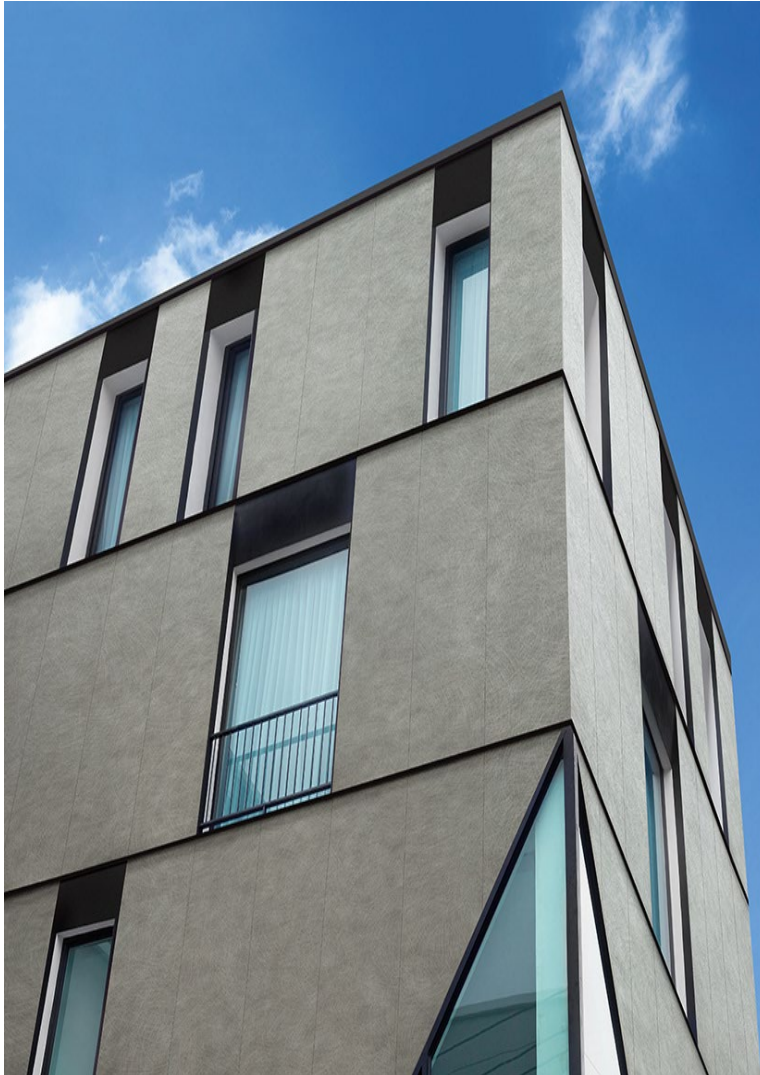


"Aestech-LP" Lightweight Wall Panel

designed and simulated
by  aestech



Aestech lightweight wall panels



Aestech's technologies open up new possibilities for design and architecture by using lightweight, self-supporting panels as an enclosing structure. The wall panel is a final product with a specific color solution and texture, which allows for any architectural design to be implemented quickly. The panel's lightweight allows for construction under non-standard building conditions. This is an excellent opportunity to quickly create a home with a ready-made designer solution.

Aestech's panel consists of two ceramic granite plates with a Visco-elastic membrane (used to reduce noise) and a thermal and sound insulation material (mineral wool/extruded polystyrene) placed in between.


Specifications of panels with thicknesses of 100mm, 150mm, and 200mm


PARAMETER	100mm	150mm	200mm
Weight, (kg/m ²)	≈ 20	≈ 26	≈ 30
Heat transfer coefficient, U (W/m ² K)	0,44	0,29	0,21
Heat transfer resistance, Rc (m ² K/W)	2,27	3,44	4,76
Modulus of elasticity, E (N/m ²)	1,15x10 ⁸	1,15x10 ⁸	1,15x10 ⁸
Wind load, Max (Pa)	1500	2000	2500


Advantages of Aestech Wall Panels


 **No wet works** – the finished product comes with a predetermined texture and color

 **Bending resistance** – the panel has high strength against bending

 **Eco-friendliness** – non-toxic to the environment


 **Installation** – fast installation, work can be done at any time


 **UV resistance** – the surface does not change color or texture

 **Moisture and frost resistance** – water absorption of the panel is less than 0.1%, improved frost-resistant characteristics

 **Increased useful area** – reducing wall thickness increases the interior area

 **Resistance to mold and fungi** – not prone to the formation of microorganism colonies

 **Wide range of colors** – a variety of colors and textures

 **Resistance to sudden temperature changes** – suitable for various climatic conditions

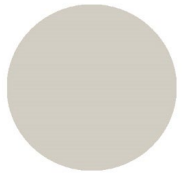
Aestech-LP Wall Panel

The characteristics of the panels contribute to the quick and high-quality performance of installation works. The advantage of the product is a wide range of colors and a large selection of textures. When choosing panels, we advise you to take into account the geographical location and color of the plates:

- Dark colors look modern, but attract more heat, which leads to heating of the facade surface.
- Light and bright shades emphasize the facade and blend in with the surrounding environment. This is especially important to consider in sunny regions.

Maximum dimensions of the panel **1000x3000 mm**.

Color palette and textures:



Pietra di Cardoso Nero Fiammato

The texture is distinguished by veins and a fine structure.



Perla

Beauty in simplicity, a solid coating that allows you to choose any shade.



Ossidiana Vena Grigia

The material's texture is as close as possible to wood.



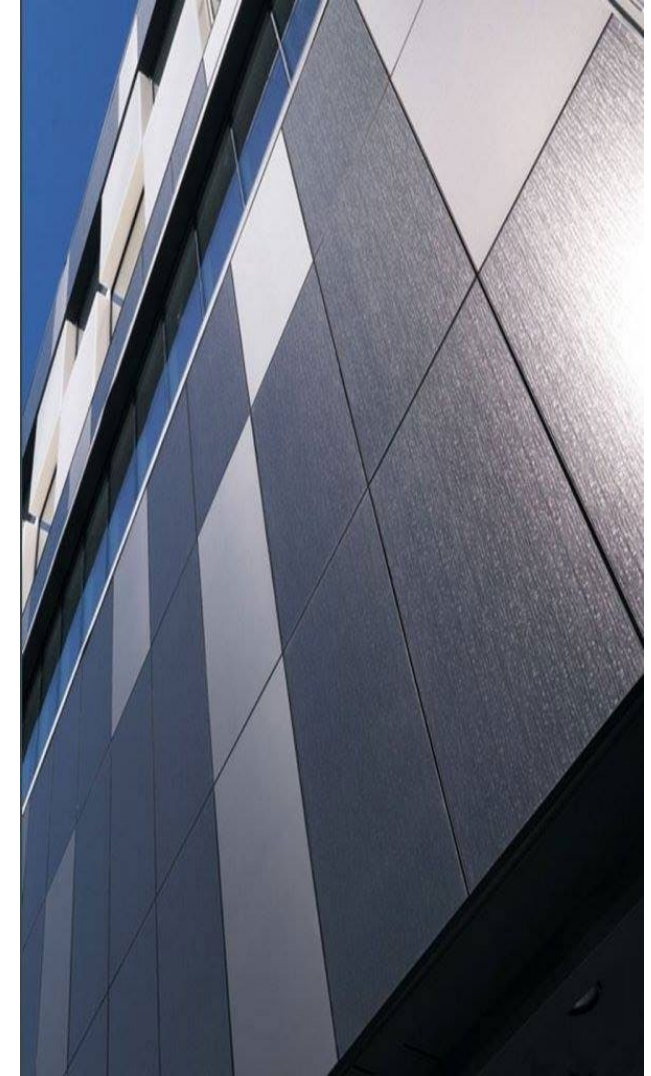
Cemento Avorio Bocciaurato

The texture is based on concrete walls and a decorative finishing layer.



Grigio

Inspired by industrial concrete, it allows for creating modern and creative designs.

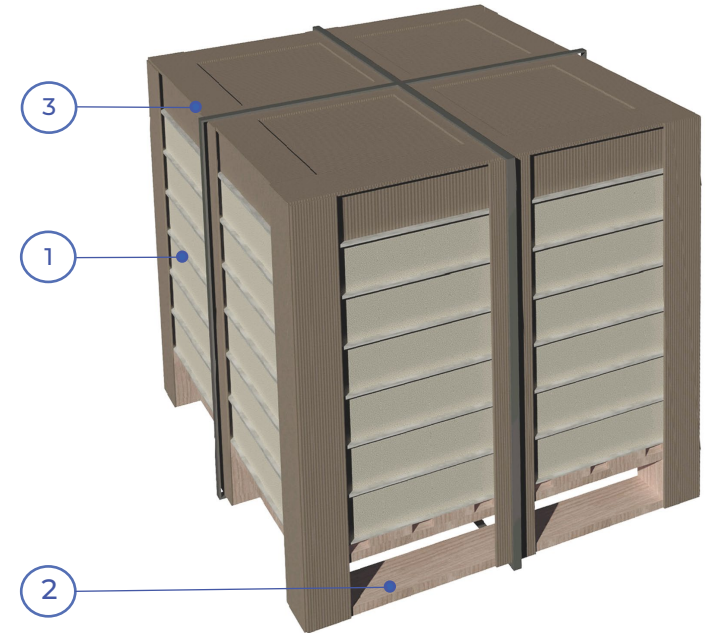


Aestech-LP panel's packaging

- Panels **larger** than 1000x1000 mm are packed carefully on wooden pallets, which are stacked.
- Panels **smaller** than 1000x1000 mm are packed in reinforced cardboard boxes placed on wooden pallets.

Legend:

- ① Composite panel.
- ② Wooden pallet.
- ③ Cardboard box.



Joints

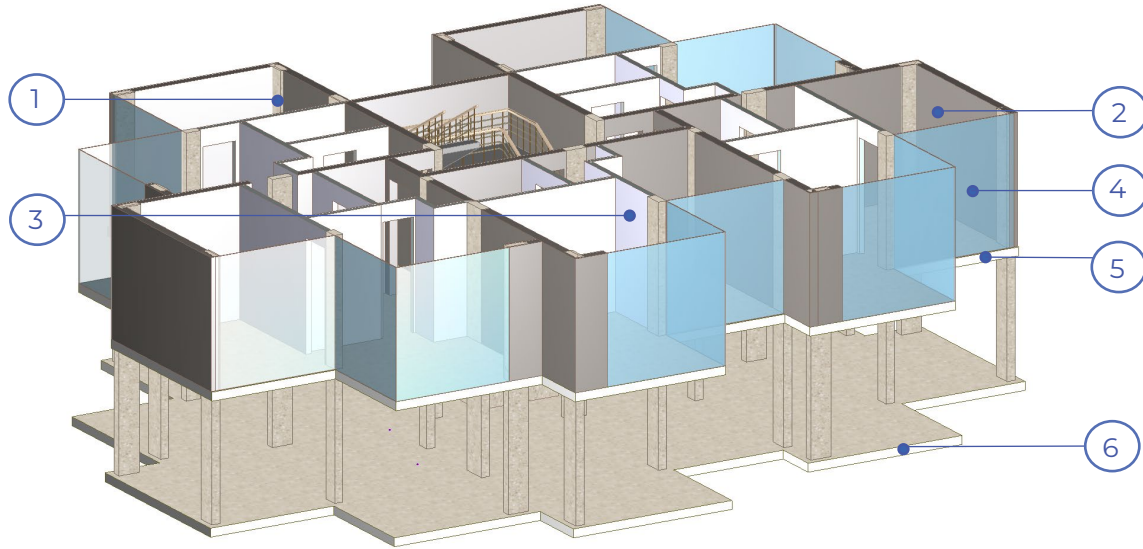
Joints around the perimeter of the wall opening must be tightly insulated and sealed, taking into account the principle of "more airtight from the inside than from the outside". The installation layers around the perimeter and the installation location should prevent freezing, and condensation on the surface of the panel or adjacent parts of the building, including due to drafts between the wall panel and other structural elements of the building (floor slabs, supporting columns, roof, windows, doors, etc.).

Joints are designed and arranged in such a way as to withstand all possible loads (wind loads, building movement, operational loads, accumulation of people, etc.) throughout the service life of the building (not less than 50 years) without losing their operational properties (moisture and vapor permeability, heat and sound insulation, wind load capacity, etc.), and depending on the design, the direct influence of atmospheric and other factors of the external environment, in particular the impact of solar radiation. The joint sizes are chosen as described below:

- The vertical joint must be at least **5 mm** thick, considering the linear expansion coefficients of the wall panel.
- The horizontal joint must be at least **10 mm** thick, considering the wall panel's linear expansion coefficients.

Installation of the panel directly adjacent to supporting columns or roof beams, resting on the panel of the supporting parts of the building or its structural parts, is not allowed. Regardless of the installation location, the lightweight Aestech-LP wall panel must be fastened and properly sealed around the entire perimeter.

Comparison of the impact on stress in the floor slab between a standard solution (aerated concrete blocks) and the lightweight wall panel Aestech-LP.



Legend:

- ① reinforced concrete elements
- ② external walls and inter-apartment partitions
- ③ inter-room partitions
- ④ translucent enclosing structures
- ⑤ floor slab
- ⑥ foundation slab

The calculation was performed using the Lira software complex. The calculation results are presented for the floor slab at the mark +2.750 mm.

- Thickness of the floor slab — 150 mm.
- Area of the floor slab — 197.3 m².
- Material of the slab — concrete of class C20/25.
- A500 reinforcement.
- Thickness of external walls and inter-apartment partitions — 200 mm.
- Thickness of inter-room partitions — 100 mm.

Comparison of loads on the floor from walls made of different materials*

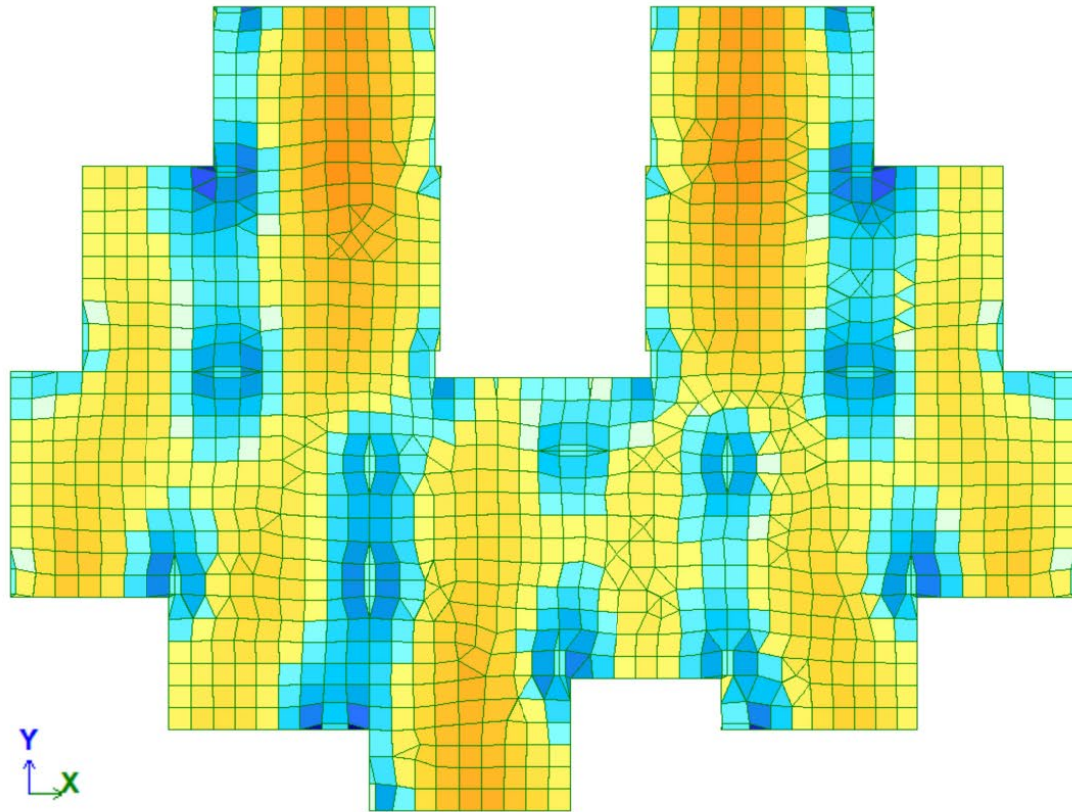
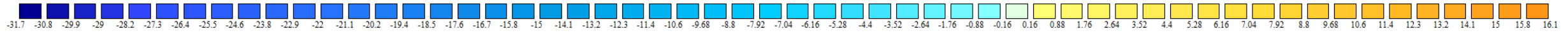
Name	Weight, unit/kg	
	b=100mm	b=200mm
Aestech LP lightweight wall panel, thickness (b) = 100 mm / 200 mm	56	112
Gas block wall with equipment, b=100mm**	330	
A solid brick wall with fittings, b=125mm***	848	

- * Data calculated for 1 meter of linear wall 2,85 m high
- ** The density of the aerated concrete block 400 kg/m³
- *** The density of a solid bricks 1800 kg/m³

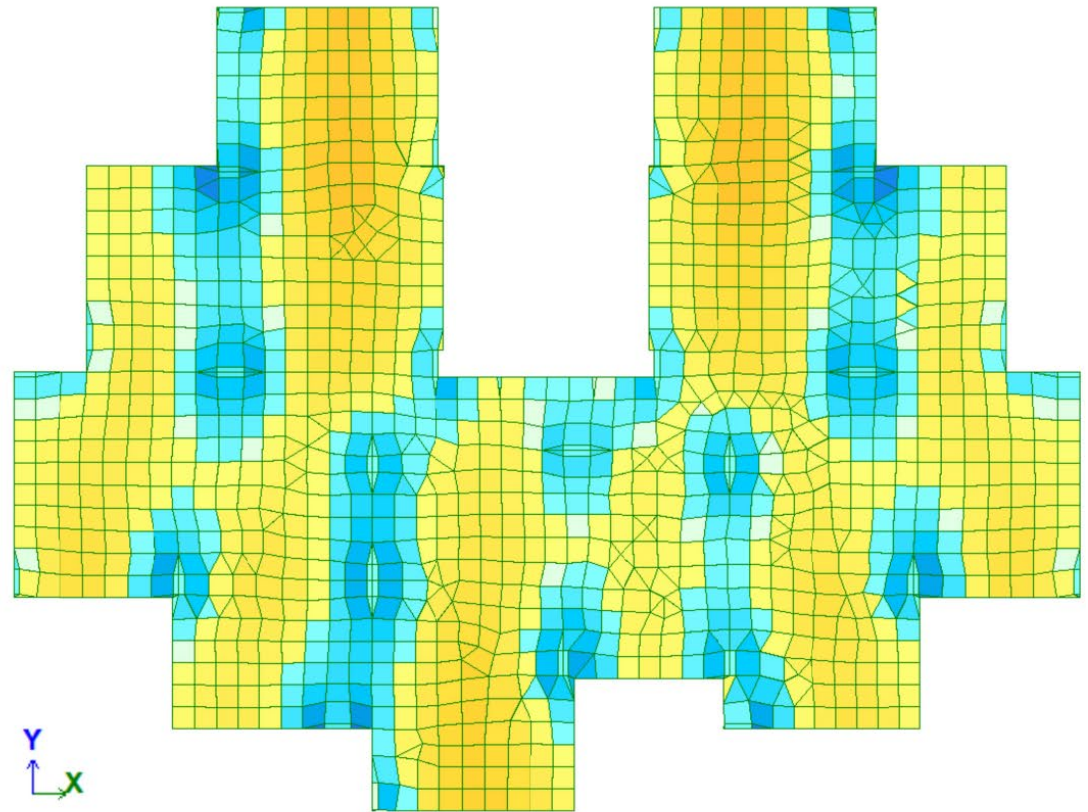
Comparison of isofields of moments by M_x

Using a standard solution (aerated blocks)

Using Aestech-LP lightweight wall panel



Maximum bending moment $M_x = 31,7 \text{ kNm/m}$.

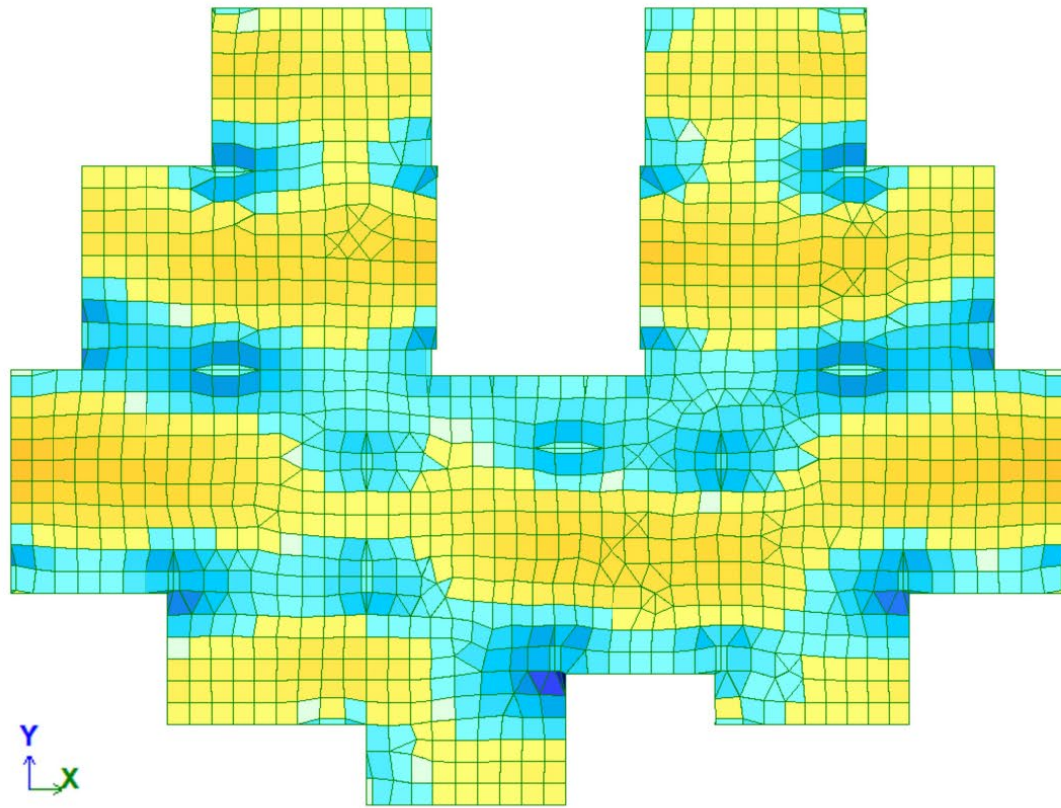


Using Aestech-LP lightweight wall panel $M_x = 20,9 \text{ kNm/m}$.

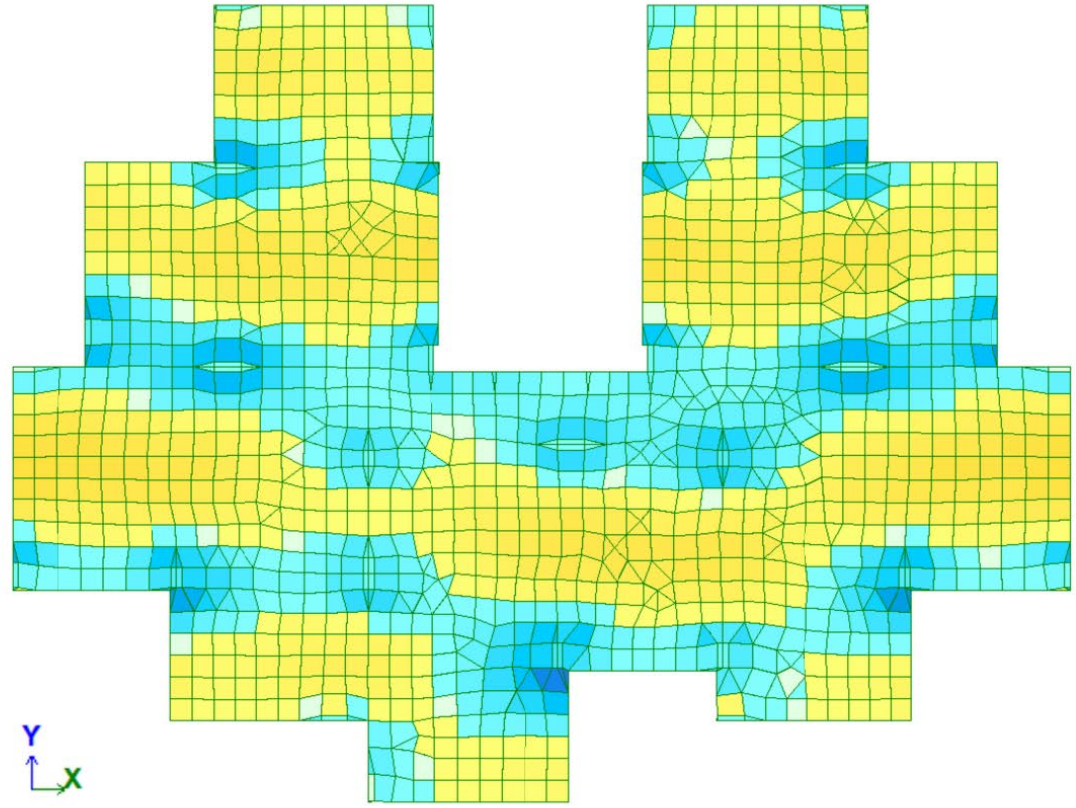
Comparison of isofields of moments by M_y

Using a standard solution (aerated blocks)

Using Aestech-LP lightweight wall panel



Maximum bending moment $M_y = 44 \text{ kNm/m}$.



Maximum bending moment $M_y = 29 \text{ kNm/m}$.

Comparison of the required amount of material

Using a standard solution (aerated blocks)

Specification of floor slab elements

Nº	Marking	Name	Quantity	Weight per unit, kg	Total weight, kg
		Floor slab			3948,8
Details					
1	DSTU 3760:2019	Ø 10 A500C	6040 lm	0,62	3722
2	DSTU 3760:2019	Ø 12 A500C	60 lm	0,89	53,2
3	DSTU 3760:2019	Ø 16 A500C	110 lm	1,58	173,5
Materials					
		Concrete C20/25(B25) П4	29,61 m ²		

Using Aestech-LP lightweight wall panel





Specification of floor slab elements

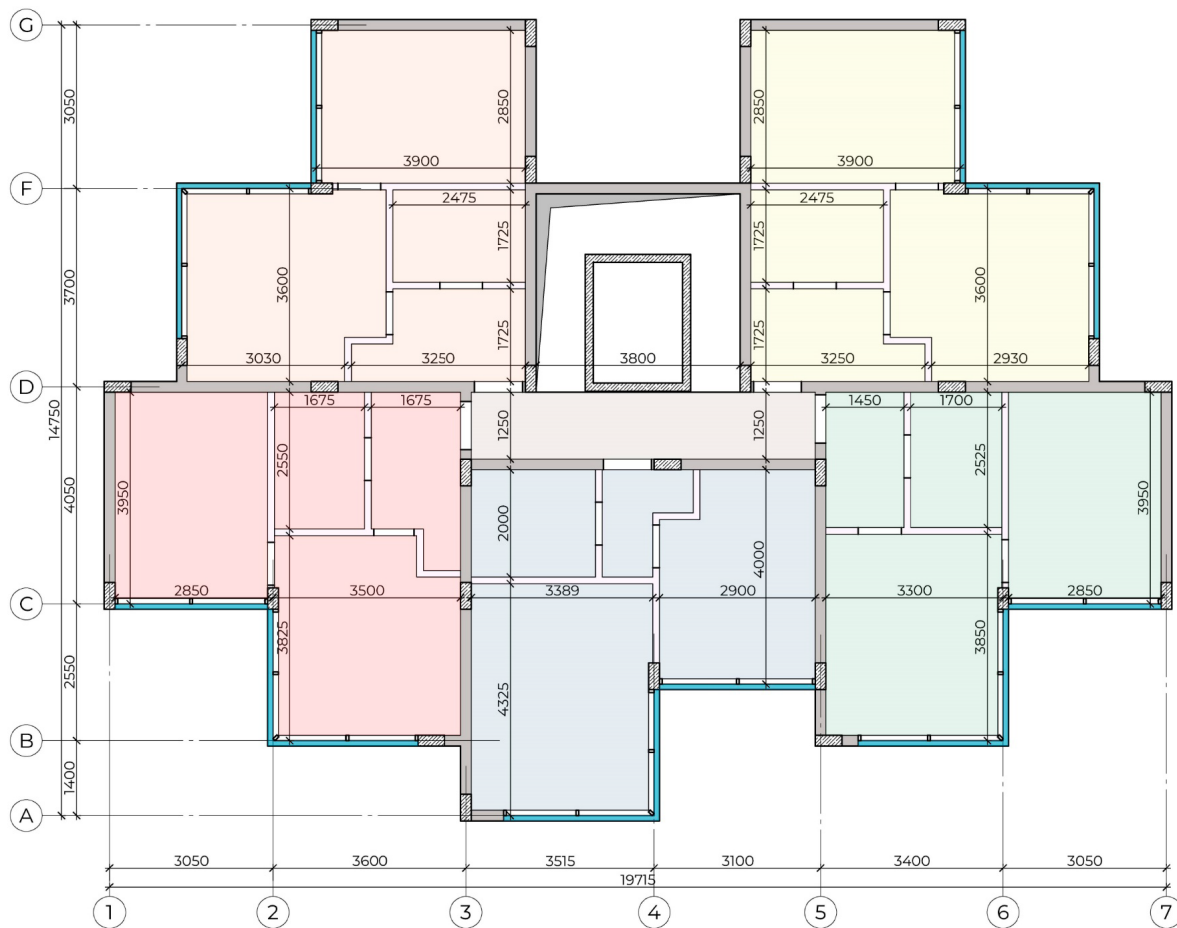
Nº	Marking	Name	Quantity	Weight per unit, kg	Total weight, kg
		Floor slab			3296,1
Details					
1	DSTU 3760:2019	Ø 10 A500C	5320 lm	0,62	3278,3
2	DSTU 3760:2019	Ø 12 A500C	20 lm	0,89	17,7
Materials					
		Concrete C20/25(B25) П4	29,6 m ²		







- ❑ The use of Aestech-LP lightweight wall panel allows for reducing the stress in the floor slab due to its lower weight which makes it possible to save on the reinforcement of the slab. At the same time, the saving of fittings is at least 16.5% compared to a standard solution (aerated concrete blocks), depending on the configuration of the slab and supporting elements.
- ❑ It is also possible to reduce the cross-section of the slab (if it is permissible according to the standards, without sparing reinforcements), to reduce the total weight when building on low-bearing soils. The weight of the floor slab can be reduced by 15%, which, in turn, will reduce the load on the vertical load-bearing elements — accordingly, you can save on their reinforcement and cross-section.
- ❑ By using Aestech-LP's panel technology, construction costs can be significantly reduced without sacrificing quality on the structural elements

Calculation of the useful floor area using a standard solution (aerated concrete blocks)

Legend:

-  - reinforced concrete pylon;
-  - external walls and inter-apartment partitions;
-  - interior partitions;
-  - rack-transom glazing system.

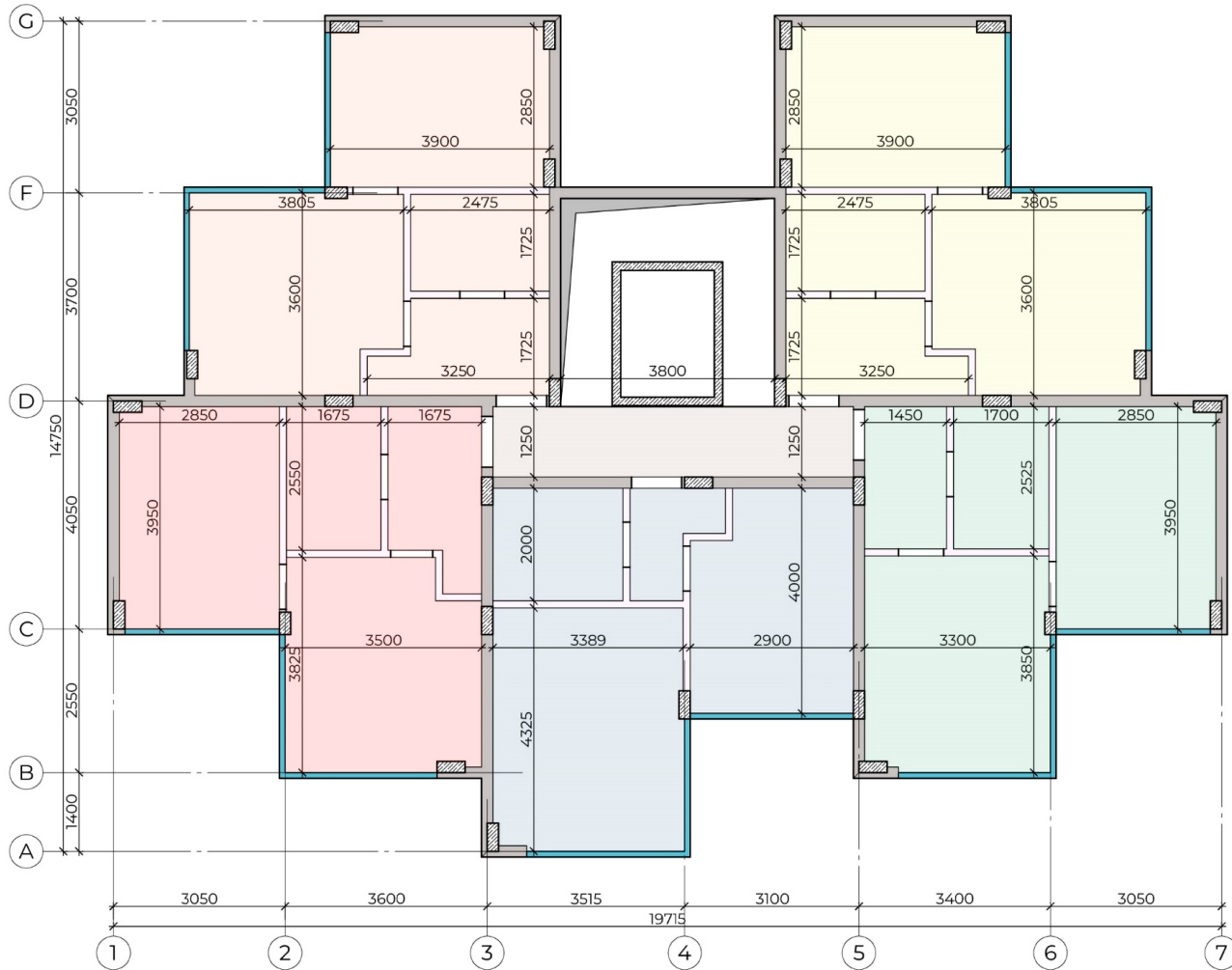


Nº	Function	Area, m ²
	Flat N° 1	31,19
	Flat N° 2	31,19
	Flat N° 3	31,12
	Flat N° 4	31,10
	Flat N° 5	29,88
	General use	7,71
Total:		162,19





When using a standard solution (aerated concrete blocks), the possible total revenue from one floor will be 502,789 €.







Calculation of useful surface area using Aestech-LP lightweight wall panel and Aestech insulated glass unit with higher stiffness

Floor plan



Legend:

-  - reinforced concrete pylon;
-  - external walls and inter-apartment partitions;
-  - interior partitions;
-  - rack-transom glazing system.

Nº	Function	Area, m ²
	Flat № 1	33,33
	Flat № 2	33,33
	Flat № 3	33,53
	Flat № 4	33,55
	Flat № 5	33,07
	General use	8,37
	Total:	175,18

Conclusion

- ❑ The solution with the use of lightweight wall panels Aestech-LP is more economical by 17.2% compared to the solution based on aerated blocks technologies, due to the reduction of the cost of basic costs for building materials and installation services, as well as obtaining additional useful area by reducing the thickness of the enclosing structures.
- ❑ When using technologies with the use of Aestech-LP panels and Aestech HSG insulated glass unit with higher stiffness, the difference in additional area compared to standard solutions (aerated blocks and transom glazing) will be 7.4% (+12.9 sqm on one floor).



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