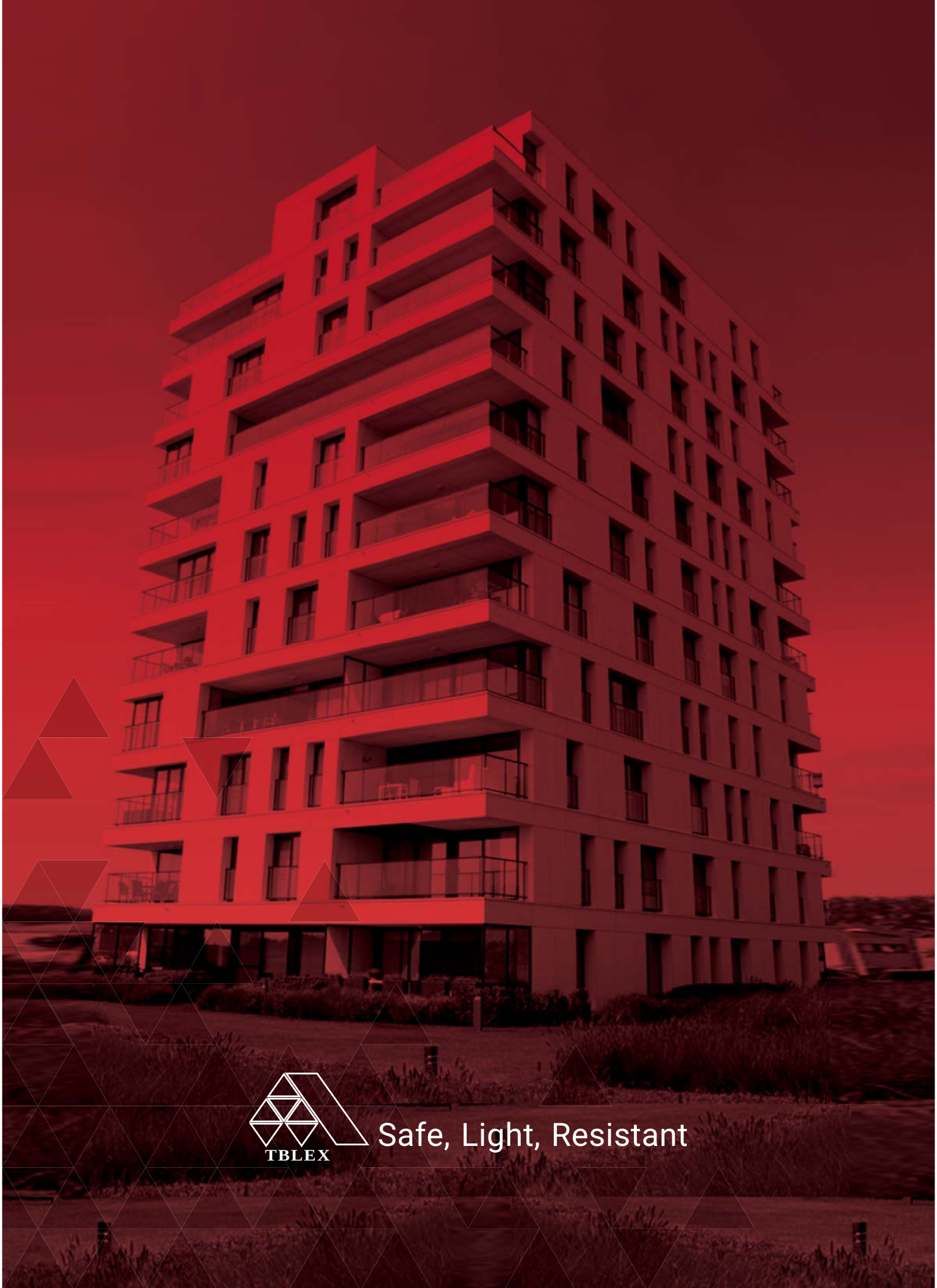
TBLEX

TBLEX, Autoclaved light Blocks and Reinforced Panels and Dry Mortar

IRAN China Clay Industries Co.



TBLEX

Safe, Light, Resistant

About IRAN China Clay Industries Co.

As the largest and most experienced company in the production of different types of processed kaolin in the Middle East and Iran, IRAN China Clay Industries was established in 1985 in Marand located in East Azerbaijan province and its processing plant was put into operation in 1993 and accepted in Tehran Stock Exchange in 1996.

In order to complete the value chain of products and to use Silica resulted from the process of processed kaolin production, this company has planned the production of autoclaved aerated blocks, reinforced panels and dry mortar and as the largest and the most modern Lightweight concrete factory, is proud to provide its products with an annual capacity of 325,500 cubic meters of autoclaved aerated concrete (AAC), 139,500 cubic meters of lightweight reinforced panels and 48,000 tons of dry mortar using the latest European technologies (HESS, EIRICH, LAHTIPRECISION) in accordance with the need of domestic and foreign markets.

TBLEX

An Evolution in Construction Industry

Autoclaved Aerated Concrete-AAC.

History

Autoclaved Aerated Concrete (AAC) was first invented and produced in the 1920s by Dr. Johann Alex Erickson, an assistant professor at the Stockholm Institute of Technology in Sweden. The motive of its production was to protect forests and obtain materials with wood properties such as lightness, thermal insulation, cutting and shaping ability, and in contrast, without wood defects such as flammability, decay, termite destruction, etc. Then in 1945, in the course of the evolution of this product, German inventors discovered how to cut it, and with the acquisition of this technology, mass production began and in 1958, it was approved by the German Standard (DIN). Since 1960, due to the cost-effectiveness of construction with these materials, German scientists have been thinking about strengthening it, and in the process of this development, in 1977, in the form of joggle joint with precise cuts, these materials minimized construction problems.

Since 1987, with the production of large pieces of this product, there has been a revolution in the construction time and it has been greatly reduced, and since 1994, with new research and studies, the strength and lightness of this product has reached its perfection.

Today this product is produced with various methods and brands in many countries. The products that are produced and supplied under various brands are different in proportions of raw materials mixing, method of cutting concrete and the production processes.

TBLEX Production Process

Initial Constituents

AAC concrete structure is composed of the following raw materials:

- Silica
- Cement
- Lime
- gypsum
- Aluminum powder

Description of the Production Process:

1. Grinding silica and gypsum with water and preparing grout
2. Mixing cement, lime and grout according to the specified formula in the mixer for a certain period of time
3. Adding aluminum powder to produce green-cake
4. Molding the cake and transferring the mold to the processing hall
5. After reducing the moisture sufficiently, the cake is transferred to the cutting line and cut to the desired size by special wires, after which the cake is ready for the curing process

The prepared green-cake is first arranged and automatically loaded in the autoclave for processing under a specified pressure and temperature, and when the autoclave door is closed, the curing process begins by the software system.

AAC concrete curing time and cycle in the autoclave can be briefly divided into four parts:

1. Time before applying steam and pressure
2. Gradual application of steam and pressure(controlled increase)
3. Apply constant pressure and steam
4. Gradual reduction of pressure

6. The production line of TBLEX Company has 8 autoclave machines with a diameter of 2.90 meters and a length of 43.70 meters. These machines have the ability to cure 1555 cubic meters of AAC

concrete 24 hours a day.

At the end of the curing process, the green-cake turns into an almost white cake, which indicates the completion of the curing process.

7. The white cake taken out of the autoclave is transferred to the packing line by the robot and after taping is packed with a plastic cover by the packing machine .

To produce reinforced panels (for wall or ceiling) prepared armatures impregnated with special adhesive and anti-corrosion are molding and then grout is poured into the mold and around the armatures. After filling and rising the grout in the mold, the resulting cake is cut into the desired forms.

Differences between AAC concrete types in specific weight and other properties, is due to changes in the ratio of ingredients and chemical compounds in their production. Considering the TBLEX company's equipment, the production of special blocks in various forms such as interlocked or blocks with a very smooth surface, etc are also possible.

Laboratory and Quality Control Department

The laboratory unit of TBLEX Company is equipped with the most modern and accurate laboratory equipment and due to the importance of the quality of the final products, it has the continuous monitoring of all production stages and the properties of the final product on its agenda, which includes controlling input raw materials to issue entry permits to production lines, control of product parameters in the middle stages of production, monitoring the performance of equipment and machinery, and finally controlling the properties of products in accordance with International . Standards and National Standards of Iran

Packaging

TBLEX blocks are automatically placed on wooden pallets and packed with UV resistant shrink and delivered to customers.

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The Choice of Engineers and Executives of Buildings

TBLEX Blocks Technical Specifications

TBLEX blocks are produced in two strength categories according to the National Standard of Iran with the specifications of the following table and are used in non-load-bearing walls .

Resistance category	Special compressive strength lb/in^2 (MPa)	Dry volumetric mass lb/ft^3 (kg/m^3)	Density range lb/ft^3 (kg/m^3)
AAC 2.0	290(2.0)	25(400) 31(500)	22(350)-28(450) 28(450)-34(550)
AAC 4.0	580(4.0)	31(500) 37(600)	28(450)-34(550) 34(550)-41(650)

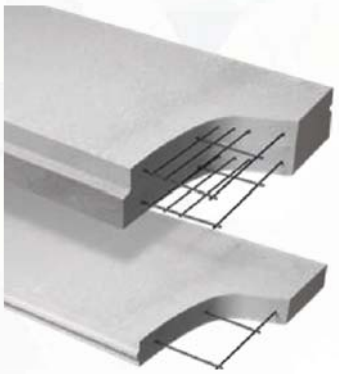
TBLEX Blocks Specifications

Row	Product Name	Block dimensions (Cm)	Capacity of each pallet (Cubic meters)	Capacity of each pallet (Square meter)	Number in each pallet (number)	Approximate dry weight of the block (kg)	Weight of each block with the common moisture of%20	Available number of blocks per cubic meter
1	TBLEX	60×25×7.5	1.8	24	160	5.74	6.9	89
2		60×25×10	1.8	18	120	7.65	9.2	67
3		60×25×12.5	1.8	14.4	96	9.56	11.5	53
4		60×25×15	1.8	12	80	11.5	13.8	44
5		60×25×17.5	1.8	10.35	69	13.4	16	38
6		60×25×20	1.92	9.6	64	15.3	18.36	33
7		60×25×25	1.8	7.2	48	19.1	22.95	27
8		60×25×30	1.8	6	40	22.95	27.55	22

Reinforced Panel

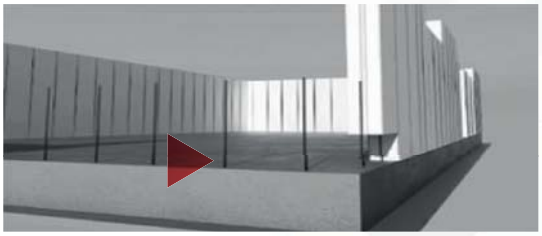
Panels made of aerated concrete are produced in reinforced forms and provided to users in order to withstand the loads on them. The amount of this reinforcement and related calculations are based on valid standards and regulations. In fact, reinforced panels, in addition to autoclaved aerated concrete, have armatures in order to increase strength and they also have all the technical advantages of AAC concrete.

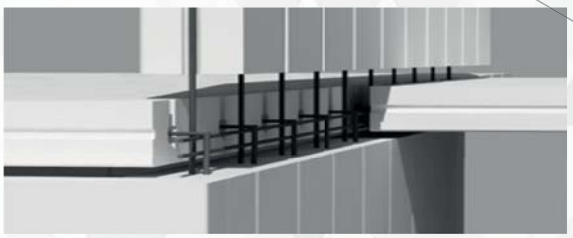
The use of this type of panels made of aerated concrete in interior and exterior non-load-bearing walls, as well as ceillings is allowed and their mechanical and physical properties must meet the requirements of the Iranian National Standard (if the relevant standard is not set, then it will be based on the EN Standard).



There is a tongue and groove on both sides of these products, which accelerates installation and results in more resistance. By using these walls, installation costs, including manpower and building materials, can be reduced by at least 35%.

The producible sizes in TBLEX company is 60 cm width and different length and thickness based on the customer's order .





Prepared Dry mortar

The use of construction mortars is an integral part of the construction process that has been common for a long time. Due to the problems of traditional mortars such as variable quality of raw materials, impossibility of correction in case of incorrect mixing of materials and risk of the scale control and impossibility of adding additives, dry mortar is used for connecting aerated concrete pieces including blocks or panels to each other. Also wall leveling mortar could be produced, which is used as a coating for surface of walls made with AAC. Other applications of this product, are concrete sealing and repairing concrete pieces.

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Better Foundation for Building

Advantages of Prepared Dry Mortar

- Final quality control of dry mortar produced in the factory to comply with various National and International Standards
- Consumption in the desired and required amount
- Higher quality of construction and increase the lifetime of the building
- Reducing human error
- Reducing construction costs
- Efficiency in run time and building construction speed up
- The lowest amount of waste
- High dry speed
- Easy to use
- High pressure and tension bearing
- Efficiency in cement consumption
- Taking the least space in the construction working-place
- Easy transportation

Technical Advantages of TBLEX Blocks

- Lightweight and resistant
- Fire-resistant
- Sound insulation
- Thermal insulation (Energy-efficiency)
- Speed and ease of installation
- Eco-friendly
- Waterproof and frost resistant
- Increasing the interior space of the building
- Durable without the need for repairs
- Cost-saving (transportation and installation)
- Impossibility of animal penetration
- Possibility of production based on customer's order

TBLEX Light & Resistant

Lightening of building is one of the main concerns of earthquake-prone countries such as Iran. Lightening the building by using TBLEX blocks reduces the weight of building by 30% in skeleton weight and also 25% of the mortar used during installation, in addition to reducing the destructive forces of the earthquake, leads to a reduction of costs by 30%.

The reason for the lightness of this product is the porous structure created in its constituent concrete, so that 80% of the air inside the primary mortar is retained and the density is reduced to less than 500kg/m.

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Materials / Thickness	Brick	Clay block	AAC
10cm	260	160	80
20cm	450	250	160
30cm	635	335	240

Comparison table of different wall weights (Kg/m^2)

TBLEX Fire-resistant

Resistant to fire is expressed in terms of the number of hours that materials can withstand a standard fire, and its called the degree of firefighting (UL), which is one of the most stringent available building standards .

TBLEX blocks have a good performance against fire, one of the main reasons for which is high resistance to heat transfer due to the use of non-flammable raw materials. One of the main raw materials used is Silica. Silica increases the melting temperature sharply, and acts as insulation against heat, so that the heat flow rate in this type of block is approximately 3cm per hour.

TBLEX block is not only more resistant to fire than other materials, it also does not emit harmful gas and is able to withstand extreme temperatures up to 1200°C and has the highest degree in terms of UL between construction materials .

In the fire resistance test, a wall with a thickness of 20cm made of AAC blocks examined and torches retained the temperature at 1200°C. On the other side there was no increase in temperature up to two hours and after 4 hours, the temperature was increased only to 75°C.

Thickness	7.5cm	10cm	15cm
Fire resistance	3 Hours	4 Hours	5 hours

AAC Wall Fire-resistance Table

TBLEX as Sound Insulation

Noise pollution in machine life and big cities has deprived people of comfort. Therefore, materials should be used in construction that lead to reducing noise pollution in offices, educational, health and residential buildings, because noise control in the building has a great impact on the health and tranquility of residents .AAC blocks, due to the molecular and porous structure, are highly sound absorbing and with a reduction of 50 decibels of sound intensity are categorized in the" Very Good" insulation rank of ASTM Standard.

Thickness	10cm	15cm	20cm
The amount of sound absorption	39 dB	44 dB	50 dB
Type of sound insulation	Good and Very Good border	Very Good	Excellent

AAC Block Sound Absorption with different thickness

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Cost-saving in Construction

Energy-efficiency by TBLEX

Thermal insulations contain materials that effectively reduce the transfer of heat and cold from one environment to another and in the building, are more important in the perimeter walls that are in direct contact with the outside air, than the inner walls.

TBLEX blocks have good heat insulation properties due to their large number of air-filled cells. The heat transfer coefficient of this type of concrete is about 10% of ordinary concrete. Also, the thermal resistance of the wall made with TBLEX blocks is about 3 times of similar walls made with clay blocks .

- Advantages of thermal insulation of buildings

. Energy-efficiency and Cost-saving

. Creating suitable thermal conditions inside the building, even in very hot and very cold weather conditions

. Environmental protection of the building against climate changes

. Reducing energy consumption, which in addition to cost-savings, it reduces heat emissions in the atmosphere and global warming

. Reduction of the quantity of required cooling and heating equipments by 50%

Faster Construction by TBLEX

Due to its low weight, ease and accuracy of the connection between the blocks and elimination of some procedures, such as initial plastering on the walls, the pace of building construction in this method will increase up to 3 times.

TBLEX blocks are easy to cut, modify and shape, as well as easily screwed into and allowing for a very small diameter path for electronic ducts and piping. This flexibility is an important feature and makes installation, design, construction and configuration easy in all areas of construction.

Thickness / Materials	Brick	Clay block	AAC
10cm	15	30	40
20cm	10	20	25
30cm	5	-	20

Comparison table of the implementation of different walls in terms of square meters by an executive team in a working day

TBLEX Eco-friendly

• Environmental Benefits of TBLEX Blocks

- No use of clay in the production: due to the fact that clay is more appropriate for the agriculture and farms, the use of this product prevents the excessive destruction of soil and improper consumption.

-No construction waste: the use of other traditional products generates a significant volume of construction waste that in addition to loss cost and wasting time, has environmental harm.

-Reduction of air pollution: due to the high thermal resistance followed by reduction in fuel consumption for heating and cooling, air pollution is largely prevented.

- Recycling: the waste of some industries can be used as a raw material to produce this product.

- Non-spoilage: due to the constituents of the blocks, this product is long lasting and does not spoil, and because it is based on inorganic materials, its properties and nature would not change. No mold appears on it and it is not a suitable place for microorganisms, so insects (such as ants, beetles, etc) do not nest or lay eggs in it.

Maintenance and Execution of TBLEX Blocks Manual

1. Unload the blocks with an appropriate vehicle
2. Covers should be removed one day before installation (in a dry environment)
3. Pallets and dry mortar should be stored in nearest place to the project
4. Mortar should be stored in a dry place
5. Prepare the required amount of mortar according to the instructions on the package and continue mixing until the air is omitted
6. Before starting the installation, the surface should be smoothed and leveled with mortar
7. Apply a layer of waterproofing up to 30 cm from the floor before applying the mortar
8. After installing each block, its surface should be cleaned and the vertical surface of the block should be glued
9. It is essential to precisely control the first row
10. Implement the main rows first
11. To prevent the effects of earthquakes and the expansion and contraction effects, the walls should be placed at a distance of 1cm from the columns, beams and concrete walls and connected to the structure with metal straps at a distance of one to three blocks (vertical and horizontal). Materials such as retarded plaster can be used to fill the gaps
12. Avoid slipping the block and clean the extra mortar with a trowel
13. Vertical seams should not be placed along each other
14. Side walls are installed with a thickness less than the main walls and with a distance of 1cm from it (they are connected to the main wall using steel strips)

• While the blocks do not transfer the moisture, the block surface absorbs more water compared to similar materials. Therefore, when using this blocks (dry place) the following points must be considered:

- Before implementation, the block must be thoroughly wet (drowned in water)
- After implementation, if possible, make the walls wet

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Autoclaved Aerated Concrete

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