit.’, the following sentence is added: ‘**The insulation material “painted cork” is counted as 3 mm, regardless of the reference year of construction or renovation.’**
- Section 2.5.2.2 has been completely replaced by this section:

Heat transfer coefficient due to hygienic ventilation for space heating

$$H_{V,hyg,H}=0{,}34\times\dot{V}_{hyg,nom}\times\sum_i\left[f_{V,i}\times\left(1-\eta_{wtw,H,i}\right)\times f_{reduc,i}\times m_{H,i}\right]$$

Heat transfer coefficient due to hygienic ventilation for space cooling

$$H_{V,hyg,C}=0{,}34\times\dot{V}_{hyg,nom}\times\sum_i\left[f_{V,i}\times\left(1-\eta_{wtw,C,i}\right)\times f_{reduc,i}\times m_{C,i}\right]$$

where

$H_{V,hyg,H}$	**Heat transfer coefficient due to hygienic ventilation for space heating**	**[W/K]**
$H_{V,hyg,C}$	**Heat transfer coefficient due to hygienic ventilation for space cooling**	**[W/K]**
$\dot{V}_{hyg,nom}$	**Nominal hygienic ventilation flow rate**	**[m³/h]**
$f_{V,i}$	**Fraction of the ventilation cluster i**	**[-]**
$\eta_{hr,H,i}$	**Thermal return of heat recovery for space heating in ventilation cluster i**	**[-]**
$\eta_{hr,C,i}$	**Thermal return of heat recovery for space cooling in ventilation cluster i**	**[-]**
$f_{reduc,i}$	**Reduction factor on the ventilation flow rate of ventilation cluster i for the regulation, detection and demand response of the existing ventilation system**	**[-]**

$m_{H,i}$	**Multiplication factor of ventilation cluster i for the type of ventilation system and the quality of the space heating implementation, as determined in Table 27.**	**[-]**
$m_{C,i}$	**Multiplication factor of ventilation cluster i for the type of ventilation system and the quality of the space cooling implementation, as determined in Table 27.**	**[-]**

The nominal hygienic ventilation flow rate will be determined as follows:

$$\dot{V}_{hyg,nom} = \left(0{,}2 + 0{,}5 \times \exp\left(\frac{-V_{gebouweenheid}}{500}\right)\right) \times V_{gebouweenheid}$$

gebouweenheid	building unit

where

$V_{building\ unit}$	**Protected volume of the building unit**	**[m³]**

There are a maximum of three ventilation clusters per unit. Group $f_{V,i}$ of the ventilation cluster i will be determined on the basis of the number of wet spaces and living spaces entered and their type of ventilation provisions:

$f_{V,NONE}$	**Sum of wet spaces and living spaces without ventilation provision/total number of wet spaces and living spaces**
$f_{V,NATURAL}$	**Sum of wet spaces and living spaces with natural ventilation provision/total number of wet spaces and living spaces**
$f_{V,MECHANICAL}$	**Sum of wet spaces and living spaces with permanently rotating mechanical ventilation device/total number of wet spaces and living spaces**

always with $f_{V,\ NO} + F_{V,\ NATURAL} + F_{V,\ MECHANICAL} = 1$.

If a space has both mechanical and natural provisions, it is included in the mechanical ventilation cluster.

Heat recovery thermal return $\eta_{HR,H,i}$ and the reduction factor $f_{reduc,i}$ is determined per ventilation cluster i as follows:

	$\eta_{hr,H,i}$	$f_{reduc,i}$
$f_{V,NONE}$	**0**	**1**
$f_{V,NATURAL}$	**0**	**= 1 if $f_{V,MECH} = 0$** **= $f_{reduc,MECH}$ if $f_{V,MECH} > 0$**
$f_{V,MECHANICAL}$	**Average of the $\eta_{hr,device}$**	**Average of the $f_{reduc,device}$**

The following types of mechanical ventilation devices can be entered per unit:

- **Permanently rotating mechanical ventilation device, supply**
- **Permanently rotating mechanical ventilation device, discharge**
- **Permanently rotating mechanical ventilation device, supply and discharge**
- **Permanently rotating mechanical ventilation device, supply and discharge with heat recovery.**

If there are several of these devices, the properties of these devices are averaged to one average type in proportion to the number of spaces their serve.

- If a device does not have heat recovery, then $\eta_{HR,\ device}$ = 0. If a device does have heat recovery, $\eta_{HR,\ device}$ is calculated by the following equation:

$$\eta_{WTW,toestel} = r_q \times r_{th} \times \eta_{WTW,test} \qquad \text{V. 49}$$

toestel	device

Where:

$\eta_{hr,device}$	Thermal return of heat recovery	[-]
r_q	Reduction factor to account for the imbalance between the ventilation supply and ventilation discharge flow rates, set at 1.	[-]
r_{th}	Reduction factor for automatic adjustment of ventilation flow rates instead of continuous measurement, fixed at 0.85.	[-]
$\eta_{hr,\ test}$	Thermal test return of the heat recovery unit	[-]

If $\eta_{HR,test}$ not known, the value is determined on the basis of Table 25.

Table 25: Calculation value for the thermal return of the heat recovery unit

Reference year of manufacture	$\eta_{hr,test}$ [-]
Unknown	0.6
< 2015	0.6
≥ 2015	0.75

If the heat recovery device has a by-pass;

$$\eta_{WTW,C} = 0 \qquad \text{V. 50 applies}$$

In all other cases;

$$\eta_{WTW,C} = \eta_{WTW,H} \qquad \text{V. 51 applies}$$

Where:

$\eta_{hr,H}$	Thermal return of heat recovery for space heating	[-]
$\eta_{hr,C}$	Thermal return of heat recovery for space cooling	[-]

If $f_{reduc,\ device}$ not known, the value is determined on the basis of Table 26.

Table 26: Calculation values for the reduction factor $f_{reduc,\ device}$

Type of regulation, detection or demand response	$F_{reduc,\ device}$ [-]	$F_{reduc,\ device}$ [-]
Unknown/none	1.0	1.0
Manual regulation	1.0	1.0
Clock regulation	0.95	1.0
Demand response, central	0.9	0.8
Demand response, local	0.65	0.7

If there are several types of regulations available for the same device, the best value for $f_{reduc,\ device}$ is used.

The multiplication factors $m_{H, device}$ and $m_{C, device}$ are given in Table 27.

Table 27: Values for $m_{H, device}$ and $m_{C, device}$

	$m_{H, device}$	$m_{C, device}$
residential	**1.2**	**1**
Non-residential	**1**	**1**

- In section 2.5.6.1, in Table 34, the default coverage ratio in the case of a heat pump as a preferred generator is adjusted from:

Preferred generator	$f_{pref, m}$							
	Jan	Feb	Mar	Apr	May-Sep	Oct	Nov	Dec
β < 0.1	0	0	0	0	0	0	0	0
0.1 ≤ β < 0.2	0.42	0.44	0.53	0.70	1	0.86	0.52	0.40
0.2 ≤ β < 0.3	0.69	0.73	0.86	1	1	1	0.86	0.66
0.3 ≤ β < 0.4	0.81	0.86	1	1	1	1	1	0.78
0.4 ≤ β < 0.6	0.85	0.90	1	1	1	1	1	0.81
0.6 ≤ β < 0.8	0.86	0.91	1	1	1	1	1	0.82
β ≥ 0.8	1	1	1	1	1	1	1	1
β unknown	**0.86**	**0.91**	**1**	**1**	**1**	**1**	**1**	**0.82**

to:

Preferred generator	$f_{pref, m}$							
	Jan	Feb	Mar	Apr	May-Sep	Oct	Nov	Dec
β < 0.1	0	0	0	0	0	0	0	0
0.1 ≤ β < 0.2	0.42	0.44	0.53	0.70	1	0.86	0.52	0.40
0.2 ≤ β < 0.3	0.69	0.73	0.86	1	1	1	0.86	0.66
0.3 ≤ β < 0.4	0.81	0.86	1	1	1	1	1	0.78
0.4 ≤ β < 0.6	0.85	0.90	1	1	1	1	1	0.81
0.6 ≤ β < 0.8	0.86	0.91	1	1	1	1	1	0.82
β ≥ 0.8	1	1	1	1	1	1	1	1
β unknown	**0.42**	**0.44**	**0.53**	**0.70**	**1**	**0.86**	**0.52**	**0.40**

- Section 2.7.2 has been completely replaced by this section:

The energy consumption for ventilators is calculated by:

$$Q_{ventilator} = \sum_m Q_{ventilator,m} \qquad \textbf{V. 130}$$

$Q_{ventilator}$	**$Q_{ventilator}$**

Where:

$Q_{ventilator}$	**Annual energy consumption for ventilators**	**[MJ]**
$Q_{ventilator,m}$	**Power consumption for ventilators in month m**	**[MJ]**

The monthly energy consumption for ventilators is determined as follows.

$$Q_{ventilator,m} = t_m \times \left(f_{vent} \times \Phi_{vent} + f_{heat} \times \Phi_{heat} \right) \qquad \textbf{V. 131}$$

Where:

t_m	Duration of month m, see §4.2	[Ms]
f_{vent}	Conventional time fraction that the ventilators operate in ventilation mode, as determined below.	[-]
Φ_{vent}	Ventilator power in ventilation mode	[W]
f_{heat}	Conventional time fraction that the ventilators operate in heating mode, as determined below.	[-]
Φ_{heat}	Ventilator power in heating mode	[W]

The ventilator power in ventilation mode is determined as follows:

$$\Phi_{vent} = 0.235 \times V_{gebouwenheeid} \times \left(f_{V,GEEN} + f_{V,MECH}\right) \quad \text{V. 131}$$

$Q_{ventilator}$	$Q_{ventilator}$
$V_{gebouwenheid}$	$V_{building\ unit}$
$f_{V,GEEN}$	$f_{V,NONE}$
$f_{V,MECH}$	$f_{V,MECH}$

The ventilator power in heating mode is determined on the basis of Table 81.

Table 81: Value in the absence of electrical power in heating mode φ_{heat}

Installation	Power Φ_{heat} [W]
No air heating present	0
Air heating as a release system in at least one installation for RV in the building unit	0.78 x $V_{building\ unit}$

Where:

$V_{building\ unit}$	Protected volume of the building unit	[m³]
$f_{V,NONE}$	Fraction of the ventilation cluster without ventilation devices, as provided for in §2.5.2.2	[-]
$f_{V,MECH}$	Fraction of the ventilation cluster with permanently rotating mechanical ventilation devices, as provided for in §2.5.2.2	[-]

The following assumptions apply for determining conventional time fractions:

$$f_{heat} = \sum_i f_{installatie,lucht,i} \quad \text{V. 132}$$

In the case Φ_{vent} = 0:

$f_{installatie,lucht,\ i}$	$f_{installation,\ air,\ i}$

$$f_{vent} = 0$$

V. 133 applies

In all other cases:

$$f_{vent} = 1 - f_{heat}$$

V. 134 applies

Where

$f_{installation, air, i}$	**Fraction of the total space heating requirement provided by installation i with release system = air heating. If installation i has a release system = air heating and at least one generator = air/air heat pump, the fraction for installation i is set to zero.**	**[-]**

3 ANNEX 3: INSPECTION PROTOCOL EPC RES, KNR, GD

3.1 PART II

- At the end of section II.3.2.16, the following sentence is added: '**The indication of a date is not a condition for the use of technical documentation as evidence**.'

- Section II.5.1.2 has been replaced entirely with the following:
  When identifying missing shell parts or installations or other errors made in the EPC of the common parts (EPC GD), it is important to contact the energy expert of the EPC of the common parts so that the EPC is adjusted as soon as possible. The EPC of the unit can only be submitted once the errors in the EPC GD have been corrected. The adjusted EPC GD will be transferred to the building owner or association of co-owners.

  If the energy expert refuses to adjust the errors in the EPC GD, the VEKA will be contacted. A check may be commenced in which the EPC GD is temporarily withdrawn until the necessary adjustment has been made. However, an EPC of a unit can be formatting in the meantime without using the EPC GD.

  The details of the energy expert who drew up the EPC GD can be consulted in the software and on the (test) certificate of the unit.

- Section II.5.1.3 has been added:
  II.5.1.3 Methodology for new information for the EPC common sharing

  If, after the EPC has been drawn up, GD is presented while the EPC of a building unit is being drawn up, it is up to the client (owner or association of co-owners) to give a new instruction to have the EPC GD adjusted. Only in this way can the new information be used with the EPC.

  For instance: An owner has the EPB declaration of his apartment. This evidence was not presented when formatting the EPC GD. The owner/association of co-owners will first have to have the EPC GD adjusted in order to be able to use this information in the EPC of their apartment.

- At the end of section II.7.2, the last sentence 'A screenshot of the EPBD database, residential card, etc. should also be kept up to date in your project file.' is replaced by: '**A screenshot of the EPBD database, residential card, etc. is also best kept in your project file, if the information was used for the formatting of the EPC.**'

- In the box at the beginning of Section II.3.3.1.1, the following has been added to the bullet 'the date': '**(unless otherwise specified in the supporting document in Part II.2.3.3)**'.

3.2 PART IV

- Section IV.1.2.7.6 has been replaced entirely with the following:

IV.1.2.7.6 Attic space of an apartment building

IV.1.2.7.6.1 Common and accessible attic

The common and accessible attic of an apartment building is considered a common space in the building, just like circulation spaces in the building.

This space must also be tested when determining the protected volume of the building. If this space is included in the PV of the building, this space is assumed to be heated.

- **If this space is heated directly => include in PV based on step 1**
- **If the space is thermally protected because the roof is insulated => include in PV based on step 3**

In this case, the apartments under this attic will have a ceiling with adjacent heated space, as the attic is considered an adjacent heated space in the building.

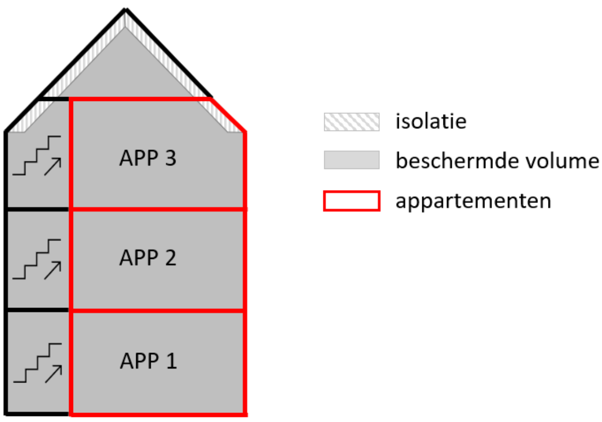


Figure 6: Ceiling at adjacent heated space as PV limit apartment 3

Isolatie	Insulation
Beschermde volume	Protected volume
appartementen	apartments

If the common attic of an apartment building is not heated directly and the attic floor (and not the roof) is insulated, the attic is not included in the apartment building's protected volume. The apartments located under attic have a ceiling (insulated or otherwise) with adjacent unheated space limit.

IV.1.2.7.6.2 Other attics

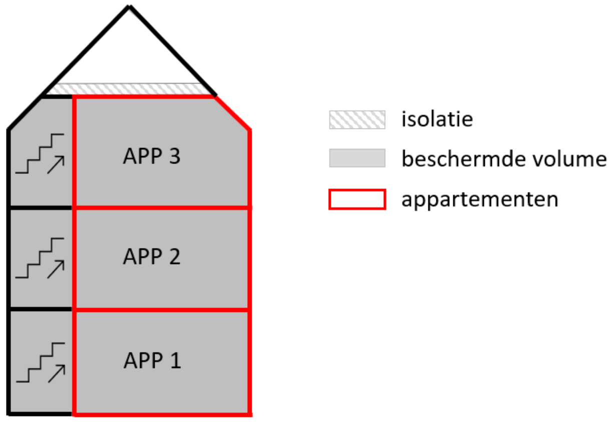


Figure 7: Ceiling at adjacent unheated space as PV limit apartment 3

Isolatie	Insulation
Beschermde volume	Protected volume
appartementen	apartments

If the attic space is not accessible at all, or is only accessible to the apartment below, this attic is not part of the common spaces of the building. This space is then part of the apartment below. In the case of a continuous attic with several apartments below it, work can be performed with notional walls to split up the attic for each apartment.
When determining the building's protected volume, this attic space is tested as part of the apartment below. The limit of the protected volume of the building will therefore be identical at the level of this attic, at the limit of the protected volume of the apartment.
In the case of an attic space with an insulated roof, the apartment will then have an insulated roof as a limit to the protected volume.

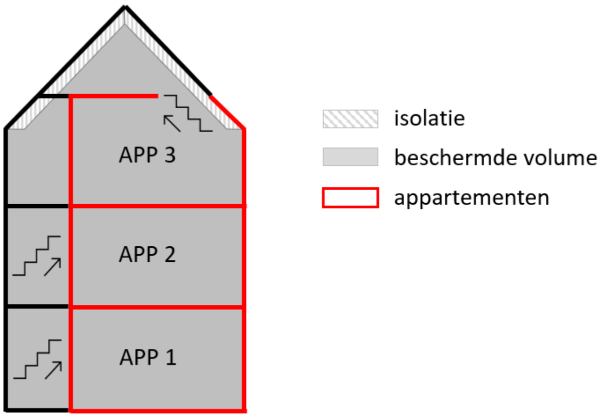


Figure 8: Sloping roof as a boundary PV apartment 3

Isolatie	Insulation
Beschermde volume	Protected volume
appartementen	apartments

- Section IV.1.2.7.7 has been added:
  IV.1.2.7.7 OBLIQUE EDGE OF AN APARTMENT BUILDING
  The method of working concerning attic spaces also applies to other spaces in the building, such as oblique roof edges.

- In Section IV.3.4.1.1 the following sentence is added behind the sentence 'The "ground" limit will only be entered if there is sufficient ground mass to exert a positive thermal influence on the wall.': '**Depths < 50 cm below ground level may be ignored.**'
- In Section IV.3.4.1.3, the following sentence has been added: '**Depths < 50 cm below ground level may be ignored.**'

3.3 Part V

- In section V.2.3.1, sprayed cork has been added to Table 3 as an insulation material:

λ-value W/(mK)	Insulating materials
0.150	Insulating mortars
0.150	Expanded clay granules
0.110	Expanded vermiculite granules
0.090	Expanded vermiculite – panels
0.080	Non-factory-manufactured insulating materials, based on vegetable and/or animal fibres, other than cellulose
0.080	Cellulose injected in situ
0.080	**Cork - sprayed**
0.080	Expanded pearlite grains (EPB) – injected
0.075	Urea-formaldehyde foam (UF) – injected
0.070	Expanded polystyrene (EPS) – injected – bonded
0.070	Mineral wool (MW) – injected
0.065	Phenolic foam (PF) – injected

0.060	Factory-manufactured insulation panels or blankets based on vegetable and/or animal fibres, other than cellulose and provided 50 ≤ ρ < 150 kg/m^3
0.060	Factory-manufactured cellulosic panels, provided 50 ≤ ρ < 150 kg/m^3
0.060	Expanded pearlite (EPB) – panels
0.055	Polyurethane (PUR/PIR) – injected
0.055	Cellular glass (CG) – panels
0.050	Cork (ICB) – panels
0.050	Expanded polyethylene (PEF) – panels
0.050	Expanded polystyrene (EPS) – panels
0.050	Mineral wool (MW) – panels or blankets
0.045	Phenolic foam (PF) – coated panels
0.045	Expanded polystyrene (XPS) – panels
0.035	Polyurethane (PUR/PIR) – coated panels

- In section V.2.3.1, the following sentences have been deleted:
    - ‘Sprayed cork is entered as “non-factory-manufactured natural materials”’.
    - ‘Sprayed cork is also entered as this type of insulation material.’

- In Section V.2.3.1, the paragraph ‘Insulating mortars or layers’ is replaced by:


Insulating mortar with EPS beads

Insulating mortars

In situ: Mortar mixed with insulating aggregates, such as PUR granulates, EPS beads or clay granules to an insulating layer with a (very) limited own weight. Is applied to floors (e.g. underfloor heating) and flat roofs. The insulating mortar can be made in situ according to the manufacturer's requirements, or mixed in advance and sprayed in situ.
Please note: foam concrete is not an insulating mortar. During the 'foaming', air bubbles are entered into the mixture.

- In section V.2.4.2, for main type 3 and for main type 4, '**for walls with external boundaries**' is inserted between 'In addition to' and 'an external finish must also be present.'

- In Section V.3.1.3.2, the sentence 'The presence and placement of the coating is examined.' is replaced by: '**If the presence of the coating is not indicated in the spacer ("low e or low e coating"), the presence and location of the coating must be examined.**'

- In Section V.3.1.3.4, the following sentence is added to main type 4: '**In the case of doubt between high-return glazing or ordinary double glazing (e.g. if the location of the coating is position 2), double glazing is chosen.**'

- In section V.3.1.3.4, main type 5 has been removed.

3.4 Part VI

- Section VI.5.2.2.2 is replaced by:
  Non-residential units are counted per building unit, regardless of their size.
  Examples
  - **A site with a small office building (< 500 m², 1 building unit), a large office building (> 1 000 m², 1 building unit) and a separate warehouse (industry à is outside the scope of EPC) are connected to the same heating installation. The heating system is entered as a collective system with 2 (1+ 1) equivalent units.**
  - **A building includes a concierge residence and one separate office area of more than 500 m² (i.e. not a small but a large non-residential unit). The concierge residence and the office area are connected to the same heating system. The heating system is entered as a collective system with 2 (1+ 1) equivalent units.**

3.5 Part IX

Part IX has been completely replaced by:

START OF NEW PART IX

///

///

INSPECTION PROTOCOL

Energy performance certificate for existing buildings with residential function, non-residential function and common parts

Part IX: Ventilation

Valid from 1 January 2024

//

Part IX: Ventilation

IX.1 Specific supporting documents

IX.1.1 Ventilation performance report (VPR)

IX.2 General principles of ventilation in the EPC

IX.3 Step-by-step plan for the inspection of ventilation provisions

IX.3.1 EPC residential or EPC small non-residential

IX.3.2 EPC of the common parts

IX.4 Layout of spaces

IX.4.1 Wet space

IX.4.2 Living space

IX.4.3 Circulation space

IX.4.4 Mixed spaces

IX.5 Ventilation openings

IX.5.1 Natural ventilation openings

IX.5.2 Mechanical ventilation openings

IX.6 Mechanical ventilation device

IX.6.1 Central ventilation unit

IX.6.2 Decentralised ventilation device

IX.6.3 Special systems

IX.6.3.1 Geothermal exchangers or ground heat exchangers

IX.7 Mechanical ventilation equipment input parameters

IX.7.1 Regulation

IX.7.1.1 Ventilation reduction factor

IX.7.1.2 Regulation type

IX.7.2 Heat recovery

IX.7.2.1 Return

IX.7.2.2 Manufacture reference year

IX.7.2.3 Bypass

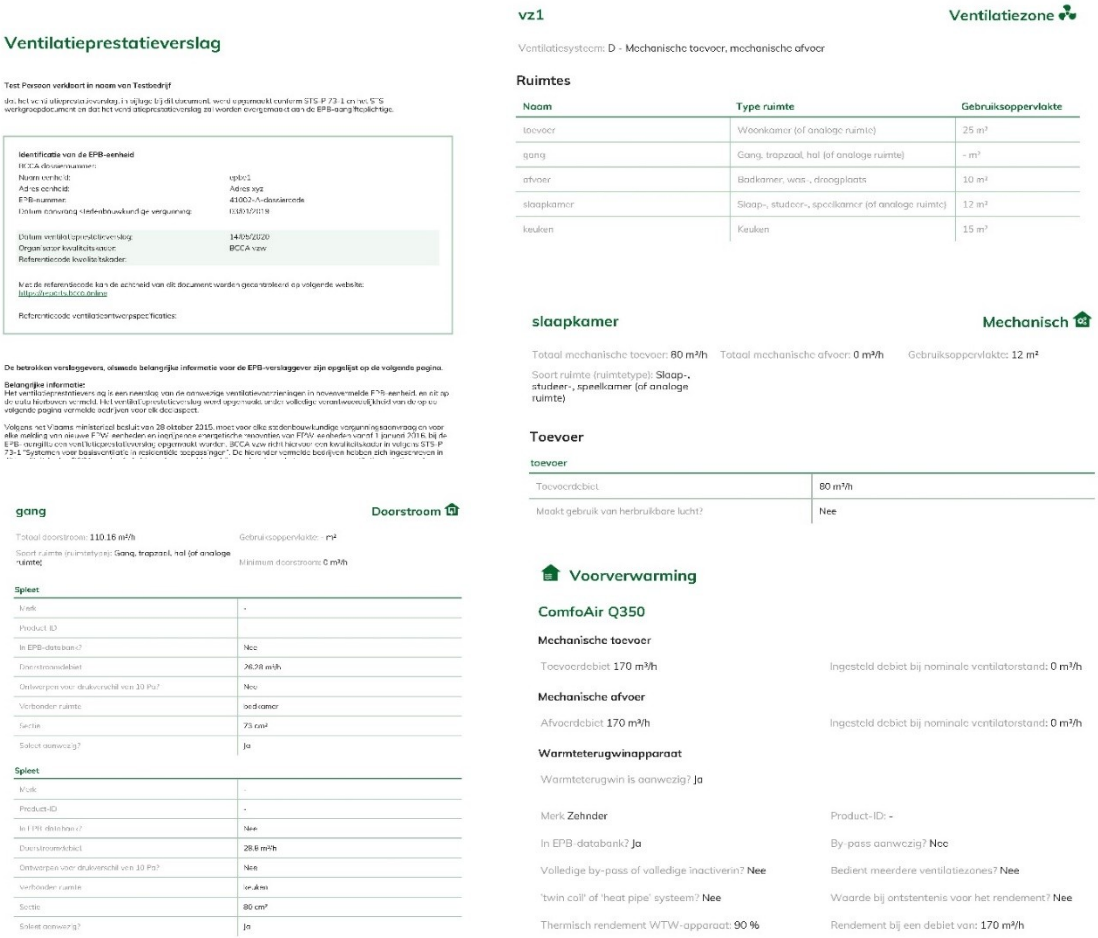
PART IX Ventilation

IX.1 Specific supporting documents

IX.1.1 Ventilation performance report (VPR)

The ventilation performance report can be compiled when finishing the ventilation system, and documents the performance of the ventilation works performed (as-built situation). The ventilation performance report is a document required for EPB declarations submitted after 1 July 2017. The ventilation performance report can also be drawn up for files where no EPB declaration has to be submitted.
The ventilation performance report can only be drawn up by an authorised ventilation reporter.
A ventilation performance report may contain the following information:

- Heat recovery return
- Summer bypass
- The regulation type and the reduction factor



Ventilatieprestatieverslag

Test Persoon verklaart in naam van Testbedrijf

Identificatie van de EPB-eenheid

BCCA dossiernummer:	
Naam eenheid:	epbe1
Adres eenheid:	Adres xyz
EPB-nummer:	41002-A-dossiercode
Datum aanvraag stedenbouwkundige vergunning:	03/01/2019
Datum ventilatieprestatieverslag:	14/05/2020
Organisator kwaliteitskader:	BCCA vzw
Referentiecode kwaliteitskader:	

Met de referentiecode kan de echtheid van dit document worden gecontroleerd op volgende website: https://reports.bcca.online

Referentiecode ventilatieontwerpspecificaties:

De betrokken verslaggevers, alsmede belangrijke informatie voor de EPB-verslaggever zijn opgelijst op de volgende pagina.

Belangrijke informatie:

gang — **Doorstroom**

Totaal doorstroom: 110.16 m³/h — Gebruiksoppervlakte: - m²

Soort ruimte (ruimtetype): Gang, trapzaal, hal (of analoge ruimte) — Minimum doorstroom: 0 m³/h

Spleet

Merk	-
Product ID	
In EPB-databank?	Nee
Doorstroomdebiet	26.28 m³/h
Ontworpen voor drukverschil van 10 Pa?	Nee
Verbonden ruimte	badkamer
Sectie	73 cm²
Spleet aanwezig?	Ja

Spleet

Merk	-
Product-ID	-
In EPB-databank?	Nee
Doorstroomdebiet	28.8 m³/h
Ontworpen voor drukverschil van 10 Pa?	Nee
Verbonden ruimte	keuken
Sectie	80 cm²
Spleet aanwezig?	Ja

vz1 — **Ventilatiezone**

Ventilatiesysteem: D - Mechanische toevoer, mechanische afvoer

Ruimtes

Naam	Type ruimte	Gebruiksoppervlakte
toevoer	Woonkamer (of analoge ruimte)	25 m²
gang	Gang, trapzaal, hal (of analoge ruimte)	- m²
afvoer	Badkamer, was-, droogplaats	10 m²
slaapkamer	Slaap-, studeer-, speelkamer (of analoge ruimte)	12 m²
keuken	Keuken	15 m²

slaapkamer — **Mechanisch**

Totaal mechanische toevoer: 80 m³/h — Totaal mechanische afvoer: 0 m³/h — Gebruiksoppervlakte: 12 m²

Soort ruimte (ruimtetype): Slaap-, studeer-, speelkamer (of analoge ruimte)

Toevoer

toevoer

Toevoerdebiet	80 m³/h
Maakt gebruik van herbruikbare lucht?	Nee

Voorverwarming

ComfoAir Q350

Mechanische toevoer

Toevoerdebiet 170 m³/h — Ingesteld debiet bij nominale ventilatorstand: 0 m³/h

Mechanische afvoer

Afvoerdebiet 170 m³/h — Ingesteld debiet bij nominale ventilatorstand: 0 m³/h

Warmteterugwinapparaat

Warmteterugwin is aanwezig? Ja

Merk Zehnder	Product-ID: -
In EPB-databank? Ja	By-pass aanwezig? Nee
Volledige by-pass of volledige inactiverin? Nee	Bedient meerdere ventilatiezones? Nee
'twin coil' of 'heat pipe' systeem? Nee	Waarde bij ontstentenis voor het rendement? Nee
Thermisch rendement WTW-apparaat: 90 %	Rendement bij een debiet van: 170 m³/h

Figure 221: Example of some pages from a VPR

IX.2 General principles ven

A ventilation system ensures the supply of fresh air into dry living spaces and the discharge of polluted and damp air in wet spaces. This is done naturally, mechanically or through a mixed system.
Through flow openings (e.g. cracks under the door), the air can migrate between the enclosures and circulation areas on the one hand, and between circulation spaces and wet spaces on the other.

Assumption when formatting the EPC:
Only the presence of ventilation provisions (= natural and mechanical ventilation openings and mechanical ventilation devices) should be established for the formatting of the certificate. The functioning (proper or otherwise) of the system should not be determined. It is always assumed that the ventilation provisions in place **are correctly designed** and **function correctly**.
It is also not necessary to verify compliance with the ventilation standard or the EPB regulation. The ventilation flow rates, the size of entrance and drain openings and the presence of flow openings should also not be inspected.
It is not necessary to specify which total systems are in place (system A, B, C, D, etc.). In the case of renovations in particular, it is possible to use a mix of systems that are not always unambiguously separate from each other. The EPC software will automatically generate conclusions and recommendations based on the installed ventilation provisions.
For example, the EPC software will automatically test whether there are minimum ventilation provisions available. This is the case if:

- at least 75 % of the wet spaces and all kitchens, bath and shower rooms
    - have a natural supply connected to a vertical drain, or
    - have a permanently rotating mechanical provision, *and*
- A minimum of 75 % of the living spaces (with window openings to the outside, see IX.4.2)
    - have a natural supply (regardless of type), or
    - have a permanently rotating mechanical provision.

For the purpose of determining the percentage, only the number of wet and living spaces is taken into account, not the surface areas. For the minimum number of spaces which must comply, it is arithmetically rounded to the nearest integer.
If not all of the conditions are met, then there are no or insufficient ventilation provisions in the unit and this is also automatically stated on the EPC. For the part of the unit where there are no natural or permanent ventilation provisions, a notional ventilation system is calculated automatically determining the energy score: mechanical supply and discharge, without regulation and without heat recovery.

IX.3 Roadmap for inspection of ventilation provisions

<u>IX.3.1 EPC residential or EPC small non-residential</u>

1. Step 1 Determine the wet spaces and the living spaces

   Procedure
   Check the conditions set out in the inspection protocol under IX.4 to determine how a wet space and how a living space is determined.
   All wet spaces and living spaces must be entered. Surface areas or volumes of the wet and living spaces should not be determined.
   Garages, circulation spaces and ‘dark’ living spaces are not entered (see IX.4).

2. Step 2 Determine the ventilation openings and type for each wet space and for each living space

   Procedure
   Check the conditions set out in the inspection protocol under IX.5 to determine what is deemed a ventilation opening.
   Determine the presence of ventilation openings and type (the number of openings should not be determined):

- If there are multiple vents of a different type (e.g. window grille and a mechanical vent in the same space), note down both types for this space.
- If there are multiple vents of the same type in a room (e.g. multiple windows each having a window grille), note down only one type.

If there are no ventilation openings in a wet space or in a living space, this is also entered

3. Step 3 Determine the mechanical ventilation devices serving the unit

   Procedure
   Check the conditions set out in the inspection protocol under IX.6 to determine what is deemed a mechanical ventilation device.
   Determine the mechanical ventilation devices serving the unit. There may be several mechanical ventilation devices for each unit. In this case, the mechanical ventilation openings from step 2 must be connected to the corresponding mechanical ventilation device. If this is not known, choose 'mechanical unknown'.
   The characteristics related to regulation and heat recovery are entered per mechanical ventilation device as described in IX.6.

<u>IX.3.2 EPC of the common parts</u>
Determine only the collective mechanical ventilation equipment

Check the conditions set out in the inspection protocol under IX.6 to determine how a mechanical ventilation device is determined.
Only enter the collective ventilation devices and their properties. These are devices serving more than one unit in the building.
Mechanical ventilation equipment solely responsible for the common areas are not considered. Ventilation openings and spaces are not entered.
Individual mechanical ventilation devices are not entered into the EPC of the common parts, but in the EPC of the unit. If an EPC of the common parts is available, formatting the unit's EPC shall determine whether the collective ventilation device that may be present serves the unit. If this is the case, the data from the collective ventilation device is copied over. Details of any individual regulation may be entered.

Example

- *On the roof of an apartment building are mechanical ventilators that extract the polluted air in all toilets and bathrooms via vertical shafts. A collective ventilation unit is entered into the EPC of the common parts, discharge only. When creating an EPC of an apartment, this collective ventilation unit is copied over (inherited).*

IX.4 Layout of spaces
We only look at <u>the spaces within the protected volume</u>, as provided for in Part IV of this inspection protocol. Spaces with ventilation openings that are not in the protected volume should not be inspected or entered.
<u>Exception to spaces within the protected volume</u>: the following spaces are never entered:

- for the inspection of ventilation, **garages are never** considered, even though they are part of the protected volume and even though in the meantime, the garage has been given other functions such as laundry room, shower room, hobby room, boiler, etc. . A garage is any space that has a garage gate and is (initially) intended to store a car, even if the actual situation is such that a car can no longer enter. According to the Belgian ventilation standard NBN D50-001, a garage is a special space, meaning it is recommended not to include it in the ventilation system of the unit.
- Circulation spaces (see IX.4.3)

- 'Dark' living spaces (see IX.4.2)

IX.4.1 Wet space

All kitchens, bath and shower rooms, toilets and all other rooms in which there is at least one toilet, bath, shower or hob, even if these provisions no longer function. If there are several of these provisions in one space, it is one wet space. If the connection points are present, but the provisions themselves are not (yet), it is only entered as a wet space if the function of the room will clearly be as a kitchen, bath or shower room or WC.
Laundry areas also count as wet spaces. The laundry area is the space where the washing machine stands or is intended to stand, of course only if this space is part of the protected volume.
The presence of a basin or sink alone is not enough for a space to be a wet space.
A wet space is **always** entered, even if there is no or only a small window opening.

Example

- *A kitchen in combination with a shower in the same room is entered as one wet space.*
- *A storage room with sink or a bedroom with sink is not a wet space.*
- *There is a washing machine in the garage. The garage function takes precedence over the laundry function. The garage will thus not be entered.*

IX.4.2 Living space

This refers to all spaces that are not wet spaces and are not circulation spaces.

Note, an exception is made for **'dark'** living spaces that are not actually suitable for long-term occupancy by persons. These are defined as living spaces without transparent openings to the outside or with transparent openings to the outside with a total area of less than 0.25 m². These spaces are not considered adequate living space for the EPC for the layout of the EPC and are therefore NOT entered into the software.

Example

- *The attic space is part of the protected volume, but does not have windows to the outdoor environment. The attic space is not considered when inspecting the ventilation.*
- *An indoor storage space: not to be considered in the inspection of ventilation.*

Examples of living spaces	
Residential units	- living space, dining room, - bedroom, guest room, - games room, TV room, desk, hobby room, library, - storage room, etc.
Non-residential units	- office, shop, - dining area, restaurant, - storage room, etc.

IX.4.3 Circulation space

This means: all spaces used primarily for circulation and not for other purposes. Examples: hallway, corridor, stairwell.

If there is uncertainty or doubt as to whether a space is a circulation or a living space, the space is entered as a living space.

Example

- *The stairway has been opened up into the living space. This is entered as one living space.*

IX.4.2 Mixed spaces

If a wet space and living space are combined in the same room, a notional split is made into one wet space and one living space. Both rooms are individually checked for ventilation openings. If the net floor surface area (see part IV of the inspection protocol) of the total mixed space is less than 6 m², then this space can be entered as one wet space.

Example

- *One bedroom with en-suite bathroom, without lockable door between the two: to be entered as one wet space and one living space*
- *An open kitchen, in open connection to the living room: to be entered as one wet space and one living space*
- *A shower room in a bedroom with floor area of 5 m²: enter as one wet space.*

If multiple wet functions are combined in the same space, this is taken together into one wet space. If multiple living functions are combined in the same space, this is taken together into one living space.

Example

- *A shower room in the kitchenette of an apartment: enter as one wet space.*
- *The living room, via a loft in open connection to the office one floor higher: to be entered as a single living space.*
- *The living room, dining area and TV corner are located in the same open space: to be entered as a single living space.*

IX.5 Ventilation openings

The energy expert enters the existing ventilation openings for each space. The possible ventilation openings are:

- Natural ventilation openings
- Mechanical ventilation openings

It should not be inspected whether a ventilation opening works effectively, and whether a ventilation opening supplies or drains air. Only the presence and type must be inspected.
It is possible that ventilation openings are visually concealed in indoor furniture, in line grilles in the ceiling, etc. . Non-visible ventilation openings can only be entered if evidence demonstrates they are present, such as the plan of the ventilation system or the ventilation performance report.

IX.5.1 Natural ventilation openings

This concerns ventilation openings through which air flows naturally. The ventilation opening is not linked to a mechanical ventilation device.
A natural ventilation opening should always be in contact with air from the outside environment. A natural ventilation in contact with a basement, an adjacent unheated space or an adjacent heated space may not be entered.
There are no conditions for the controllability of natural ventilation openings (as opposed to the EPB requirements). The natural ventilation openings that can be entered are:

- grilles in exterior wall, sloping roof, window or exterior door (usually with grid on the inside and outside)
- grilles in wall, inclined roof or flat roof, connected to vertical shaft or vertical duct to above the roof surface (air pipe)

- o Please note, this does not concern air pipes ventilating the roof package itself. There must be an effective pipe hole into the interior space.

- ventilation valves in roof-plane windows;
- automatically controlled, opening windows, doors or panels.

The ability to open or manually tilt windows, doors or panels is <u>not</u> considered a ventilation opening.

Figure 2: Grilles on glass, in walls, in window profiles

Figure 3: Left: natural ventilation opening with vertical duct in sloping roof. Right: natural drain grille in the wall

<u>IX.5.2 Mechanical ventilation openings</u>

These are ventilation openings through which air is supplied or discharged with mechanical support. The ventilation opening is connected to a permanently rotating mechanical ventilation device, such as via a network of ventilation ducts or a direct connection.
A mechanical ventilation opening may only be entered if the mechanical ventilation device meets the conditions set out in IX.6.

Figure 4: Mechanical ventilation openings

IX.6 Mechanical ventilation devices

Ventilation can be achieved via natural airflow, but can also be mechanically controlled. This is achieved with mechanical ventilation devices. There are both central devices (also called: ventilation unit, air group, etc.) as decentralised devices (separate ventilator).
In order to be considered, a mechanical ventilation device must meet two conditions:

- Permanently rotating, and
- supply and/or discharge connected to outdoor environment.

Permanently rotating
Only mechanical ventilation equipment designed for permanent rotation is considered:

- Within EPC, the assumption is that a central ventilation device is always designed for permanent rotation. A central ventilation device can therefore always be entered.
- This assumption does not apply to a decentralised ventilation device. This is because there are many types of decentralised ventilators that are not designed to rotate permanently. Therefore, the energy expert should be able to infer from the technical sheet or from other evidence that the device is designed for permanent rotation, otherwise the decentralised device cannot be entered.

Non-continuous or temporary ventilators and other forms of interrupted ventilation are therefore not regarded as mechanical ventilation device and should not be entered.
Note:

- a ventilation device may contain a regulation system that detects the need for ventilation and adjusts the ventilation flow accordingly (see IX.7.1). This is permitted, under these conditions:
    - for residential units: the regulation system must not reduce the flow rate to zero.
    - for non-residential units: the regulation system may reduce the flow rate to zero, provided that this is only done outside the unit's occupancy hours.
- Permanently rotating systems can also have an on/off button, this is allowed to deactivate the ventilation system in exceptional situations (maintenance, fire in the environment, etc.).

Examples

- *ventilators that only rotate following impetus from the light switch or a sensor (CO2, moisture, presence, etc.) in, for example, toilet or bathroom, whether or not with reversing time, do NOT count as permanently rotating ventilators.*
- *In principle, a hood is intended as temporary intensive ventilation and therefore does not operate permanently. However, there are types of extractor hoods that are continuously in operation and, for example, have an additional low setting. This type of system is by no means available as standard on all extractor hoods and must therefore be demonstrated with supporting documents.*

Supply and/or drainage connected to outdoor environment
The supply of air must always be performed with air from the outside environment and the polluted indoor air must always be discharged into the outdoor environment. A mechanical ventilation device that supplies air from or drains air to a basement, an adjacent unheated space or an adjacent heated space may not be entered.

<u>IX.6.1 Central ventilation device</u>
A central ventilation device (also called: ventilation unit, air group, etc.) is typically connected via a network of ventilation ducts to multiple ventilation nozzles. A ventilation unit can handle single supply (rarely) or single drain (also called: drainage ventilation), or can be responsible for both supply and drainage (also called: balance ventilation).

Inspection tip:

- A central ventilation device for single supply or single drain usually has only one duct to the outside environment, and is usually smaller than a ventilation unit for both supply and drainage.

- A central ventilation device for both supply and drainage typically has four ducts: two ducts to the outside environment (one for supply and one for drain) and two ducts to the indoor environment (one for supply and one for drain).

With an device for both supply and drainage, heat recovery may occur. In that case, the heat from the vented air is recovered and transferred to the ventilation air. If there is a heat recovery system, this is usually stated on the device itself or in the technical documentation.
A heat recovery system mainly occurs in homes that were recently radically renovated energetically, BEN homes, passive housing and low-energy homes.

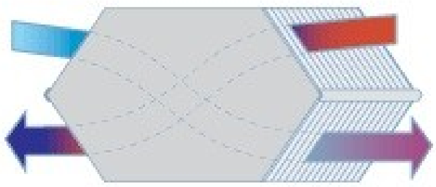


Figure 232: Principle of heat recovery

Figure 231: Ventilation unit for mechanical supply and discharge with heat recovery

IX.6.2 Decentralised ventilation device
There are also decentralised ventilation devices, serving only one room and are typically located directly in the outer wall or roof. These are usually tube ventilators (also called: duct ventilator) which only handles either a single drain or a single supply. Decentralised permanently rotating ventilation devices are less common than central ventilation equipment.

Special case: alternating decentralised ventilator, whether or not with heat recovery
It can also be ventilated by a decentralised ventilator unit, where mechanical supply and drainage alternately to ventilate the room. The ventilators work in alternation: if one ventilator stops working, the other ventilator starts. Despite the fact that both ventilators do not rotate continuously, the ventilation system is in continuous operation. A heat recovery element may be present in the ventilator unit locally.
A decentralised ventilator that works permanently, but in alternation as a supply of fresh outdoor air and discharge of indoor air, is entered as a 'mechanical ventilation device supply and discharge', whether or not with heat recovery.

Figure 231: Decentralised mechanical ventilation device for installation in an external wall, alternating supply and drainage, with heat recovery.

<u>IX.6.3 Special system</u>
IX.6.3.1 Geothermal exchangers or ground heat exchangers
Geothermal exchangers or ground heat exchangers use the earth's thermal inertia to preheat or cool the hygienic ventilation air. At a sufficient depth, the ground temperature is stable. As a result, the ventilated air can be cooled in summer and warmed up in winter.
There are two different systems: earth-water heat exchangers and earth-air heat exchangers

- In the case of earth-water heat exchangers, water is sent through a series of tubes that are connected to an air battery via a collector. The water that the pump circulates through the tubes will preheat or pre-cool the air.
- In the case of earth-to-air heat exchangers (also called 'ground tube' or 'Canadian well'), ventilation air is preheated or pre-cooled via tubes in the ground. The heat or cold in the air is exchanged directly with the ground.

A system with mechanical supply and drainage with a geothermal exchanger or soil heat exchanger is entered as **'**Mechanical supply and discharge with heat recovery**'.**

IX.7 Input parameters for mechanical ventilation devices
The following features can be entered <u>for each mechanical ventilation device</u>:

- Regulation properties
- Properties of heat recovery (only in case of device with drain and supply)

<u>IX.7.1 Regulation</u>
When discharging indoor air, heat is also lost together with the vented air. In addition, the ventilators of mechanical ventilation devices also use energy. In order to reduce the total energy losses caused by ventilation, a ventilation device is often provided with a **regulation system** that detects the need for ventilation and adjusts the ventilation flow accordingly. This regulation can be done manually or automatically. Each type of ventilation system may have regulation.

Additional information related to the regulation be sought out for each mechanical ventilation device. If a regulation is in place, the following information is entered:

- If the reduction factor for ventilation regulation is available from supporting documents, it should be entered directly (see IX.7.1.1)
- If the reduction factor is not known, the type of regulation is determined by visual inspection (IX.7.1.2)

The possible supporting documents are:

- EPB declaration;
- EPB database;
- Ventilation performance report;
- Equivalence decisions of the Flemish Energy and Climate Agency for demand-driven ventilation (available on the website https://www.vlaanderen.be/epb-pedia/epb-regelgeving/besluiten-van-de-administrateur-generaal/gelijkwaardigheidsbesluiten-voor-vraaggestuurde-ventilatie);
- Technical documentation (e.g. from manufacturers).

IX.7.1.1 Ventilation reduction factor

If the ventilation reduction factor is available from the list of possible supporting documents, this will be mandatory.

Note: This concerns the reduction factor of the regulation, and not of the preheating of the ventilation air.

ID_produit Product_ID	Classification Product	Facteur chauffage Factor verwarming $f_{reduc,vent,heat,zonez}$ -
Flair CO2 0,61	4.5	0,61
Flair CO2 0,70	4.5	0,7
Flair CO2 0,87	4.5	0,87
Flair Ventilation à la demande 2.0 0,49 Flair Vraaggestuurd ventileren 2.0 0,49	4.5	0,49
Flair Ventilation à la demande 2.0 0,53 Flair Vraaggestuurd ventileren 2.0 0,53	4.5	0,53
Sky CO2 0,61	4.5	0,61
Sky CO2 0,70	4.5	0,7
Sky CO2 0,87	4.5	0,87

Figure 235: Ventilation reduction factor from the EPB database

Factor verwarming	Heating factor
Flair Vraaggestuurd verntilreren	Flair Demand-driven ventilation

Reductiefactor ventilatie	0.9
Bepaling volgens de waarde bij ontstentenis	nee
Bepaling volgens de detailberekening	ja

2.2 Voorverwarming: plaatsen waar mechanisch buitenlucht wordt toegevoerd of binnenlucht wordt afgevoerd naar buiten

Wordt de ventilatielucht voorverwarmd met een warmteterugwinapparaat? ja

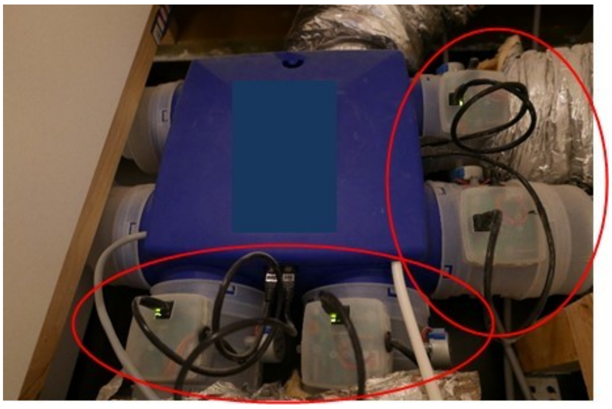
Figure 235: Ventilation reduction factor from an EPB declaration (EPW form)

Reductie factor ventilatie	Ventilation reduction factor
Bepaling volgens de waarde bij ontstentenis	Determination according to the value in the absence
Bepaling volgens de detailberekening	Determination according to the detailed calculation
2.2 Voorverwarming: plaatsen waar mechanisch	2.2 Preheating: places where mechanical outdoor air

buitenlucht wordt toegevoerd of binnenlucht wordt afgevoerd naar buiten	is supplied or indoor air is discharged to the outside
Wordt de ventilatielucht voorverwarmd met een warmteterugwinapparaat? ja	Is the ventilation air preheated with a heat recovery device? yes

IX.7.1.2 Regulation type

There are 5 types of regulation:

'unknown'	If the regulation cannot be determined or is unknown, 'unknown' is entered.
'manual regulation'	With manual regulation, the ventilation flow rate can be varied manually. The ventilation device then has a <u>switch</u> where the ventilation flow rate can be adjusted manually. Often this is a three-mode switch. If only an on and off switch is available to completely switch the ventilation unit off and on, there is no regulation. In this case, it is not possible to adjust the ventilation flow rate.
'clock regulation'	With clock regulation, the ventilation flow rate is controlled on the basis of a <u>schedule</u>. However, in the case of residential units, the ventilation flow rate will never be zero, for non-residential units only outside the opening hours.
'demand response, central'	In this case, the mechanical ventilation device is controlled via <u>motion, moisture or CO_2 detection</u>. The regulation occurs **centrally**. Therefore, as soon as presence of moisture and/or CO_2 is detected in one space, the ventilation flow rate throughout the unit/building is increased.
'demand response, local'	In this case, the mechanical ventilation device is controlled via <u>motion, moisture or CO_2 detection</u>. The regulation occurs **locally** or by space/ventilation zone. Therefore, when moisture and/or CO_2 is detected in a space/ventilation zone presence, the ventilation flow rate is increased only in that specific zone. These are usually the more recent and advanced ventilation systems.  Figure 10: Ventilation unit for mechanical discharge with a separate regulation valve per room/ventilation zone

<u>IX.7.1 Heat recovery</u>

IX.7.1.1 Return

If the return of heat recovery is available from the list of possible supporting documents, entering this is mandatory.

If the return is available at different flow rates, the return is determined as follows:

- Identify the total flow rate and total drain flow rate in the report containing the measured flow rates or the ventilation performance report;
- Take the largest flow rate of both;
- Locate the corresponding return in the class where the flow rate falls;
- If the flow rates are not known, take the worst return.

Example

- *In a unit there is a ventilation system with mechanical supply and mechanical drainage. The measurement report states that the total flow rate is 250 m^3/h and the total drain flow rate is 125 m^3/h. The EPB database provides the return at 250 m^3/h*

  234 m^3/h < 250 m^3/h ≤ 318 m^3/h □ 73 %.

Rendement 1 Rendement 1 $\eta_{t,epb}$ %	Débit 1 Debiet 1 m^3/h	Rendement 2 Rendement 2 $\eta_{t,epb}$ %	Débit 2 Debiet 2 m^3/h	Rendement 3 Rendement 3 $\eta_{t,epb}$ %	Débit 3 Debiet 3 m^3/h	Rendement 4 Rendement 4 $\eta_{t,epb}$ %	Débit 4 Debiet 4 m^3/h
78%	147	75%	234	73%	307	72%	318

Figure 11: Look up return in heat recovery in the EPB database

Rendement	Return
Debiet	Flow rate

IX.7.1.2 Manufacture reference year

If the manufacture reference year of the ventilation device with heat recovery is known, this is entered (see Part III).

IX.7.1.3 Bypass

Because heat recovery is not desired in every season, many heat recovery devices are equipped with a summer bypass that allows the passage of air through the heat exchanger to be shut down wholly or partially. This has the advantage that the heat recovery outside the heating season can be switched off automatically if the indoor temperature is higher than the outside temperature. The bypass therefore reduces the risk of overheating.

If the presence of a complete/incomplete summer bypass is known on the basis of the list of possible supporting documents, this is mandatory to enter.

ID_produit Product_ID	Classification produit Product classificatie	Type moteur 1 Motortype 1	Puissance max. ventilateur 1 Max. vermogen ventilator 1 $P_{elec,fan}$ W	Type moteur 2 Motortype 2	Puissance max. Max. vermogen $P_{elec,fan}$ W	Rendement 1 Rendement 1 $\eta_{t,epb}$ %	Débit 1 Debiet 1 m³/h	Rendement 2 Rendement 2 $\eta_{t,epb}$ %	Débit 2 Debiet 2 m³/h	Rendement 3 Rendement 3 $\eta_{t,epb}$ %	Débit 3 Debiet 3 m³/h	Rendement 4 Rendement 4 $\eta_{t,epb}$ %	Débit 4 Debiet 4 m³/h	Régulation auto. Auto. regeling	By-pass ete Zomer by-pass
V2A	4.4.1	DC	13												
V4A	4.4.1	DC	27												
V5S	4.4.1	DC	57												
VAM	4.4.1	AC	53												
Pulmo 330	4.4.2	DC	86	DC	86	88%	105	82%	239	79%	336			No	Incomplete
Pulmo 330S	4.4.2	DC	86	DC	86	88%	105	82%	239	79%	336			No	Incomplete
Silentio 350	*4.4.2*	*DC*	*110*	*DC*	*110*	*88%*	*105*	*82%*	*239*	*79%*	*336*			*No*	*Incomplete*
Project 300	*4.4.2*	*DC*	*110*	*DC*	*110*	*88%*	*105*	*82%*	*239*	*79%*	*336*			*No*	*Incomplete*
Project 400	*4.4.2*	*DC*	*174*	*DC*	*174*	*86%*	*151*	*80%*	*303*	*78%*	*401*			*No*	*Incomplete*
Silentio 450	*4.4.2*	*DC*	*174*	*DC*	*174*	*86%*	*151*	*80%*	*303*	*78%*	*401*			*No*	*Incomplete*
AM 500	4.4.2	DC	104	DC	104	78%	328	77%	437	76%	534			No	Complete
AM 150	4.4.2	DC	20	DC	20	77%	78	76%	104	75%	132			no	Incomplete
AM 800	4.4.2	DC	108	DC	108	80%	590	79%	704					No	Complete
CV 80	4.4.2	DC	14	DC	14	76%	46	75%	62	74%	80			No	Complete
CV 200	4.4.2	DC	77	DC	77	78%	147	75%	234	73%	307	72%	318	No	Complete
AM 300	4.4.2	DC	104	DC	104	79%	171	77%	254	75%	351			No	Complete

Figure 239: Search for bypass type in the EPB database

Product classificatie	Product classification
Motortype 1	Motor type 1
Max. vermogen ventilator 1	Max. power ventilator 1
Rendement	Return
Debiet	Flow rate
Auto. regeling	Auto. regulation
Zomer by-pass	Summer by-pass
Incomplete	Incomplete
Complete	Complete

END OF NEW PART IX

3.6 Part X

- Section X.2.1 has been replaced entirely with the following:

  X.2.1 Inspection report

  The inspection report is required by an approved inspector before the solar panels are put into service. The technical data of the solar panels on the electrical inspection report may be used to enter directly into the EPC. An inspection report contains information on peak power (see X.8.1).

  Inspection tip: An inspection report may include, among other things, the following:

  - **reference to the applicable legislation in the inspection report (RD 8/09/2019); Book 1. Chapter 6.4.1. indicating the conformity check for the entry into service of the electrical installation**
  - **the date of the inspection;**
  - **the number, type, serial number and maximum AC power of the converter(s);**
  - **the number and peak power of the solar panels;**
  - **the serial number of the production meter and the meter reading at the time of the inspection;**
  - **the calibration marking on the production meter**
  - **electrical wiring diagram as an attachment.**

  An electrical inspection report is drawn up by an approved inspection body: in the case of doubt, the list can be consulted: https://economie.fgov.be/sites/default/files/Files/Energy/Installations-

electriques-liste-d-organismes-agrees-pour-le-controle-Elektrische-installaties-%20lijst-van-erkende-organismen-voor-het-uitvoeren-van-controles.pdf

4 ANNEX 4: FORMULA STRUCTURE EPC NR

4.1 §2.1.2.5.1.2:

Eq. 71 $H_{V,hyg,heat,k} = 0{,}34 \cdot f_{reduc,vent,k} \cdot r_{preh,heat,k} \cdot f_{vent,heat,k} \cdot \dot{V}_{hyg}$ (W/K)

is replaced by

Eq. 71 $H_{V,hyg,heat,k} = 0{,}34 \cdot f_{reduc,vent,heat,k} \cdot r_{preh,heat,k} \cdot \dot{V}_{hyg}$ (W/K)

And Table 21

Type of regulation, detection or demand response	**$f_{reduc,vent,k}$ [-]**
If ventilation system = 'none' or unknown	1.0
If ventilation system ≠ 'none' or unknown	
Type of regulation = 'unknown' or 'none'	1.0
Manual regulation	1.0
Clock regulation	1.0
Demand response, central	0.8
Demand response, local	0.7

By

Type of regulation, detection or demand response	***$f_{reduc,vent,heat,k}$* [-]**
If ventilation system = 'none' or unknown	1.0
If ventilation system ≠ 'none' or unknown	
Type of regulation = 'unknown' or 'none'	1.0
Manual regulation	1.0
Clock regulation	*$f_{vent,heat,k}$*
Demand response, central	0.8 *. $f_{vent,heat,k}$*
Demand response, local	0.7 *. $f_{vent,heat,k}$*

Under Eq.73,

d_{occ} the occupancy rate is set at 0.10 persons/m²;
replaced by

d_{occ} the occupancy rate is set at 0.15 persons/m²;

4.2 §2.1.2.8.2

Above Eq.93,

The number of meals prepared per service:
The parameter n_{meal} depends on the surface area of the kitchen $A_{use,kitchen}$:

Replaced by

The number of meals prepared per service:
* The number of meals prepared per service n_{meal} can be entered directly.

If the number is not directly entered,* the parameter n_{meal} is calculated according to the use area of the kitchen $A_{use,kitchen}$:

At the bottom of the paragraph, the following is entered:

For the calculation of the annual net energy demand for sanitary hot water from kitchen counters, where the number of meals per service was directly entered, n_{meal} = min ($n_{meal,\ entered\ directly}$; $n_{meal,calculated}$).

4.3 §2.1.3

Under Eq. 113,

$l_{tubing,sink}$ the average length of the pipes to a kitchen counter is equal to 20 m;

replaced by

$l_{tubing,sink}$ the average length of the pipes to a kitchen counter is equal to *10*m;

4.4 §2.1.4

In Table 41, a line is added at the bottom:

*Direct residual heat recovery	1.00	1.00

4.5 §2.1.5

The second paragraph is replaced by:

The same formalism for the determination of the preferred generator is used as in the case of space heaters; *determine the preferred generator as described in § 2.1.4.1, for the generation return of the generator, the generation return for sanitary hot water is then used.*

Table 60 is replaced by:

	instantaneous heating	with heat storage or unknown

electric resistance heating	0.75	0.70
electric heat pump *on ambient heat	1.45	1.40
gas-powered heat pump	0.58	0.56
CHP on the site (1)	$\varepsilon_{cogen,th}$	$\varepsilon_{cogen,th}$ – 0.05
external heat supply (1)	$\eta_{water,dh}$	$\eta_{water,dh}$ – 0.05
*Direct residual heat recovery	0.75	0.70
*Residual heat recovery via heat pump	3	2.80
unknown	0.70	

4.6 §2.1.6 is replaced by:

Determine the monthly useful energy contribution of a solar thermal system as follows:

- if it serves for both space heating and sanitary hot water: according to §2.1.6.1
- if it serves only for the preparation of sanitary hot water: according to §2.1.6.2

If there is no solar thermal system contributing to the space heating of energy sector i, the value for $f_{as,heat}$ is equal to zero.

If the sanitary hot water in a sanitary hot water installation considered is not preheated by means of a solar thermal energy system, the relevant value is for $f_{as,water,m}$ equal to zero.

1.1.1.1 Monthly useful energy contribution from a solar thermal energy system for both space heating and sanitary hot water

Determine the monthly useful energy contribution (as a share of the total heat demand of the installation) of a solar thermal energy system for space heating and sanitary hot water as follows:

*For space heating:

Eq. 271 If $A_{as} > 6\,m^2 : f_{as,heat,x,m} = \min\left(\max\left(0; \frac{Q_{as,out,heat,m}}{\sum_x Q_{heat,gross,x,m}}\right); 1\right)$ [-]

Eq. 272 If $A_{as} \leq 6\,m^2 : f_{as,heat,m} = 0$ [-]

For sanitary hot water:

Eq. 273 $f_{as,water,x,m} = \min\left(\max\left(0; \frac{Q_{as,out,water,m}}{\sum_x Q_{water,gross,x,m}}\right); 1\right)$ [-]

For the purpose of determining the gross energy requirement for space heating and sanitary hot water, **all** installations x for space heating and sanitary hot water where the solar thermal energy systems are connected are always aggregated.

Furthermore, at all times when applying the above formulas:

Eq. 274 If $\sum_x Q_{heat,gross,x,m} = 0$, then $f_{as,heat,m} = 0$

Eq. 275 If $\sum_x Q_{water,gross,x,m} = 0$, then $f_{as,water,m} = 0$

Where

A_{as}	the aperture surface area of the collector in the solar thermal energy system, determined according to the standard NBN EN ISO 9488, in m²;
$f_{as,heat,x,m}$	the proportion of the total heat demand of the space heating installation x covered by the solar thermal system, (−);
$f_{as,water,x,m}$	the proportion of the total heat demand of the sanitary hot water installation x covered by the solar thermal system, (−);
$Q_{as,out,heat,s,m}$	the monthly space heating useful energy that can be supplied by the solar thermal system, as provided for in §2.1.6.4 in MJ;
$Q_{heat,gross,x,m}$	the monthly gross energy requirement for space heating by installation x, determined in accordance with §2.1.3.1, in MJ.
$Q_{as,\ out,\ water,\ m}$	the monthly useful energy for sanitary hot water that can be supplied by the solar thermal system, taking into account the losses of the storage vessel and as provided for in §2.1.6.3, in MJ;
$Q_{water,gross,x,m}$	the monthly gross energy requirement for sanitary hot water by installation x, determined in accordance with §2.1.3.3, in MJ;

1.1.1.2 Monthly useful energy contribution from a solar thermal energy system for sanitary hot water

Determine the monthly useful energy of a solar thermal energy system that only helps to prepare sanitary hot water as $f_{as,water\ x,m}$ in § 2.1.6.1.

In this regard, **all** installations x for sanitary hot water to which the solar thermal energy system is connected are always aggregated.

1.1.1.3 Monthly useful energy for sanitary hot water through the solar thermal system

Determine the monthly useful energy for sanitary hot water by the solar thermal system, taking into account the losses of the storage vessel as:

Eq. 276 $$Q_{as,out,water,m} = Q_{as,woL,water,m} - Q_{as,loss,stor,water,m}$$ [MJ]

Where:

Eq. 277 $$Q_{as,woL,water,m} = max\ \{0;(1{,}111 . Y_{as,water,m} - 0{,}070 . X_{as,water,m} - 0{,}265 . Y^2_{as,water,m} + 0{,}002 .$$ [MJ]

Where:

$Q_{as,woL,water,m}$	the monthly useful energy for sanitary hot water that can be supplied by the solar thermal system, without the losses of the storage vessel, in MJ;
$Q_{as,loss,stor,water,m}$	the monthly storage losses for sanitary hot water of the solar thermal system, as provided for in §2.1.6.3.3, in MJ;
$Y_{as,water,m}$	the monthly value for the auxiliary variable Y for sanitary hot water support by the solar thermal system, as provided for in §2.1.6.3.2 (−);
$X_{as,water,m}$	the monthly value for the auxiliary variable X for sanitary hot water support by the solar thermal system, as provided for in §2.1.6.3.1 (−);

$Q_{water,gross,x,m}$ the monthly gross energy requirement for sanitary hot water by installation x, determined in accordance with §2.1.3.3, in MJ;

1.1.1.3.1 Auxiliary variable X for sanitary hot water support by the solar thermal system

Determine the monthly value for the auxiliary variable X for sanitary hot water support by the solar thermal system if:

If the solar thermal energy system is only responsible for sanitary hot water or $A_{as} \leq 6\,m^2$:

Eq. 278

$$X_{\text{as,water,m}} = \frac{\left(0{,}9 \cdot A_{as} \cdot H_{\text{as,loop}} \cdot \left(\begin{array}{c}58{,}8 + 3{,}86 \cdot \theta_{\text{coldwater,m}} \\ -2{,}32 \cdot \theta_{\text{e,m}}\end{array}\right) \cdot f_{\text{as,stor}} \cdot t_m\right)}{Q_{\text{water,gross,x,m}}}$$ (-)

In all other cases:

Eq. 279

$$X_{\text{as,water,m}} = \frac{\left(0{,}9 \cdot A_{as} \cdot H_{\text{as,loop}} \cdot \left(\begin{array}{c}58{,}8 + 3{,}86 \cdot \theta_{\text{coldwater,m}} \\ -2{,}32 \cdot \theta_{\text{e,m}}\end{array}\right) \cdot f_{\text{as,stor}} \cdot t_m\right)}{Q_{\text{water,gross,x,m}} + Q_{\text{heat,gross,x,m}}}$$ (-)

Where:

A_{as} the aperture area of the collector in the solar thermal energy system, determined according to the standard NBN EN ISO 9488, in m²;

$H_{as,loop}$ the heat transfer coefficient of the collector circuit (collector+pipes), as determined below, in W/(m².K);

$\theta_{coldwater,m}$ the monthly cold water temperature, equal to 10 °C;

$\theta_{e,m}$ the monthly average outdoor temperature for heating calculation, in °C, see Table 1;

$f_{as,stor}$ the correction factor for the capacity of the storage vessel, as determined below, (–);

t_m the length of the month in question, in Ms, see Table 1;

$Q_{heat,gross,x,m}$ the monthly gross energy requirement for space heating by installation x, determined in accordance with §2.1.3.1, in MJ.

$Q_{water,gross,x,m}$ the monthly gross energy requirement for sanitary hot water by installation x, determined in accordance with §2.1.3.3, in MJ;

Determine the heat transfer coefficient of the collector circuit as:

Eq. 280

$$H_{\text{as,loop}} = a_1 + a_2 \cdot 40 + \frac{\left(5 + 0{,}5 \cdot A_{as}\right)}{A_{as}}$$ (W/(m²K))

Where:

a_1	the heat loss coefficient of the solar collector, depending on the collector type, see Table 89. If several solar collectors are connected to the collector circuit, the highest heat loss coefficient is retained here;
a_2	the temperature-dependent part of the heat loss coefficient of the solar collector, see Table 89. If several solar collectors are connected to the collector circuit, the highest temperature-dependent part of the heat loss coefficient is retained here;
$A_{as,j}$	the aperture surface of collector module j in the solar thermal energy system, determined according to the standard NBN EN ISO 9488, in m².

Determine the correction factor for the capacity of the storage vessel, for sanitary hot water, if:

Eq. 281
$$f_{\text{as,stor}} = \left(\frac{75 \cdot A_{as}}{f_{\text{stor,sys}} \cdot V_{\text{as,stor}}} \right)^{0,25} \quad (-)$$

Where:

A_{as}	the aperture area of the collector in the solar thermal energy system, determined according to the standard NBN EN ISO 9488, in m²;
$F_{stor,sys}$	correction factor taking into account the type of system, (–). This factor is equal to 1;
$V_{as,stor}$	the total volume of the storage vessel in the solar thermal system (including any part heated by a back-up heater) in litres. If the volume of the storage vessel is not known, it is equal to 2 000 litres.

Table 89: fixed values for collector properties

Parameter	Flat panel collector	Vacuum tube (CPC)	Vacuum tube (Heat pipe)	Other or unknown
η_0	0.70	0.60	0.70	0.6
a_1	4.00	3.00	1.25	1.25
a_2	0.03	0.02	0.01	0.01
IAM	0.83	0.83	0.89	0.83

1.1.1.3.2 Auxiliary variable Y for sanitary hot water support by the solar thermal system

Determine the monthly value for the auxiliary variable Y for the sanitary hot water support by the solar thermal system as:

If the solar thermal energy system is only responsible for sanitary hot water or $A_{as} \leq 6\, m^2$:

Eq. 282
$$Y_{\text{as,water,m}} = \frac{0{,}9 \cdot A_{as} \cdot I_{\text{as,m,shad}} \cdot \text{IAM} \cdot \eta_0}{Q_{\text{water,gross,x,m}}} \quad (-)$$

In all other cases:

Eq. 283

$$Y_{\text{as,water,m}} = \frac{0{,}9 \cdot A_{as} \cdot I_{\text{as,m,shad}} \cdot \text{IAM} \cdot \eta_0}{Q_{\text{water,gross,x,m}} + Q_{\text{heat,gross,x,m}}}$$ (-)

Where:

A_{as}	the aperture area of the collector in the solar thermal energy system, determined according to the standard NBN EN ISO 9488, in m²;
$I_{as,m,shad}$	the sunshine on the collector for the month under consideration, taking into account shading, as determined in Table 32, in MJ/m²;
IAM	the angular dependency coefficient, depending on the collector type, see Table 89;
η_0	the return of the collector if there is no heat loss to the environment, depending on the collector type, Table 89;
$Q_{heat,gross,x,m}$	the monthly gross energy requirement for space heating by installation x, determined in accordance with §2.1.3.1, in MJ.
$Q_{water,gross,x,m}$	the monthly gross energy requirement for sanitary hot water by installation x, determined in accordance with §2.1.3.3, in MJ;

1.1.1.3.3 Monthly storage losses for sanitary hot water from the solar thermal system

Determine the monthly storage losses for sanitary hot water of the solar thermal energy system as:

If the solar thermal energy system is only responsible for sanitary hot water or $A_{as} \leq 6\,m^2$:

Eq. 284

$$Q_{\text{as,loss,stor,water,m}} = \text{¿}$$
$$\max\left\{0; \left(H_{\text{as,stor}} \cdot f_{\text{stor,sys}} \cdot \left(\theta_{\text{coldwater,m}} + (60 - \theta_{\text{coldwater,m}}) \cdot f_{\text{as,woL,water,m}} - \theta_{\text{as,stor,amb,m}}\right) \cdot f_{\text{as,woL,water,m}} \cdot t_m\right)\right\}$$ (MJ)

In all other cases:

Eq. 285

$$Q_{\text{as,loss,stor,water,m}} = \text{¿}$$
$$\max\left\{0; \left(H_{\text{as,stor}} \cdot f_{\text{stor,sys}} \cdot \left(\theta_{\text{coldwater,m}} + (60 - \theta_{\text{coldwater,m}}) \cdot f_{\text{as,woL,water,m}} - \theta_{\text{as,stor,amb,m}}\right) \cdot f_{\text{as,woL,water,m}} \cdot t_m \cdot \left(\frac{Q_{\text{water,gross,x,m}}}{Q_{\text{water,gross,x,m}} + Q_{\text{heat,gross,x,m}}}\right)\right)\right\}$$ (MJ)

Where:

Eq. 286

$$f_{\text{as,woL,water,m}} = min\left(1; \frac{Q_{\text{as,woL,water,m}}}{Q_{\text{water,gross,x,m}}}\right)$$ (-)

Where:

$H_{as,stor}$	the total heat transfer coefficient of the storage vessel, as determined below, in W/K;
$F_{stor,sys}$	correction factor taking into account the type of system, (−). This factor is equal to 1;
$\theta_{coldwater,m}$	the monthly cold water temperature, equal to 10 °C;
$F_{as,woL,water,m}$	the monthly useful energy contribution (as a share of total heat demand) of the solar thermal energy system for sanitary hot water, without taking into account the losses of the storage vessel, (−);
$\theta_{as,stor,amb,m}$	the monthly average ambient temperature of the storage vessel, in °C. Equal to 18 °C;
t_m	the length of the month in question, in Ms, see Table 1;
$Q_{heat,gross,x,m}$	the monthly gross energy requirement for space heating by installation x, determined in accordance with §2.1.3.1, in MJ.
$Q_{heat,gross,x,m}$	the monthly gross energy requirement for space heating by installation x, determined in accordance with §2.1.3.1, in MJ.
$Q_{as,woL,water,m}$	the monthly useful energy for sanitary hot water that can be supplied by the solar thermal system, without the losses of the storage vessel, as provided for in §2.1.6.3 in MJ.

Determine the total heat transfer coefficient of the storage vessel, $H_{as,stor}$, as follows:

If $V_{as,stor} \leq 2000$:

Eq. 287 $$H_{as,stor} = \frac{31 + 16{,}66 \,.\, V_{as,stor}^{0{,}4}}{45}$$ (W/K)

In all other cases:

Eq. 288 $$H_{as,stor} = \frac{16{,}66 + 8{,}33 \,.\, V_{as,stor}^{0{,}4}}{45}$$ (W/K)

Where:

$V_{as,stor}$	the total volume of the storage vessel in the solar thermal system (including any part heated by a back-up heater) in litres.

1.1.1.4 Monthly useful space-heating energy from the solar thermal system

Determine the monthly useful space-heating energy from the solar thermal system, if:

Eq. 289

$$Q_{\text{as,out,heat,m}} = \max\left\{0; \begin{pmatrix} 1{,}111 \cdot Y_{\text{as,heat,m}} - 0{,}070 \cdot X_{\text{as,heat,m}} \\ -0{,}265 \cdot Y^2_{\text{as,heat,m}} + 0{,}002 \cdot X^2_{\text{as,heat,m}} \\ +0{,}023 \cdot Y^3_{\text{as,heat,m}} \end{pmatrix} \cdot Q_{\text{heat, gross,x,m}}\right\} \quad \text{(MJ)}$$

Where:

$Y_{as,heat,m}$	the monthly value for the auxiliary variable Y for space heating support by the solar thermal system, as defined in §2.1.6.4.2, (−);
$X_{as,heat,m}$	the monthly value for the auxiliary variable X for space heating support by the solar thermal system, as defined in §2.1.6.4.1 (−);
$Q_{heat,gross,x,m}$	the monthly gross energy requirement for space heating by installation x, determined in accordance with §2.1.3.1, in MJ.

1.1.1.4.1 Auxiliary variable X for space heating support by the solar thermal system

Determine the monthly value for the auxiliary variable X for space-heating support by the solar thermal system if:

Eq. 290

$$X_{\text{as,heat,m}} = \frac{0{,}9 \cdot A_{as} \cdot H_{\text{as,loop}} \cdot \left(88{,}75 - \theta_{\text{e,m}}\right) \cdot f_{\text{as,stor}} \cdot t_m}{Q_{\text{water,gross,x,m}} + Q_{\text{heat,gross,x,m}}} \quad \text{(-)}$$

Where:

A_{as}	the aperture area of the collector in the solar thermal energy system, determined according to the standard NBN EN ISO 9488, in m²;
$H_{as,loop}$	the heat transfer coefficient of the collector circuit (collector+pipes), as defined in §2.1.6.3.1, in W/(m².K);
$\theta_{e,m}$	the monthly average outdoor temperature for heating calculation, in °C, see Table 1;
$f_{as,stor}$	the correction factor for the capacity of the storage vessel, as defined in §2.1.6.3.1, (−);
t_m	the length of the month in question, in Ms, see Table 1;
$Q_{heat,gross,x,m}$	the monthly gross energy requirement for space heating by installation x, determined in accordance with §2.1.3.1, in MJ.
$Q_{water,gross,x,m}$	the monthly gross energy requirement for sanitary hot water by installation x, determined in accordance with §2.1.3.3, in MJ;

1.1.1.4.2 Auxiliary variable Y for space-heating support by the solar thermal system

Determine the monthly value for the auxiliary variable Y for space-heating support by the solar thermal system if:

Eq. 291 $$Y_{as,heat,m} = \frac{0,9 \cdot \left[A_{as} \cdot I_{as,m,shad} \cdot IAM \cdot \eta_0 \right]}{Q_{water,gross,x,m} + Q_{heat,gross,x,m}}$$ (-)

Where:

A_{as}	the aperture area of the collector in the solar thermal energy system, determined according to the standard NBN EN ISO 9488, in m²;
$I_{as,m,shad}$	the sunshine on the collector for the month under consideration, taking into account shading, as determined in Table 31, in MJ/m²;
IAM	the angular dependency coefficient, depending on the collector type, see Table 89;
η_0	the return of the collector if there is no heat loss to the environment, depending on the collector type, Table 89;
$Q_{heat,gross,x,m}$	the monthly gross energy requirement for space heating by installation x, determined in accordance with §2.1.3.1, in MJ.
$Q_{water,gross,x,m}$	the monthly gross energy requirement for sanitary hot water by installation x, determined in accordance with §2.1.3.3, in MJ;

4.7 §2.1.7

Eq.151 is replaced by

*Eq. 151 $f_{\text{fans,hyg,m}} = f_{\text{reduc,vent,heat,k}}$ (-)

Where:

$f_{\text{reduc,vent,heat,k}}$ a reduction factor valid for ventilation system k as defined in §2.1.2.5.1.2, (−);*

4.8 §2.1.8

Table 64 is replaced by

Technology	$p_{light,type}$
Unknown	*0.020
Other technology	0.020
Incandescent lamp or (eco) halogen lamp	0.020*
No fixed lighting in the room	0.020
Compact fluorescent lamp	0.020
High-pressure gas discharge lamp	0.016
Tubular fluorescent lamp, other than type T5	0.016
Tubular fluorescent lamp, type T5	0.012
Led	0.010

4.9 §3.1.1

The first subparagraph is replaced by:

*The energy label is determined on the basis of the indicator I_{LTD}, as laid down in the main text of this Decree. This indicator indicates which percentage of the unit's energy use already meets the long-term target. It concerns the total energy use of the unit, not just the building-related energy use as calculated in the energy score. The indicator I_{LTD} is determined on the basis of measured values of energy consumption.

The long-term target for non-residential buildings is carbon neutrality, both <u>renewable energy use</u> and the <u>recovery of waste heat and cold (also called residual heat)</u>, is covered by carbon-neutral energy use.

Energy consumption is considered (partly) renewable if:

4.10 §3.2 is replaced by:

*Electricity can be divided into two types: renewable and non-renewable electricity. Heat can be divided into four types: renewable non-residual heat, renewable residual heat, non-renewable residual heat and non-renewable non-residual heat. For the sake of simplicity, what follows refers to renewable heat, non-renewable heat and residual heat, these include the following of the above types of heat:

- Renewable heat = renewable non-residual heat AND renewable residual heat
- Residual heat or waste heat = non-renewable residual heat
- Non-renewable heat = non-renewable non-residual heat

*The long-term target indicator is calculated as the ratio of the renewable energy used *and residual heat up to total energy consumption:

Eq. 292 $$I_{LTD} = \frac{E_{LTD}}{E_{TOT}} = \frac{E_H + E_A}{E_H + E_N + E_A}$$ [-]

Where:

*I_{LTD}	Long-term target indicator	[-]
*E_{LTD}	Carbon neutral energy use	[kWh]
E_H	Net renewable energy consumed (supplied – exported) over the measurement period	[kWh]
*E_A	Net waste heat consumed (supplied – exported) over the measurement period	[kWh]
E_N	Net non-renewable energy consumed (supplied – exported) over the measurement period	[kWh]

*The long-term target is 1 (or 100 %) when the unit complies with the LTD.

Building units usually need both electricity and heat. *Heat requirement includes both the need for the supply of heat (heating) and the removal of heat (cooling). Renewable heat/cold or residual heat cannot be used to compensate for non-renewable electricity, or vice versa. To understand the extent to which the electricity and heat requirements of the building unit *already meet the long-term target, the indicators for the long-term heat and electricity targets can be determined separately:

Eq. 293 $$I_{LTD,w}=\frac{E_{H,w}+E_A}{E_{H,w}+E_{N,w}+E_A}$$ [-]

Eq. 294 $$I_{LTD,el}=\frac{E_{H,el}}{E_{H,el}+E_{N,el}}$$ [-]

Furthermore, $I_{Ltd,w}$ can be split into renewable heat and residual heat:

Eq. 295 $$I_{LTD,w,H}=\frac{E_{H,w}}{E_{H,w}+E_{N,w}+E_A}$$ [-]

Eq. 296 $$I_{LTD,w,A}=\frac{E_A}{E_{H,w}+E_{N,w}+E_A}$$ [-]

Where:

*$I_{LTD,w}$	Indicator of long-term heat demand	[-]
$E_{H,w}$	Net renewable heat consumed (supplied – exported) over the measurement period	[kWh]
*E_A	Net waste heat consumed (supplied – exported) over the measurement period	[kWh]
$E_{N,w}$	Net non-renewable heat consumed (supplied – exported) over the measurement period	[kWh]
*$I_{Ltd,el}$	Indicator of long-term electricity requirement target	[-]
$E_{H,el}$	Net renewable electricity consumed (supplied – exported) over the measurement period	[kWh]
$E_{N,el}$	Net non-renewable electricity consumed (supplied – exported) over the measurement period	[kWh]
*$I_{LTD,w}$	Indicator for long-term renewable heat target	[-]
*$I_{LTD,w}$	Indicator for long-term residual heat target	[-]

For the determination of *$I_{LTD,w}$ the following flows and local producers are included: heat network, *external cold supply, gas distribution network, boiler, heater, heat pump, *residual heat recovery, electric compression chillers, geo-cooling open system, geo-cooling closed system and free chilling by air, heat generated by CHP, solar boiler and outgoing heat flow.

For the determination of *$I_{LTD,el}$ the following flows and local producers are included: distribution network electricity, electricity generated by CHP, PV panels, wind and
hydropower and outgoing electrical power.

In order to assess the importance of heat and electricity in total energy consumption, the proportion of heat and electricity in the total energy consumption is determined:

Eq. 216 $$A_w=\frac{E_{H,w}+E_{N,w}+E_A}{E_H+E_N+E_A}$$ [-]

Eq. 217 $$A_{el}=\frac{E_{H,el}+E_{N,el}}{E_H+E_N+E_A}$$ [-]

Where:

A_w	Share of heat demand in total energy use	[-]
$E_{H,w}$	Net renewable heat consumed (supplied – exported) over the measurement period	[kWh]
$E_{N,w}$	Net non-renewable heat consumed (supplied – exported) over the measurement period	[kWh]
E_A	Net waste heat consumed (supplied – exported) over the measurement period	[kWh]
E_H	Net renewable energy consumed (supplied – exported) over the measurement period	[kWh]
E_N	Net non-renewable energy consumed (supplied – exported) over the measurement period	[kWh]
A_{el}	Share of electricity demand in total energy consumption	[-]
$E_{H,el}$	Net renewable electricity consumed (supplied – exported) over the measurement period	[kWh]
$E_{N,el}$	Net non-renewable electricity consumed (supplied – exported) over the measurement period	[kWh]

For, renewable electricity production often more is produced than is currently used. Own use of electricity indicates how much of the locally produced renewable electricity is used in the unit itself:

Eq. 218 $$A_{eigen,el} = \frac{E_{H,el}}{E_{H,el} + \sum_n \sum_X E_{H,el,we,\exp,n,X}}$$ [-]

Where:

$A_{own,el}$	Self-use of renewable electricity production	[-]
$E_{H,el}$	Net renewable electricity consumed (supplied – exported) over the measurement period	[kWh]
$E_{H,el,we,exp,n,X}$	Weighted renewable electricity exported over the measurement period for network n, and by producer X as defined in §3.4.2.	[kWh]

4.11 §3.3 is replaced by:

The carbon return is calculated as the ratio between total energy consumption and total CO_2 emissions:

Eq. 219 $$KE = \frac{E_H + E_N + E_A}{E_{H,CO_2} + E_{N,CO_2} + E_{A,CO_2}}$$ [kWh/kg CO2]

Applicable here:

CE	Carbon return	[kWh/kg CO2]
E_H	Net renewable energy consumed (supplied – exported) over the measurement period	[kWh]
E_N	Net non-renewable energy consumed (supplied – exported) over the measurement period	[kWh]
*E_A	Net waste heat consumed (supplied – exported) over the measurement period	[kWh]
$E_{H,CO2}$	CO2 emissions from the net renewable energy consumed (supplied – exported) over the measurement period, determined as E_H where the weighting factor $f_{H,we,del,t}$ is equal to f_{CO2} as outlined in Table 70 (and not 1)	kg CO_2

$E_{N,CO2}$	CO2 emissions from the net non-renewable energy consumed (supplied – exported) over the measurement period determined as E_N where the weighting factor $f_{N,we,del,t}$ equal to f_{CO2} as set out in Table 70 (and not 1)	kg CO_2
*$E_{A,CO2}$	CO2 emissions from the net waste heat consumed (supplied – exported) over the measurement period determined as E_A where the weighting factor $f_{A,we,del,t}$ equal to f_{CO2} as outlined in Table 70 (and not 1)	kg CO_2

Table 70: CO_2 factor f_{CO2} for the determination of carbon return, in kg CO_2/kWh

Energy carrier	**f_{CO2} [kg CO_2/kWh]**
Coal	0.36
Diesel oil/gas oil (light fuel oil)	0.29
Heavy fuel oil	0.29
Liquid biofuel	0.28
Propane	0.22
Natural gas low calorific	0.22
Natural gas high calorific	0.22
Methane	0.22
Butane	0.22
Hydrogen gas	0.22
Biogas	0.1
Wood (pellets or chopped) and other biomass	0.04
Electricity from electricity network	0.64
Electricity from local generation PV, wind or water	0
Heat from heat network	0.26
Heat from solar boiler	0
*Residual heat recovered on the site	0
*Environmental heat absorbed by heat pump in heating mode	0
*Heat extracted by chiller or heat pump in cooling mode	0
Other or unknown	0.64

4.12 §3.4

Under Eq. 221 is entered as follows:

Eq. 297 $$E_A = \sum_X max\left(0; E_{A,we,del,X} - E_{A,we,\exp,X}\right)$$ [kWh]

Where

*$E_{A,we,del,X}$	Weighted quantity of waste heat supplied over the measurement period by producer X	[kWh]
*$E_{A,we,exp,X}$	Weighted quantity of waste heat exported by producer X over the measurement period	[kWh]

§3.4.1

Under Eq.223, the following is inserted:

*Eq. 298 $E_{A,we,del,X}$ ¿ $\sum_{t} E_{A,del,X,t} \cdot f_{A,we,del,t}$ [kWh]

¿ ¿

Where

*$E_{A,del,X,t}$	Residual heat supplied over the measurement period by producer X with energy carrier t	[kWh]
*$f_{A,we,del,t}$	A residual heat weighting factor, based on energy carrier t, conventionally equal to 1	[-]

The text between Figure 1 and Eq. 228 is replaced by

*For producers that are not heat pumps or chillers, the division between primary and secondary sides can be derived from Figure 1. this depends on the operating mode (heating or cooling).

For a heat pump in heating mode the ambient heat absorbed is seen as the primary side, the absorbed electricity or gas to power the heat pump sit on the secondary side as shown in the figure below. Since the heat pump absorbs this flow on the secondary side instead of emitting it, this is seen as a negative flow.

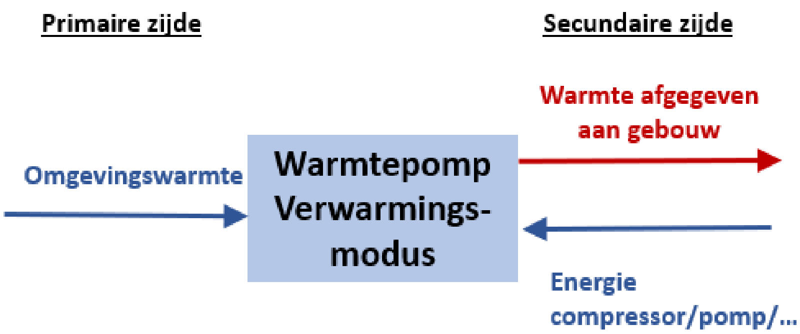


Figure 2: possible measurement locations *heat pump in heating mode

Primaire zilje	Primary side
Secundaire zijje	Secondary side
Omgevingwarmte	Ambient heat
Warmtepomp	Heat pump
Verwarmings-modus	Heating mode
Warmte afgegeven aan gebouw	Heat emitted to building
Energie compressor/pomp/...	Energy compressor/pump/etc.

For a refrigerating machine[1] whether heat pump is in cooling mode, the heat extracted from the building is seen as the primary side, the electricity absorbed to power the device and the heat emitted to the environment sit on the secondary side, as shown in the figure below. The electricity absorbed here is also seen as a negative flow.

[1] Any system that extracts heat from the building and falls within the scope of application as laid down in the inspection protocol. This can be both an active cooling device (e.g. compression chiller) and free cooling (e.g. free cooling via soil heat exchanger).

*Figure 3: possible measurement locations for a chiller or heat pump in cooling mode

Primaire zilje	Primary side
Secundaire zijje	Secondary side
Warmte onttrokken aan gebouw	Heat extracted from the building
Warmte afgegeven aan omgeving	Heat emitted to the environment
Koelmachine	Refrigerating machine
Energie compressor/pomp/...	Energy compressor/pump/etc.

The energy supplied to the unit by producer X is determined as:

- For a measurement value recorded at the primary measurement location:

Eq. 224 $$E_{H,del,X,t} = M_{p,X} \cdot C_t \cdot F_H$$ ¿ [kWh]

Eq. 225 $$E_{N,del,X,t} = M_{p,X} \cdot C_t \cdot (1 - F_H - F_A)$$ ¿ [kWh]

*Eq. 299 $$E_{A,del,X,t} = M_{p,X} \cdot C_t \cdot F_A$$ ¿ [kWh]

- For a measurement value recorded at the secondary measurement location:

Eq. 226 $$E_{H,del,X,t} = \frac{M_{s,X} \cdot F_H}{\eta_{X,t}}$$ ¿ [kWh]

Eq. 227 $$E_{N,del,X,t} = \frac{M_{s,X} \cdot (1 - F_H - F_A)}{\eta_{X,t}}$$ ¿ [kWh]

*Eq. 300 $$E_{A,del,X,t} = \frac{M_{s,X} \cdot F_A}{\eta_{X,t}}$$ ¿ [kWh]

Where

$E_{H,del,X,t}$	Quantity of renewable energy supplied over the measurement period by producer X with energy carrier t;	[kWh]
$E_{N,del,X,t}$	Quantity of non-renewable energy supplied over the measurement period by producer X with energy carrier t;	[kWh]
*$E_{A,del,X,t}$	Quantity of residual heat supplied over the measurement period by producer X	[kWh]

	with energy carrier t;	
$M_{p,X}$	Measurement value at the primary location of producer X for the energy carrier;	[Depending on energy carrier]
$M_{s,X}$	Measurement value at the secondary location of producer X for the energy carrier;	[Depending on energy carrier]
C_t	Correction factor to convert measurement value of energy carrier to [kWh] as defined in §3.4.3, compared to the upper combustion value;	[Depending on energy carrier]
F_H	Fraction of measured value that can be seen as renewable as laid down in §3.4.4;	[-]
F_A	Fraction of measured value that can be seen as residual heat as laid down in §3.4.4;	[-]
$\eta_{X,t}$	Return of producer X for energy carrier t, as laid down in §3.4.5.	[-]

If both measurement values for the primary and secondary measurement location are available, the $E_{del,X}$ will be determined on the basis of the measurement value recorded at the primary location.

If several producers of the same type *provide (part of) the heat and/or electricity requirements of the unit and it is physically possible to measure it with one measuring device, and this group of producers may be seen as one producer in the above calculation.

For combined heat and power (CHP), both the supplied electricity and heat can be measured in a secondary measurement. If both measurements are available, they are converted separately into an incoming amount of energy:

- In the case of renewable energy, the lowest value of the two is retained.
- In the case of non-renewable energy, the highest value of the two is retained.

For a heat pump *in heating mode in a secondary measurement, both the electricity or natural gas absorbed and the heat supplied can be measured. It follows from Figure 2 that the electricity or natural gas absorbed on the secondary side is considered a negative flow. If both measurements are available, they are each separately converted to an incoming amount of energy and the lowest value of the two is retained.

*For a chiller or heat pump in cooling mode, both the absorbed electricity and the heat emitted to the environment can be measured in a secondary measurement. If both measurements are available, they are individually converted into an amount of heat extracted from the building and the lowest value of the two is retained.

*For devices that can both heat and cool, such as a reversible heat pump or chiller, the measured values in heating mode and cooling mode are calculated separately, if measurements cannot be distinguished between heating and cooling mode measurements, the renewable energy use for both modes cannot be determined separately. In this case, renewable energy consumption is determined twice: once based on the measurements in continuous cooling mode, over the entire measurement period, and once based on the measurements in continuous heating mode. Then the lowest value of both is used in the further calculation.

For cogeneration, the total energy supplied may be divided into a contribution for heat and a contribution for electricity:

4.13 §3.4.2 is replaced by:

The quantity exported over the measurement period * residual heat, renewable and non-renewable energy is determined as:

Eq. 232	$E_{H,we,\exp,X}=\sum_{n}\left(E_{H,el,we,\exp,n,X}+E_{H,w,we,\exp,n,X}\right)$ ¿	[kWh]
Eq. 233	$E_{N,we,\exp,X}=\sum_{n}\left(E_{N,el,we,\exp,n,X}+E_{N,w,we,\exp,n,X}\right)$ ¿	[kWh]
*Eq. 301	$E_{A,we,\exp,X}=\sum_{n}E_{A,we,\exp,n,X}$ ¿	[kWh]

Where:

$E_{H,el,we,exp,n,X}$	Weighted renewable electricity exported over the measurement period for network n and producer X	[kWh]
$E_{H,w,we,exp,n,X}$	Weighted renewable heat *or cold exported over the measurement period for network n and by producer X	[kWh]
$E_{N,el,we,exp,n,X}$	Weighted non-renewable electricity exported over the measurement period for network n and producer X	[kWh]
$E_{N,w,we,exp,n,X}$	Weighted non-renewable heat exported over the measurement period *or cold for network n and by producer X	[kWh]
*$E_{A,we,exp,n,X}$	Weighted residual heat exported over the measurement period for network n and by producer X	[kWh]

All networks n in the building of which exported energy is measured must be aggregated.

The measured heat exported, *cold and/or electricity from different producers (*residual heat, renewable or non-renewable). In this case, the exported energy is distributed among the producers in proportion to their energy produced. For the exported energy, only those producers that are on the same network as the exported electricity can be counted.

Where it is not known which producers are linked to network n, it is assumed that all producers of *residual heat and renewable energy of this type (i.e heat/*cold or electricity) are connected to this network. If there is no *residual heat or renewable local producers are of this type, this exported electricity is ignored in the calculation.

*For producers that are not a heat pump or chiller, the weighted exported heat and electricity is determined as:

Eq. 234	$E_{H,el,we,\exp,n,X}=f_{H,\exp,el,t,X,n}\frac{M_{\exp,el,n}}{\left(\eta_{X,t,el}+\eta_{X,t,w}\right)}f_{H,we,del,t}$	[kWh]
Eq. 235	$E_{N,el,we,\exp,n,X}=f_{N,\exp,el,t,X,n}\frac{M_{\exp,el,n}}{\left(\eta_{X,t,el}+\eta_{X,t,w}\right)}f_{N,we,del,t}$	[kWh]
Eq. 236	$E_{H,w,we,\exp,n,X}=f_{H,\exp,w,t,X,n}\frac{M_{\exp,w,n}}{\left(\eta_{X,t,el}+\eta_{X,t,w}\right)}f_{H,we,del,t}$	[kWh]

Eq. 237 $$E_{N,w,we,\exp,n,X}=f_{N,\exp,w,t,X,n}\frac{M_{\exp,w,n}}{(\eta_{X,t,el}+\eta_{X,t,w})}f_{N,we,del,t}$$ [kWh]

*Eq. 302 $$E_{A,we,\exp,n,X}=f_{A,\exp,t,X,n}\frac{M_{\exp,w,n}}{(\eta_{X,t,el}+\eta_{X,t,w})}f_{A,we,del,t}$$ [kWh]

*For electric heat pumps in heating mode, the exported heat can be traced back to part exported ambient heat and part exported electricity. The exported heat is assigned to the network n to which the heat pump supplies heat, the exported electricity is viewed as energy use outside the unit and calculated as set out in section 3.4.7.

*Eq. 303 $$E_{H,el,we,\exp,n,X}=f_{H,\exp,el,t,X,n}\frac{M_{\exp,w,n}}{SPF}f_{H,we,del,t}$$ [kWh]

*Eq. 304 $$E_{N,el,we,\exp,n,X}=f_{N,\exp,el,t,X,n}\frac{M_{\exp,w,n}}{SPF}f_{N,we,del,t}$$ [kWh]

*Eq. 305 $$E_{H,w,we,\exp,n,X}=f_{H,\exp,w,t,X,n}\frac{M_{\exp,w,n}}{\eta_{X.t.w}}f_{H,we,del,t}$$ [kWh]

*Eq. 306 $$E_{N,w,we,\exp,n,X}=f_{N,\exp,w,t,X,n}\frac{M_{\exp,w,n}}{\eta_{X.t.w}}f_{N,we,del,t}$$ [kWh]

*Eq. 307 $$E_{A,we,\exp,n,X}=f_{A,\exp,t,X,n}\frac{M_{\exp,w,n}}{\eta_{X.t.w}}f_{A,we,del,t}$$ [kWh]

For gas heat pumps in heating mode, the exported heat can be traced back to part exported ambient heat $E_{H,w,we,exp,n,X}$ and some exported heat from gas $E_{N,w,we,exp,n,X}$. The exported ambient heat is assigned to the network n to which the heat pump supplies heat, the exported heat from gas is assigned to a notional network linked to all incoming flows of the type of gas (natural gas, propane, butane, etc.).

*Eq. 308 $$E_{H,w,we,\exp,n,X}=f_{H,\exp,w,t,X,n}\frac{M_{\exp,w,n}}{\eta_{X.t.w}}f_{H,we,del,t}$$ [kWh]

*Eq. 309 $$E_{N,w,we,\exp,n,X}=f_{N,\exp,w,t,X,n}\frac{M_{\exp,w,n}}{SPF}f_{N,we,del,t}$$ [kWh]

*Eq. 310 $$E_{A,we,\exp,n,X}=f_{A,\exp,t,X,n}\frac{M_{\exp,w,n}}{\eta_{X.t.w}}f_{A,we,del,t}$$ [kWh]

For electric chillers or heat pumps in cooling mode, the exported cold can be traced back to a part exported cold and part exported electricity. The exported cold is assigned to the network n to which the refrigerating machine or heat pump supplies cold, the exported electricity is seen as energy use outside the unit and calculated in accordance with paragraph 3.4.7.

Eq. 311	$E_{H,el,we,exp,n,X} = f_{H,exp,el,t,X,n} \frac{M_{exp,w,n}}{SEER} f_{H,we,del,t}$		[kWh]
Eq. 312	$E_{N,el,we,exp,n,X} = f_{N,exp,el,t,X,n} \frac{M_{exp,w,n}}{SEER} f_{N,we,del,t}$		[kWh]
Eq. 313	$E_{H,w,we,exp,n,X} = f_{H,exp,w,t,X,n} \frac{M_{exp,w,n}}{\eta_{X.t.w}} f_{H,we,del,t}$		[kWh]
Eq. 314	$E_{N,w,we,exp,n,X} = f_{N,exp,w,t,X,n} \frac{M_{exp,w,n}}{\eta_{X.t.w}} f_{N,we,del,t}$		[kWh]

Where:

$f_{H,exp,el,t,X,n}$	The renewable share of each producer X with energy carrier t in the exported electricity for network n	[-]
$M_{exp,el,n}$	Measured value of the exported electricity for network n	[kWh]
$\eta_{X,t,el}$	Electrical generation return for producer X and energy carrier t, determined in accordance with §3.4.5.	[-]
$\eta_{X,t,w}$	Thermal generation return for producer X and energy carrier t, determined in accordance with §3.4.5.	[-]
$f_{H,we,del,t}$	A weighting factor for renewable energy based on energy carrier t, conventionally equal to 1	[-]
$f_{N,exp,el,t,X,n}$	The non-renewable share of each producer X with energy carrier t in the exported electricity for network n	[-]
$f_{N,we,del,t}$	A weighting factor for non-renewable energy based on energy carrier t, conventionally equal to 1	[-]
$f_{H,exp,w,t,X,n}$	The renewable share of each producer X with energy carrier t in the exported heat*/cold for network n	[-]
*$f_{A,exp,t,X,n}$	The residual heat share of each producer X with energy carrier t in the exported heat for network n	[-]
*$f_{A,we,del,t}$	A weighting factor for residual heat based on energy carrier t, conventionally equal to 1	[-]
$M_{exp,w,n}$	Measurement value of the exported heat*/cold for network n	[kWh]
$f_{N,exp,w,t,X,n}$	The non-renewable share of each producer X with energy carrier t in the exported heat*/cold for network n	[-]
*SPF	The (measured) seasonal performance factor of the heat pump in heating mode, determined in accordance with §3.4.5.	[-]
*SEER	The (measured) seasonal energy return of the chiller or heat pump in cooling mode, determined in accordance with §3.4.5.	[-]

The share of exported energy flow of each producer X for network n is determined as:

Eq. 238	$f_{H,exp,el,X,t,n} = \frac{E_{H,del,el,X,t}}{\sum\sum(E¿¿H,del,el,X,t+E_{N,del,el,X,t})¿}$	[-]
Eq. 239	$f_{N,exp,el,X,t,n} = \frac{E_{N,del,el,X,t}}{\sum\sum(E¿¿H,del,el,X,t+E_{N,del,el,X,t})¿}$	[-]
Eq. 240	$f_{H,exp,w,X,t,n} = \frac{E_{H,del,w,X,t}}{\sum\sum(E¿¿H,del,w,X,t+E_{N,del,wX,t}+E_{A,del,wX,t})¿}$	[-]
Eq. 241	$f_{N,exp,w,X,t,n} = \frac{E_{N,del,w,X,t}}{\sum\sum(E¿¿H,del,w,X,t+E_{N,del,w,X,t}+E_{A,del,wX,t})¿}$	[-]

*Eq. 315 $$f_{A,\exp,X,t,n} = \frac{{}_{A,del,w,X,t}}{\sum\sum\left(E ¿¿ H,del,w,X,t + E_{N,del,wX,t} + E_{A,del,wX,t}\right) ¿}$$ [-]

There must be aggregation on generators X coupled with network n.
Where:

$E_{H,del,el,X,t}$	Renewable electricity supplied with producer X and energy carrier t	[kWh]
$E_{,N,del,el,X,t}$	Non-renewable electricity supplied with producer X and energy carrier t	[kWh]
$E_{H,del,w,X,t}$	Supplied renewable heat */cold with producer X and energy carrier t	[kWh]
$E_{N,del,w,X,t}$	Supplied non-renewable heat */cold with producer X and energy carrier t	[kWh]
*$E_{A,del,w,X,t}$	Residual heat supplied with producer X and energy carrier t	[kWh]

The heat, *cold and/or electricity supplied from each producer is equal to:

- For heat or electricity: the measured value at the producer's secondary measurement location. *For a heat pump, only the heat supplied is considered. For producers for which only a measurement value is available at the primary location, this is determined on the basis of the return and the energy supplied per producer:

Eq. 242 $$E_{H,del,el,X,t} = E_{H,del,X,t} \cdot \eta_{X,t,el}$$ [kWh]

Eq. 243 $$E_{N,del,el,X,t} = E_{N,del,X,t} \cdot \eta_{X,t,el}$$ [kWh]

Eq. 244 $$E_{H,del,w,X,t} = E_{H,del,X,t} \cdot \eta_{X,t,w}$$ [kWh]

Eq. 245 $$E_{N,del,w,X,t} = E_{N,del,X,t} \cdot \eta_{X,t,w}$$ [kWh]

*Eq. 316 $$E_{A,del,X,t} = E_{A,del,X,t} \cdot \eta_{X,t,w}$$ [kWh]

- * For cold: the measured (or calculated) value at the producer's primary measurement location.

*The renewable and non-renewable part of the measured value is determined by multiplying the renewable fraction F_H and $(1-F_H)$, respectively.

Where:

$E_{H,del,X,t}$	Renewable energy (heat and electricity) supplied with producer X and energy carrier t, determined in accordance with §3.4.1	[kWh]
$E_{N,del,X,t}$	Supplied non-renewable energy (heat and electricity) with producer X and energy carrier t, determined in accordance with § 3.4.1	[kWh]
*$E_{A,del,X,t}$	Residual heat supplied with producer X and energy carrier t, determined in accordance with §3.4.1	[kWh]
$\eta_{X,t,w}$	Thermal generation return for producer X and energy carrier t, determined in accordance with §3.4.5	[-]
$\eta_{X,t,el}$	Electrical generation return for producer X and energy carrier t, determined in accordance with §3.4.5.	[-]

4.14 §3.4.4 is replaced by:

For heaters, boilers and CHPs, the value of F_H for the heat produced and or electricity, the same as the energy carrier used, as outlined in Table 72. *The value of F_A for generators not listed in the table below is always 0.

For the other producers F_H *and F_A, as outlined in table 72.

Table 72: renewable fraction F_H *and residual heat fraction F_A

Energy carrier	F_H	*F_A
Coal	0	*0
Fuel oil		
• Fuel oil (light)	0	*0
• Fuel oil (heavy)	0	*0
Liquid biofuel	1	*0
Gas		
• Propane	0	*0
• Natural gas – low calorific	0	*0
• Natural gas – high caloric	0	*0
• Methane	0	*0
• Butane	0	*0
• Hydrogen	0	*0
• Biogas	1	*0
Wood (pellets or chopped) and other biomass	1	*0
Electricity from distribution network	0	*0
Electricity from PV, wind or hydropower	1	*0
*Heat from heat network	Renewable share of external heat-supply system (1)	Share of non-renewable residual heat from system external heat supply
*Cold from cold network	Renewable share of external cold supply system (1)	Share of non-renewable residual cold system external heat supply
Heat from solar boiler	1	*0
*Environmental heat absorbed by heat pump in heating mode	1	*0
*Residual heat recovered via heat pump in heating mode	0	*1
*Direct residual heat recovery	0	*1
*Heat extracted by electric compression chiller, heat pump in cooling mode or geo-cooling open system	$Max\left(0; Min\left(1; \frac{SPF_{p,x} - SPF_{p,low}}{SPF_{p,high} - SPF_{p,low}}\right)\right)$ (2)	*0

(1) Determined and substantiated in the same way as in the EPB regulations and as laid down by the Minister. This can be any value between 0 and 1, including values 0 and 1. The value in the absence is 0 (completely non-renewable).

(2) With $SPF_{p,low}$ = 1.4; $SPF_{P,high}$ = 6 and SPF_P determined as recorded below.

*The primary seasonal return $SPF_{P,x}$ for producer X is determined as:

Eq. 317 $$SPFp,x = \frac{SEER}{f_p} - F(1) - F(2)$$ [-]

Where:

SEER Seasonal energy return of producer X (chiller or heat pump) in cooling [-]

	mode, determined in accordance with §3.4.5:	
FP	The average ratio between primary energy consumption for electricity production and total gross electricity production in the EU, conventionally equal to 2.5;	[-]
F(1)	Correction factor as laid down in (EU) 2016/2281, equal to 0.03 for space cooling and 0 for process cooling;	[-]
F(2)	Correction factor as laid down in (EU) 2016/2281, equal to 0.05 for space cooling and 0 for process cooling;	[-]

A device used for both space cooling and process cooling is calculated as space cooling device in the formula above.

4.15 §3.4.5 is replaced by:

A distinction is made between the thermal and electrical return of a producer. Most producers have only one of the two returns, *a CHP, heat pump in heating or cooling mode and chiller have both thermal and electrical return.

*For a producer where measurements are available for at least two measurement locations the electrical and thermal return is derived from this.

- For producer X that is not a heat pump *or chiller: determined as:

Eq. 246 $$\eta_{X,t,el}=\frac{M_{s,X,el}}{M_{p,X}\cdot C_t}$$ [-]

Eq. 247 $$\eta_{X,t,w}=\frac{M_{s,X,w}}{M_{p,X}\cdot C_t}$$ [-]

- For producer X that is a heat pump *or chiller , in principle, one speaks of a drive return rather than an electric return. *For one heat pump in heating mode the drive return and thermal return are determined as:

Eq. 248 $$\eta_{X,t,el}=\frac{-1}{SPF-1}$$ [-]

Eq. 249 $$\eta_{X,t,w}=\frac{SPF}{SPF-1}$$ [-]

- *For producer X that is a chiller or heat pump in cooling mode, drive return and thermal return are determined as:

Eq. 318 $$\eta_{X,t,el}=\frac{-1}{SEER}$$ [-]

Eq. 319 $$\eta_{X,t,w}=\frac{SEER+1}{SEER}$$ [-]

Where:

$M_{s,X,el}$	Electricity measured at the secondary location of producer X	[kWh]
$M_{p,X}$	Measurement value at the primary location of producer X	[Depending on

		energy carrier]
C_t	Correction factor to convert measurement value of energy carrier to [kWh] as defined in §3.4.3, relative to the upper combustion value	[Depending on Energy carrier]
$M_{s,X,w}$	Heat measurement value at the secondary location of producer X	[kWh]
SPF	The (measured) seasonal performance factor of the heat pump *in heating mode, determined as defined below	[-]
*SEER	The (measured) seasonal energy return of the chiller or heat pump in cooling mode, determined as defined below	[-]

For an electric heat pump, the SPF *and SEER determined as below. When only a measurement value at the primary location and one secondary location is known, the measurement value at the second secondary location can be derived from the second formula (follows from Figure 2 and *Figure 3).

*For electric heat pumps in heating mode:

Eq. 250 $$SPF = \left| \frac{M_{s,X,w}}{M_{s,X,el}} \right|$$ [-]

Eq. 251 $$M_{p,X} = M_{s,X,w} + M_{s,X,el}$$ [kWh]

*For electric chillers or electric heat pumps in cooling mode:

Eq. 320 $$SEER = \left| \frac{M_{p,X}}{M_{s,X,el}} \right|$$ [-]

Eq. 321 $$M_{p,X} = M_{s,X,w} + M_{s,X,el}$$ [kWh]

*For electric chillers or electric heat pumps in cooling mode for process cooling, it is not the SEER but the SEPR. For the sake of simplicity, this document determines both the SEER and the SEPR as is done for the SEER.

For *a gas heat pump in heating mode, the SPF is determined as below. The measurement value at the second secondary location can also be derived here based on the second formula: :

Eq. 252 $$SPF = \left| \frac{M_{s,X,w}}{M_{s,X,gas} \cdot C_t} \right|$$ [-]

Eq. 253 $$M_{p,X} = M_{s,X,w} + M_{s,X,gas} \cdot C_t$$ [kWh]

Where:

$M_{s,X,w}$	Heat measurement in heating mode at the secondary location of producer X, see also Figure 2	[kWh]
$M_{s,X,el}$	Electricity measured in heating mode at the secondary location of producer X, *for a heat pump in heating mode or in cooling mode for a chiller or heat pump in cooling mode	[kWh]
$M_{p,X}$	Measurement value at the primary location of producer X	[Depending on energy carrier]
C_t	Correction factor to convert measurement value of energy carrier to [kWh] as defined in §3.4.3, relative to the upper combustion value	[Depending on Energy carrier]
$M_{s,X,gasl}$	Gas usage measured in heating mode at the secondary location of producer X.	[kWh or m³]

For producers for which measurements are only available in one location, the return is determined as follows:

- As laid down in Table 73 for devices that provide *cooling, space heating and/or humidification, whether or not in combination with the production of sanitary hot water, except electric air/air heat pumps. For heat pumps *in heating mode, the value from this table is the SPF, for chillers and heat pumps in cooling mode the SEER (space cooling) or SPER (process cooling). This still needs to be converted into an electrical and thermal return as defined above.
- Electric air/air heat pumps *in heating mode: here the return is taken equal to the SCOP if it is known and greater than the COP test (if known). In all other cases, the return is determined according to Table 73. The SCOP should be determined in accordance with European Regulation (EU) 206/2012 or (EU) 2016/2281. In both cases, this value is the SPF, which still needs to be converted into an electrical and thermal return as defined above.
- *Electric air/air chillers or heat pumps in cooling mode: here, the return is taken equal to the SEER or SEPR according to the European Regulation (EU) 206/2012 or (EU) 2016/2281. If this value is not known, the return is determined according to Table 73. In both cases, this value is the SEER or SEPR, which still needs to be converted into an electrical and thermal return as defined above.
- As laid down in Table 73:for solar boilers that produce only sanitary hot water
- According to §2.1.5.1 for devices that produce only sanitary hot water and are not solar water heaters. For heat pumps, this particular return is the SPF, which still needs to be converted to an electrical and thermal return as defined above. For all other generators this is the thermal return; if the electrical return also has to be determined for a CHP, this is determined as set out in Table 73.

The energy carrier is assumed as follows when:

- If fuel ‘Heavy fuel oil’ or ‘Diesel oil/gas oil’ was chosen for the producer, the determination of the return is based on ‘Fuel oil’
- If fuel ‘Natural gas: high calorific’, ‘Natural gas: low-calorific, ‘Propane’, ‘Methane’, ‘Butane’, ‘Hydrogen gas’ or ‘Biogas’ were chosen for the determination of the return of ‘(Natural) gas’

Where the same producer operates several installations or units which generate different efficiencies for the same producer, the lowest of these returns is awarded to that producer.

Table 73: Generation return for the calculation of the renewable share, when return cannot be calculated, it is always stated which return is involved

Producer	Return	
	Coupling installation energy score	Value in the absence
Boiler not obtained from biomass, biogas extracted on site or liquid biofuel extracted on site	Thermal return determined according to §2.1.4.2.1 and §2.1.4.2.2	Thermal return according to Table 75
Heater not obtained from biomass, biogas extracted on site or liquid biofuel extracted on site	Thermal return determined according to §2.1.4.2.2	Thermal return according to Table 44
Boiler or stove on biomass, biogas extracted from the site or liquid biofuel extracted on site	Thermal return: 1	
CHP	Thermal and electrical return determined according to §C.1	Thermal and electrical return determined according to §C.1.2 (type CHP 'other')
Electric heat pump *in heating mode with ambient heat as source	SPF determined according to §2.1.4.2.3	SPF according to Table 52
*Residual heat recovery via electric heat pump in heating mode	SPF determined according to §2.1.4.2.3	SPF: 4
Gas absorption heat pump	SPF: 1.2	
Heat pump with gas-powered engine	SPF: 1.2	
Heat pump on gas, type unknown	SPF: 1.2	
*Electric compression chiller or heat pump in cooling mode	SEER = min($\eta_{Gen,cool,m}$) according to §2.1.4.3	SEER determined according to *Table 76
*Geo-cooling, open system	12	
*Geo-cooling, closed system	12	
PV, wind and hydropower	Electrical return: 1	
Solar boiler	Thermal return: 1	
*Residual heat recovery on the site	Thermal return: 1	
Electricity distribution network	Electrical return: 1	
Gas distribution network	Thermal return: 1	
Heat network	Thermal return: 1	

Table 74: value in the absence of generation return boilers, $f_{NCV/GCV}$ as laid down in Table 75

Producer	Energy carrier	Return
Condensing boiler	Gas	$f_{NCV/GCV}$. 1.02
	Fuel oil	$f_{NCV/GCV}$. 0.98
Non-condensing boiler	Gas	$f_{NCV/GCV}$. 0.73
	Fuel oil	$f_{NCV/GCV}$. 0.7
	Coal	$f_{NCV/GCV}$. 0.7

*Table 90: value in the absence of the SEER of refrigerating machines, based on the type

Type of chiller	SEER
Air-cooled air conditioning regulator, or air-cooled multi-split system	2.7
Water-cooled climate regulator, or water-cooled multi-split system	3.0
Heat pump air/water, or air-cooled cooling group for cooling water with or without separate condenser	2.7
Heat pump glycolated water/water, or water-cooled cooling group for cooling water with or without separate condenser	2.9
Thermally powered chiller	0.7
Unknown	2.5

4.16 Annex A

A row is inserted at the bottom of Table 75:

*Direct residual heat recovery	1.00	1.00

4.17 Annex B.1

A row is inserted at the bottom of Table 80:

*Unknown	0.20	1500	0.01*

5 ANNEX 5: EPC NR INSPECTION PROTOCOL

5.1 Paragraph I.2.1.3 is replaced by:

The following types of energy use are seen as carbon neutral, and are included in the counter of I_{LTD}:
- **Renewable electricity** produced and used on own site[2]
- **Renewable heat** produced and used on own site or supplied via external heat supply
- **Residual heat** recovered from own site or supplied via external heat supply

The following techniques are considered **renewable** in determining the energy label in accordance with the European Directive (EU 2018/2001) on the promotion of the production and use of renewable energy:
- Boiler or heater from biomass or biofuel extracted from the site;
- CHP from biomass or biofuel extracted from the site;
- Wind and/or water turbine;
- The renewably generated part of external heat supply;
- 47.78 % of residual heat from waste incineration plants covered by 6.1.10 of the Energy Decree is considered renewable heat;
- Solar boiler;
- PV panels;
- The part of the heat extracted from the environment by a heat pump in heating mode
- Part of the heat extracted by an electric compression chiller, if the primary seasonal return of the device exceeds a lower limit, as determined in the formula structure for the EPC NR.

Residual heat and – cold (or waste heat and cold) is also included in the counter of I_{LTD}, in accordance with EU 2018/2001 (Article 15(3)), this is seen as an equivalent alternative to renewable energy. It is heat produced as an inevitable by-product of a process. After all, using this heat effectively ensures that there are no additional CO_2 – emissions for filling that heat demand. The following flows are considered:
- The part of non-renewable residual heat or cold from the heat supplied to the scope via external heat supply, as defined in Article 1.1.1/3°/0/1 of the Energy Decree[3].
- Heat which is inevitably produced as a by-product in industrial or power generation plants or in the tertiary sector on its own site and whose heat production from this process cannot be controlled according to the heat demand of the scope, where this heat is:
    - the source for a heat pump that serves the scope
    - OR used directly through a system of central heating and/or distribution of sanitary hot water in the scope

5.2 § I.2.1.4 is replaced by:

The following techniques are currently **not** included in the numerator of the indicator I_{LTD} (non-exhaustive list):
- Guarantees of origin (GOO) for green electricity supplied via the electricity network;
- Guarantees of origin for green gas such as biogas or green hydrogen;
- Heat or electricity supplied by devices (on its own site or via external network) on hydrogen (e.g. hydrogen cell) or another 'green' fuel with guarantees of origin;

[2] own site as defined in Article 1.1.3 of the Energy Decree: the cadastral plot or the adjacent cadastral plots of the same natural or legal person as owner, landlord, building owner or concessionaire

[3] the heat or cold inevitably generated as a by-product in industrial or power generating installations or in the tertiary sector, which would end up unused in air or water without connection to a district heating or cooling system, if a cogeneration process has been used or will be used or is not feasible as cogeneration;

5.3 Paragraph 2.5.1 is replaced by:

As described above, not all energy flows (see VI.1 for an overview of the different energy flows) must always be measured. Some measurements are optional. Table 1 gives an overview of the mandatory and possible optional measurements per energy flow. This table is structured in such a way that the lack of certain measurement data provides a conservative estimate of the *energy label.
In concrete terms this means:

- ***Energy flows that meet the long-term target:** Measuring these energy flows is optional when they enter the scope. However, if these incoming energy flows are measured, it is mandatory to also measure all exported energy flows of this type. This is because the energy consumption that meets the requirements should never be overestimated.
- ***Other energy flows**: incoming energy flows that fall outside the above category must always be measured. On the other hand, measurements of exported energy flows of this type are optional. After all, energy consumption that does not meet the long-term target may always be overestimated but not underestimated.

Depending on the situation and the desired label, optional measurements can be interesting and therefore worth the additional investment. This is explained with a number of extensive examples[4]. See VI.1.3 for an overview of possible energy flows. VII.3 provides an overview of the possible measuring locations per generator.

	Incoming energy flow	**Mandatory location(s) measuring point**	**Optional location(s) measuring point**
HEAT	External heat supply (partially) with non-renewable *and non-residual heat	Heat	/
	External heat supply with only renewable and/or residual heat	/	Heat
ELECTRICITY	Electricity via electricity network	Electricity	/
FUEL	Natural gas or other non-renewable fuel	Fuel	/
	Renewable fuel	/	Fuel
	Renewable or non-renewable fuel as propulsion of an emergency generator[5]	/	Fuel
	Locally generated energy flow (other than above)	**Mandatory location(s) measuring point**	**Optional location(s) measuring point**
FUEL	Natural gas or other non-renewable fuel, (exclusively) connected to boiler, heater or CHP and not yet included in the	Provide at least one measuring point (fuel, electricity produced or heat)	Second measuring point (and third measurement point for CHP)

[4] See https://www.vlaanderen.be/epc-pedia

[5] An emergency generator (emergency group) is a device used only in emergency situations to temporarily ensure the security of the power supply to the building unit. A device that is also used outside emergency situations is not an emergency generator.

	measurement of incoming fuel flow		
	Renewable fuel, (only) connected to boiler, stove or CHP and not yet included in measurement of incoming fuel flow	/	Fuel, electricity produced or heat, see measurement points in VII.3.1
HEAT	Solar boiler	/	Heat
	Heat pump *with ambient heat or residual heat as source (1)	/	Ambient heat or residual heat, heat or gas/electricity supplied, see measurement points in VII.3.2
	*Residual heat recuperated directly on the site	/	Heat
	*Cooling machine or reversible heat pump in cooling mode (1)	/	Heat extracted from the building, heat released to the environment or gas/electricity
ELECTRICITY	PV panels, wind or water turbine with reversing counter for injection on network[6]	Electricity (total production)	/
	PV panels, wind or water turbine with digital, AMR or MMR meter for injection on network	/	Electricity (total production)
	Exported energy flow	**Mandatory location(s) measuring point**	**Optional location(s) measuring point**
HEAT	Heat from (partly) renewable source *and/or recovery of residual heat	Exported heat (total for export network) (2)	/
	Heat from completely non-renewable*and non-residual heat source	/	Exported heat (total for export network)
ELECTRICITY	Electricity from (partly) renewable sources	Exported electricity (2)	/
	Electricity from entirely non-renewable sources	/	Exported electricity

(1) *For a reversible heat pump, the extracted heat is calculated separately in heating and cooling mode. The electricity or gas consumption of the heat pump must therefore be measured separately in each mode. If this split (between cooling and heating mode) cannot be made, a conservative estimate is made by the software.

(2) This measurement (injection to the electricity or heat network) is not mandatory when the following two conditions are met

a. The export is 100 % heat or electricity *which meets the long-term target

[6] This is a classic, analogue meter that is mainly found in existing residential units and other small consumers in Flanders. This meter cannot separately record the electricity taken from the network and the electricity is placed back on the network. When a kWh of electricity is injected, the meter reverses and a kWh of electricity is compensated for at another time from the network, hence the name 'reversing counter'. The meter reading annually corresponds to the difference between the electricity actually consumed and the electricity injected into the network over the past period.

b. No generator connected to the export flow is measured for the *energy label

Table 1: overview of mandatory and optional measurements per energy flow

5.4 §II.7.2 is replaced by:

Inspection result

Data collected	Type	Unit	Contained between
Number of meals per service	• unknown • Value	-	1 and →

If it is indicated that the building unit contains a kitchen, the number of prepared meals per service can be entered. This value is used to determine the sanitary hot water use for the kitchen. If this value is not known, an estimate is made based on the surface area of the unit.

5.5 §3.1.5 is replaced by:

Inspection result

Data collected	Type
Generator measured for the *energy label	• Yes • No
*Separate measurements for heating and cooling mode	• Yes • No

The *energy label is determined on the basis of measurements. When at least one energy flow from an entered generator is measured for the determination of the *energy label, 'yes' is ticked here.

Generators measured for the *energy label must always be located on the site and directly connected to the scope. This entry is possible for the following generators:

- Boiler or Heater
- Heat pump
- *Compression chiller, electric
- *Geo-cooling open system, electric
- *Residual heat recovery on site, both directly and via heat pump
- CHP
- PV installation, wind turbine and water turbine
- Solar boiler

All other generators can never be measured in the context of the *energy label, such as ventilation systems and electrical resistance heating.

Example

- *For a fuel oil boiler, the heat produced is measured as part of the determination of the energy label. 'Yes' is checked for this question.*
- *Within a building unit, natural gas is used for a gas boiler and other purposes. No heat is exported. The natural gas consumption of the gas boiler is contained in the total natural gas consumption measured by the utility meter (incoming flow) and should not be measured separately. This generator is therefore not measured separately. 'No' is checked.*

For all generators for which it is indicated that they are measured for the determination of the *energy label, at least one meter must be provided. The measurement values can then be entered. An overview of all minimum mandatory measurements under this EPC is shown in II.5.

*For heat pumps that are reversible, which are measured for the energy label, an additional input field appears, separate measurements for heating and cooling mode. The contribution to the indicator I_{LTD} for the cooling mode and the heating mode of the heat pump is determined in a different way, and for this reason the measurements of a reversible heat pump must be able to distinguish between the measurements in cooling mode and the measurements in heating mode. If this does not occur, please indicate no. If the measurements can be broken down to the heat pump mode, this leads to the best result for the energy label. If the measurements cannot be broken down, the software automatically makes a conservation estimate of the contribution to renewable energy.

5.6 §3.1.6

The second paragraph:

If the energy expert determines the presence of a storage vessel for sanitary hot water, it is entered to the generator responsible for the production of the sanitary hot water. If the same storage vessel is divided by several generators, the energy expert enters the storage vessel only at one of the connected generators. Therefore, the presence of a storage vessel does not have to be provided with every connected generator.

Is replaced by the following:

If the energy expert determines the presence of a storage vessel for sanitary hot water, it is entered to the generator responsible for the production of the sanitary hot water.
*In case the installation for sanitary hot water is fed by several generators:

- If **one unique storage vessel is shared by different generators** in the installation, enter the necessary information about the storage vessel with each generator clock, as requested depending on the type of generator.
- If **a storage vessel is linked to one specific generator** within a sanitary hot water installation, the necessary information about the storage vessel is only entered at the specific generator system to which the storage vessel is connected.
- If it is not possible to determine with certainty which generator(s) the storage vessel is connected to, the storage vessel is assumed to be linked to all generators within the sanitary hot water installation. You therefore enter the information of the storage vessel at each generator, as requested depending on the type of generator.

5.7 §III.3 is inserted:

*III.3 Residual heat recovery on the site

Data to be collected;

Type of residual heat recovery	
Thermal power heat exchanger	()

 : the data is strictly necessary for the application of the method of determination
() : the data is not strictly necessary, this entry can also be checked as ‘unknown’

Recovery of residual heat may only be entered if the residual heat meets the definition in the Energy Decree (see also I.2.1.3). It is therefore only heat as an inevitable by-product of a process that cannot be controlled according to the heat demand. Heat production from a CHP is not included, for example.

Note
Heat recovered on the site can only be seen as residual heat if it has a temperature of 20 °C or more. Heat that has a lower temperature is seen as ambient heat, even if it meets all other requirements for residual heat.

III.3.1 Type of residual heat recovery

Inspection result

Data collected	Type
Type of residual heat recovery	• Direct residual heat recovery • Residual heat recovery with heat pump

Depending on the temperature of the residual heat and the intended application, the recovery can be achieved in several ways:

- Direct residual heat recovery: the heat is used directly, without an intermediate heat pump, possibly with an interchangeable heat exchanger. This is possible when the residual heat is already available at sufficient high temperature for the intended application.
- Residual heat recovery with a heat pump: if the temperature of the residual heat is too low for the intended application, this temperature can be increased by a heat pump. The residual heat then forms the heat source of the heat pump.

It is usually clear whether the source of a heat pump is residual heat or ambient heat (III.5). In case of any doubt about the source of the heat pump, the distinction is made based on the temperature of the source:

- If the temperature of the source does not exceed 20 °C, this concerns a heat pump on ambient heat
- If the temperature of the source is higher than 20 °C, this concerns a heat pump on residual heat

Note
Direct residual heat recovery is only considered if it is used through a system of central heating and/or distribution of sanitary hot water in the scope. Residual heat recovery whereby this is not the case is not counted for the energy label.

III.3.2 Power of the heat exchanger

Inspection result

Data collected	Type	Unit	Contained between
Power of the heat exchanger	• unknown • Value	kW	0.01 and →

Here you specify the power of the heat exchanger used to recover the residual heat, whether or not with a heat pump.

5.8 §4.2.4.4 is entered:

4.2.4.4 *Linked to combi loop

Inspection result

Data collected	Type
Combi loop	• Yes • No • Unknown

For the calculation of the auxiliary energy of the installation it must be indicated whether the installation is feeding a combi loop or not.

5.9 § IV.3.2.5 is entered:

IV.3.2.5*Number of meals per service

If tap points of the 'kitchen' type are present, the number of meals prepared in this kitchen per service must be determined. If the number of meals per service is not known, 'unknown' may be indicated.*

5.10 § V.1.5

At the bottom of the paragraph, the box 'Note' is replaced by the following:

*If neither the type of insulation material nor the thermal properties of the insulation layer can be determined with certainty, but the energy expert has sufficient evidence to establish with certainty that there is indeed insulation in the shield, an 'unknown' insulation material is entered.

5.11 VI.1.3

Table 6 is replaced by:

Incoming energy flow	***Complies with LTD**	***Does not comply with LTD**
Heat	Heat from external heat supply (see VI.5): - produced from renewable sources - *residual heat	Heat from external heat supply not produced from renewable sources and no residual heat (see VI.5)
Electricity	/	All electricity from external networks (see VI.1.2), regardless of any guarantees of origin.
Fuel	Wood (pellets or chopped), other biomass or biofuel extracted from biomass on own site	Coal, fuel oil, natural gas, propane, methane, butane, green gas supplied to the site with guarantees of origin (e.g. biogas, green hydrogen, etc.)
Locally generated energy flow	***Complies with LTD**	***Does not comply with LTD**
Boiler or heater	All heat generated by combustion of renewable fuel (see above)	All heat generated by combustion of non-renewable fuel (see above)
*Heat pump in heating mode	Proportion of heat extracted from the environment (outdoor air, groundwater,	*share of heat from electricity or gas use

	surface water, ground)	
*Chiller or heat pump in cooling mode	*Share of heat extracted from the scope	*share of heat from electricity or gas use
*Residual heat recovery	*Quantity of residual heat recovered	*share of heat from electricity or gas use in heat pump recovery
CHP	All heat and electricity generated by incineration of renewable fuel (see above).	All heat and electricity generated by combustion of non-renewable fuel (see above).
Solar boiler	Heat from solar boiler	/
PV panels, wind and water turbine	Electricity generated from installation	/
Exported energy flow	***Complies with LTD**	***Does not comply with LTD**
Heat	*Heat from energy flows complying with the LTD (see above)	*Heat from energy flows that do not comply with the LTD (see above)
Electricity	*Electricity from energy flows complying with the LTD (see above)	*Electricity from energy flows that do not comply with the LTD (see above)

5.12 VII.3.2

The 'Note' is replaced by:

*For a reversible heat pump, the contribution to the ILTD indicator for the heating mode and cooling mode of the device is calculated in a different way. When measuring reversible heat pumps, the best distinction is therefore made between the measurements in cooling and heating mode. For some heat pumps, this can easily be read. If this is not the case and there is no other way to distinguish between the two modes, indicate this in the software (see III.1.5).

5.13 § VII.3.3. is inserted:

A chiller extracts heat from the scope of the energy label and releases it to the outdoor environment.
As with a heat pump, it needs power: electricity or natural gas. Chillers that can be measured as part of the energy label are limited to electrically driven compression equipment. See Figure 138 for a schematic performance.
In principle, these three currents can be measured for the chiller. However, the possible measuring points are in fact limited by the type of heat source: the heat absorbed or released to air is difficult to measure in practice. See also VII.3.2.

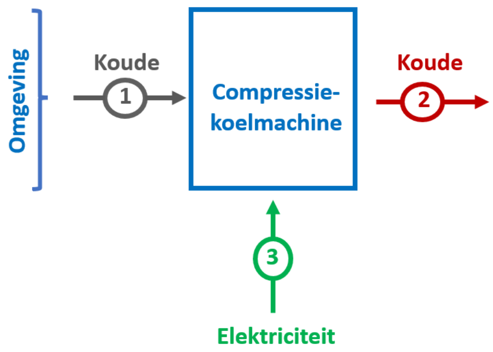


Figure 138: possible measuring points chiller

Omgeving	Environment
Koude	Cold
Compressie-koelmachine	Compression chiller
Elektriciteit	Electricity