# PRANA 2023
# MODEL RANGE

**In 2022,** the PRANA team conducted a large-scale project, the main task of which was to bring the characteristics of devices in line with modern European standards and directives, which, among other things, take into account the results of research, levels, and consumer satisfaction.

Updating the model range will simplify the work of specialists at the stage of design and selection of engineering solutions, and evaluation of the effectiveness of calculations on the energy efficiency of the building for further certification.

After all, the devices of ventilation systems must meet the parameters of regulatory documents, in particular, **such as the recovery factor, electricity consumption, degree of filtration, noise level and productivity**. The peculiarity of ventilation devices is that the compliance of these parameters should be comprehensive, because achieving good values of one parameter does not provide full compliance with the requirements and full comfort of use for the user.

Therefore, as part of the implementation of the project, not only regulatory requirements for ventilation systems and standardized microclimate parameters were taken into account, but also numerous feedback and wishes of our end users from different countries of the world.

The main document defining the requirements for the design of ventilation systems in Ukraine and Europe is **DSTU B EN 15251:2011 (UNI DIN BS EN 15251).**

# Updated characteristics of PRANA systems

| System / Parameter | 150 m23 | 200G m23 | 200C m23 |
|---|---|---|---|
| **Noise** [Lwa] | 50 | 50 | 56 |
| **Шум 3м.** [$Lpa_{3м}$] | 36 | 38 | 44 |
| **Air exchange** [m3 /h] | 5/14/21/32/52/70* | 5/20/28/38/65/85* | 7,5/25/35/48/90/140* |
| **Consumption from** [W/h] | 3,2 | 3,2 | 3,4 |
| **Consumption (ventilation)** [W/h] | 12 | 15 | 26 |
| **Consumption (full)** [Wh/h] | 74 | 74 | 91 |
| **SPI*** [W/m3/h] | 0,17 | 0,13 | 0,12 |
| **SEC for each climate*** [kWh*h*m2*year] | -35,17(A) | -35,02(A) | -35,15(A) |
| **AEC for each climate*** [kW*h*year] | 2,55 | 2,09 | 1,98 |
| **AHS for each climate*** [kW*h*year] | 38,07 | 37,39 | 37,39 |

* boost mode – not a normalized mode of operation, maximum performance, not recommended for constant use;
* SPI - "specific power consumption (SPI)" (expressed in W/(m3/h)) means the ratio between the effective power consumption (in W) and air supply (in m3/h)
* "specific energy consumption (SEC)" (expressed in kWh/(m2/year)) means the coefficient that expresses the amount of energy consumed for ventilation per m2 of the heating area of a living space or room;
* Annual volume of electricity consumption on an area of 100 m2 (AEC) (in kWh/year of electricity per year);
* annual amount of heat savings (AHS) (in kWh of primary energy/year) "average", "warm", "cold").

# SERIAL EQUIPMENT


SERIES STANDART


SERIES ECO ENERGY


SERIES ECO LIFE

| System configuration | STANDART | ECO ENERGY | ECO LIFE |
|---|---|---|---|
| Separate control of engines | + | + | + |
| Sleep timer | + | + | + |
| Bluetooth, Wi-Fi support | + | + | + |
| "Mini-reheat" function | + | + | + |
| "Winter mode" function | + | + | + |
| Date and time | - | + | + |
| Determining the state of the filter | - | + | + |
| Air humidity sensor | - | + | + |
| AUTO, AUTO PLUS operating mode | - | + | + |
| Carbon dioxide equivalent sensor, $CO_2eq$ | - | - | + |
| Efficiency level indicator | - | - | + |
| Air quality sensor, TVOC | - | - | + |
| 1 - exhaust air temperature before recuperation | - | + | + |
| 2 - supply air temperature after recuperation | - | + | + |
| 3 - supply air temperature before recuperation | - | - | + |
| 4 - exhaust air temperature after recuperation | - | - | + |

The project to update the model range also provided for improving the reliability and reliability of the devices by conducting research in the world's leading laboratories.

In particular, in 2022, the fans, which are equipped with PRANA ventilation systems, were subjected to such tests. Having implemented the recommendations and comments received from the experts of the TÜV SÜD research laboratory, we received a certificate confirming the safety and conformity of electrical components.

# Air movement speed According to DSTU B EN ISO 7730:2011 "Ergonomics of the thermal environment

When selecting ventilation systems according to air consumption, it is also necessary to take into account the speed of air movement in the room. Even with the same temperature of indoor and supply air, increased mobility can be felt as discomfort. Taking into account the possibility of recuperators being located near the "working zone" in the room, the provision of excessive air flow can create an excess of air movement speed. On average, the speed of air movement is taken to be 0.3 m/s. The requirements of this indicator can be found in detail in **EN ISO 7730:2011.**

| Types of buildings/ Spaces | Activity V/m² | Categories | Equivalent temperature °C | | Maximum average speed of air movement, m/s | |
|---|---|---|---|---|---|---|
| | | | **Summer** (warm season) | **Winter** (cold season) | **Summer** (warm season) | **Winter** (cold season) |
| Room with open space<br>Room with partitions<br>Concert hall<br>Audience<br>Cafe<br>Class | 70 | A | 24,5 ± 1,5 | 22,0±1,0 | 0,12 | 0,10 |
| | | B | 24,5 ± 1,5 | 22,0±2,0 | 0,19 | 0,16 |
| | | C | 24,5 ± 1,5 | 22,0±3,0 | 0,24 | 0,21[b] |
| Kindergarten | 81 | A | 23,5 ± 1,0 | 22,0±1,0 | 0,11 | 0,10[b] |
| | | B | 23,5 ± 2,0 | 22,0±2,0 | 0,18 | 0,15[b] |
| | | C | 23,5 ± 2,5 | 22,0±2,5 | 0,23 | 0,19[b] |
| Department store | 93 | A | 23,5 ± 1,0 | 19,0 ± 1,5 | 0,16 | 0,13[b] |
| | | B | 23,5 ± 2,0 | 19,0 ± 3,0 | 0,20 | 0,15[b] |
| | | C | 23,5 ± 3,0 | 19,0 ± 4,0 | 0,23 | 0,18[b] |

**Table 4. Examples of design criteria for premises in different types of buildings**

## Preliminary testing of user comfort when using PRANA-150

In 2022, PRANA-150 parameters were also tested by an accredited Etelab laboratory. In particular, one of the obtained values is the speed of air movement at a distance of 50 cm from the device, which is 0.17 m/s.

Etelab
we test

| Test point | Mode | Side | Temperature [°C] | Relative humidity [%] | Airflow mass [g/s] | Airflow volume [m³/h] | Power [W] | Ambient temperature 50 cm from the wall [°C] | Flow 50 cm from the wall [m/s] |
|---|---|---|---|---|---|---|---|---|---|
| ODO -10 °C IDO +20 °C Mini-heating | 8 | 21 | -10.1 | 76.8 | 11.1 | 32.7 | 46.0 | 19.0 | 0.17 |
| | | 22 | 8.8 | 23.5 | | | | | |
| | 9 | 11 | 19.5 | 30.3 | 10.7 | 32.8 | | | |
| | | 12 | 2.4 | 77.3 | | | | | |
| ODO -15 °C IDO +20 °C Mini-heating | 8 | 21 | -14.8 | 71.1 | 11.1 | 32.6 | 46.0 | 18.4 | |
| | | 22 | 6.3 | 18.7 | | | | | |
| | 9 | 11 | 19.5 | 24.8 | 10.7 | 32.8 | | | |
| | | 12 | 0.9 | 79.4 | | | | | |
| ODO -15 °C IDO +20 °C Recovery only | 8 | 21 | -14.8 | 74.5 | 11.2 | 32.4 | 7.0 | 18.0 | |
| | | 22 | 3.3 | 25.1 | | | | | |
| | 9 | 11 | 19.4 | 27.3 | 10.7 | 32.8 | | | |
| | | 12 | -1.0 | 89.4 | | | | | |

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Bringing the performance settings of the systems in line with their direct purpose, which is regulated by the current standards, made it possible to guarantee the compliance of the noise level with the current norms, which corresponds to the document EN 15251:2011 (EN 15251:2007, IDT)

## Admissible sound levels in rooms are determined by the sound pressure level of continuous noise (dBA) and noise criteria (NC).

In residential premises, the permissible noise level during the
day (08:00 - 22:00) - 40 dBA;
at night (22:00 - 08:00) - 30 dBA.
At the same time, **the maximum level during the day is -55 dBA,**
**at night - 45 dBA**.
***For reference:***
sound level 30 dBA - whispering and ticking of a wall clock;
45 dBA - the sound of an ordinary conversation;
65 dBA is the sound of a loud conversation that is clearly audible to outsiders.

# Sound pressure level in rooms according to EN 15251:2011 (EN 15251:2007, IDT)

| Building | Type of room | Sound level, dB | |
|---|---|---|---|
| | | Standard range | Accepted design value |
| Housing | Living room | From 25 to 40 | 32 |
| | Bedroom | From 20 to 35 | 26 |
| Child care facilities | Kindergartens | From 30 to 45 | 40 |
| | Nursery | From 30 to 45 | 40 |
| Places of public gathering of people | The auditorium | From 30 to 35 | 33 |
| | Libraries | From 28 to 35 | 30 |
| | Cinemas | From 30 to 35 | 33 |
| | Courtrooms | From 30 to 40 | 35 |
| | Museums | From 28 to 35 | 30 |
| Commercial | Retail store | From 28 to 35 | 40 |
| | Department stores | From 40 to 50 | 45 |
| | Supermarkets | From 40 to 50 | 45 |
| | Computer rooms | From 40 to 60 | 50 |
| | Computer classes | From 40 to 50 | 45 |
| Hospitals | Corridors | From 35 to 45 | 40 |
| | Operational | From 30 to 48 | 40 |
| | Hospital wards | From 25 to 35 | 30 |
| | Chambers of overnight stay | From 20 to 35 | 30 |
| | Day care wards | From 25 to 40 | 30 |
| Hotels | Vestibules | From 35 to 45 | 40 |
| | Registration | From 35 to 45 | 40 |
| | Hotel rooms (for the night period) | From 25 to 35 | 30 |
| | Hotel rooms (for daytime) | From 30 to 40 | 35 |
| Office buildings | Small offices | From 30 to 40 | 35 |
| | Conference halls | From 30 to 40 | 35 |
| | Offices with open space | From 35 to 45 | 40 |
| | Office rooms (one-room rooms) | From 35 to 45 | 40 |
| Restaurants | Cafeterias | From 35 to 50 | 40 |
| | Restaurant halls | From 35 to 50 | 45 |
| | Kitchens | From 40 to 60 | 55 |
| Schools | Classes | From 30 to 40 | 35 |
| | Corridors | From 35 to 50 | 40 |
| | Sports halls | From 35 to 45 | 40 |
| | Teacher's | From 30 to 40 | 35 |
| Sports facilities | Indoor sports stadiums | From 35 to 50 | 45 |
| | Swimming pools | From 40 to 50 | 45 |
| Buildings of general use | Toilet facilities | From 40 to 50 | 45 |
| | Dressing rooms | From 40 to 50 | 45 |

**Table 1. Examples of design weighted sound pressure level**

**Note:** Estimated values of typical sound pressure levels are given in Table 1. The values may be exceeded if the occupant of the premises has the opportunity to control the operation of the equipment. For example, a room air conditioner may generate a higher sound pressure level if it is operated by a person, but even in this case the exceedance of the calculated values of the sound pressure level should be limited, for example to 10 db(A) - source (EN 13779:200, IDT )

## **EN 15251:2011** Calculation parameters of the microclimate of premises for the design and assessment of the energy performance of buildings in relation to air quality, thermal comfort, lighting and acoustics (EN 15251:2007, IDT)

**Table 2 -** Examples of the recommended rate of ventilation for non-residential buildings with a standard number of people in the building, for three categories of pollution from the building itself. If smoking is allowed, the last column contains the additional required ventilation rate**.**

| Type of building or premises | Category | Total area m²/per person | $q_p$ | $q_B$ | $q_{tot}$ | $q_B$ | $q_{tot}$ | $q_B$ | $q_{tot}$ | Attached at smoking |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | m² for residents | m² for a very low level of building pollution | | m² for a low level of building pollution | | m² for a high level of building pollution | | m² |
| Separate office | I | 10 | 1,0 | 0,5 | 1,5 | 1,0 | 2,0 | 2,0 | 3,0 | 0,7 |
| | II | 10 | 0,7 | 0,3 | 1,0 | 0,7 | 1,4 | 1,4 | 2.1 | 0,5 |
| | III | 10 | 0,4 | 0,2 | 0,6 | 0,4 | 0,8 | 0,8 | 1,2 | 0,3 |
| Landscape (open plan) office | I | 15 | 0,7 | 0,5 | 1,2 | 1,0 | 1,7 | 2,0 | 2,7 | 0,7 |
| | II | 15 | 0,5 | 0,3 | 0,8 | 0,7 | 1,2 | 1,4 | 1,9 | 0,5 |
| | III | 15 | 0,3 | 0,2 | 0,5 | 0,4 | 0,7 | 0,8 | 1,1 | 0,3 |
| Conference room | I | 2 | 5,0 | 0,5 | 5,5 | 1,0 | 6,0 | 2,0 | 7,0 | 5,0 |
| | II | 2 | 3,5 | 0,3 | 3,8 | 0,7 | 4,2 | 1,4 | 4,9 | 3,6 |
| | III | 2 | 2,0 | 0,2 | 2,2 | 0,4 | 2,4 | 0,8 | 2,8 | 2,0 |
| Audience | I | 0,75 | 15 | 0,5 | 15,5 | 1,0 | 16 | 2,0 | 17 | |
| | II | 0,75 | 10,2 | 0,3 | 10,8 | 0,7 | 11,2 | 1,4 | 11,9 | |
| | III | 0,75 | 6,0 | 0,2 | 0,8 | 0,4 | 6,4 | 0,8 | 6,8 | |
| Restaurant | I | 1,5 | 7,0 | 0,5 | 7,5 | 1,0 | 8,0 | 2,0 | 9,0 | |
| | II | 1,5 | 4,9 | 0,3 | 5,2 | 0,7 | 5,6 | 1,4 | 6,3 | 5,0 |
| | III | 1,5 | 1,5 | 0,2 | 3,0 | 0,4 | 3,2 | 0,8 | 3,6 | 2,8 |
| Class | I | 2,0 | 5,0 | 0,5 | 5,5 | 1,0 | 6,0 | 2,0 | 7,0 | |
| | II | 2,0 | 3,5 | 0,3 | 3,8 | 0,7 | 4,2 | 1,4 | 4,9 | |
| | III | 2,0 | 2,0 | 0,2 | 2,2 | 0,4 | 2,4 | 0,8 | 2,8 | |
| Kindergarten | I | 2,0 | 6,0 | 0,5 | 6,5 | 1,0 | 7,0 | 2,0 | 8,0 | |
| | II | 2,0 | 4,2 | 0,3 | 4,5 | 0,7 | 4,9 | 1,4 | 5,8 | |
| | III | 2,0 | 2,4 | 0,2 | 2,6 | 0,4 | 2,8 | 0,8 | 3,2 | |
| Shop | I | 7 | 2,1 | 1,0 | 3,1 | 2,0 | 4,1 | 3,0 | 5,1 | |
| | II | 7 | 1,5 | 0,7 | 2,2 | 1,4 | 2,9 | 2,1 | 3,6 | |
| | III | 7 | 0,9 | 0,4 | 1,3 | 0,8 | 1,7 | 1,2 | 2,1 | |

| Category | Air exchange rate [a] | | Living rooms and exhaust air flow, l/s, laundry rooms, mainly external air flow | | | | |
|---|---|---|---|---|---|---|---|
| | m² | Multiplicity | m2/per person | m² | Kitchen | Bathrooms | Toilet facilities |
| I | 0,49 | 0,7 | 10 | 1,4 | 28 | 20 | 14 |
| II | 0,49 | 0,6 | 7 | 1,0 | 20 | 15 | 10 |
| III | 0,49 | 0,5 | 4 | 0,6 | 14 | 10 | 7 |

**Table 2.** Recommended ventilation standards for buildings

Notes on calculations attached below according to **EN 15251, EN 13779:2011 (New UNI DIN EN 16798) and (CEN/TR 14788:2006, IDT):**

**Building categories:**
***I*** *- High level of expectation, recommended for premises occupied by very sensitive and frail people with special needs, such as the disabled, the sick, young children and the elderly;*
***II*** *- Normal level of expectation, should be used for new buildings and renovations;*
***III*** *- Acceptable average level of expectations, can be used for existing buildings.*

**Room height:**
*The air exchange rate expressed in l/s, m2 and the air exchange rate correspond to each other at a ceiling height of 2.5 m*

**Noise level:**
*Exceeding the noise load is permitted with reference to EN 13779:2007, IDT, which states: The values may be exceeded in the case where the occupant has the possibility to control the operation of the equipment, but even then the exceeding of the calculated values of the sound pressure level shall be limited , for example, up to 10 db(A)*

**Minimum air consumption:**
*In a residential building, the unoccupied period means mainly the period when there is no need. The minimum ventilation rate is recommended to be between 0.05 l/s, m2 and 0.1 l/s, m2 during unoccupied hours, provided that there is no value at the national level. In this case, the minimum air exchange of a living space with an area of 20 m2 = from 3.6 to 7.2 m3/h is required. Such performance is provided by the PRANA-150 system in the amount of 1 pc.*

## Selection of the ventilation system according to UNI DIN BS EN 15251.

**According to the calculation, with the norm of air exchange according to the volume of the premises of category II**

**Air consumption:**
Type of room: **Bedroom of a residential building**
Number of persons (n) = **2;**
Area of the premises, m2: **20;**
Room height, m: **2.5** (according to EN 15251)
Kategory : **II**;
Air exchange rate, multiplicity l/s, m2: **0.42** (table 2);
Air exchange rate, multiplicity (K-1): **0.6** (table 2);;

L = 20 * 0.42 = 8.4 l/s = **32.4** m3/h

or

L = 20 * 2.5 * 0.6 = **30.0** m3/h

In this case, the required air exchange in the bedroom will be **32.4 m3 /h**
This total performance is provided by the **PRANA-150 recuperator in the amount of 1 pc**

**Noise load:**

The noise load of the device at a distance of 3 m will be up to 34 dB(A), which will meet the requirements according to table 1 (from 20 to 35 dB(A) for the bedroom)

## Selection of the ventilation system according to UNI DIN BS EN 15251.

**According to the calculation, with the norm of air exchange according to the volume of the premises of category III**

**Air consumption:**
Type of room: **Bedroom of a residential building**
Number of persons (n) = **2;**
Area of the premises, m2: **20;**
Room height, m: **2.5** (according to EN 15251)
Kategory : **III**;
Air exchange rate, multiplicity l/s, m2: **0.35** (table 2);
Air exchange rate, multiplicity (K-1): **0.5** (table 2);;

L = 20 * 0.35 = 7.0 l/s = **25.2** m3/h

or

L = 20 * 2.5 * 0.5 = **25.0** m3/h

In this case, the required air exchange of the bedroom will be **25.2 m3/h**
This total productivity is provided by the **PRANA-150 recuperator in the amount of 1 pc**

**Noise load:**

The noise load of the device at a distance of 3 m will be up to 34 dB(A), which will meet the requirements according to table 1 (from 20 to 35 dB(A) for the bedroom)

## Selection of the ventilation system according to UNI DIN BS EN 15251.

**According to the calculation, with the norm of air exchange according to the volume of the premises of category II**

**Air consumption:**
Type of room: **Living room of a residential building;**
Number of persons (n) = **4;**
Area of the premises, m2: **30;**
Room height, m: **2.5** (according to EN 15251)
Kategory : **II**;
Air exchange rate, multiplicity l/s, m2: **0.42** (table 2);
Air exchange rate, multiplicity (K-1): **0.6** (table 2);;

L = 30 * 0.42 = 12.6 l/s = **45.4** m3/h

or

L = 30 * 2.5 * 0.6 = **45.0** m3/h

In this case, the required air exchange of the living room will be **45, 4 m3/h .**
This total productivity is provided by the **PRANA-200S recuperator in the amount of 1 pc.**

**Noise load:**

The noise load of the device at a distance of 3 m will be up to 44 dB(A), which exceeds the requirements according to table 1 (from 25 to 40 dB(A) for the living room)

## Selection of the ventilation system according to UNI DIN BS EN 15251.

**According to the calculation, with the norm of air exchange according to the volume of the premises of category III**

**Air consumption:**
Type of room: **Living room of a residential building;**
Number of persons (n) = **4;**
Area of the premises, m2: **30;**
Room height, m: **2.5** (according to EN 15251)
Kategory : **III**;
Air exchange rate, multiplicity l/s, m2: **0.35** (table 2);
Air exchange rate, multiplicity (K-1): **0.5** (table 2);

L = 30 * 0.35 = 10.5 l/s = **37.8** m3/h

or

L = 30 * 2.5 * 0.5 = **37.5** m3/h

In this case, the required air exchange of the living room will be **37, 8 m3/h .**
This total productivity is provided by the **PRANA-200G recuperator in the amount of 1 pc.**

**Noise load:**

The noise load of the device at a distance of 3 m will be up to 38 dB(A), which will meet the requirements according to table 1 (from 25 to 40 dB(A) for the living room)

## Selection of the ventilation system according to UNI DIN BS EN 15251.

**Separate office, room category II**
Number of people(n): **5;**
Area of the premises (A), m2: **50;**
Category : **II**;
Ventilation rate for residents, calculated per person (qp), l/s: **0.7** (table 2);
Ventilation norm for emissions from the house (qB), l/s: 0.7 (table 2);

Qtot = 5 * 0,7 + 50 * 0,7 = 38,5 l/s = 138.6 m3/h

In this case, the required air exchange of the office space will be **138.6 m3/h**, or **27.7 m3/h per 1 person.** This total productivity is provided by the **PRANA-200C recuperator in the amount of 3 pcs**

**Separate office, room category III**
Number of people(n): **5;**
Area of the premises (A), m2: **50;**
Category : **III**;
Ventilation rate for residents, calculated per person (qp), l/s: **0.4** (table 2);
Ventilation norm for emissions from the house (qB), l/s: **0.4** (table 2);

Qtot = 5 * 0.4 + 50 * 0.4 = 22.0 l/s = 79.2 m3/h

In this case, the required air exchange of the office space will be **138.6 m3/h**, or **27.7 m3/h per 1 person.** This total productivity is provided by the **PRANA-200C recuperator in the amount of 3 pcs**

## Підбір вентиляційної системи згідно UNI DIN BS EN 15251.

**Separate office, room category II**
Number of people(n): 2**5;**
Area of the premises (A), m2: **50;**
Category : **II**;
Ventilation rate for residents, calculated per person (qp), l/s: **3.5** (table 2);
Ventilation norm for emissions from the house (qB), l/s: 0.7 (table 2);

Qtot = 25*3.5 + 50*0.7= 122.5l/s= 441m3/h

In this case, the required air exchange of the classroom will be **441 m3/h, or 17.6 m3/h per 1 student.** This is the total productivity provided by the **PRANA-200C recuperator in the amount of 5 pcs. (est. 90 m3/h)**

**Separate office, room category III**
Number of people(n): 2**5;**
Area of the premises (A), m2: **50;**
Category : **III**;
Ventilation rate for residents, calculated per person (qp), l/s: **2.0** (table 2);
Ventilation norm for emissions from the house (qB), l/s: 0.4 (table 2);

Qtot = 25*2.0 + 50*0.4= 70.0l/s= 252m3/h

In this case, the required air exchange of the classroom will be **252 m3/h, or 10.1 m3/h per 1 student**. Such total productivity provided by the **PRANA-200C recuperator in the amount of 3 pcs. (est. 90 m3/h)**

**Selection of the ventilation system according to (CEN/TR 14788:2006, IDT) Requirements relating to the calculation of air flow in the bedroom, for the removal of moisture, described in DSTU (CEN/TR 14788:2006, IDT).**

**Table F3 -** Air temperature in the bedroom 20 °C

| Air flow rate | The outside air temperature is - 5 °C | | | | The outside air temperature is 0 °C | | | | The outside air temperature +10 °C | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Humidity | | Risk | | Humidity | | Risk | | Humidity | | Risk | |
| m³/h | g/kg | %RH | conden-sate | molds | g/kg | φ/% | conden-sate | molds | g/kg | φ/% | conden-sate | molds |
| 36,4 | 3,9 | 27 | no | no | 5,1 | 35 | no | no | 8,9 | 61 | no | no |
| 20,7 | 4,6 | 32 | no | no | 5,8 | 40 | no | no | 9,6 | 66 | no | no |
| 14,4 | 5,2 | 36 | no | no | 6,4 | 44 | no | no | 10,2 | 70 | no | no |
| 10,8 | 5,8 | 40 | no | no | 7,0 | 48 | no | no | 10,8 | 74 | no | no |
| 6,9 | 7,1 | 49 | no | no | 8,2 | 57 | no | no | 12,0 | 82 | yes | yes |
| 3,8 | 9,4 | 64 | yes | yes | 10,5 | 72 | yes | yes | 14,1 | 96 | yes | yes |

Calculation of air consumption is one of the most important when selecting ventilation systems, which is necessary to ensure air quality, but compliance with standards is an important component. In the opposite case, it is impractical to provide a higher air flow, which leads to an increase in air mobility in the room, an increase in energy consumption for air transportation, a decrease in maintaining the supply air temperature, etc.

**Input data for calculation:**
- release of water vapor from an adult during sleep 40 g/h;
- room temperature 20 °C;
- the area of the premises is 9 $m^2$;
- ceiling height 2.5 m;
- the calculation condition is a sealed room;
- presence: two adults;
- stay time: 8 hours.

As we can see, the consumption of supply air to maintain the humidity level is from **6.9 to 36.4 m3/h, which directly depends on the external temperature (season).**

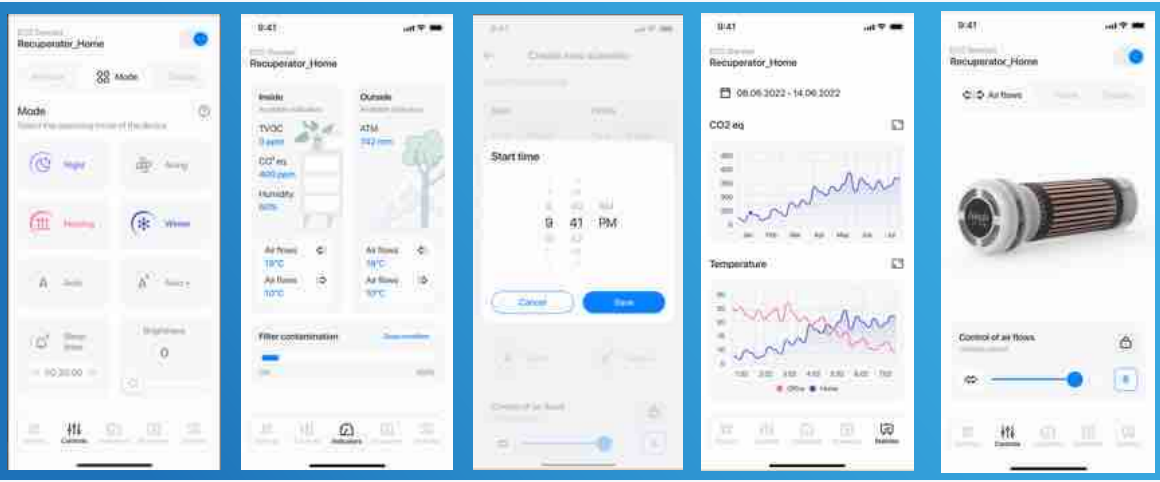
**According to the above, depending on the problems of the room or the wishes of the customer, each system from the model range of PRANA ventilation units is subject to application**

**Thanks to the update of the model range of PRANA ventilation systems,** it was possible to achieve the set goals, namely to increase the comfort of the end user, as well as to bring all the characteristics of the system into compliance with the requirements of European legislation, which provides wide opportunities for cooperation with designers and builders of EU countries

However, these are not all the changes that await the fans of **PRANA recuperators in 2023.** Currently, the company's professional engineers are working on modern innovations that will allow our systems to gain additional advantages among competitors in their segment. These include: an updated mobile application, new software, and the implementation of a design change to the filtering system.

**Expect more detailed information about the release date of the new items later!**

# Fragments of the updated PRANA application




**Updates introduced in the new version of the mobile application**

- *User friendly design;*
- *the possibility of grouping premises;*
- *programming and group management;*
- *a significant reduction in the delay time for command execution;*
- *simplified control that takes into account previous experience.*

# List of documents used in the project process

| № | Name |
|---|---|
| 1 | **EN 13779:2011** Ventilation of public buildings. Requirements for the performance of ventilation and air conditioning systems (EN 13779:2007, IDT) |
| 2 | **EN 15242:2015** Ventilation of buildings. Calculation methods for determining air consumption for building ventilation, taking into account infiltration (EN 15242:2007, IDT) |
| 3 | **EN 13142:2019** Ventilation for buildings - Components/products for residential ventilation - Required and optional performance characteristics (EN 13142:2013, IDT) |
| 4 | **EN 15251:2007, IDT** Indoor environmental input parameters for design and assessment of energy performance of buildings addressingindoor air quality, thermal environment, lighting and acoustics |
| 5 | **EN 308-2001** Heat exchangers. Test procedure for establishing performance of air to air and flue gases heat recovery devices (EN 308:1997, IDT) |
| 6 | **CEN/TR 14788:2015** «Ventilation for buildings–Design and dimensioning of residential ventilation systems» (CEN/TR 14788:2006, IDT). Проект, остаточна редакція |
| 7 | **CEN/TR 16798-14:2017** «Energy performance of buildings—Ventilation for buildings». Part 1-20. |

## List of documents used in the project process

| № | Name |
|---|---|
| 8 | **EN 15241:2015** «Ventilation for buildings–Calculation methods for energy losses due to ventilation and infiltration in buildings» (EN 15241:2007 + EN 15241:2007/AC:2011, IDT). |
| 9 | **EN 12599:2005**. «Ventilation for buildings - Test procedures and measurement methods to hand over air conditioning and ventilation systems» |
| 10 | **EN 15239** «Ventilation for buildings - Energy performance of buildings - Guidelines for inspection of ventilation systems» |
| 11 | **EN 15243:2015** «Ventilation for buildings - Calculation of room temperatures and of load and energy for buildings with room conditioning systems» (EN 15243:2007, IDT) |
| 12 | **EN ISO 7730:2011** «Ergonomics of the thermal environment — Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria» **(EN ISO 7730:2005, IDT)** |


prana
recuperators