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GREEN
AAC BLOCK

Build Strong, Last Long

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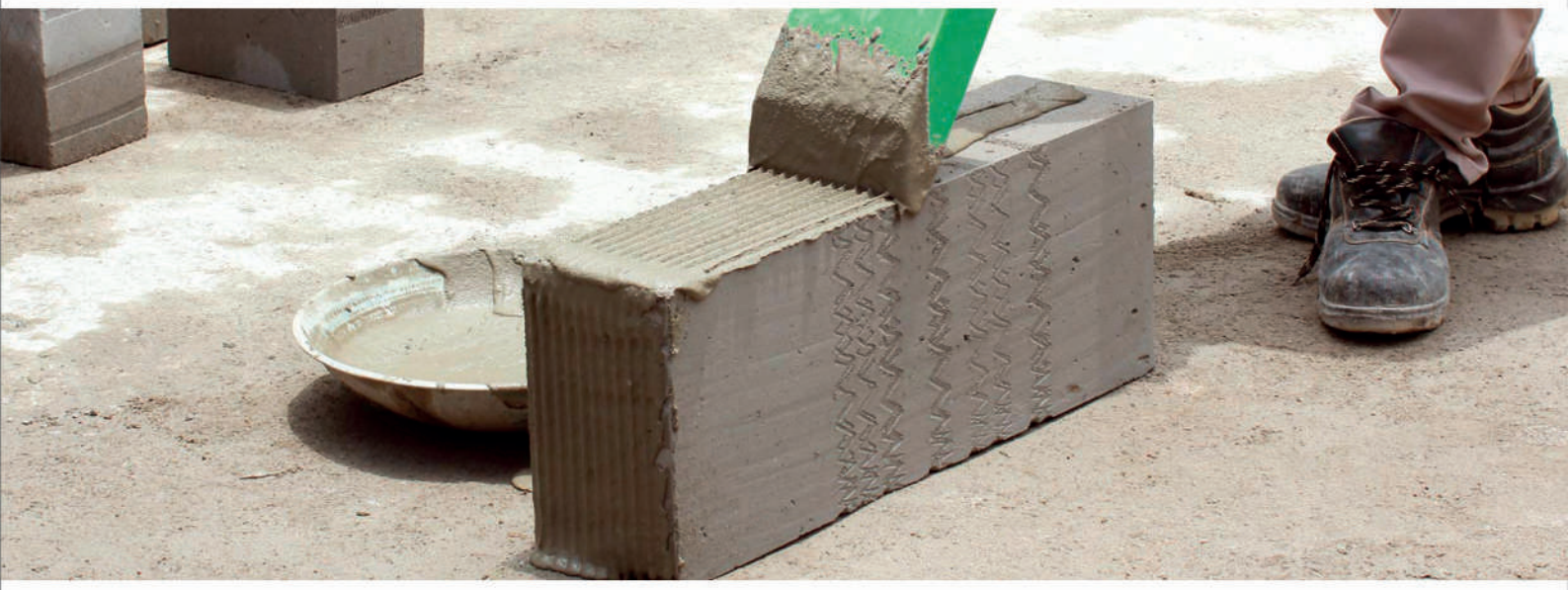


Welcome to the Green Block Catalogue

The fact that you are leafing through this booklet shows that you are a smart entrepreneur! Thank you for contemplating Green Block for your varied construction needs.

In today's competitive, tough economic climate, every business or construction company is compelled to optimize costs without compromising on quality, efficiency and speed in their projects. Towards this end, Green Block turns out to be the best material of choice endowed with many superlative properties. It is an economical, eco-friendly, reliable and long-lasting option that adds value to the construction in several ways.

Green Block is available in multiple configurations of dimensions, thickness and strength. Kindly review the Technical Chart to select the best option for your construction activity.

Just in case you need any assistance, our friendly experts are available to guide you with your selection.

Company Profile

**The passion to excel,
The vision to lead, and
The desire to make a
positive difference...**

This is the philosophy that is steering the K D Group towards a new horizon of success.

The KD Group of Industries prides to be a major enterprise in the North Eastern region of India. It is a growing conglomerate with a deep footprint in the Cement, Steel, Metallurgical Coke and Real Estate verticals.

The Group aims to be at the leading edge of growth in the NE region; it is a consortium backed by state-of-the-art production units, a strong dealer network and a loyal customer base.

Leveraging our extensive expertise in the building material industry, the Group has launched a new line of Autoclaved Aerated Blocks (AAC) by the brand name Green Block.

The launch of Green Block symbolizes a positive step in the direction of sustainable development. By bringing this brand into the market, we seek to give a boost to eco-sensitive, green construction practices.

Our Vision and Mission

To enrich our market dominance through strategic acquisitions and expansions.

To give best value for money to customers by nurturing a culture of quality, reliability and commitment.

Peeping into the past

The history of AAC Blocks

AAC Block is produced from inorganic materials – lime, sand, cement and water and offers multiple benefits over conventional building materials. To list out only a few advantages, it has excellent thermal and acoustic insulation and great workability.

Autoclaved Aerated Concrete (AAC) is a lightweight, precast building material that simultaneously provides structure, insulation, and fire- and mold-resistance. AAC products include blocks, wall panels, floor and roof panels, cladding (facade) panels and lintels.

It is indeed interesting to understand AAC Blocks from a historical perspective.

AAC was perfected in the mid-1920s by the Swedish architect Dr. Johan Axel Eriksson, working with Professor Henrik Kreüger at the Royal Institute of Technology. Eriksson was searching for material with the properties of wood – good thermal insulation, solid structure, easy to work with & handle – but without the disadvantages of combustibility, decay and termite damage. After much experimenting, Eriksson succeeded in developing AAC, which went into commercial production in a factory in Sweden in 1929 and gained popularity over the decades.

Today, AAC is manufactured by about 1000 plants in 35 countries and is extensively used in residential, commercial and industrial construction for more than 70 years.

Engineered for perfection

The step-wise making of AAC Blocks

1. Dosing and mixing of fly ash with lime, Ordinary Portland Cement (OPC), stabilizers and gypsum at a high dosing speed at very high accuracy.

2. Casting and rising/pre-curing of the mixture to enable the fresh mix to rise and harden to a firm green cake with the volume of the mould.

3. Tilting mould cakes with the tilt manipulator on to a cutter machine and oiling to prevent the sticking of the green cakes for reuse.

4. Horizontal and cross-cutting the cakes by cutter which are equipped with broken-wire-detection system.

5. Milling and back tilting onto a cooking frame.

6. Green separation of cut cakes by passing through the green separator to avoid sticking of cut layers during autoclaving and eliminating further mechanical separation in white state.

7. Curing with a steam at pressure of approximately 12 Bar in autoclave system for 12-hour period.

8. Buffering and de-stacking of hardened cakes from the cooking frames to the packaging line for final packaging.

Our state-of-the-art set up

GREEN BLOCK FOR THE HOUSEHOLD SEGMENT

More safety, better comfort and greater elegance

Minimizing Earthquake Damage

AAC Blocks are the ideal building material for constructing earthquake-resistant, steady & safe buildings. Owing to their excellent load-bearing capacity, compressive strength and high ductility, such structures can better withstand tremors and shocks.

Green Block confirms to Seismic Zone IV & V statutory requirements.

Generally speaking, the seismic performance of AAC Blocks was clearly demonstrated when a major earthquake hit the Kobe region of Japan in 1995; buildings made out of AAC Blocks suffered minimal damage and also did not allow fire to spread rapidly.

Superb thermal efficiency

As Green Block is characterized by superior thermal insulation, these blocks enable to maintain optimal ambient temperature; the air inside is warm during winters and cool during summers. Residents end up with around 30% saving in AC costs.

Key highlights

- No need for insulation
- Low heat transfer rate
- Superior to traditional wood & masonry structures

Low Water Penetration

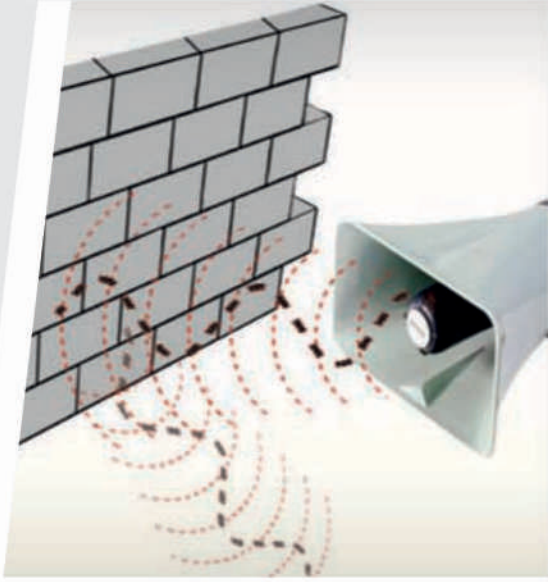
Compared to conventional clay bricks, Green Block has lesser capillary action resulting in lower water retention. Hence rainwater water/ dampness from the outside does not seep inside. They are ideally suited for areas with heavy rainfall and high humidity.

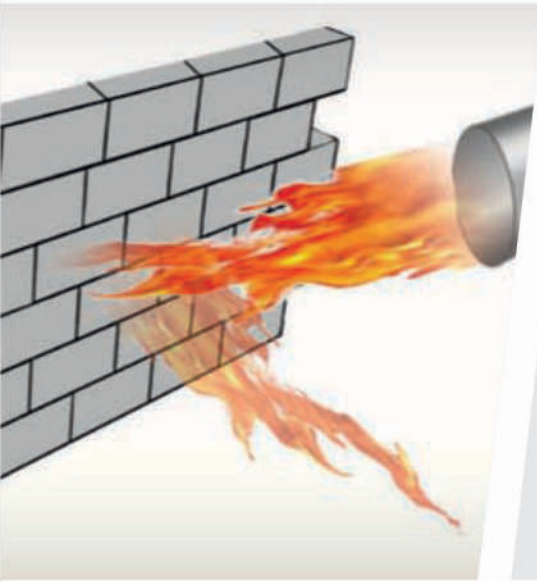
Higher Acoustic Insulation

Green Block is endowed with amazing sound insulation properties because of their inherent porous structure. This makes them the ideal building material for residential construction as well as silence zones, such as hospitals, schools, auditoriums, studios, etc.

Key highlights

- Excellent sound shielding at no extra cost
- Shields external irritable sounds, such as machinery & equipment
- Offers more privacy & peace for residents





When safety is an issue, Green Block takes the heat

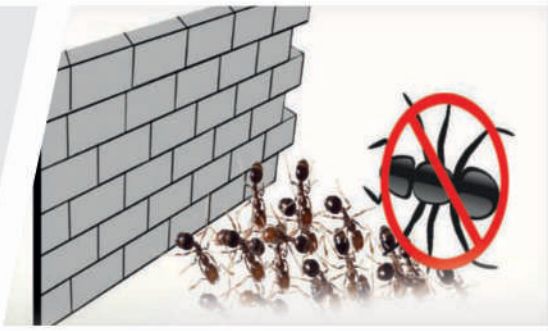
A unique property of Green Block is that it contains water in crystalline form, which acts as a heat sink, absorbing heat and converting it into steam. The Green Block structure allows this steam to escape without causing surface spalling.

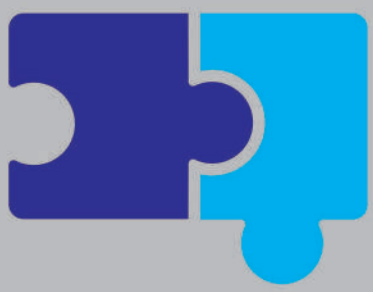
Key highlights

- Excellent fire-resistance
- Ability to withstand fire from 2 hours up to 6 hours
- No toxins/harmful gases emitted when fire breaks out

Better Pest Resistance:

Green Block is made from inorganic, non-biodegradable materials that do not allow termites/pests to inhabit or grow within its structure.





Amazing Adaptability

Owing to its inherent nature and structure, Green Block brings incredible flexibility to the design of a building, which is simply not possible with traditional materials.

Key highlights

- Practically infinite workability
- Hassle-free manipulation (sawing, drilling, etc.)
- Amenable to quick & easy field adjustments
- Blocks available without or without handholds
- Ideal for all terrains & climatic conditions – humid, dry, wet and cold

GREEN BLOCK FOR THE CONSTRUCTION COMMUNITY

Style, speed, convenience and cost control

Workability:
Green Block units can be handled with greater ease and comfort, making them more convenient than regular clay bricks.

Speedy construction:
Green Block units enable rapid construction owing to their large size, fewer joints, hassle-free handling and easy manipulation (such as cutting & sawing).
Due to reduced turnaround time, construction companies can take up and complete more projects, resulting in improved business.

Superior finish:
Perfect shape & size of Green Block and better surface smoothness lead to well-aligned walls along with a pleasant finish to the building.

Higher carpet area:
Attributes of Green Block such as high dimensional accuracy and reduced plaster thickness result in an increase of 2% carpet area.

Greater material efficiency:
Being lightweight than conventional clay bricks, Green Block significantly lowers the dead weight of the structure by 50%, which leads to lesser consumption of cement & steel (15 t0 20%).

Quicker application of finishes:
Since AAC compatible finishes can usually be directly applied with spray equipment in a one-coat application, the time associated with finishing the building is minimized. Many products can also be specified with integral colour, eliminating the costs and time associated with painting.

Substantial cost savings:

Green Block results in cost-optimized, high quality construction due to:

1. Lower Logistics Costs

Due to the low weight of ACC products, the capacity for transporting the material is maximized and related freight costs reduced.

2. Quicker Construction

The large size of the block allows much higher productivity than most materials. Construction crews can complete their work and move to the next project.

3. Reduce Finish Material Costs

Because of the fire, thermal, acoustic, and surface properties, finish materials such as insulation are not needed, Smaller AC Systems are usually possible when using AAC material.

4. Quicker Application of Finishes

Since AAC compatible finishes can usually be directly applied with spray equipment in a one-coat application, the time associated with finishing the building is minimized. Many products can also be specified with integral color, eliminating the costs and time associated with painting.

5. Lower Life cycle Cost

The durability of the AAC Block minimizes ongoing maintenance and repair costs normally associated with conventional construction.

6. Lesser structural steel requirement

Due to light weight and low density, overall dead load reduces, thus saving structural steel consumption compared to conventional masonry.

7. Reduced mortar Use/Low Cement Consumption

This sheet is part of a series highlighting alternative design details which use less materials or result in less waste being created than 'standard' details used in construction. The benefits provided by the alternative design detail are quantified, and technical considerations presented.

70% lighter than standard concrete blocks.

- Up to 80% less mortar - sets within 20 minutes.
- Construction times can be equivalent to off site methods.
- Modest extra cost of materials is off set by low waste and waste disposal.
- 21% less embodied carbon than standard blocks of the same size.

8. Reduce Internal Plaster Cost

AAC blocks are factory finished with precise edges & shapes, this result in economical POP or Putty finish and much reduced plaster cost.

9. Enhanced Labor Output

If you are using the AAC blocks for construction then you can make your home within a short time. These blocks can reduce the project time to almost 40%, and you can save the labor cost in the same way.

Energy conservation – higher energy efficiency & lesser carbon emission:

AAC Block has excellent thermal insulation and thermal storage capacity. These properties reduce energy requirement for both heating and cooling. In locations where off-peak energy rates are high, the thermal mass characteristics allow more of the air conditioning load to take place in lower cost periods of the day. It is fire and pest resistant, while still being environmentally responsible – real peace of mind for your customers and you.

Maintenance & Operations:

AAC material is inorganic and resistant to insect damage or infiltration. Since AAC is a solid material, there are no voids in the construction that present an opportunity for insects and pest inhabitation. Hence costs for pest control & treatment can be substantially reduced, if not eliminated.

GREEN BLOCK FOR THE SOCIETY AT LARGE

Enables soil conservation, reduces pollution, optimizes logistic cost and effectively increases carpet area

- **Saves fertile land:** Fly ash waste generated in thermal power plants is used in making Green AAC Block. Unlike red brick manufacturing, it does not require fertile clay; it thus helps in conserving soil and safeguarding the environment.
  Also, we dig up sand from the Brahmaputra River and use it in the manufacturing of AAC Block. Due to this the depth of the River increases and it stays its course, preventing from spilling over and causing floods in adjoining areas.

- **Recycling fly ash waste:**
  After hydro power, we are still largely dependent on thermal power, which presents a huge challenge of effectively disposing fly ash waste, which is precisely the major raw material for AAC Blocks.

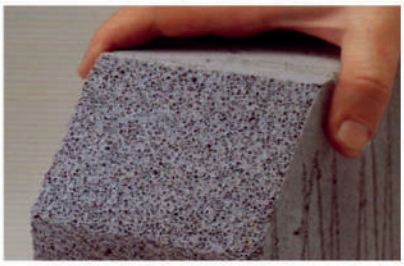
- **Energy efficient- reduces carbon emission:**
  The manufacturing of Green AAC Block is a highly energy efficient process compared to the production of other walling material, which again helps to reduce carbon emission.

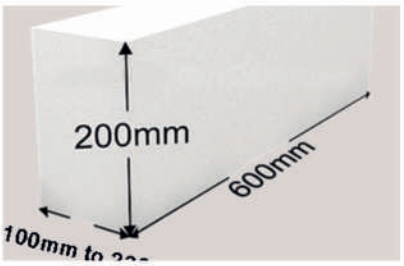
- **Saves fuel for transportation – lowers transportation cost:**
  Green AAC Blocks being lightweight, more volume of walling material (almost 3 times higher) can be transported in the same carrier, thus saving fuel for transportation by a staggering 66%.

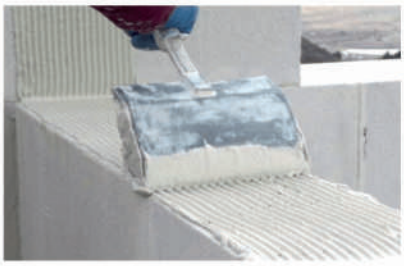
- **Green Building Certificates:**
  Because of the above social and environmental benefits, it is the material of choice for green building certifying organizations such as LEED, IGBC, BREEAM, DGNB, CASBEE, etc.

Technical Parameter

Parameters	Unit	Value Block	Value Brick
Size: Length x Height	mm	600 x 200 or 625 x 240	225 x 75
Size: Thickness	mm	50,75,100,150,200,225,300	105
Dry Density	Kg/M3	550-650	1900-2000
Compressive Strength	Kg/cm2	<3	<3
Thermal Conductivity	W/KOM	0.16 to 0.18	0.81 to 0.96
Size variation	mm	+1mm	+10mm







Project Impact

Cost Element	(X)Saving Element	(X)Projected Impact
Steel & Concrete	10	5
carpet Area	1.5	3
Plastering Mortar	35	2
Joining Mortar	60	1
Wastages	10	0.5
Capex of HVAC System	30	0.3
Project Saving		11.8

Comparison

Comparison between AAC Blocks, Clay Bricks		
Parameters	**AAC Block**	**Clay Bricks**
Size	625 mm x 240 mm x 50-300 mm	230 mm x 115 mm x 75 mm
Precision in Size	Variation 1.5 mm ±	Variation 5 mm ±
Compressive Strength	30 - 40 kg/cm^2	25 - 30 kg/cm^2
Dry density	551-650 kg/M^3 (oven dry)	1950 kg/M^3
Wet density	Approx 800-900kg/M^3	Approx 2400kg/M^3
Wastage	upto 5%	upto 20%
Baking	Done in Autoclaves with high pressure steam ready in 12 hours	Done in clay kilns
Fire Resistance	upto 6 hours for 200 mm thickness	2 hour
Sound Reduction (DB)	upto 45 for 200 mm thick wall	50 for 230 mm thick wall
Thermal conductivity	Approx 0.16-0.25	Approx 0.81
Surface quality (fungus problems)	None, Smooth clean finish with no fungus	Fungus and salinity problems on the surface
Adaption to various surface finishes	Smoother surface results in better coating application	Inconsistent surface
Mortar consumption	0.018 per M^2 with 1.6/0.5% Bag of cement	0.1 per M^2 with 1.6/1.35% Bag of cement
Consumption Time	Reduced by upto 50% compared to clay bricks	Double AAC Blocks
Energy Saving	32% (App.) Air-Condition load heating and cooling come down	No Saving
Cost benefit factor	dead load reduce structural cost	No Saving
Contribution to Carpet area	2-3%	No Saving
Chemical Composition	Fly Ash used in 50% which reacts with (Lime & Cement) to form AAC which is an inert material	Soil is used which contains many inorganic impurities like sulphates etc. which results in Efflorescence

Technical Specification

Technical Specification			
Property	Units	AAC Block	Clay Brick
Size	mm	600 x 200 x (75 to 300)	230 x 75 x 110
Size Tolerance	mm	± 5mm in length* ± 3mm in width & height	± 05 to 15
Compressive Strength	N/mm^2	Min 4.0*	2.5 to 3.5
Normal Dry (Oven Dry) Density	Kg/m^3	551 to 650*	1800
Normal Conductivity "K"	W/m-k	Max 0.24*	0.81
Drying Shrinkage	%	Max 0.05*	-
Fire Resistance	Hrs.	2 to 6 (Depending on thickness)	2
Sound Reduction Index	Db	45 for 200 mm thick wall	-

* As per IS2185 Part 3

Comparison between AAC Block and Clay Brick		
Parameter	AAC Block	Clay Brick
Structural Cost	Steel saving upto 15%	No saving
Cement Mortar for Plaster & Masonry	Required Less due to flat even surface and less number of joints	Requires more due to Irregular surface and more number of joints
Breakage	Less than 2%	Average 10 to 12%
Construction Speed	Speedy construction due to its big size light weight and easy to cut in any size or shape	Comparatively slow
Quality	Uniform & Consistent	Normally varies
Fitting & Chasing	All kind of fitting and chasing possible	All kind of fitting and chasing possible
Carpet Area	More due to less thickness of walling material	Comparatively Less
Energy Saving	Approx. 30% reduction in air-conditioned Load	No such saving
Chemical Composition	Flyash used around: 65 to 68% which reacts with lime and cement to form AAC	Soil used contains many inorganic impurities like sulphate etc. resulting in efflorescence

Calculation Sheet				
Length (mm)	Height (mm)	Width (mm)	No of Pcs (per m^3)	Work in Sq.ft.** (per m^2)
600	200	100	83.33	116.33
600	200	125	66.67	93.07
600	200	150	55.56	77.56
600	200	200	41.67	58.17
600	200	230	36.33	50.58

** Assumption: 12 mm Mortar Thickness

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