

structure layout enabling free arrangement of the module

lightweight design  
steel from profiles  
cold-bent easy transportation

layered partition  
structure that meets fire,  
thermal and acoustic  
requirements

the ability to choose the color of  
the building and the method  
of finishing the facade

## MODULE 1 35m<sup>2</sup>

the possibility of creating  
multi-apartment  
and multi-storey buildings



# MODULAR FLATS

vision.design.future.

Each of the designed modules creates residential unit with an area of **approximately 35m<sup>2</sup>**. The structure of the module allows the arrangement of the residential unit in various configurations tailored to the user's needs.

In the standard arrangement, the residential unit consists of a spacious living room with a kitchenette, a living room, a fully equipped bathroom and an auxiliary room. **The residential units will be implemented in various finishing options and equipment.**

Optionally, each of the premises can be equipped with the following installation and interior design elements: **air conditioning, external window blinds, signage for the blind and visually impaired, alarm and CCTV.**



## WE ARE PRESENTING OUR OFFER

of modular flats that allow you to create buildings in three configurations:

# BASIC, COMPACT, MULTI

consisting of **4**, **8** and **16** units, respectively one-story residential units.

Modules can create residential buildings **up to four floors**, additionally equipped with a passenger lift.

The foundation of the modules was designed on **footings or foundation slabs** with the possibility of adaptation to local ground conditions.

In addition, the buildings can be equipped with a **photovoltaic installation** adapted to local conditions, with the power depending on the exposure of the roof of the building and the size of the facility.

The modules will be implemented in various finishing standards and façade colors.

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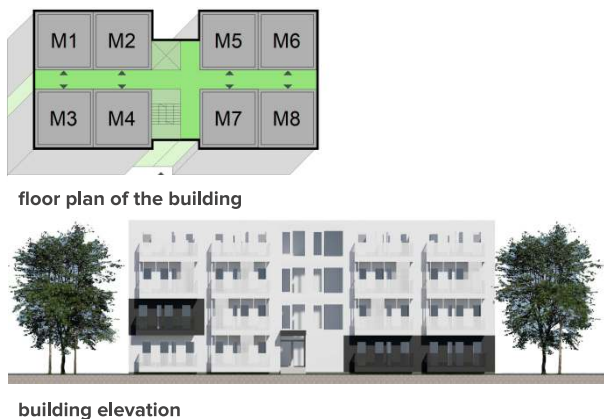
## BASIC CONFIGURATION



floor plan of the building

building elevation

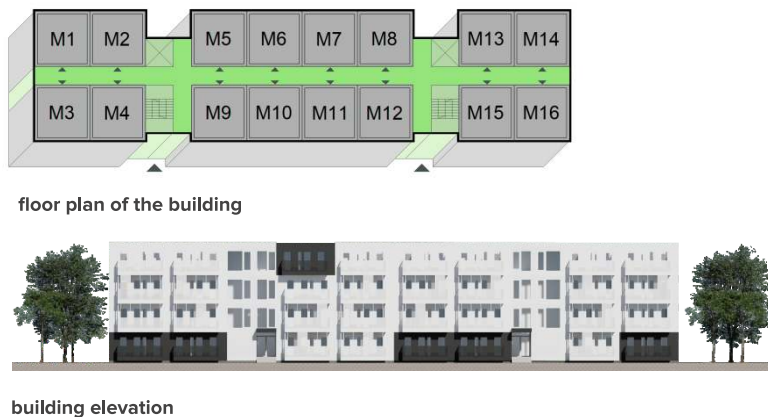
## COMPACT CONFIGURATION



floor plan of the building

building elevation

## MULTI CONFIGURATION



floor plan of the building

building elevation

### CONFIGURATION BASIC

**Building dimensions:** 13,5 x 15,22 m  
**Minimum plot area\*:** 21,15 x 24,25 m

**Area user building:** 154,0 m<sup>2</sup>  
**Area user flats:** 131,3 m<sup>2</sup>

**Possible building configurations:**

<b>Number of storeys</b>	I	II	III	IV
<b>Number of premises/modules</b>	4	8	12	16

### CONFIGURATION COMPACT

**Gabaryty budynku:** 32,05 x 15,25 m  
**Minimum plot area\*:** 40,05 x 24,25 m

**Area user building:** 1399,8 m<sup>2</sup>  
**Area user flats:** 1050,6 m<sup>2</sup>

**Possible building configurations:**

<b>Number of storeys</b>	I	II	III	IV
<b>Number of premises/modules</b>	8	16	24	32

### CONFIGURATION MULTI

**Gabaryty budynku:** 64,10 x 15,25 m  
**Minimum plot area\*:** 72,10 x 15,25 m

**Area user building:** 2799,5 m<sup>2</sup>  
**Area user flats:** 2101,2 m<sup>2</sup>

**Possible building configurations:**

<b>Number of storeys</b>	I	II	III	IV
<b>Number of premises/modules</b>	16	32	48	64

\* the given minimum plot area does not include the land reserve for car parks for passenger cars, a square for a solid waste bin, landscaped green areas and a playground.

## Technical description of the buildings

### 1. Product description

#### 1. Project assumptions

The premise of the project is to create residential buildings from structural and building modules with passive features in order to streamline the construction process and easily transport a single section of modules and minimize the building's completion time.

#### 2. General description

The designed buildings are composed of structural and building modules with a usable area of about 35m<sup>2</sup> and common parts of the building such as staircases, passageways, entrance vestibules. Appropriate arrangement of each section of the modules makes it possible to create a finished multi-apartment building according to the Investor's needs on each of the designed floors. The projections of the designed buildings are shown on the boards with the layouts of the units.

The structure of the building (module) is a steel space frame filled with mineral wool and covered with several layers of wood, gypsum, lime and gypsum boards, as well as other building materials that provide appropriate physical properties.

### 2. Erection technology and material assumptions

#### 1. Location

Due to the modular nature of the building, the project provides for the foundation of the building on a foundation slab. The foundation slab of the building will be implemented in monolithic technology - reinforced concrete.

The design of foundations, the reinforcement used, the class of concrete, and the guidelines for the need to prepare installation approaches will be adapted to local soil conditions.

#### 2. Module design

The structure of the building-module was based on a steel spatial frame with dimensions of 2.0x6.2x3.0m made of cold-bent, galvanized profiles with replacements and profiles filling the wall, floor and ceiling planes at 400-600mm intervals.

The building's structural loads meet the project's assumptions of up to 4 floors above ground.

Balconies at the building will be a separate self-supporting structure.

#### 3. Partitions characteristics

The main principle of wall, ceiling and floor construction is to create multilayer structures, in which each of the designed planes has a separate function. Subsequent layers of partitions are implemented based on well-known and commonly used materials in construction, including wood panels, gypsum boards, thermal insulation, cement-gypsum boards, vapor barrier films, membranes.

The technical parameters of the designed partitions ensure compliance with the current technical and construction regulations for thermal, acoustic and strength insulation. Detailed data are presented in sec. 2.4 of the description.



#### 4. Thermal, acoustic and strength properties

##### Thermal properties

- Exterior wall -  $U = 0.15 \text{ W/m K}^2$
- Floor on the ground -  $U = 0.25 \text{ W/m K}^2$
- ceiling -  $U = 0.15 \text{ W/m K}^2$
- partition wall (between premises and communication) -  $U = 0.25 \text{ W/m K}^2$
- EP (heating and cooling)  $< 20\text{kWh/m}^2 \text{ year}$
- EP (heating, cooling, hot water, electrical appliances)  $< 120\text{kWh/m}^2 \text{ year}$
- air tightness  $< 0.6$
- $U_w$  window  $< 0.85 \text{ W/m K}^2$

##### Acoustic properties

- exterior wall  $> 50\text{dB}$
- Inter-family wall  $> 50\text{dB}$
- Partition wall (between premises and communication)  $> 50\text{dB}$
- inter-apartment ceiling  $> 55\text{dB}$

##### Structural features

- adopted payloads -  $1.5\text{kN/m}^2$
- accepted load from partition walls -  $1.2\text{kN/m}^2$

#### 3. Technical installation solutions

##### 1. Sanitary installations

##### Water and sewage system

The building is to be connected to the local water and sewage network on the technical conditions of the network operator.

Water will be supplied from the water supply system on the terms of the local administrator, through the designed connection, sanitary sewage will be discharged to the newly designed sewer connection.

The layout of the water and sewage system is designed through planned installation shafts with distribution to individual residential / commercial units. For individual apartments will be made branches equipped with shut-off valves and water meter for metering consumption.

Domestic hot water will be prepared in a hot water storage exchanger with a capacity of  $65 \text{ dm}^3$ . The heater will be equipped with an electric heater of 1.0 and 1.25 kW.

## **Mechanical ventilation**

In the residential units, mechanical supply-exhaust ventilation is designed based on a supply-exhaust air handling unit with a design capacity of 156 m<sup>3</sup>/h. The air handling unit will be equipped with a heat exchanger. The air handling unit will be installed in the suspended ceiling zone of the bathroom. Condensate drainage from the air handling unit to the sanitary sewer.

For air distribution, rectangular and circular air ducts were designed.

Ventilation intake and exhaust implemented on the roof of the building.

## **Central heating installation**

The central heating system will be based on underfloor heating. The distribution of the medium will be done by a circulation pump in the technical room to the main heating riser, then to the manifolds and individual floor heating loops. The heating medium in the system is water with parameters from 40/32 °C.

The supply of the central heating system is foreseen from the heat pump system. Technical solution of heat pump installation working only for central heating needs. - According to a separate study.

A system based on a room thermostat was designed to control underfloor heating.

## **2. Electrical installations**

The building should be connected to the local electric power grid under the technical conditions of the grid manager.

The number of power points was adjusted to the assumed functional layout of the building. Cabinets with meters will be located in the common part of the building, in the stairwells. In the premises are designed outlets for ceiling and wall light fixtures, electrical outlets and switches. The premises electrical box will be located at the entrance door to the premises from the inside, on the partition wall. Three-phase metering system.

The modules will also be equipped with low-current installations: intercom installation, LAN, satellite TV installation and broadband installation according to the industry-technical study;

PV panels of about 20kW will be mounted on the roof of the building.

## **4. Facade finishing methods and interior arrangements**

The buildings will be constructed to a finished standard. Finished standard is understood to mean the completion of the building to the extent that it can be put into use.

On the outside, the buildings will be finished with silicone-silicate plaster, lambskin type, grain 1.5mm, and sheet metal elements.

## **5. Land development**

Development of the area around the building will be carried out based on the sketch of the landscaping project shown on the board.

Pedestrian and roadways, parking spaces for cars, a shelter for solid waste garbage cans, a shelter for bicycles, areas of landscaped greenery and playgrounds are designed on the plots.